CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H01 ELECTRIC ELEMENTS

(NOTES omitted)

H01L SEMICONDUCTOR DEVICES NOT COVERED BY CLASS H10 (use of semiconductor devices for measuring G01; resistors in general H01C; magnets, inductors or transformers H01F; capacitors in general H01G; electrolytic devices H01G 9/00; batteries or accumulators H01M; waveguides, resonators or lines of the waveguide type H01P; line connectors or current collectors H01R; stimulated-emission devices H01S; electromechanical resonators H03H; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R; electric light sources in general H05B; printed circuits, hybrid circuits, casings or constructional details of electrical apparatus, manufacture of assemblages of electrical components H05K; use of semiconductor devices in circuits having a particular application, see the subclass for the application)

NOTES

1. This subclass is residual to class H10.
2. This subclass covers:
   - semiconductor devices for rectifying, amplifying, oscillating or switching; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
   - semiconductor devices sensitive to radiation; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
   - semiconductor devices for light emission; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
   - processes or apparatus for the manufacture or treatment of semiconductor or solid-state devices where the type of device is not listed under bullets 1 to 3, above, or not essential;
   - constructional details or arrangements of semiconductor or solid-state devices not covered by class H10 and not specific to types of devices listed under bullets 1 to 3, above;
   - packaging or assembling of semiconductor or solid-state devices covered by this subclass or by class H10.
3. In this subclass, the following terms or expressions are used with the meaning indicated:
   - "wafer" means a slice of semiconductor or crystalline substrate material, which can be modified by impurity diffusion (doping), ion implantation or epitaxy, and whose active surface can be processed into arrays of discrete components or integrated circuits;
   - "solid state body" means the body of material within which, or at the surface of which, the physical effects characteristic of the device occur;
   - "electrode" is a region in or on the body of the device (other than the solid state body itself), which exerts an electrical influence on the solid state body, irrespective of whether or not an external electrical connection is made thereto. An electrode may include several portions and the term includes metallic regions which exert influence on the solid state body through an insulating region (e.g. capacitive coupling) and inductive coupling arrangements to the body. The dielectric region in a capacitive arrangement is regarded as part of the electrode. In arrangements including several portions, only those portions which exert an influence on the solid state body by virtue of their shape, size, or disposition or the material of which they are formed are considered to be part of the electrode. The other portions are considered to be "arrangements for conducting electric current to or from the solid state body" or "interconnections between solid state components formed in or on a common substrate", i.e. leads;
   - "device" means an electric circuit element; where an electric circuit element is one of a plurality of elements formed in or on a common substrate; it is referred to as a "component";
   - "complete device" is a device in its fully assembled state which may or may not require further treatment, e.g. electroforming, before it is ready for use but which does not require the addition of further structural units;
   - "parts" includes all structural units which are included in a complete device;
   - "container" is an enclosure forming part of the complete device and is essentially a solid construction in which the body of the device is placed, or which is formed around the body without forming an intimate layer thereon. An enclosure which consists of one or more layers formed on the body and in intimate contact therewith is referred to as an "encapsulation";
   - "integrated circuit" is a device where all components, e.g. diodes or resistors, are built up on a common substrate and form the device including interconnections between the components;
   - "assembly" of a device is the building up of the device from its constructional units; the term covers the provision of fillings in containers.

H01L
(continued)

4. In this subclass, both the process or apparatus for the manufacture or treatment of a device and the device itself are classified, whenever both of these are described sufficiently to be of interest.
5. Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the Periodic Table of chemical elements the CPC refers. In this subclass, the system used is the 8 group system, indicated by Roman numerals in the Periodic Table thereunder.

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

H01L 21/301	covered by	H01L 21/30
H01L 21/328	covered by	H01L 29/66075
H01L 21/329	covered by	H01L 29/66083
H01L 21/33	covered by	H01L 29/66227
H01L 21/331	covered by	H01L 29/66234
H01L 21/332	covered by	H01L 29/66363
H01L 21/334	covered by	H01L 29/66075
H01L 21/335	covered by	H01L 29/66409
H01L 21/336	covered by	H01L 29/66477
H01L 21/337	covered by	H01L 29/66893
H01L 21/338	covered by	H01L 29/66848
H01L 21/339	covered by	H01L 29/66946
H01L 21/36-H01L 21/368	covered by	H01L 21/02107
H01L 21/58	covered by	H01L 24/80
H01L 21/66	covered by	H01L 22/00
H01L 21/98	covered by	H01L 25/50
H01L 29/38	covered by	H01L 29/04-H01L 29/365
H01L 29/96	covered by	H01L 29/68-H01L 29/945

2. {In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.}

21/00 **Processes or apparatus adapted for the manufacture or treatment of semiconductor or solid state devices or of parts thereof**

21/02 . Manufacture or treatment of semiconductor devices or of parts thereof

21/02002 . . {Preparing wafers}

NOTES

1. This group covers processes for manufacturing wafers prior to the fabrication of any device, i.e. between the sawing of ingots (covered by B28D) and the cleaning of substrates (covered by H01L 21/02041).
2. This group does not cover:
   - simple use of grinding or polishing machines B24B
   - thermal smoothening H01L 21/324

21/02005 . . . {Preparing bulk and homogeneous wafers}
21/02008 . . . . {Multistep processes}
21/0201 . . . . . {Specific process step}
21/02013 . . . . . {Grinding, lapping}
21/02016 . . . . . {Backside treatment}
21/02019 . . . . . {Chemical etching}
21/02021 . . . . . {Edge treatment, chamfering}
21/02024 . . . . . {Mirror polishing}
21/02027 . . . . {Setting crystal orientation}
21/0203 . . . . {Making porous regions on the surface}
21/02032 . . . . {by reclaiming or re-processing}
21/02035 . . . . {Shaping}
21/02041 . . {Cleaning}
21/02043 . . . {Cleaning before device manufacture, i.e. Begin-Of-Line process}
21/02046 . . . . {Dry cleaning only (H01L 21/02085 takes precedence)}
21/02049 . . . . . {with gaseous HF}
21/02052 . . . . {Wet cleaning only (H01L 21/02085 takes precedence)}
21/02054 . . . . {combining dry and wet cleaning steps (H01L 21/02085 takes precedence)}
21/02057 . . . {Cleaning during device manufacture}
21/0206 . . . . {during, before or after processing of insulating layers}
21/02063 . . . . . {the processing being the formation of vias or contact holes}
21/02065 . . . . . {the processing being a planarization of insulating layers}
21/02068 . . . . {during, before or after processing of conductive layers, e.g. polysilicon or amorphous silicon layers}
21/02071 . . . . . {the processing being a delineation, e.g. RIE, of conductive layers}
21/02074 . . . . . {the processing being a planarization of conductive layers}
21/02076 . . . {Cleaning after the substrates have been singulated}
21/02079 . . . {Cleaning for reclaiming}
21/02082 . . . {product to be cleaned}
21/02085 . . . . {Cleaning of diamond}
21/02087 . . . . {Cleaning of wafer edges}
21/0209 . . . . {Cleaning of wafer backside}
21/02093 . . . . {Cleaning of porous materials}
21/02096 . . . {only mechanical cleaning}
21/02098 . . . {only involving lasers, e.g. laser ablation}
21/02101 . . . {only involving supercritical fluids}

21/02104 . . {Forming layers (deposition in general C23C; crystal growth in general C30B)}

WARNING

Groups H01L 21/02104 – H01L 21/02694 are incomplete pending reclassification of documents from groups H01L 21/06, H01L 21/16, and H01L 21/20.

Groups H01L 21/02104 – H01L 21/02694, H01L 21/06, H01L 21/20,and H01L 21/16 should be considered in order to perform a complete search.

21/02107 . . . {Forming insulating materials on a substrate}

WARNING

Groups H01L 21/02107 – H01L 21/02326 are incomplete pending reclassification of documents from groups H01L 21/312, H01L 21/314, H01L 21/316, and H01L 21/318.

Groups H01L 21/02107 – H01L 21/02326, H01L 21/312, H01L 21/314, H01L 21/316, and H01L 21/318 should be considered in order to perform a complete search.

21/02109 . . . . {characterised by the type of layer, e.g. type of material, porous/non-porous, pre-cursors, mixtures or laminates}

21/02112 . . . . . {characterised by the material of the layer}

NOTE

Layers comprising sublayers, i.e. multi-layers, are additionally classified in H01L 21/022; porous layers are additionally classified in H01L 21/02203

21/02115 . . . . . {the material being carbon, e.g. alpha-C, diamond or hydrogen doped carbon}

21/02118 . . . . . {carbon based polymeric organic or inorganic material, e.g. polyimides, poly cyclobutene or PVC (polymers per se C08G, photoresist per se G03F)}

21/0212 . . . . . {the material being fluoro carbon compounds, e.g.(CFx) n, (CHxFy) n or polytetrafluoroethylene}

21/02123 . . . . . {the material containing silicon}

21/02126 . . . . . {the material containing Si, O, and at least one of H, N, C, F, or other non-metal elements, e.g. SiOC, SiOC:H or SiONC}

21/02129 . . . . . {the material being boron or phosphorus doped silicon oxides, e.g. BPSG, BSG or PSG}

NOTE

Halogen, e.g. fluorine, containing BPSG, PSG, BSG, and the like, are additionally classified in H01L 21/02131

21/02131 . . . . . {the material being halogen doped silicon oxides, e.g. FSG}

21/02134 . . . . . {the material comprising hydrogen silsesquioxane, e.g. HSQ}

21/02137 . . . . . {the material comprising alkyl silsesquioxane, e.g. MSQ}

21/0214 . . . . . {the material being a silicon oxynitride, e.g. SiON or SiON:H}

21/02142 . . . . . {the material containing silicon and at least one metal element, e.g. metal silicate based insulators or metal silicon oxynitrides}

21/02145 . . . . . {the material containing aluminium, e.g. AlSiOx}

21/02148 . . . . . {the material containing hafnium, e.g. HfSiOx or HfSiON}

21/0215 . . . . . {the material containing tantalum, e.g. TaSiOx}

21/02153 . . . . . {the material containing titanium, e.g. TiSiOx}

21/02156 . . . . . {the material containing at least one rare earth element, e.g. silicate of lanthanides, scandium or yttrium}

21/02159 . . . . . {the material containing zirconium, e.g. ZrSiOx}

21/02161 . . . . . {the material containing more than one metal element}

21/02164 . . . . . {the material being a silicon oxide, e.g. SiO_2}

NOTE

The formation of silicon oxide layers is classified in this group regardless of the precursor or of the process of formation; in case of explicit statements on doping, on rest-groups, or on material components see H01L 21/02126 and subgroups; deposition of silicon oxide from organic precursors without further statements on film composition is classified here and in H01L 21/02205 and subgroups

21/02167 . . . . . {the material being a silicon carbide not containing oxygen, e.g. SiC, SiC:H or silicon carbonitrides (H01L 21/02126 and H01L 21/0214 take precedence)}

21/0217 . . . . . {the material being a silicon nitride not containing oxygen, e.g. SixNy or SixByNz (H01L 21/02126 and H01L 21/0214 take precedence)}

21/02172 . . . . . {the material containing at least one metal element, e.g. metal oxides, metal nitrides, metal oxynitrides or metal carbides (materials containing silicon H01L 21/02123; metal silicates H01L 21/02142)}

21/02175 . . . . . {characterised by the metal (H01L 21/02197 takes precedence)}

21/02178 . . . . . {the material containing aluminium, e.g. Al_2O_3}

21/02181 . . . . . {the material containing hafnium, e.g. HfO_2}

21/02183 . . . . . {the material containing tantalum, e.g. Ta_2O_5}

21/02186 . . . . . {the material containing titanium, e.g. TiO_2}

21/02189 . . . . . {the material containing zirconium, e.g. ZrO_2}

21/02192 . . . . . {the material containing at least one rare earth metal element, e.g. oxides of lanthanides, scandium or yttrium}

21/02194 . . . . . {the material containing more than one metal element}

21/02197 . . . . . {the material having a perovskite structure, e.g. $BaTiO_3$}

21/022 . . . . {the layer being a laminate, i.e. composed of sublayers, e.g. stacks of alternating high-k metal oxides (adhesion layers or buffer layers H01L 21/02304, H01L 21/02362)}

21/02203 . . . . {the layer being porous}

21/02205 . . . . {the layer being characterised by the precursor material for deposition}

21/02208 . . . . . {the precursor containing a compound comprising Si}

21/02211 . . . . . {the compound being a silane, e.g. disilane, methylsilane or chlorosilane}

21/02214 . . . . . {the compound comprising silicon and oxygen}

NOTE

This group does not cover mixtures of a silane and oxygen

21/02216 . . . . . {the compound being a molecule comprising at least one silicon-oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane}

21/02219 . . . . . {the compound comprising silicon and nitrogen}

NOTE

This group does not cover mixtures of silane and nitrogen

21/02222 . . . . . {the compound being a silazane}

21/02225 . . . {characterised by the process for the formation of the insulating layer}

21/02227 . . . . {formation by a process other than a deposition process}

NOTE

Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 is additionally classified in H01L 21/02249, H01L 21/02255 and H01L 21/02252, depending on the type of reaction

21/0223 . . . . . {formation by oxidation, e.g. oxidation of the substrate}

21/02233 . . . . . {of the semiconductor substrate or a semiconductor layer}

21/02236 . . . . . {group IV semiconductor}

21/02238 . . . . . {silicon in uncombined form, i.e. pure silicon}

21/02241 . . . . . {III-V semiconductor}

21/02244 . . . . . {of a metallic layer}

21/02247 . . . . . {formation by nitridation, e.g. nitridation of the substrate}

21/02249 . . . . . {formation by combined oxidation and nitridation performed simultaneously}

21/02252 . . . . . {formation by plasma treatment, e.g. plasma oxidation of the substrate (after treatment of an insulating film by plasma H01L 21/3105 and subgroups)}

21/02255 . . . . . {formation by thermal treatment (H01L 21/02252 takes precedence; after treatment of an insulating film H01L 21/3105 and subgroups)}

21/02258 . . . . . {formation by anodic treatment, e.g. anodic oxidation}

21/0226 . . . . {formation by a deposition process (per se C23C)}

21/02263 . . . . . {deposition from the gas or vapour phase}

NOTE

This group and subgroups also cover deposition methods in which the gas or vapour is produced by physical means, e.g. ablation from targets or heating of source material

21/02266 . . . . . {deposition by physical ablation of a target, e.g. sputtering, reactive sputtering, physical vapour deposition or pulsed laser deposition}

21/02269 . . . . . {deposition by thermal evaporation (H01L 21/02293 takes precedence)}

NOTE

Subject matter relating to molecular beam epitaxy is classified in this group

21/02271 . . . . . {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)}

21/02274 . . . . . {in the presence of a plasma [PECVD]}

21/02277 . . . . . {the reactions being activated by other means than plasma or thermal, e.g. photo-CVD}

21/0228 . . . . . {deposition by cyclic CVD, e.g. ALD, ALE, pulsed CVD}

NOTE

Subject matter relating to cyclic plasma CVD is additionally classified in H01L 21/02274

21/02282 . . . . . {liquid deposition, e.g. spin-coating, sol-gel techniques, spray coating}

21/02285 . . . . . {Langmuir-Blodgett techniques}

21/02288 . . . . . {printing, e.g. ink-jet printing (per se B41J)}

21/0229 . . . . . {liquid atomic layer deposition}

21/02293 . . . . . {formation of epitaxial layers by a deposition process (epitaxial growth per se C30B)}

NOTE

Formation of non-epitaxial layers by MBE, ALE, etc. is not covered by this group; for MBE see H01L 21/02269; for ALE see H01L 21/0228

21/02296 . . . . {characterised by the treatment performed before or after the formation of the layer (H01L 21/02227 and subgroups take precedence)}

NOTE

This group and subgroups only cover processes which are directly linked to the layer formation; routine anneals, i.e. thermal treatment without further features like a special atmosphere, presence of a plasma, thermally induced chemical reactions, change of phase (crystal structure) etc. are not classified here; for cleaning see H01L 21/02041 and subgroups; for etching processes see H01L 21/311 and subgroups; for planarization processes see H01L 21/31051 and subgroups; for processes to repair etch damage see H01L 21/3105 and subgroups

21/02299 . . . . . {pre-treatment}

NOTE

This group and subgroups cover treatments to improve adhesion or change the surface termination; for etching see H01L 21/306 and subgroups and H01L 21/311 and subgroups

21/02301 . . . . . {in-situ cleaning}

NOTE

Subject matter relating to the cleaning processes for semiconductor devices in general is covered by H01L 21/02041 and subgroups

21/02304 . . . . . {formation of intermediate layers, e.g. buffer layers, layers to improve adhesion, lattice match or diffusion barriers}

21/02307 . . . . . {treatment by exposure to a liquid}

21/0231 . . . . . {treatment by exposure to electromagnetic radiation, e.g. UV light}

21/02312 . . . . . {treatment by exposure to a gas or vapour}

21/02315 . . . . . {treatment by exposure to a plasma}

21/02318 . . . . . {post-treatment}

NOTE

This group only covers processes that are part of the layer formation; treatments which are performed after completion of the insulating layer are covered by H01L 21/3105 and subgroups

21/02321 . . . . . {introduction of substances into an already existing insulating layer (H01L 21/02227 and subgroups take precedence)}

NOTE

processes like the introduction of phosphorus into silicon oxide by diffusion, or doping of an already existing insulating layer are covered by this group and subgroups; for the method of introduction, see H01L 21/02337, H01L 21/02343, H01L 21/02345 and subgroups

21/02323 . . . . . {introduction of oxygen}

21/02326 . . . . . {into a nitride layer, e.g. changing SiN to SiON}

21/02329 . . . . . {introduction of nitrogen}

21/02332 . . . . . {into an oxide layer, e.g. changing SiO to SiON}

21/02334 . . . . . {in-situ cleaning after layer formation, e.g. removing process residues}

NOTE

Subject matter relating to the cleaning processes for semiconductor devices in general is covered by H01L 21/02041 and subgroups

21/02337 . . . . . {treatment by exposure to a gas or vapour}

21/0234 . . . . . {treatment by exposure to a plasma}

21/02343 . . . . . {treatment by exposure to a liquid}

21/02345 . . . . . {treatment by exposure to radiation, e.g. visible light}

21/02348 . . . . . {treatment by exposure to UV light}

21/02351 . . . . . {treatment by exposure to corpuscular radiation, e.g. exposure to electrons, alpha-particles, protons or ions}

21/02354 . . . . . {using a coherent radiation, e.g. a laser}

21/02356 . . . . . {treatment to change the morphology of the insulating layer, e.g. transformation of an amorphous layer into a crystalline layer}

21/02359 . . . . . {treatment to change the surface groups of the insulating layer}

21/02362 . . . . . {formation of intermediate layers, e.g. capping layers or diffusion barriers}

21/02365 . . . {Forming inorganic semiconducting materials on a substrate (for light-sensitive devices H01L 31/00)}

WARNINGS

1. Group H01L 21/02365 is incomplete pending reclassification of documents from groups H01L 21/06, H01L 21/16 and H01L 21/20.

   Groups H01L 21/06, H01L 21/16, and H01L 21/20 should be considered in order to perform a complete search.

2. Groups H01L 21/02365 - H01L 21/02694 are incomplete pending reclassification of documents from groups H01L 21/2018, H01L 21/2022, H01L 21/2026, H01L 21/203, H01L 21/2033, H01L 21/2036, H01L 21/205, H01L 21/2053, H01L 21/2056, H01L 21/208 and H01L 21/2085.

   All groups listed in this Warning should be considered in order to perform a complete search.

21/02367 . . . . {Substrates}
21/0237 . . . . . {Materials}
21/02373 . . . . . {Group 14 semiconducting materials}
21/02376 . . . . . {Carbon, e.g. diamond-like carbon}
21/02378 . . . . . {Silicon carbide}
21/02381 . . . . . {Silicon, silicon germanium, germanium}
21/02384 . . . . . {including tin}
21/02387 . . . . . {Group 13/15 materials}
21/02389 . . . . . {Nitrides}
21/02392 . . . . . {Phosphides}
21/02395 . . . . . {Arsenides}
21/02398 . . . . . {Antimonides}
21/024 . . . . . {Group 12/16 materials}
21/02403 . . . . . {Oxides}
21/02406 . . . . . {Sulfides}
21/02409 . . . . . {Selenides}
21/02411 . . . . . {Tellurides}
21/02414 . . . . . {Oxide semiconducting materials not being Group 12/16 materials, e.g. ternary compounds}
21/02417 . . . . . {Chalcogenide semiconducting materials not being oxides, e.g. ternary compounds}
21/0242 . . . . . {Crystalline insulating materials}
21/02422 . . . . . {Non-crystalline insulating materials, e.g. glass, polymers}
21/02425 . . . . . {Conductive materials, e.g. metallic silicides}
21/02428 . . . . . {Structure}
21/0243 . . . . . {Surface structure}
21/02433 . . . . . {Crystal orientation}
21/02436 . . . . {Intermediate layers between substrates and deposited layers}
21/02439 . . . . . {Materials}
21/02441 . . . . . {Group 14 semiconducting materials}
21/02444 . . . . . {Carbon, e.g. diamond-like carbon}
21/02447 . . . . . {Silicon carbide}
21/0245 . . . . . {Silicon, silicon germanium, germanium}
21/02452 . . . . . {including tin}
21/02455 . . . . . {Group 13/15 materials}
21/02458 . . . . . {Nitrides}
21/02461 . . . . . {Phosphides}
21/02463 . . . . . {Arsenides}
21/02466 . . . . . {Antimonides}
21/02469 . . . . . {Group 12/16 materials}
21/02472 . . . . . {Oxides}
21/02474 . . . . . {Sulfides}
21/02477 . . . . . {Selenides}
21/0248 . . . . . {Tellurides}
21/02483 . . . . . {Oxide semiconducting materials not being Group 12/16 materials, e.g. ternary compounds}
21/02485 . . . . . {Other chalcogenide semiconducting materials not being oxides, e.g. ternary compounds}
21/02488 . . . . . {Insulating materials}
21/02491 . . . . . {Conductive materials}
21/02494 . . . . {Structure}
21/02496 . . . . . {Layer structure}
21/02499 . . . . . {Monolayers}
21/02502 . . . . . {consisting of two layers}
21/02505 . . . . . {consisting of more than two layers}
21/02507 . . . . . {Alternating layers, e.g. superlattice}
21/0251 . . . . . {Graded layers}
21/02513 . . . . . {Microstructure}
21/02516 . . . . {Crystal orientation}
21/02518 . . . {Deposited layers}
21/02521 . . . . {Materials}
21/02524 . . . . . {Group 14 semiconducting materials}
21/02527 . . . . . {Carbon, e.g. diamond-like carbon}
21/02529 . . . . . {Silicon carbide}
21/02532 . . . . . {Silicon, silicon germanium, germanium}
21/02535 . . . . . {including tin}
21/02538 . . . . . {Group 13/15 materials}
21/0254 . . . . . {Nitrides}
21/02543 . . . . . {Phosphides}
21/02546 . . . . . {Arsenides}
21/02549 . . . . . {Antimonides}
21/02551 . . . . . {Group 12/16 materials}
21/02554 . . . . . {Oxides}
21/02557 . . . . . {Sulfides}
21/0256 . . . . . {Selenides}
21/02562 . . . . . {Tellurides}
21/02565 . . . . . {Oxide semiconducting materials not being Group 12/16 materials, e.g. ternary compounds}
21/02568 . . . . . {Chalcogenide semiconducting materials not being oxides, e.g. ternary compounds}
21/0257 . . . . . {Doping during depositing}
21/02573 . . . . . {Conductivity type}
21/02576 . . . . . {N-type}
21/02579 . . . . . {P-type}
21/02581 . . . . . {Transition metal or rare earth elements}
21/02584 . . . . . {Delta-doping}
21/02587 . . . . . {Structure}
21/0259 . . . . . {Microstructure}

21/02592 . . . . . {amorphous}
21/02595 . . . . . {polycrystalline}
21/02598 . . . . . {monocrystalline}
21/02601 . . . . . {Nanoparticles (fullerenes H10K 85/211)}
21/02603 . . . . . {Nanowires}
21/02606 . . . . . {Nanotubes (carbon nanotubes H10K 85/211)}
21/02609 . . . . . {Crystal orientation}
21/02612 . . . . {Formation types}
21/02614 . . . . . {Transformation of metal, e.g. oxidation, nitridation}
21/02617 . . . . . {Deposition types}
21/0262 . . . . . {Reduction or decomposition of gaseous compounds, e.g. CVD}
21/02623 . . . . . {Liquid deposition}
21/02625 . . . . . {using melted materials}
21/02628 . . . . . {using solutions}
21/02631 . . . . . {Physical deposition at reduced pressure, e.g. MBE, sputtering, evaporation}
21/02634 . . . . . {Homoepitaxy}
21/02636 . . . . . {Selective deposition, e.g. simultaneous growth of mono- and non-monocrystalline semiconductor materials}
21/02639 . . . . . {Preparation of substrate for selective deposition}
21/02642 . . . . . {Mask materials other than SiO_2 or SiN}
21/02645 . . . . . {Seed materials}
21/02647 . . . . . {Lateral overgrowth}
21/0265 . . . . . {Pendeoepitaxy}
21/02653 . . . . . {Vapour-liquid-solid growth}
21/02656 . . . . {Special treatments}
21/02658 . . . . . {Pretreatments (cleaning in general H01L 21/02041)}
21/02661 . . . . . {In-situ cleaning}
21/02664 . . . . . {Aftertreatments (planarisation in general H01L 21/304)}
21/02667 . . . . . {Crystallisation or recrystallisation of non-monocrystalline semiconductor materials, e.g. regrowth}
21/02669 . . . . . {using crystallisation inhibiting elements}
21/02672 . . . . . {using crystallisation enhancing elements}
21/02675 . . . . . {using laser beams}
21/02678 . . . . . {Beam shaping, e.g. using a mask}
21/0268 . . . . . {Shape of mask}
21/02683 . . . . . {Continuous wave laser beam}
21/02686 . . . . . {Pulsed laser beam}
21/02689 . . . . . {using particle beams}
21/02691 . . . . . {Scanning of a beam}
21/02694 . . . . . {Controlling the interface between substrate and epitaxial layer, e.g. by ion implantation followed by annealing}
21/02697 . . . {Forming conducting materials on a substrate}

21/027 . . Making masks on semiconductor bodies for further photolithographic processing not provided for in group H01L 21/18 or H01L 21/34 {(photographic masks or originals per se G03F 1/00; registration or positioning of photographic masks or originals G03F 9/00; photographic cameras G03B; control of position G05D 3/00)}
21/0271 . . . {comprising organic layers}
21/0272 . . . . {for lift-off processes}
21/0273 . . . . {characterised by the treatment of photoresist layers}
21/0274 . . . . . {Photolithographic processes}
21/0275 . . . . . {using lasers}
21/0276 . . . . . {using an anti-reflective coating (anti-reflective coating for lithography in general G03F 7/09)}
21/0277 . . . . . {Electrolithographic processes}
21/0278 . . . . . {Röntgenlithographic or X-ray lithographic processes}
21/0279 . . . . . {Ionlithographic processes}
21/033 . . . comprising inorganic layers
21/0331 . . . . {for lift-off processes}
21/0332 . . . . {characterised by their composition, e.g. multilayer masks, materials}
21/0334 . . . . {characterised by their size, orientation, disposition, behaviour, shape, in horizontal or vertical plane}
21/0335 . . . . . {characterised by their behaviour during the process, e.g. soluble masks, redeposited masks}
21/0337 . . . . . {characterised by the process involved to create the mask, e.g. lift-off masks, sidewalls, or to modify the mask, e.g. pre-treatment, post-treatment}
21/0338 . . . . . {Process specially adapted to improve the resolution of the mask}
21/04 . . the devices having potential barriers, e.g. a PN junction, depletion layer or carrier concentration layer
21/0405 . . . {the devices having semiconductor bodies comprising semiconducting carbon, e.g. diamond, diamond-like carbon (multistep processes for the manufacture of said devices H01L 29/66015)}

NOTE

This group covers passivation

21/041 . . . . {Making n- or p-doped regions}
21/0415 . . . . . {using ion implantation}
21/042 . . . . {Changing their shape, e.g. forming recesses (etching of the semiconductor body H01L 21/302)}
21/0425 . . . . {Making electrodes}
21/043 . . . . . {Ohmic electrodes}
21/0435 . . . . . {Schottky electrodes}
21/044 . . . . . {Conductor-insulator-semiconductor electrodes}
21/0445 . . . {the devices having semiconductor bodies comprising crystalline silicon carbide (multistep processes for the manufacture of said devices H01L 29/66053)}
21/045 . . . . {passivating silicon carbide surfaces}

21/0455 . . . . {Making n or p doped regions or layers, e.g. using diffusion}

21/046 . . . . . {using ion implantation}

NOTE

Processes where ion implantation of boron and subsequent annealing does not produce a p-doped region are classified elsewhere, e.g. H01L 21/0445

21/0465 . . . . . {using masks}

21/047 . . . . . {characterised by the angle between the ion beam and the crystal planes or the main crystal surface}

21/0475 . . . . {Changing the shape of the semiconductor body, e.g. forming recesses, (etching of the semiconductor body H01L 21/302)}

21/048 . . . . {Making electrodes}

21/0485 . . . . . {Ohmic electrodes}

21/049 . . . . . {Conductor-insulator-semiconductor electrodes, e.g. MIS contacts}

21/0495 . . . . . {Schottky electrodes}

21/06 . . . the devices having semiconductor bodies comprising selenium or tellurium in uncombined form other than as impurities in semiconductor bodies of other materials

21/08 . . . . Preparation of the foundation plate

21/10 . . . . Preliminary treatment of the selenium or tellurium, its application to the foundation plate, or the subsequent treatment of the combination

21/101 . . . . . {Application of the selenium or tellurium to the foundation plate}

21/103 . . . . . Conversion of the selenium or tellurium to the conductive state

21/105 . . . . . Treatment of the surface of the selenium or tellurium layer after having been made conductive

21/108 . . . . . Provision of discrete insulating layers, i.e. non-genetic barrier layers

21/12 . . . . Application of an electrode to the exposed surface of the selenium or tellurium after the selenium or tellurium has been applied to the foundation plate

21/14 . . . . Treatment of the complete device, e.g. by electroforming to form a barrier

21/145 . . . . . Ageing

21/16 . . . the devices having semiconductor bodies comprising cuprous oxide or cuprous iodide

21/161 . . . . {Preparation of the foundation plate, preliminary treatment oxidation of the foundation plate, reduction treatment}

21/162 . . . . . {Preliminary treatment of the foundation plate}

21/164 . . . . . {Oxidation and subsequent heat treatment of the foundation plate (H01L 21/165 takes precedence)}

21/165 . . . . . {Reduction of the copper oxide, treatment of the oxide layer}

21/167 . . . . . {Application of a non-genetic conductive layer}

21/168 . . . . {Treatment of the complete device, e.g. electroforming, ageing}

21/18 . . . the devices having semiconductor bodies comprising elements of Group IV of the Periodic Table or AIIIBV compounds with or without impurities, e.g. doping materials {(H01L 21/041 - H01L 21/0425, H01L 21/045 - H01L 21/048 take precedence)}

NOTE

This group covers also processes and apparatus which, by using the appropriate technology, are clearly suitable for manufacture or treatment of devices whose bodies comprise elements of Group IV of the Periodic Table or AIIIBV compounds, even if the material used is not explicitly specified.

21/182 . . . . {Intermixing or interdiffusion or disordering of III-V heterostructures, e.g. IILD}

21/185 . . . . {Joining of semiconductor bodies for junction formation}

21/187 . . . . . {by direct bonding}

21/20 . . . . Deposition of semiconductor materials on a substrate, e.g. epitaxial growth {solid phase epitaxy}

WARNING

Group H01L 21/20 is impacted by reclassification into groups H01L 21/02365 – H01L 21/02694.

Groups H01L 21/20 and H01L 21/02365 – H01L 21/02694 should be considered in order to perform a complete search.

21/2003 . . . . . {characterised by the substrate}

21/2007 . . . . . {Bonding of semiconductor wafers to insulating substrates or to semiconducting substrates using an intermediate insulating layer (H01L 21/2011 takes precedence; bonding of semiconductor wafers to semiconductor wafers for junction formation H01L 21/187)}

21/2011 . . . . . {the substrate being of crystalline insulating material, e.g. sapphire}

21/2015 . . . . . {the substrate being of crystalline semiconductor material, e.g. lattice adaptation, heteroepitaxy}

21/2018 *(Frozen)* . . . . . {Selective epilaxial growth, e.g. simultaneous deposition of mono - and non-mono semiconductor materials}

WARNING

Group H01L 21/2018 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/2018 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/2022 *(Frozen)* . . . . . {Epitaxial regrowth of non-monocrystalline semiconductor materials, e.g. lateral epitaxy by seeded solidification, solid-state crystallization, solid-state graphoepitaxy, explosive crystallization, grain growth in polycrystalline materials}

WARNING

Group H01L 21/2022 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/2022 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/2026 *(Frozen)* . . . . . {using a coherent energy beam, e.g. laser or electron beam}

WARNING

Group H01L 21/2026 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/2026 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/203 *(Frozen)* . . . . . using physical deposition, e.g. vacuum deposition, sputtering

WARNING

Group H01L 21/203 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/203 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/2033 *(Frozen)* . . . . . {Epitaxial deposition of elements of Group IV of the Periodic System, e.g. Si, Ge}

WARNING

Group H01L 21/2033 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/2033 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/2036 *(Frozen)* . . . . . {Epitaxial deposition of AIII BV compounds}

WARNING

Group H01L 21/2036 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/2036 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/205 *(Frozen)* . . . . . using reduction or decomposition of a gaseous compound yielding a solid condensate, i.e. chemical deposition

WARNING

Group H01L 21/205 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/205 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/2053 *(Frozen)* . . . . . {Expitaxial deposition of elements of Group IV of the Periodic System, e.g. Si, Ge}

WARNING

Group H01L 21/2053 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/2053 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/2056 *(Frozen)* . . . . . {Epitaxial deposition of $A_{III}B_{V}$ compounds}

WARNING

Group H01L 21/2056 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/2056 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/208 . . . . . using liquid deposition *(Frozen)*

WARNING

Group H01L 21/208 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/208 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/2085 . . . . . {Epitaxial deposition of $A_{III}B_V$ compounds} *(Frozen)*

WARNING

Group H01L 21/2085 is no longer used for the classification of documents as of August 1, 2022.

The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694.

Groups H01L 21/2085 and H01L 21/02365 - H01L 21/02694 should be considered in order to perform a complete search.

21/22 . . . . Diffusion of impurity materials, e.g. doping materials, electrode materials, into or out of a semiconductor body, or between semiconductor regions; {Interactions between two or more impurities; Redistribution of impurities}

21/2205 . . . . . {from the substrate during epitaxy, e.g. autodoping; Preventing or using autodoping}

21/221 . . . . . {of killers}

21/2215 . . . . . {in $A_{III}B_V$ compounds}

21/222 . . . . . {Lithium-drift}

21/2225 . . . . . {Diffusion sources}

21/223 . . . . . using diffusion into or out of a solid from or into a gaseous phase {(H01L 21/221 - H01L 21/222 take precedence; diffusion through an applied layer H01L 21/225)}

21/2233 . . . . . {Diffusion into or out of $A_{III}B_V$ compounds}

21/2236 . . . . . {from or into a plasma phase}

21/225 . . . . . using diffusion into or out of a solid from or into a solid phase, e.g. a doped oxide layer {(H01L 21/221 - H01L 21/222 take precedence)}

21/2251 . . . . . {Diffusion into or out of group IV semiconductors}

NOTE

{In groups H01L 21/2254 - H01L 21/2257 one should consider the main compositional parts of the applied layer just before the diffusion step}

21/2252 . . . . . {using predeposition of impurities into the semiconductor surface, e.g. from a gaseous phase}

21/2253 . . . . . {by ion implantation}

21/2254 . . . . . {from or through or into an applied layer, e.g. photoresist, nitrides}

21/2255 . . . . . {the applied layer comprising oxides only, e.g. P_2O_5, PSG, H_3BO_3, doped oxides}

21/2256 . . . . . {through the applied layer}

21/2257 . . . . . {the applied layer being silicon or silicide or SIPOS, e.g. polysilicon, porous silicon}

21/2258 . . . . . {Diffusion into or out of $A_{III}B_V$ compounds}

21/228 . . . . . using diffusion into or out of a solid from or into a liquid phase, e.g. alloy diffusion processes {(H01L 21/221 - H01L 21/222 take precedence)}

21/24 . . . . Alloying of impurity materials, e.g. doping materials, electrode materials, with a semiconductor body {(H01L 21/182 takes precedence)}

21/242 . . . . . {Alloying of doping materials with $A_{III}B_V$ compounds}

21/244 . . . . . {Alloying of electrode materials}

21/246 . . . . . {with $A_{III}B_V$ compounds}

21/248 . . . . . {Apparatus specially adapted for the alloying}

21/26 . . . . Bombardment with radiation {(H01L 21/3105 takes precedence)}

21/2605 . . . . . {using natural radiation, e.g. alpha, beta or gamma radiation}

21/261 . . . . . to produce a nuclear reaction transmuting chemical elements

21/263 . . . . . with high-energy radiation (H01L 21/261 takes precedence)

21/2633 . . . . . {for etching, e.g. sputteretching}

21/2636 . . . . . {for heating, e.g. electron beam heating}

21/265 . . . . . producing ion implantation

21/26506 . . . . . {in group IV semiconductors}

21/26513 . . . . . {of electrically active species}

21/2652 . . . . . {Through-implantation}

21/26526 . . . . . {Recoil-implantation}

21/26533 . . . . . {of electrically inactive species in silicon to make buried insulating layers}

21/2654 . . . . . {in $A_{III}B_V$ compounds}

21/26546 . . . . . {of electrically active species}

21/26553 . . . . . {Through-implantation}

21/2656 . . . . . {characterised by the implantation of both electrically active and inactive species in the same semiconductor region to be doped}

21/26566 . . . . . {of a cluster, e.g. using a gas cluster ion beam}

2021/26573 . . . . . {in diamond}

21/2658 . . . . . {of a molecular ion, e.g. decaborane}

21/26586 . . . . . {characterised by the angle between the ion beam and the crystal planes or the main crystal surface}

21/26593 . . . . . {at a temperature lower than room temperature}

21/266 . . . . . using masks {(H01L 21/26586 takes precedence)}

21/268 . . . . . using electromagnetic radiation, e.g. laser radiation

21/2683 . . . . . {using X-ray lasers}

21/2686 . . . . . {using incoherent radiation}

21/28 . . . . Manufacture of electrodes on semiconductor bodies using processes or apparatus not provided for in groups H01L 21/20 - H01L 21/268 {(etching for patterning the electrodes H01L 21/311, H01L 21/3213; multistep manufacturing processes for data storage electrodes H01L 29/4011)}

21/28008 . . . . . {Making conductor-insulator-semiconductor electrodes}

21/28017 . . . . . {the insulator being formed after the semiconductor body, the semiconductor being silicon}

NOTE

This group covers deposition of the insulators, including epitaxial insulators, and the conductors within the same process or chamber

21/28026 . . . . . {characterised by the conductor (H01L 21/28176 takes precedence)}

NOTE

When the final conductor comprises a superconductor, subject matter is not classified according to the subgroups H01L 21/28035 - H01L 21/28097. Instead, it is classified in H01L 21/28026

21/28035 . . . . . {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)}

NOTE

A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator

21/28044 . . . . . {the conductor comprising at least another non-silicon conductive layer}

21/28052 . . . . . {the conductor comprising a silicide layer formed by the silicidation reaction of silicon with a metal layer (formed by metal ion implantation H01L 21/28044)}

21/28061 . . . . . {the conductor comprising a metal or metal silicide formed by deposition, e.g. sputter deposition, i.e. without a silicidation reaction (H01L 21/28052 takes precedence)}

NOTE

To assess the coverage of groups H01L 21/28052 and H01L 21/28061, barrier layers, e.g. TaSiN, are not considered

21/2807 . . . . . {the final conductor layer next to the insulator being Si or Ge or C and their alloys except Si}

21/28079 . . . . . {the final conductor layer next to the insulator being a single metal, e.g. Ta, W, Mo, Al}

21/28088 . . . . . {the final conductor layer next to the insulator being a composite, e.g. TiN}

21/28097 . . . . . {the final conductor layer next to the insulator being a metallic silicide}

21/28105 . . . . . {the final conductor next to the insulator having a lateral composition or doping variation, or being formed laterally by more than one deposition step}

21/28114 . . . . . {characterised by the sectional shape, e.g. T, inverted-T}

NOTE

Documents are also classified in groups H01L 21/28035 - H01L 21/2810 when the composition is also relevant

21/28123 . . . . . {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects}

21/28132 . . . . . {conducting part of electrode is difined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating}

21/28141 . . . . . {insulating part of the electrode is defined by a sidewall spacer, e.g. dummy spacer, or a similar technique, e.g. oxidation under mask, plating}

21/2815 . . . . . {part or whole of the electrode is a sidewall spacer or made by a similar technique, e.g. transformation under mask, plating}

21/28158 . . . . . {Making the insulator}

21/28167 . . . . . {on single crystalline silicon, e.g. using a liquid, i.e. chemical oxidation}

21/28176 . . . . . {with a treatment, e.g. annealing, after the formation of the definitive gate conductor}

21/28185 . . . . . {with a treatment, e.g. annealing, after the formation of the gate insulator and before the formation of the definitive gate conductor}

21/28194 . . . . . {by deposition, e.g. evaporation, ALD, CVD, sputtering, laser deposition (H01L 21/28202 takes precedence)}

21/28202 . . . . . {in a nitrogen-containing ambient, e.g. nitride deposition, growth, oxynitridation, NH_3 nitridation, N_2O oxidation, thermal nitridation, RTN, plasma nitridation, RPN}

21/28211 . . . . . {in a gaseous ambient using an oxygen or a water vapour, e.g. RTO, possibly through a layer (H01L 21/28194 and H01L 21/28202 take precedence)}

NOTE

thin oxidation layers used as a barrier layer or as a buffer layer, e.g. before the fomation of a high-k insulator, are classified here only if important per se

21/2822 . . . . . {with substrate doping, e.g. N, Ge, C implantation, before formation of the insulator}

21/28229 . . . . . {by deposition of a layer, e.g. metal, metal compound or poysilicon, followed by transformation thereof into an insulating layer}

21/28238 . . . . . {with sacrificial oxide}

21/28247 . . . . . {passivation or protection of the electrode, e.g. using re-oxidation}

21/28255 . . . . . {the insulator being formed after the semiconductor body, the semiconductor belonging to Group IV and not being elemental silicon, e.g. Ge, SiGe, SiGeC}

21/28264 . . . . . {the insulator being formed after the semiconductor body, the semiconductor being a III-V compound}

21/283 . . . . . Deposition of conductive or insulating materials for electrodes {conducting electric current}

21/285 . . . . . from a gas or vapour, e.g. condensation

21/28506 . . . . . {of conductive layers}

21/28512 . . . . . {on semiconductor bodies comprising elements of Group IV of the Periodic Table}

21/28518 . . . . . {the conductive layers comprising silicides (H01L 21/28537 takes precedence)}

21/28525 . . . . . {the conductive layers comprising semiconducting material (H01L 21/28518, H01L 21/28537 take precedence)}

21/28531 . . . . . {Making of side-wall contacts}

21/28537 . . . . . {Deposition of Schottky electrodes}

21/2855 . . . . . {by physical means, e.g. sputtering, evaporation (H01L 21/28518 - H01L 21/28537 and H01L 21/28568 take precedence)}

21/28556 . . . . . {by chemical means, e.g. CVD, LPCVD, PECVD, laser CVD (H01L 21/28518 - H01L 21/28537 and H01L 21/28568 take precedence)}

21/28562 . . . . . {Selective deposition}

21/28568 . . . . . {the conductive layers comprising transition metals (H01L 21/28518 takes precedence)}

21/28575 . . . . . {on semiconductor bodies comprising $A_{III}B_V$ compounds}

21/28581 . . . . . {Deposition of Schottky electrodes}

21/28587 . . . . . {characterised by the sectional shape, e.g. T, inverted T}

21/28593 . . . . . {asymmetrical sectional shape}

21/288 . . . . . from a liquid, e.g. electrolytic deposition

21/2885 . . . . . {using an external electrical current, i.e. electro-deposition}

21/30 . . . . Treatment of semiconductor bodies using processes or apparatus not provided for in groups H01L 21/20 - H01L 21/26 (manufacture of electrodes thereon H01L 21/28)

21/3003 . . . . . {Hydrogenation or deuterisation, e.g. using atomic hydrogen from a plasma}

21/3006 . . . . . {of $A_{III}B_V$ compounds}

21/302 . . . . . to change their surface-physical characteristics or shape, e.g. etching, polishing, cutting

21/304 . . . . . Mechanical treatment, e.g. grinding, polishing, cutting {(H01L 21/30625 takes precedence)}

21/3043 . . . . . {Making grooves, e.g. cutting}

21/3046 . . . . . {using blasting, e.g. sand-blasting (H01L 21/2633 takes precedence)}

21/306 . . . . . Chemical or electrical treatment, e.g. electrolytic etching (to form insulating layers H01L 21/31)

21/30604 . . . . . {Chemical etching}

21/30608 . . . . . {Anisotropic liquid etching (H01L 21/3063 takes precedence)}

21/30612 . . . . . {Etching of $A_{III}B_V$ compounds}

21/30617 . . . . . {Anisotropic liquid etching}

21/30621 . . . . . {Vapour phase etching}

21/30625 . . . . . {With simultaneous mechanical treatment, e.g. mechanico-chemical polishing}

21/3063 . . . . . Electrolytic etching

21/30635 . . . . . {of $A_{III}B_V$ compounds}
21/3065 . . . . . Plasma etching; Reactive-ion etching
21/30655 . . . . . {comprising alternated and repeated etching and passivation steps, e.g. Bosch process}
21/308 . . . . . using masks (H01L 21/3063, H01L 21/3065 take precedence)
21/3081 . . . . . {characterised by their composition, e.g. multilayer masks, materials}
21/3083 . . . . . {characterised by their size, orientation, disposition, behaviour, shape, in horizontal or vertical plane}
21/3085 . . . . . {characterised by their behaviour during the process, e.g. soluble masks, redeposited masks}
21/3086 . . . . . {characterised by the process involved to create the mask, e.g. lift-off masks, sidewalls, or to modify the mask, e.g. pre-treatment, post-treatment}
21/3088 . . . . . {Process specially adapted to improve the resolution of the mask}
21/31 . . . . . to form insulating layers thereon, e.g. for masking or by using photolithographic techniques (encapsulating layers H01L 21/56); After treatment of these layers; Selection of materials for these layers
21/3105 . . . . . After-treatment
21/31051 . . . . . {Planarisation of the insulating layers (H01L 21/31058 takes precedence)}
21/31053 . . . . . {involving a dielectric removal step}
21/31055 . . . . . {the removal being a chemical etching step, e.g. dry etching (etching per se H01L 21/311)}
21/31056 . . . . . {the removal being a selective chemical etching step, e.g. selective dry etching through a mask}
21/31058 . . . . . {of organic layers}
21/311 . . . . . Etching the insulating layers {by chemical or physical means (H01L 21/31058 takes precedence)}
21/31105 . . . . . {Etching inorganic layers}
21/31111 . . . . . {by chemical means}
21/31116 . . . . . {by dry-etching}
21/31122 . . . . . {of layers not containing Si, e.g. PZT, Al_2O_3}
21/31127 . . . . . {Etching organic layers}
21/31133 . . . . . {by chemical means}
21/31138 . . . . . {by dry-etching}
21/31144 . . . . . {using masks}
21/3115 . . . . . Doping the insulating layers
21/31155 . . . . . {by ion implantation}

21/312 . . . . . Organic layers, e.g. photoresist (H01L 21/3105, H01L 21/32 take precedence; {photoresists per se G03C})
(Frozen)

WARNING

Groups H01L 21/312 – H01L 21/3128 are no longer used for the classification of documents as of May 1, 2011. The content of these groups is being reclassified into groups H01L 21/02107 – H01L 21/02326.

Groups H01L 21/02107 – H01L 21/02326 should be considered in order to perform a complete search.

21/3121 . . . . . {Layers comprising organo-silicon compounds}
(Frozen)
21/3122 . . . . . {layers comprising polysiloxane compounds}
(Frozen)
21/3124 . . . . . {layers comprising hydrogen silsesquioxane}
(Frozen)
21/3125 . . . . . {layers comprising silazane compounds}
(Frozen)
21/3127 . . . . . {Layers comprising fluoro (hydro)carbon compounds, e.g. polytetrafluoroethylene}
(Frozen)
21/3128 . . . . . {by Langmuir-Blodgett techniques}
(Frozen)
21/314 . . . . . Inorganic layers (H01L 21/3105, H01L 21/32 take precedence)
(Frozen)

WARNING

Groups H01L 21/314 – H01L 21/3185 are no longer used for the classification of documents as of May 1, 2011. The content of these group is being reclassified into group H01L 21/02107 – H01L 21/02326.

Groups H01L 21/02107 – H01L 21/02326 should be considered in order to perform a complete search.

21/3141 . . . . . {Deposition using atomic layer deposition techniques [ALD]}
(Frozen)
21/3142 . . . . . {of nano-laminates, e.g. alternating layers of Al203-Hf02}
(Frozen)
21/3143 . . . . . {composed of alternated layers or of mixtures of nitrides and oxides or of oxinitrides, e.g. formation of oxinitride by oxidation of nitride layers}
(Frozen)
21/3144 . . . . . {on silicon}
(Frozen)
21/3145 . . . . . {formed by deposition from a gas or vapour}
(Frozen)
21/3146 . . . . . {Carbon layers, e.g. diamond-like layers}
(Frozen)
21/3147 . . . . . {Epitaxial deposition of insulating materials}
(Frozen)
21/3148 . . . . . {Silicon Carbide layers}
(Frozen)
2021/3149 . . . . . {Langmuir-Blodgett techniques}
(Frozen)

21/316 *(Frozen)* . . . . . composed of oxides or glassy oxides or oxide based glass

WARNING

Group H01L 21/316 is no longer used for the classification of documents as of May 1, 2011. The content of this group is being reclassified into groups H01L 21/02107 – H01L 21/02326.

Groups H01L 21/02107 – H01L 21/02326 should be considered in order to perform a complete search.

21/31604 *(Frozen)* . . . . . {Deposition from a gas or vapour (H01L 21/31691, H01L 21/31695 take precedence)}

21/31608 *(Frozen)* . . . . . {Deposition of SiO_2 (H01L 21/31625, H01L 21/31629 and H01L 21/31633 take precedence)}

21/31612 *(Frozen)* . . . . . {on a silicon body}

21/31616 *(Frozen)* . . . . . {Deposition of Al_2O_3}

21/3162 *(Frozen)* . . . . . {on a silicon body}

21/31625 *(Frozen)* . . . . . {Deposition of boron or phosphorus doped silicon oxide, e.g. BSG, PSG, BPSG}

21/31629 *(Frozen)* . . . . . {Deposition of halogen doped silicon oxide, e.g. fluorine doped silicon oxide}

21/31633 *(Frozen)* . . . . . {Deposition of carbon doped silicon oxide, e.g. SiOC}

21/31637 *(Frozen)* . . . . . {Deposition of Tantalum oxides, e.g. Ta_2O_5}

21/31641 *(Frozen)* . . . . . {Deposition of Zirconium oxides, e.g. ZrO_2}

21/31645 *(Frozen)* . . . . . {Deposition of Hafnium oxides, e.g. HfO_2}

21/3165 *(Frozen)* . . . . . {formed by oxidation (H01L 21/31691, H01L 21/31695 take precedence)}

21/31654 *(Frozen)* . . . . . {of semiconductor materials, e.g. the body itself}

21/31658 *(Frozen)* . . . . . {by thermal oxidation, e.g. of SiGe}

21/31662 *(Frozen)* . . . . . {of silicon in uncombined form}

21/31666 *(Frozen)* . . . . . {of AIII BV compounds}

21/3167 *(Frozen)* . . . . . {of anodic oxidation}

21/31675 *(Frozen)* . . . . . {of silicon}

21/31679 *(Frozen)* . . . . . {of AIII BV compounds}

21/31683 *(Frozen)* . . . . . {of metallic layers, e.g. Al deposited on the body, e.g. formation of multi-layer insulating structures}

21/31687 *(Frozen)* . . . . . {by anodic oxidation}

21/31691 *(Frozen)* . . . . . {with perovskite structure}

21/31695 *(Frozen)* . . . . . {Deposition of porous oxides or porous glassy oxides or oxide based porous glass}

21/318 *(Frozen)* . . . . . composed of nitrides

WARNING

Group H01L 21/318 is no longer used for the classification of documents as of May 1, 2011. The content of this group is being reclassified into groups H01L 21/02107 – H01L 21/02326.

Groups H01L 21/02107 – H01L 21/02326 should be considered in order to perform a complete search.

21/3185 *(Frozen)* . . . . . {of siliconnitrides}

21/32 . . . . . using masks

21/3205 . . . . . Deposition of non-insulating-, e.g. conductive- or resistive-, layers on insulating layers; After-treatment of these layers (manufacture of electrodes H01L 21/28)

21/32051 . . . . . {Deposition of metallic or metal-silicide layers}

21/32053 . . . . . {of metal-silicide layers}

21/32055 . . . . . {Deposition of semiconductive layers, e.g. poly - or amorphous silicon layers}

21/32056 . . . . . {Deposition of conductive or semi-conductive organic layers (H01L 21/32058 takes precedence)}

21/32058 . . . . . {Deposition of superconductive layers}

21/321 . . . . . After treatment

21/32105 . . . . . {Oxidation of silicon-containing layers}

21/3211 . . . . . {Nitridation of silicon-containing layers}

21/32115 . . . . . {Planarisation}

21/3212 . . . . . {by chemical mechanical polishing [CMP]}

21/32125 . . . . . {by simultaneously passing an electrical current, i.e. electrochemical mechanical polishing, e.g. ECMP}

21/3213 . . . . . Physical or chemical etching of the layers, e.g. to produce a patterned layer from a pre-deposited extensive layer

21/32131 . . . . . {by physical means only}

21/32132 . . . . . {of silicon-containing layers}

21/32133 . . . . . {by chemical means only}

21/32134 . . . . . {by liquid etching only}

21/32135 . . . . . {by vapour etching only}

21/32136 . . . . . {using plasmas}

21/32137 . . . . . {of silicon-containing layers}

21/32138 . . . . . {pre- or post-treatments, e.g. anti-corrosion processes}
21/32139 . . . . . {using masks}
21/3215 . . . . . Doping the layers
21/32155 . . . . . {Doping polycristalline - or amorphous silicon layers}
21/322 . . . . . to modify their internal properties, e.g. to produce internal imperfections
21/3221 . . . . . {of silicon bodies, e.g. for gettering}
21/3223 . . . . . {using cavities formed by hydrogen or noble gas ion implantation}
21/3225 . . . . . {Thermally inducing defects using oxygen present in the silicon body for intrinsic gettering (H01L 21/3226 takes precedence)}

NOTE

Gettering using both extrinsic and intrinsic gettering techniques is classified in both H01L 21/3221 and H01L 21/3225

21/3226 . . . . . {of silicon on insulator}
21/3228 . . . . . {of $A_{III}B_{V}$ compounds, e.g. to make them semi-insulating}
21/324 . . . . . Thermal treatment for modifying the properties of semiconductor bodies, e.g. annealing, sintering (H01L 21/20 - H01L 21/288 and H01L 21/302 - H01L 21/322 take precedence)
21/3242 . . . . . {for the formation of PN junctions without addition of impurities (H01L 21/22 takes precedence)}
21/3245 . . . . . {of $A_{III}B_{V}$ compounds}
21/3247 . . . . . {for altering the shape, e.g. smoothing the surface}

WARNING

Group H01L 21/3247 is incomplete pending reclassification of documents from group H01L 21/324.

Groups H01L 21/324 and H01L 21/3247 should be considered in order to perform a complete search.

21/326 . . . . . Application of electric currents or fields, e.g. for electroforming (H01L 21/20 - H01L 21/288 and H01L 21/302 - H01L 21/324 take precedence)
21/34 . . . the devices having semiconductor bodies not provided for in groups {H01L 21/0405, H01L 21/0445} , H01L 21/06, H01L 21/16 and H01L 21/18 with or without impurities, e.g. doping materials
21/38 . . . . Diffusion of impurity materials, e.g. doping materials, electrode materials, into or out of a semiconductor body, or between semiconductor regions
21/383 . . . . . using diffusion into or out of a solid from or into a gaseous phase
21/385 . . . . . using diffusion into or out of a solid from or into a solid phase, e.g. a doped oxide layer
21/388 . . . . . using diffusion into or out of a solid from or into a liquid phase, e.g. alloy diffusion processes
21/40 . . . . Alloying of impurity materials, e.g. doping materials, electrode materials, with a semiconductor body
21/42 . . . . Bombardment with radiation
21/423 . . . . . with high-energy radiation
21/425 . . . . . producing ion implantation
21/426 . . . . . using masks
21/428 . . . . . using electromagnetic radiation, e.g. laser radiation
21/44 . . . . Manufacture of electrodes on semiconductor bodies using processes or apparatus not provided for in groups H01L 21/38 - H01L 21/428
21/441 . . . . . Deposition of conductive or insulating materials for electrodes
21/443 . . . . . from a gas or vapour, e.g. condensation
21/445 . . . . . from a liquid, e.g. electrolytic deposition
21/447 . . . . . involving the application of pressure, e.g. thermo-compression bonding
21/449 . . . . . involving the application of mechanical vibrations, e.g. ultrasonic vibrations
21/46 . . . . Treatment of semiconductor bodies using processes or apparatus not provided for in groups H01L 21/428 (manufacture of electrodes thereon H01L 21/44)
21/461 . . . . . to change their surface-physical characteristics or shape, e.g. etching, polishing, cutting
21/463 . . . . . Mechanical treatment, e.g. grinding, ultrasonic treatment
21/465 . . . . . Chemical or electrical treatment, e.g. electrolytic etching (to form insulating layers H01L 21/469)
21/467 . . . . . using masks
21/469 . . . . . to form insulating layers thereon, e.g. for masking or by using photolithographic techniques (encapsulating layers H01L 21/56); After-treatment of these layers
21/47 . . . . . Organic layers, e.g. photoresist (H01L 21/475, H01L 21/4757 take precedence)
21/471 . . . . . Inorganic layers (H01L 21/475, H01L 21/4757 take precedence)
21/473 . . . . . composed of oxides or glassy oxides or oxide based glass
21/475 . . . . . using masks
21/4757 . . . . . After-treatment
21/47573 . . . . . {Etching the layer}
21/47576 . . . . . {Doping the layer}
21/4763 . . . . . Deposition of non-insulating, e.g. conductive -, resistive -, layers on insulating layers; After-treatment of these layers (manufacture of electrodes H01L 21/28, {H01L 21/44})
21/47635 . . . . . {After-treatment of these layers}

21/477 . . . . . Thermal treatment for modifying the properties of semiconductor bodies, e.g. annealing, sintering (H01L 21/38 - H01L 21/449 and H01L 21/461 - H01L 21/475 take precedence)

21/479 . . . . . Application of electric currents or fields, e.g. for electroforming (H01L 21/38 - H01L 21/449 and H01L 21/461 - H01L 21/475 take precedence)

21/48 . . . Manufacture or treatment of parts, e.g. containers, prior to assembly of the devices, using processes not provided for in a single one of the subgroups H01L 21/06 - H01L 21/326

NOTE

In this group, the expression "treatment" covers also the removal of leads from parts

21/4803 . . . . {Insulating or insulated parts, e.g. mountings, containers, diamond heatsinks (H01L 21/4846 takes precedence; printed circuit boards H05K 1/00)}

21/4807 . . . . . {Ceramic parts}

21/481 . . . . . {Insulating layers on insulating parts, with or without metallisation}

21/4814 . . . . {Conductive parts}

21/4817 . . . . . {for containers, e.g. caps (H01L 21/4871 takes precedence)}

21/4821 . . . . . {Flat leads, e.g. lead frames with or without insulating supports}

21/4825 . . . . . {Connection or disconnection of other leads to or from flat leads, e.g. wires, bumps, other flat leads}

21/4828 . . . . . {Etching (etching for cleaning without patterning H01L 21/4835)}

21/4832 . . . . . {Etching a temporary substrate after encapsulation process to form leads}

21/4835 . . . . . {Cleaning, e.g. removing of solder}

21/4839 . . . . . {Assembly of a flat lead with an insulating support, e.g. for TAB}

21/4842 . . . . . {Mechanical treatment, e.g. punching, cutting, deforming, cold welding}

21/4846 . . . . . {Leads on or in insulating or insulated substrates, e.g. metallisation (H01L 21/4821 takes precedence; metallisation of ceramics in general C04B 41/51; printed circuits H05K 3/00)}

21/485 . . . . . {Adaptation of interconnections, e.g. engineering charges, repair techniques}

21/4853 . . . . . {Connection or disconnection of other leads to or from a metallisation, e.g. pins, wires, bumps}

21/4857 . . . . . {Multilayer substrates (multilayer metallisation on monolayer substrate H01L 21/4846)}

21/486 . . . . . {Via connections through the substrate with or without pins}

21/4864 . . . . . {Cleaning, e.g. removing of solder}

21/4867 . . . . . {Applying pastes or inks, e.g. screen printing (H01L 21/486 takes precedence)}

21/4871 . . . . . {Bases, plates or heatsinks}

21/4875 . . . . . {Connection or disconnection of other leads to or from bases or plates}

21/4878 . . . . . {Mechanical treatment, e.g. deforming}

21/4882 . . . . . {Assembly of heatsink parts}

21/4885 . . . . . {Wire-like parts or pins (wire ball formation B23K 20/00; methods related to connecting semiconductor or other solid state bodies H01L 24/00)}

21/4889 . . . . . {Connection or disconnection of other leads to or from wire-like parts, e.g. wires}

21/4892 . . . . . {Cleaning}

21/4896 . . . . . {Mechanical treatment, e.g. cutting, bending}

21/50 . . . Assembly of semiconductor devices using processes or apparatus not provided for in a single one of the subgroups H01L 21/06 - H01L 21/326, {e.g. sealing of a cap to a base of a container}

NOTE

Arrangements for connecting or disconnecting semiconductor or other solid state bodies, or methods related thereto, other than those arrangements or methods covered by the following subgroups, are covered by H01L 24/00

21/52 . . . . Mounting semiconductor bodies in containers

21/54 . . . . Providing fillings in containers, e.g. gas fillings

21/56 . . . . Encapsulations, e.g. encapsulation layers, coatings

21/561 . . . . . {Batch processing}

21/563 . . . . . {Encapsulation of active face of flip-chip device, e.g. underfilling or underencapsulation of flip-chip, encapsulation preform on chip or mounting substrate}

21/565 . . . . . {Moulds}

21/566 . . . . . {Release layers for moulds, e.g. release layers, layers against residue during moulding}

21/568 . . . . . {Temporary substrate used as encapsulation process aid (H01L 21/4832 and H01L 21/566 take precedence)}

21/60 . . . . Attaching {or detaching} leads or other conductive members, to be used for carrying current to or from the device in operation

2021/60007 . . . . . {involving a soldering or an alloying process}

2021/60015 . . . . . {using plate connectors, e.g. layer, film}

2021/60022 . . . . . {using bump connectors, e.g. for flip chip mounting}

2021/6003 . . . . . {Apparatus therefor}

2021/60037 . . . . . {Right-up bonding}

2021/60045 . . . . . {Pre-treatment step of the bump connectors prior to bonding}

2021/60052 . . . . . {Oxide removing step, e.g. flux, rosin}

2021/6006 . . . . . {with temporary supporting member not part of an apparatus, e.g. removable coating, film or substrate}

2021/60067 . . . . . {Aligning the bump connectors with the mounting substrate}
2021/60075 . . . . . {involving active alignment, i.e. by apparatus steering, e.g. using alignment marks, sensors}
2021/60082 . . . . . {involving passive alignment, e.g. using surface energy, chemical reactions, thermal equilibrium}
2021/6009 . . . . . {involving guiding structures, e.g. structures that are left at least partly in the bonded product, spacers}
2021/60097 . . . . . {Applying energy, e.g. for the soldering or alloying process}
2021/60105 . . . . . {using electromagnetic radiation}
2021/60112 . . . . . {Coherent radiation, i.e. laser beam}
2021/6012 . . . . . {Incoherent radiation, e.g. polychromatic heating lamp}
2021/60127 . . . . . {Induction heating, i.e. eddy currents}
2021/60135 . . . . . {using convection, e.g. reflow oven}
2021/60142 . . . . . {with a graded temperature profile}
2021/6015 . . . . . {using conduction, e.g. chuck heater, thermocompression}
2021/60157 . . . . . {with a graded temperature profile}
2021/60165 . . . . . {using an electron beam}
2021/60172 . . . . . {using static pressure}
2021/6018 . . . . . {Unidirectional static pressure}
2021/60187 . . . . . {Isostatic pressure, e.g. degassing using vacuum or pressurised liquid}
2021/60195 . . . . . {using dynamic pressure, e.g. ultrasonic or thermosonic bonding}
2021/60202 . . . . . {using a protective atmosphere, e.g. with forming or shielding gas}
2021/6021 . . . . . {using an autocatalytic reaction}
2021/60217 . . . . . {Detaching bump connectors, e.g. after testing}
2021/60225 . . . . . {Arrangement of bump connectors prior to mounting}
2021/60232 . . . . . {wherein the bump connectors are disposed only on the semiconductor chip}
2021/6024 . . . . . {wherein the bump connectors are disposed only on the mounting substrate}
2021/60247 . . . . . {wherein the bump connectors are disposed on both the semiconductor chip and the mounting substrate, e.g. bump to bump}
2021/60255 . . . . . {wherein the bump connectors are provided as prepeg, e.g. are provided in an insulating plate member}
2021/60262 . . . . . {Lateral distribution of bump connectors prior to mounting}
2021/6027 . . . . . {Mounting on semiconductor conductive members}
2021/60277 . . . . . {involving the use of conductive adhesives}
2021/60285 . . . . . {involving the use of mechanical auxiliary parts without the use of an alloying or soldering process, e.g. pressure contacts}
2021/60292 . . . . . {involving the use of an electron or laser beam}
21/603 . . . . . involving the application of pressure, e.g. thermo-compression bonding (H01L 21/607 takes precedence)
21/607 . . . . . involving the application of mechanical vibrations, e.g. ultrasonic vibrations
21/62 . . the devices having no potential barriers
21/64 . Manufacture or treatment of solid state devices other than semiconductor devices, or of parts thereof, not peculiar to a single device provided for in groups H01L 31/00 - H10K 99/00
21/67 . Apparatus specially adapted for handling semiconductor or electric solid state devices during manufacture or treatment thereof; Apparatus specially adapted for handling wafers during manufacture or treatment of semiconductor or electric solid state devices or components {; Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302; apparatus for manufacturing arrangements for connecting or disconnecting semiconductor or solid-state bodies and for methods related thereto H01L 24/74;)}

NOTE

In this subgroup the term substrate designates a semiconductor or electric solid state device or component, or a wafer

21/67005 . . {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)}
21/67011 . . . {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)}
21/67017 . . . . {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)}
21/67023 . . . . . {for general liquid treatment, e.g. etching followed by cleaning}
21/67028 . . . . . {for cleaning followed by drying, rinsing, stripping, blasting or the like}
21/67034 . . . . . {for drying}
21/6704 . . . . . {for wet cleaning or washing}
21/67046 . . . . . {using mainly scrubbing means, e.g. brushes}
21/67051 . . . . . {using mainly spraying means, e.g. nozzles}
21/67057 . . . . . {with the semiconductor substrates being dipped in baths or vessels}
21/67063 . . . . . {for etching}
21/67069 . . . . . {for drying etching}
21/67075 . . . . . {for wet etching}
21/6708 . . . . . {using mainly spraying means, e.g. nozzles}

21/67086 . . . . . {with the semiconductor substrates being dipped in baths or vessels}
21/67092 . . . . {Apparatus for mechanical treatment (or grinding or cutting, see the relevant groups in subclasses B24B or B28D)}
21/67098 . . . . {Apparatus for thermal treatment}
21/67103 . . . . . {mainly by conduction}
21/67109 . . . . . {mainly by convection}
21/67115 . . . . . {mainly by radiation}
21/67121 . . . . {Apparatus for making assemblies not otherwise provided for, e.g. package constructions}
21/67126 . . . . {Apparatus for sealing, encapsulating, glassing, decapsulating or the like (processes H01L 23/02, H01L 23/28)}
21/67132 . . . . {Apparatus for placing on an insulating substrate, e.g. tape}
21/67138 . . . . {Apparatus for wiring semiconductor or solid state device}
21/67144 . . . . {Apparatus for mounting on conductive members, e.g. leadframes or conductors on insulating substrates}
21/6715 . . . . {Apparatus for applying a liquid, a resin, an ink or the like (H01L 21/67126 takes precedence)}
21/67155 . . . . {Apparatus for manufacturing or treating in a plurality of work-stations}
21/67161 . . . . . {characterized by the layout of the process chambers}
21/67167 . . . . . {surrounding a central transfer chamber}
21/67173 . . . . . {in-line arrangement}
21/67178 . . . . . {vertical arrangement}
21/67184 . . . . . {characterized by the presence of more than one transfer chamber}
21/6719 . . . . . {characterized by the construction of the processing chambers, e.g. modular processing chambers}
21/67196 . . . . . {characterized by the construction of the transfer chamber}
21/67201 . . . . . {characterized by the construction of the load-lock chamber}
21/67207 . . . . . {comprising a chamber adapted to a particular process}
21/67213 . . . . . {comprising at least one ion or electron beam chamber (coating by ion implantation C23C; ion or electron beam tubes H01J 37/00)}
21/67219 . . . . . {comprising at least one polishing chamber (polishing apparatuses B24B)}
21/67225 . . . . . {comprising at least one lithography chamber (lithographic apparatuses G03F 7/00)}
21/6723 . . . . . {comprising at least one plating chamber (electroless plating apparatuses C23C, electroplating apparatuses C25D)}
21/67236 . . . . . {the substrates being processed being not semiconductor wafers, e.g. leadframes or chips}
21/67242 . . . {Apparatus for monitoring, sorting or marking (testing or measuring during manufacture H01L 22/00, marks per se H01L 23/544; testing individual semiconductor devices G01R 31/26)}
21/67248 . . . . {Temperature monitoring}
21/67253 . . . . {Process monitoring, e.g. flow or thickness monitoring}
21/67259 . . . . {Position monitoring, e.g. misposition detection or presence detection}
21/67265 . . . . . {of substrates stored in a container, a magazine, a carrier, a boat or the like}
21/67271 . . . . {Sorting devices}
21/67276 . . . . {Production flow monitoring, e.g. for increasing throughput (program-control systems per se G05B 19/00, e.g. total factory control G05B 19/418)}
21/67282 . . . . {Marking devices}
21/67288 . . . . {Monitoring of warpage, curvature, damage, defects or the like}
21/67294 . . . . {using identification means, e.g. labels on substrates or labels on containers}
21/673 . . using specially adapted carriers {or holders; Fixing the workpieces on such carriers or holders (holders for supporting a complete device in operation H01L 23/32)}
21/67303 . . . {Vertical boat type carrier whereby the substrates are horizontally supported, e.g. comprising rod-shaped elements}
21/67306 . . . . {characterized by a material, a roughness, a coating or the like}
21/67309 . . . . {characterized by the substrate support}
21/67313 . . . {Horizontal boat type carrier whereby the substrates are vertically supported, e.g. comprising rod-shaped elements}
21/67316 . . . . {characterized by a material, a roughness, a coating or the like}
21/6732 . . . {Vertical carrier comprising wall type elements whereby the substrates are horizontally supported, e.g. comprising sidewalls}
21/67323 . . . . {characterized by a material, a roughness, a coating or the like}
21/67326 . . . {Horizontal carrier comprising wall type elements whereby the substrates are vertically supported, e.g. comprising sidewalls}
21/6733 . . . . {characterized by a material, a roughness, a coating or the like}
21/67333 . . . {Trays for chips (magazine for components H05K 13/0084)}
21/67336 . . . . {characterized by a material, a roughness, a coating or the like}
21/6734 . . . {specially adapted for supporting large square shaped substrates (containers and packaging elements for glass sheets B65D 85/48, transporting of glass products during their manufacture C03B 35/00)}
21/67343 . . . . {characterized by a material, a roughness, a coating or the like}
21/67346 . . . {characterized by being specially adapted for supporting a single substrate or by comprising a stack of such individual supports}
21/6735 . . . {Closed carriers}
21/67353 . . . . {specially adapted for a single substrate}

21/67356 . . . . {specially adapted for containing chips, dies or ICs}
21/67359 . . . . {specially adapted for containing masks, reticles or pellicles}
21/67363 . . . . {specially adapted for containing substrates other than wafers (H01L 21/67356, H01L 21/67359 take precedence)}
21/67366 . . . . {characterised by materials, roughness, coatings or the like (materials relating to an injection moulding process B29C 45/00; chemical composition of materials C08L 51/00)}
21/67369 . . . . {characterised by shock absorbing elements, e.g. retainers or cushions}
21/67373 . . . . {characterised by locking systems}
21/67376 . . . . {characterised by sealing arrangements}
21/67379 . . . . {characterised by coupling elements, kinematic members, handles or elements to be externally gripped}
21/67383 . . . . {characterised by substrate supports}
21/67386 . . . . {characterised by the construction of the closed carrier}
21/67389 . . . . {characterised by atmosphere control}
21/67393 . . . . . {characterised by the presence of atmosphere modifying elements inside or attached to the closed carrierl}
21/67396 . . . . {characterised by the presence of antistatic elements}
21/677 . . for conveying, e.g. between different workstations
21/67703 . . . {between different workstations}
21/67706 . . . . {Mechanical details, e.g. roller, belt (H01L 21/67709 takes precedence)}
21/67709 . . . . {using magnetic elements}
21/67712 . . . . {the substrate being handled substantially vertically}
21/67715 . . . . {Changing the direction of the conveying path}
21/67718 . . . . {Changing orientation of the substrate, e.g. from a horizontal position to a vertical position}
21/67721 . . . . {the substrates to be conveyed not being semiconductor wafers or large planar substrates, e.g. chips, lead frames (H01L 21/6773 takes precedence)}
21/67724 . . . . {by means of a cart or a vehicule}
21/67727 . . . . {using a general scheme of a conveying path within a factory}
21/6773 . . . . {Conveying cassettes, containers or carriers}
21/67733 . . . . {Overhead conveying}
21/67736 . . . . {Loading to or unloading from a conveyor}
21/67739 . . . {into and out of processing chamber}
21/67742 . . . . {Mechanical parts of transfer devices (robots in general in B25J)}
21/67745 . . . . {characterized by movements or sequence of movements of transfer devices}
21/67748 . . . . {horizontal transfer of a single workpiece}
21/67751 . . . . {vertical transfer of a single workpiece}
21/67754 . . . . {horizontal transfer of a batch of workpieces}
21/67757 . . . . {vertical transfer of a batch of workpieces}
21/6776 . . . . {Continuous loading and unloading into and out of a processing chamber, e.g. transporting belts within processing chambers}
21/67763 . . . {the wafers being stored in a carrier, involving loading and unloading (H01L 21/6779 takes precedence)}
21/67766 . . . . {Mechanical parts of transfer devices (robots in general in B25J)}
21/67769 . . . . {Storage means}
21/67772 . . . . {involving removal of lid, door, cover}
21/67775 . . . . {Docking arrangements}
21/67778 . . . . {involving loading and unloading of wafers}
21/67781 . . . . . {Batch transfer of wafers}
21/67784 . . . {using air tracks}
21/67787 . . . . {with angular orientation of the workpieces}
21/6779 . . . . {the workpieces being stored in a carrier, involving loading and unloading}
21/67793 . . . {with orientating and positioning by means of a vibratory bowl or track}
21/67796 . . . {with angular orientation of workpieces (H01L 21/67787 and H01L 21/67793 take precedence)}
21/68 . . for positioning, orientation or alignment
21/681 . . . {using optical controlling means}
21/682 . . . {Mask-wafer alignment (in general G03F 7/70, G03F 9/70)}
21/683 . . for supporting or gripping (for conveying H01L 21/677, for positioning, orientation or alignment H01L 21/68)
21/6831 . . . {using electrostatic chucks}
21/6833 . . . . {Details of electrostatic chucks}
21/6835 . . . {using temporarily an auxiliary support}

NOTE

H01L 21/6835, details of the apparatus are to be further indexed using the indexing codes chosen from H01L 2221/68304 and subgroups

21/6836 . . . . {Wafer tapes, e.g. grinding or dicing support tapes (adhesive tapes in general C09J 7/20)}
21/6838 . . . {with gripping and holding devices using a vacuum; Bernoulli devices}
21/687 . . . using mechanical means, e.g. chucks, clamps or pinches {(using elecrostatic chucks H01L 21/6831)}
21/68707 . . . . {the wafers being placed on a robot blade, or gripped by a gripper for conveyance}
21/68714 . . . . {the wafers being placed on a susceptor, stage or support}
21/68721 . . . . . {characterised by edge clamping, e.g. clamping ring}
21/68728 . . . . . {characterised by a plurality of separate clamping members, e.g. clamping fingers}
21/68735 . . . . . {characterised by edge profile or support profile}
21/68742 . . . . . {characterised by a lifting arrangement, e.g. lift pins}
21/6875 . . . . . {characterised by a plurality of individual support members, e.g. support posts or protrusions}
21/68757 . . . . . {characterised by a coating or a hardness or a material}

21/68764 . . . . . {characterised by a movable susceptor, stage or support, others than those only rotating on their own vertical axis, e.g. susceptors on a rotating caroussel}
21/68771 . . . . . {characterised by supporting more than one semiconductor substrate}
21/68778 . . . . . {characterised by supporting substrates others than wafers, e.g. chips}
21/68785 . . . . . {characterised by the mechanical construction of the susceptor, stage or support}
21/68792 . . . . . {characterised by the construction of the shaft}
21/70 . Manufacture or treatment of devices consisting of a plurality of solid state components formed in or on a common substrate or of parts thereof; Manufacture of integrated circuit devices or of parts thereof ({multistep manufacturing processes of assemblies consisting of a plurality of individual semiconductor or other solid state devices H01L 25/00; } manufacture of assemblies consisting of preformed electrical components H05K 3/00, H05K 13/00)
21/702 . . {of thick-or thin-film circuits or parts thereof}
21/705 . . . {of thick-film circuits or parts thereof}
21/707 . . . {of thin-film circuits or parts thereof}
21/71 . . Manufacture of specific parts of devices defined in group H01L 21/70 ({H01L 21/0405, H01L 21/0445} , H01L 21/28, H01L 21/44, H01L 21/48 take precedence)
21/74 . . . Making of {localized} buried regions, e.g. buried collector layers, internal connections {substrate contacts}
21/743 . . . . {Making of internal connections, substrate contacts}
21/746 . . . . {for AIII-BV integrated circuits}
21/76 . . . Making of isolation regions between components
21/7602 . . . . {between components manufactured in an active substrate comprising SiC compounds}
21/7605 . . . . {between components manufactured in an active substrate comprising AIII BV compounds}
21/7607 . . . . {between components manufactured in an active substrate comprising $A_{II}B_{VI}$ compounds}
21/761 . . . . PN junctions
21/762 . . . . Dielectric regions {, e.g. EPIC dielectric isolation, LOCOS; Trench refilling techniques, SOI technology, use of channel stoppers}
21/76202 . . . . . {using a local oxidation of silicon, e.g. LOCOS, SWAMI, SILO (H01L 21/76235 takes precedence; together with vertical isolation, e.g. LOCOS in a SOI substrate, H01L 21/76264)}
21/76205 . . . . . {in a region being recessed from the surface, e.g. in a recess, groove, tub or trench region}
21/76208 . . . . . {using auxiliary pillars in the recessed region, e.g. to form LOCOS over extended areas}
21/7621 . . . . . {the recessed region having a shape other than rectangular, e.g. rounded or oblique shape (H01L 21/76208 takes precedence)}
21/76213 . . . . . {introducing electrical inactive or active impurities in the local oxidation region, e.g. to alter LOCOS oxide growth characteristics or for additional isolation purpose}
21/76216 . . . . . {introducing electrical active impurities in the local oxidation region for the sole purpose of creating channel stoppers}
21/76218 . . . . . {introducing both types of electrical active impurities in the local oxidation region for the sole purpose of creating channel stoppers, e.g. for isolation of complementary doped regions}
21/76221 . . . . . {with a plurality of successive local oxidation steps}
21/76224 . . . . . {using trench refilling with dielectric materials (trench filling with polycristalline silicon H01L 21/763; together with vertical isolation, e.g. trench refilling in a SOI substrate H01L 21/76264)}
21/76227 . . . . . {the dielectric materials being obtained by full chemical transformation of non-dielectric materials, such as polycristalline silicon, metals}
21/76229 . . . . . {Concurrent filling of a plurality of trenches having a different trench shape or dimension, e.g. rectangular and V-shaped trenches, wide and narrow trenches, shallow and deep trenches}
21/76232 . . . . . {of trenches having a shape other than rectangular or V-shape, e.g. rounded corners, oblique or rounded trench walls (H01L 21/76229 takes precedence)}
21/76235 . . . . . {trench shape altered by a local oxidation of silicon process step, e.g. trench corner rounding by LOCOS}
21/76237 . . . . . {introducing impurities in trench side or bottom walls, e.g. for forming channel stoppers or alter isolation behavior}
21/7624 . . . . . {using semiconductor on insulator [SOI] technology (H01L 21/76297 takes precedence; manufacture of integrated circuits on insulating substrates H01L 21/84; silicon on sapphire [SOS] technology H01L 21/86)}
21/76243 . . . . . {using silicon implanted buried insulating layers, e.g. oxide layers, i.e. SIMOX techniques}
21/76245 . . . . . {using full isolation by porous oxide silicon, i.e. FIPOS techniques}
21/76248 . . . . . {using lateral overgrowth techniques, i.e. ELO techniques}
21/76251 . . . . . {using bonding techniques}
21/76254 . . . . . {with separation/delamination along an ion implanted layer, e.g. Smart-cut, Unibond}
21/76256 . . . . . {using silicon etch back techniques, e.g. BESOI, ELTRAN}
21/76259 . . . . . {with separation/delamination along a porous layer}
21/76262 . . . . . {using selective deposition of single crystal silicon, i.e. SEG techniques}

21/76264 . . . . . {SOI together with lateral isolation, e.g. using local oxidation of silicon, or dielectric or polycristalline material refilled trench or air gap isolation regions, e.g. completely isolated semiconductor islands}

21/76267 . . . . . {Vertical isolation by silicon implanted buried insulating layers, e.g. oxide layers, i.e. SIMOX techniques}

21/7627 . . . . . {Vertical isolation by full isolation by porous oxide silicon, i.e. FIPOS techniques}

21/76272 . . . . . {Vertical isolation by lateral overgrowth techniques, i.e. ELO techniques}

21/76275 . . . . . {Vertical isolation by bonding techniques}

21/76278 . . . . . {Vertical isolation by selective deposition of single crystal silicon, i.e. SEG techniques}

21/76281 . . . . . {Lateral isolation by selective oxidation of silicon}

21/76283 . . . . . {Lateral isolation by refilling of trenches with dielectric material}

21/76286 . . . . . {Lateral isolation by refilling of trenches with polycristalline material}

21/76289 . . . . . {Lateral isolation by air gap}

21/76291 . . . . . {Lateral isolation by field effect}

21/76294 . . . . . {using selective deposition of single crystal silicon, i.e. SEG techniques}

21/76297 . . . . . {Dielectric isolation using EPIC techniques, i.e. epitaxial passivated integrated circuit}

21/763 . . . . Polycrystalline semiconductor regions {(H01L 21/76264 takes precedence)}

21/764 . . . . Air gaps {(H01L 21/76264 takes precedence)}

21/765 . . . . by field effect {(H01L 21/76264 takes precedence)}

21/768 . . . Applying interconnections to be used for carrying current between separate components within a device {comprising conductors and dielectrics}

NOTE

Groups H01L 21/768 - H01L 21/76898cover multi-step processes for manufacturing interconnections. Information peculiar to single-step processes should also be classified in the corresponding group, e.g.

- cleaning H01L 21/02041
- etching H01L 21/311, H01L 21/3213
- masking H01L 21/027, H01L 21/033, H01L 21/31144, H01L 21/32139
- planarizing H01L 21/3105, H01L 21/321

21/76801 . . . . {characterised by the formation and the after-treatment of the dielectrics, e.g. smoothing}

21/76802 . . . . . {by forming openings in dielectrics}

21/76804 . . . . . {by forming tapered via holes}

21/76805 . . . . . {the opening being a via or contact hole penetrating the underlying conductor}

21/76807 . . . . . {for dual damascene structures}

21/76808 . . . . . {involving intermediate temporary filling with material}

21/7681 . . . . . {involving one or more buried masks}

21/76811 . . . . . {involving multiple stacked pre-patterned masks}

21/76813 . . . . . {involving a partial via etch}

21/76814 . . . . . {post-treatment or after-treatment, e.g. cleaning or removal of oxides on underlying conductors}

21/76816 . . . . . {Aspects relating to the layout of the pattern or to the size of vias or trenches (layout of the interconnections per se H01L 23/528; CAD of ICs G06F 30/00)}

21/76817 . . . . . {using printing or stamping techniques}

21/76819 . . . . . {Smoothing of the dielectric (planarisation of insulating materials per se H01L 21/31051)}

21/7682 . . . . . {the dielectric comprising air gaps}

21/76822 . . . . . {Modification of the material of dielectric layers, e.g. grading, after-treatment to improve the stability of the layers, to increase their density etc.}

21/76823 . . . . . {transforming an insulating layer into a conductive layer}

21/76825 . . . . . {by exposing the layer to particle radiation, e.g. ion implantation, irradiation with UV light or electrons etc. (plasma treatment H01L 21/76826)}

21/76826 . . . . . {by contacting the layer with gases, liquids or plasmas}

21/76828 . . . . . {thermal treatment}

21/76829 . . . . . {characterised by the formation of thin functional dielectric layers, e.g. dielectric etch-stop, barrier, capping or liner layers}

21/76831 . . . . . {in via holes or trenches, e.g. non-conductive sidewall liners}

21/76832 . . . . . {Multiple layers}

21/76834 . . . . . {formation of thin insulating films on the sidewalls or on top of conductors (H01L 21/76831 takes precedence)}

21/76835 . . . . . {Combinations of two or more different dielectric layers having a low dielectric constant (H01L 21/76832 takes precedence)}

21/76837 . . . . . {Filling up the space between adjacent conductive structures; Gap-filling properties of dielectrics}

21/76838 . . . . {characterised by the formation and the after-treatment of the conductors (etching for patterning the conductors H01L 21/3213)}

NOTE

When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents are classified in the relevant electrode manufacture groups, e.g. H01L 21/28026

21/7684 . . . . . {Smoothing; Planarisation}

21/76841 . . . . . {Barrier, adhesion or liner layers}

21/76843 . . . . . {formed in openings in a dielectric}

21/76844 . . . . . {Bottomless liners}

21/76846 . . . . . {Layer combinations}

21/76847 . . . . . {the layer being positioned within the main fill metal}
21/76849 . . . . . {the layer being positioned on top of the main fill metal}
21/7685 . . . . . {the layer covering a conductive structure (H01L 21/76849 takes precedence)}
21/76852 . . . . . {the layer also covering the sidewalls of the conductive structure}
21/76853 . . . . . {characterized by particular after-treatment steps}
21/76855 . . . . . {After-treatment introducing at least one additional element into the layer}
21/76856 . . . . . {by treatment in plasmas or gaseous environments, e.g. nitriding a refractory metal liner}
21/76858 . . . . . {by diffusing alloying elements}
21/76859 . . . . . {by ion implantation}
21/76861 . . . . . {Post-treatment or after-treatment not introducing additional chemical elements into the layer}
21/76862 . . . . . {Bombardment with particles, e.g. treatment in noble gas plasmas; UV irradiation}
21/76864 . . . . . {Thermal treatment}
21/76865 . . . . . {Selective removal of parts of the layer (H01L 21/76844 takes precedence)}
21/76867 . . . . . {characterized by methods of formation other than PVD, CVD or deposition from a liquids (PVD H01L 21/2855; CVD H01L 21/28556; deposition from liquids H01L 21/288)}
21/76868 . . . . . {Forming or treating discontinuous thin films, e.g. repair, enhancement or reinforcement of discontinuous thin films}
21/7687 . . . . . {Thin films associated with contacts of capacitors}
21/76871 . . . . . {Layers specifically deposited to enhance or enable the nucleation of further layers, i.e. seed layers}
21/76873 . . . . . {for electroplating}
21/76874 . . . . . {for electroless plating}
21/76876 . . . . . {for deposition from the gas phase, e.g. CVD}
21/76877 . . . . . {Filling of holes, grooves or trenches, e.g. vias, with conductive material}
21/76879 . . . . . {by selective deposition of conductive material in the vias, e.g. selective C.V.D. on semiconductor material, plating (plating on semiconductors in general H01L 21/288)}
21/7688 . . . . . {by deposition over sacrificial masking layer, e.g. lift-off (lift-off per se H01L 21/0272)}
21/76882 . . . . . {Reflowing or applying of pressure to better fill the contact hole}
21/76883 . . . . . {Post-treatment or after-treatment of the conductive material}
21/76885 . . . . . {By forming conductive members before deposition of protective insulating material, e.g. pillars, studs}
21/76886 . . . . . {Modifying permanently or temporarily the pattern or the conductivity of conductive members, e.g. formation of alloys, reduction of contact resistances}
21/76888 . . . . . {By rendering at least a portion of the conductor non conductive, e.g. oxidation}
21/76889 . . . . . {by forming silicides of refractory metals}
21/76891 . . . . . {by using superconducting materials}
21/76892 . . . . . {modifying the pattern}
21/76894 . . . . . {using a laser, e.g. laser cutting, laser direct writing, laser repair}
21/76895 . . . . . {Local interconnects; Local pads, as exemplified by patent document EP0896365}
21/76897 . . . . {Formation of self-aligned vias or contact plugs, i.e. involving a lithographically uncritical step (self-aligned silicidation on field effect transistors H01L 29/665)}
21/76898 . . . . {formed through a semiconductor substrate}
21/77 . . Manufacture or treatment of devices consisting of a plurality of solid state components or integrated circuits formed in, or on, a common substrate (electrically programmable read-only memories or multistep manufacturing processes therefor H10B 69/00)

NOTE

Integration processes for the manufacture of devices of the type classified in H01L 27/14, H01L 27/15, H10N 19/00, H10N 39/00, H10N 59/00, H10N 79/00, H10N 89/00, H10K 19/00, H10K 39/00, H10K 59/00 and H10K 65/00 are not classified in this group and its sub-groups. Instead, as they are peculiar to said devices, they are classified together with the devices Multistep processes for manufacturing memory structures in general using field effect technology are covered by H10B 99/00; Multistep processes for manufacturing dynamic random access memory structures are covered by H10B 12/01; Multistep processes for manufacturing static random access memory structures are covered by H10B 10/00; Multistep processes for manufacturing read-only memory structures are covered by H10B 20/00; Multistep processes for manufacturing electrically programmable read-only memory structures are covered by H10B 69/00

2021/775 . . . {comprising a plurality of TFTs on a non-semiconducting substrate, e.g. driving circuits for AMLCDs}
21/78 . . . with subsequent division of the substrate into plural individual devices (cutting to change the surface-physical characteristics or shape of semiconductor bodies H01L 21/304)
21/7806 . . . . {involving the separation of the active layers from a substrate}
21/7813 . . . . . {leaving a reusable substrate, e.g. epitaxial lift off}

21/782 . . . . to produce devices, each consisting of a single circuit element (H01L 21/82 takes precedence)
21/784 . . . . . the substrate being a semiconductor body
21/786 . . . . . the substrate being other than a semiconductor body, e.g. insulating body
21/82 . . . . to produce devices, e.g. integrated circuits, each consisting of a plurality of components
21/8206 . . . . . {the substrate being a semiconductor, using diamond technology (H01L 21/8258 takes precedence)}
21/8213 . . . . . {the substrate being a semiconductor, using SiC technology (H01L 21/8258 takes precedence)}
21/822 . . . . . the substrate being a semiconductor, using silicon technology (H01L 21/8258 takes precedence)
21/8221 . . . . . {Three dimensional integrated circuits stacked in different levels}
21/8222 . . . . . Bipolar technology
21/8224 . . . . . comprising a combination of vertical and lateral transistors
21/8226 . . . . . comprising merged transistor logic or integrated injection logic
21/8228 . . . . . Complementary devices, e.g. complementary transistors
21/82285 . . . . . {Complementary vertical transistors}
21/8232 . . . . . Field-effect technology
21/8234 . . . . . MIS technology {, i.e. integration processes of field effect transistors of the conductor-insulator-semiconductor type}
21/823406 . . . . . {Combination of charge coupled devices, i.e. CCD, or BBD}
21/823412 . . . . . {with a particular manufacturing method of the channel structures, e.g. channel implants, halo or pocket implants, or channel materials}
21/823418 . . . . . {with a particular manufacturing method of the source or drain structures, e.g. specific source or drain implants or silicided source or drain structures or raised source or drain structures}
21/823425 . . . . . {manufacturing common source or drain regions between a plurality of conductor-insulator-semiconductor structures}
21/823431 . . . . . {with a particular manufacturing method of transistors with a horizontal current flow in a vertical sidewall of a semiconductor body, e.g. FinFET, MuGFET}
21/823437 . . . . . {with a particular manufacturing method of the gate conductors, e.g. particular materials, shapes}
21/823443 . . . . . {silicided or salicided gate conductors}
21/82345 . . . . . {gate conductors with different gate conductor materials or different gate conductor implants, e.g. dual gate structures}
21/823456 . . . . . {gate conductors with different shapes, lengths or dimensions}
21/823462 . . . . . {with a particular manufacturing method of the gate insulating layers, e.g. different gate insulating layer thicknesses, particular gate insulator materials or particular gate insulator implants}
21/823468 . . . . . {with a particular manufacturing method of the gate sidewall spacers, e.g. double spacers, particular spacer material or shape}
21/823475 . . . . . {interconnection or wiring or contact manufacturing related aspects}
21/823481 . . . . . {isolation region manufacturing related aspects, e.g. to avoid interaction of isolation region with adjacent structure}
21/823487 . . . . . {with a particular manufacturing method of vertical transistor structures, i.e. with channel vertical to the substrate surface (with a current flow parallel to the substrate surface H01L 21/823431)}
21/823493 . . . . . {with a particular manufacturing method of the wells or tubs, e.g. twin tubs, high energy well implants, buried implanted layers for lateral isolation [BILLI]}
21/8236 . . . . . Combination of enhancement and depletion transistors
21/8238 . . . . . Complementary field-effect transistors, e.g. CMOS
21/823807 . . . . . {with a particular manufacturing method of the channel structures, e.g. channel implants, halo or pocket implants, or channel materials}
21/823814 . . . . . {with a particular manufacturing method of the source or drain structures, e.g. specific source or drain implants or silicided source or drain structures or raised source or drain structures}
21/823821 . . . . . {with a particular manufacturing method of transistors with a horizontal current flow in a vertical sidewall of a semiconductor body, e.g. FinFET, MuGFET}
21/823828 . . . . . {with a particular manufacturing method of the gate conductors, e.g. particular materials, shapes}
21/823835 . . . . . {silicided or salicided gate conductors}
21/823842 . . . . . {gate conductors with different gate conductor materials or different gate conductor implants, e.g. dual gate structures}
21/82385 . . . . . {gate conductors with different shapes, lengths or dimensions}

21/823857 . . . . . {with a particular manufacturing method of the gate insulating layers, e.g. different gate insulating layer thicknesses, particular gate insulator materials or particular gate insulator implants}

21/823864 . . . . . {with a particular manufacturing method of the gate sidewall spacers, e.g. double spacers, particular spacer material or shape}

21/823871 . . . . . {interconnection or wiring or contact manufacturing related aspects}

21/823878 . . . . . {isolation region manufacturing related aspects, e.g. to avoid interaction of isolation region with adjacent structure}

21/823885 . . . . . {with a particular manufacturing method of vertical transistor structures, i.e. with channel vertical to the substrate surface (with a current flow parallel to the substrate surface H01L 21/823821)}

21/823892 . . . . . {with a particular manufacturing method of the wells or tubs, e.g. twin tubs, high energy well implants, buried implanted layers for lateral isolation [BILLI]}

21/8248 . . . . . Combination of bipolar and field-effect technology

21/8249 . . . . . Bipolar and MOS technology

21/8252 . . . . . the substrate being a semiconductor, using III-V technology (H01L 21/8258 takes precedence)

21/8254 . . . . . the substrate being a semiconductor, using II-VI technology (H01L 21/8258 takes precedence)

21/8256 . . . . . the substrate being a semiconductor, using technologies not covered by one of groups {H01L 21/8206, H01L 21/8213} , H01L 21/822, H01L 21/8252 and H01L 21/8254 (H01L 21/8258 takes precedence)

21/8258 . . . . . the substrate being a semiconductor, using a combination of technologies covered by {H01L 21/8206, H01L 21/8213} , H01L 21/822, H01L 21/8252, H01L 21/8254 or H01L 21/8256

21/84 . . . . . the substrate being other than a semiconductor body, e.g. being an insulating body

21/845 . . . . . {including field-effect transistors with a horizontal current flow in a vertical sidewall of a semiconductor body, e.g. FinFET, MuGFET}

21/86 . . . . . the insulating body being sapphire, e.g. silicon on sapphire structure, i.e. SOS

22/00 **{Testing or measuring during manufacture or treatment; Reliability measurements, i.e. testing of parts without further processing to modify the parts as such; Structural arrangements therefor}**

22/10 . {Measuring as part of the manufacturing process (burn-in G01R 31/2855)}

22/12 . . {for structural parameters, e.g. thickness, line width, refractive index, temperature, warp, bond strength, defects, optical inspection, electrical measurement of structural dimensions, metallurgic measurement of diffusions (electrical measurement of diffusions H01L 22/14)}

22/14 . . {for electrical parameters, e.g. resistance, deep-levels, CV, diffusions by electrical means}

22/20 . {Sequence of activities consisting of a plurality of measurements, corrections, marking or sorting steps}

22/22 . . {Connection or disconnection of sub-entities or redundant parts of a device in response to a measurement (testing and repair of stores after manufacture including at wafer scale G11C 29/00; fuses per se H01L 23/525)}

22/24 . . {Optical enhancement of defects or not directly visible states, e.g. selective electrolytic deposition, bubbles in liquids, light emission, colour change (voltage contrast G01R 31/311)}

22/26 . . {Acting in response to an ongoing measurement without interruption of processing, e.g. endpoint detection, in-situ thickness measurement (endpoint detection arrangements in CMP apparatus B24B 37/013, in discharge apparatus H01J 37/32)}

22/30 . {Structural arrangements specially adapted for testing or measuring during manufacture or treatment, or specially adapted for reliability measurements}

22/32 . . {Additional lead-in metallisation on a device or substrate, e.g. additional pads or pad portions, lines in the scribe line, sacrificed conductors (arrangements for conducting electric current to or from the solid state body in operation H01L 23/48)}

22/34 . . {Circuits for electrically characterising or monitoring manufacturing processes, e. g. whole test die, wafers filled with test structures, on-board-devices incorporated on each die, process control monitors or pad structures thereof, devices in scribe line (switching, multiplexing, gating devices G01R 19/25; process control with lithography, e.g. dose control, G03F 7/20; structures for alignment control by optical means G03F 7/70633)}

23/00 **Details of semiconductor or other solid state devices** (H01L 25/00 takes precedence {; structural arrangements for testing or measuring during manufacture or treatment, or for reliability measurements H01L 22/00; arrangements for connecting or disconnecting semiconductor or solid-state bodies, or methods related thereto H01L 24/00; finger print sensors G06V 40/12})

NOTE

This group does not cover:

- details of semiconductor bodies or of electrodes of devices provided for in group H01L 29/00, which details are covered by that group;
- details peculiar to devices provided for in a single main group of groups H01L 31/00, H01L 33/00, H10K 30/00, H10K 50/00,

H01L 23/00 (continued)

H10K 59/00, H10K 71/00, H10K 85/00, H10K 99/00, H10N 10/00, H10N 30/00, H10N 35/00, H10N 50/00, H10N 52/00, H10N 60/00, which details are covered by those groups.

23/02 . Containers; Seals (H01L 23/12, H01L 23/34, H01L 23/48, H01L 23/552, {H01L 23/66} take precedence; {for memories G11C})

23/04 . . characterised by the shape {of the container or parts, e.g. caps, walls}

23/041 . . . {the container being a hollow construction having no base used as a mounting for the semiconductor body}

23/043 . . . the container being a hollow construction and having a conductive base as a mounting as well as a lead for the semiconductor body

23/045 . . . . the other leads having an insulating passage through the base

23/047 . . . . the other leads being parallel to the base

23/049 . . . . the other leads being perpendicular to the base

23/051 . . . . another lead being formed by a cover plate parallel to the base plate, e.g. sandwich type

23/053 . . . the container being a hollow construction and having an insulating {or insulated} base as a mounting for the semiconductor body

23/055 . . . . the leads having a passage through the base {(H01L 23/057 takes precedence)}

23/057 . . . . the leads being parallel to the base

23/06 . . characterised by the material of the container or its electrical properties

23/08 . . . the material being an electrical insulator, e.g. glass

23/10 . . characterised by the material or arrangement of seals between parts, e.g. between cap and base of the container or between leads and walls of the container

23/12 . Mountings, e.g. non-detachable insulating substrates

23/13 . . characterised by the shape

23/14 . . characterised by the material or its electrical properties {(printed circuit boards H05K 1/00)}

23/142 . . . {Metallic substrates having insulating layers}

23/145 . . . {Organic substrates, e.g. plastic}

23/147 . . . {Semiconductor insulating substrates (semiconductor conductive substrates H01L 23/4926)}

23/15 . . . Ceramic or glass substrates {(H01L 23/142, H01L 23/145, H01L 23/147 take precedence)}

23/16 . Fillings or auxiliary members in containers {or encapsulations}, e.g. centering rings (H01L 23/42, H01L 23/552 take precedence)

23/18 . . Fillings characterised by the material, its physical or chemical properties, or its arrangement within the complete device

NOTE

Group H01L 23/26 takes precedence over groups H01L 23/20 - H01L 23/24

23/20 . . . gaseous at the normal operating temperature of the device

23/22 . . . liquid at the normal operating temperature of the device

23/24 . . . solid or gel at the normal operating temperature of the device {(H01L 23/3135 takes precedence)}

23/26 . . . including materials for absorbing or reacting with moisture or other undesired substances {, e.g. getters}

23/28 . Encapsulations, e.g. encapsulating layers, coatings, {e.g. for protection}(H01L 23/552 takes precedence; {insulating layers for contacts or interconnections H01L 23/5329})

23/29 . . characterised by the material {, e.g. carbon (interlayer dielectrics H01L 23/5329)}

23/291 . . . {Oxides or nitrides or carbides, e.g. ceramics, glass}

23/293 . . . {Organic, e.g. plastic}

23/295 . . . . {containing a filler (H01L 23/296 takes precedence)}

23/296 . . . . {Organo-silicon compounds}

23/298 . . . {Semiconductor material, e.g. amorphous silicon}

23/31 . . characterised by the arrangement {or shape}

23/3107 . . . {the device being completely enclosed}

23/3114 . . . . {the device being a chip scale package, e.g. CSP}

23/3121 . . . . {a substrate forming part of the encapsulation}

23/3128 . . . . . {the substrate having spherical bumps for external connection}

23/3135 . . . . {Double encapsulation or coating and encapsulation}

23/3142 . . . . {Sealing arrangements between parts, e.g. adhesion promotors}

23/315 . . . . {the encapsulation having a cavity}

23/3157 . . . {Partial encapsulation or coating (mask layer used as insulation layer H01L 21/31)}

23/3164 . . . . {the coating being a foil}

23/3171 . . . . {the coating being directly applied to the semiconductor body, e.g. passivation layer (H01L 23/3178 takes precedence)}

23/3178 . . . . {Coating or filling in grooves made in the semiconductor body}

23/3185 . . . . {the coating covering also the sidewalls of the semiconductor body}

23/3192 . . . . {Multilayer coating}

23/32 . Holders for supporting the complete device in operation, i.e. detachable fixtures (H01L 23/40 takes precedence)

23/34 . Arrangements for cooling, heating, ventilating or temperature compensation {; Temperature sensing arrangements (thermal treatment apparatus H01L 21/00)}

23/345 . . {Arrangements for heating (thermal treatment apparatus H01L 21/00)}

23/36 . . Selection of materials, or shaping, to facilitate cooling or heating, e.g. heatsinks {(H01L 23/28, H01L 23/40, H01L 23/42, H01L 23/44, H01L 23/46 take precedence; heating H01L 23/345)}

23/367 . . . Cooling facilitated by shape of device {(H01L 23/38, H01L 23/40, H01L 23/42, H01L 23/44, H01L 23/46 take precedence)}

23/3672 . . . . {Foil-like cooling fins or heat sinks (being part of lead-frames H01L 23/49568)}

23/3675 . . . . {characterised by the shape of the housing}

23/3677 . . . . {Wire-like or pin-like cooling fins or heat sinks}
23/373 . . . Cooling facilitated by selection of materials for the device {or materials for thermal expansion adaptation, e.g. carbon}
23/3731 . . . . {Ceramic materials or glass (H01L 23/3732, H01L 23/3733, H01L 23/3735, H01L 23/3737, H01L 23/3738 take precedence)}
23/3732 . . . . {Diamonds}
23/3733 . . . . {having a heterogeneous or anisotropic structure, e.g. powder or fibres in a matrix, wire mesh, porous structures (H01L 23/3732, H01L 23/3737 take precedence)}
23/3735 . . . . {Laminates or multilayers, e.g. direct bond copper ceramic substrates}
23/3736 . . . . {Metallic materials (H01L 23/3732, H01L 23/3733, H01L 23/3735, H01L 23/3737, H01L 23/3738 take precedence)}
23/3737 . . . . {Organic materials with or without a thermoconductive filler}
23/3738 . . . . {Semiconductor materials}
23/38 . . Cooling arrangements using the Peltier effect
23/40 . . Mountings or securing means for detachable cooling or heating arrangements {(heating H01L 23/345); fixed by friction, plugs or springs}
23/4006 . . . {with bolts or screws}
23/4012 . . . . {for stacked arrangements of a plurality of semiconductor devices (assemblies per se H01L 25/00)}
2023/4018 . . . . {characterised by the type of device to be heated or cooled}
2023/4025 . . . . . {Base discrete devices, e.g. presspack, disc-type transistors}
2023/4031 . . . . . {Packaged discrete devices, e.g. to-3 housings, diodes}
2023/4037 . . . . {characterised by thermal path or place of attachment of heatsink}
2023/4043 . . . . . {heatsink to have chip}
2023/405 . . . . . {heatsink to package}
2023/4056 . . . . . {heatsink to additional heatsink}
2023/4062 . . . . . {heatsink to or through board or cabinet}
2023/4068 . . . . . {Heatconductors between device and heatsink, e.g. compliant heat-spreaders, heat-conducting bands}
2023/4075 . . . . {Mechanical elements}
2023/4081 . . . . . {Compliant clamping elements not primarily serving heat-conduction}
2023/4087 . . . . . {Mounting accessories, interposers, clamping or screwing parts}
23/4093 . . . {Snap-on arrangements, e.g. clips}
23/42 . . Fillings or auxiliary members in containers {or encapsulations} selected or arranged to facilitate heating or cooling
23/427 . . . Cooling by change of state, e.g. use of heat pipes {(by liquefied gas H01L 23/445)}
23/4275 . . . . {by melting or evaporation of solids}
23/433 . . . Auxiliary members {in containers} characterised by their shape, e.g. pistons
23/4332 . . . . {Bellows}
23/4334 . . . . {Auxiliary members in encapsulations (H01L 23/49568 takes precedence)}
23/4336 . . . . {in combination with jet impingement}
23/4338 . . . . {Pistons, e.g. spring-loaded members}
23/44 . . the complete device being wholly immersed in a fluid other than air {(H01L 23/427 takes precedence)}
23/445 . . . {the fluid being a liquefied gas, e.g. in a cryogenic vessel}
23/46 . . involving the transfer of heat by flowing fluids (H01L 23/42, H01L 23/44 take precedence)
23/467 . . . by flowing gases, e.g. air {(H01L 23/473 takes precedence)}
23/473 . . . by flowing liquids {(H01L 23/4332, H01L 23/4338 take precedence)}
23/4735 . . . . {Jet impingement (H01L 23/4336 takes precedence)}
23/48 . Arrangements for conducting electric current to or from the solid state body in operation, e.g. leads, terminal arrangements {; Selection of materials therefor}

NOTE

Arrangements for connecting or disconnecting semiconductor or other solid state bodies, or methods related thereto, other than those arrangements or methods covered by the following subgroups, are covered by H01L 24/00

23/481 . . {Internal lead connections, e.g. via connections, feedthrough structures}
23/482 . . consisting of lead-in layers inseparably applied to the semiconductor body {(electrodes H01L 29/40)}
23/4821 . . . {Bridge structure with air gap}
23/4822 . . . {Beam leads}
23/4824 . . . {Pads with extended contours, e.g. grid structure, branch structure, finger structure}
23/4825 . . . {for devices consisting of semiconductor layers on insulating or semi-insulating substrates, e.g. silicon on sapphire devices, i.e. SOS}
23/4827 . . . {Materials}
23/4828 . . . . {Conductive organic material or pastes, e.g. conductive adhesives, inks}
23/485 . . . consisting of layered constructions comprising conductive layers and insulating layers, e.g. planar contacts {(H01L 23/4821, H01L 23/4822, H01L 23/4824, H01L 23/4825 take precedence; materials H01L 23/532, bond pads H01L 24/02, bump connectors H01L 24/10)}
23/4855 . . . . {Overhang structure}
23/488 . . consisting of soldered {or bonded} constructions {(bump connectors H01L 24/01)}
23/49 . . . wire-like {arrangements or pins or rods (using optical fibres H01L 23/48; pins attached to insulating substrates H01L 23/49811)}
23/492 . . . Bases or plates {or solder therefor}
23/4922 . . . . {having a heterogeneous or anisotropic structure}
23/4924 . . . . {characterised by the materials}
23/4926 . . . . . {the materials containing semiconductor material}
23/4928 . . . . . {the materials containing carbon}
23/495 . . . Lead-frames {or other flat leads (H01L 23/498 takes precedence; lead frame interconnections between components H01L 23/52)}
23/49503 . . . . {characterised by the die pad}

23/49506 . . . . . {an insulative substrate being used as a diepad, e.g. ceramic, plastic (H01L 23/49531 takes precedence)}
23/4951 . . . . . {Chip-on-leads or leads-on-chip techniques, i.e. inner lead fingers being used as die pad}
23/49513 . . . . . {having bonding material between chip and die pad}
23/49517 . . . . {Additional leads}
23/4952 . . . . . {the additional leads being a bump or a wire}
23/49524 . . . . . {the additional leads being a tape carrier or flat leads}
23/49527 . . . . . {the additional leads being a multilayer}
23/49531 . . . . . {the additional leads being a wiring board}
23/49534 . . . . {Multi-layer}
23/49537 . . . . {Plurality of lead frames mounted in one device}
23/49541 . . . . {Geometry of the lead-frame}
23/49544 . . . . . {Deformation absorbing parts in the lead frame plane, e.g. meanderline shape (H01L 23/49562 takes precedence)}
23/49548 . . . . . {Cross section geometry (H01L 23/49562 takes precedence)}
23/49551 . . . . . {characterised by bent parts}
23/49555 . . . . . {the bent parts being the outer leads}
23/49558 . . . . . {Insulating layers on lead frames, e.g. bridging members}
23/49562 . . . . . {for devices being provided for in H01L 29/00}
23/49565 . . . . . {Side rails of the lead frame, e.g. with perforations, sprocket holes}
23/49568 . . . . {specifically adapted to facilitate heat dissipation}
23/49572 . . . . {consisting of thin flexible metallic tape with or without a film carrier (H01L 23/49503 - H01L 23/49568 and H01L 23/49575 - H01L 23/49579 take precedence)}
23/49575 . . . . {Assemblies of semiconductor devices on lead frames}
23/49579 . . . . {characterised by the materials of the lead frames or layers thereon}
23/49582 . . . . . {Metallic layers on lead frames}
23/49586 . . . . . {Insulating layers on lead frames}
23/49589 . . . . {Capacitor integral with or on the leadframe}
23/49593 . . . . {Battery in combination with a leadframe}
23/49596 . . . . {Oscillators in combination with lead-frames}
23/498 . . . Leads, {i.e. metallisations or lead-frames} on insulating substrates, {e.g. chip carriers (shape of the substrate H01L 23/13)}
23/49805 . . . . {the leads being also applied on the sidewalls or the bottom of the substrate, e.g. leadless packages for surface mounting}
23/49811 . . . . {Additional leads joined to the metallisation on the insulating substrate, e.g. pins, bumps, wires, flat leads (H01L 23/49827 takes precedence)}
23/49816 . . . . . {Spherical bumps on the substrate for external connection, e.g. ball grid arrays [BGA]}
23/49822 . . . . {Multilayer substrates (multilayer metallisation on monolayer substrate H01L 23/498)}
23/49827 . . . . {Via connections through the substrates, e.g. pins going through the substrate, coaxial cables (H01L 23/49822, H01L 23/49833, H01L 23/4985, H01L 23/49861 take precedence)}
23/49833 . . . . {the chip support structure consisting of a plurality of insulating substrates}
23/49838 . . . . {Geometry or layout}
23/49844 . . . . . {for devices being provided for in H01L 29/00}
23/4985 . . . . {Flexible insulating substrates (H01L 23/49572 and H01L 23/49855 take precedence)}
23/49855 . . . . {for flat-cards, e.g. credit cards (cards per se G06K 19/00)}
23/49861 . . . . {Lead-frames fixed on or encapsulated in insulating substrates (H01L 23/4985, H01L 23/49805 take precedence)}
23/49866 . . . . {characterised by the materials (materials of the substrates H01L 23/14, of the lead-frames H01L 23/49579)}
23/49872 . . . . . {the conductive materials containing semiconductor material}
23/49877 . . . . . {Carbon, e.g. fullerenes (superconducting fullerenes H10N 60/853)}
23/49883 . . . . . {the conductive materials containing organic materials or pastes, e.g. for thick films (for printed circuits H05K 1/092)}
23/49888 . . . . . {the conductive materials containing superconducting material}
23/49894 . . . . . {Materials of the insulating layers or coatings}
23/50 . . for integrated circuit devices, {e.g. power bus, number of leads}(H01L 23/482 - H01L 23/498 take precedence)
23/52 . Arrangements for conducting electric current within the device in operation from one component to another {, i.e. interconnections, e.g. wires, lead frames (optical interconnections G02B 6/00)}
23/522 . . including external interconnections consisting of a multilayer structure of conductive and insulating layers inseparably formed on the semiconductor body
23/5221 . . . {Crossover interconnections}
23/5222 . . . {Capacitive arrangements or effects of, or between wiring layers (other capacitive arrangements H01L 23/642)}
23/5223 . . . . {Capacitor integral with wiring layers}
23/5225 . . . . {Shielding layers formed together with wiring layers}
23/5226 . . . {Via connections in a multilevel interconnection structure}
23/5227 . . . {Inductive arrangements or effects of, or between, wiring layers (other inductive arrangements H01L 23/645)}
23/5228 . . . {Resistive arrangements or effects of, or between, wiring layers (other resistive arrangements H01L 23/647)}
23/525 . . . with adaptable interconnections
23/5252 . . . . {comprising anti-fuses, i.e. connections having their state changed from non-conductive to conductive}

23/5254 . . . . . {the change of state resulting from the use of an external beam, e.g. laser beam or ion beam}

23/5256 . . . . {comprising fuses, i.e. connections having their state changed from conductive to non-conductive}

23/5258 . . . . . {the change of state resulting from the use of an external beam, e.g. laser beam or ion beam}

23/528 . . . {Geometry or} layout of the interconnection structure {(H01L 27/0207 takes precedence; algorithms G06F 30/00)}

23/5283 . . . . {Cross-sectional geometry}

23/5286 . . . . {Arrangements of power or ground buses}

23/532 . . . characterised by the materials

23/53204 . . . . {Conductive materials}

23/53209 . . . . . {based on metals, e.g. alloys, metal silicides (H01L 23/53285 takes precedence)}

23/53214 . . . . . {the principal metal being aluminium}

23/53219 . . . . . {Aluminium alloys}

23/53223 . . . . . {Additional layers associated with aluminium layers, e.g. adhesion, barrier, cladding layers}

23/53228 . . . . . {the principal metal being copper}

23/53233 . . . . . {Copper alloys}

23/53238 . . . . . {Additional layers associated with copper layers, e.g. adhesion, barrier, cladding layers}

23/53242 . . . . . {the principal metal being a noble metal, e.g. gold}

23/53247 . . . . . {Noble-metal alloys}

23/53252 . . . . . {Additional layers associated with noble-metal layers, e.g. adhesion, barrier, cladding layers}

23/53257 . . . . . {the principal metal being a refractory metal}

23/53261 . . . . . {Refractory-metal alloys}

23/53266 . . . . . {Additional layers associated with refractory-metal layers, e.g. adhesion, barrier, cladding layers}

23/53271 . . . . . {containing semiconductor material, e.g. polysilicon}

23/53276 . . . . . {containing carbon, e.g. fullerenes (superconducting fullerenes H10N 60/853)}

23/5328 . . . . . {containing conductive organic materials or pastes, e.g. conductive adhesives, inks}

23/53285 . . . . . {containing superconducting materials}

23/5329 . . . . {Insulating materials}

23/53295 . . . . . {Stacked insulating layers}

23/535 . . including internal interconnections, e.g. cross-under constructions {(internal lead connections H01L 23/481)}

23/538 . . the interconnection structure between a plurality of semiconductor chips being formed on, or in, insulating substrates ({H05K takes precedence; manufacture or treatment H01L 21/4846} ; mountings per se H01L 23/12; {materials H01L 23/49866})

23/5381 . . . {Crossover interconnections, e.g. bridge stepovers}

23/5382 . . . {Adaptable interconnections, e.g. for engineering changes}

23/5383 . . . {Multilayer substrates (H01L 23/5385 takes precedence; multilayer metallisation on monolayer substrates H01L 23/538)}

23/5384 . . . {Conductive vias through the substrate with or without pins, e.g. buried coaxial conductors (H01L 23/5383, H01L 23/5385 take precedence; pins attached to insulating substrates H01L 23/49811)}

23/5385 . . . {Assembly of a plurality of insulating substrates}

23/5386 . . . {Geometry or layout of the interconnection structure}

23/5387 . . . {Flexible insulating substrates (H01L 23/5388 takes precedence)}

23/5388 . . . {for flat cards, e.g. credit cards (cards per se G06K 19/00)}

23/5389 . . . {the chips being integrally enclosed by the interconnect and support structures}

23/544 . Marks applied to semiconductor devices {or parts}, e.g. registration marks, {alignment structures, wafer maps (test patterns for characterising or monitoring manufacturing processes H01L 22/00)}

NOTE

When classifying in group H01L 23/544, details are to be further indexed by using the indexing codes chosen from H01L 2223/544 and subgroups

23/552 . Protection against radiation, e.g. light {or electromagnetic waves}

23/556 . . against alpha rays

23/562 . {Protection against mechanical damage (H01L 23/02, H01L 23/28 take precedence)}

23/564 . {Details not otherwise provided for, e.g. protection against moisture (getters H01L 23/26)}

23/57 . {Protection from inspection, reverse engineering or tampering}

23/573 . . {using passive means}

23/576 . . {using active circuits}

23/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for {, e.g. in combination with batteries (H01L 23/49593, H01L 23/49596 take precedence)}

23/585 . . {comprising conductive layers or plates or strips or rods or rings (H01L 23/60, H01L 23/62, H01L 23/64, H01L 23/66 take precedence)}

23/60 . . Protection against electrostatic charges or discharges, e.g. Faraday shields

23/62 . . Protection against overvoltage, e.g. fuses, shunts

23/64 . . Impedance arrangements

23/642 . . . {Capacitive arrangements (H01L 23/49589, H01L 23/645, H01L 23/647, H01L 23/66 take precedence; capacitive effects between wiring layers on the semiconductor body H01L 23/5222)}

23/645 . . . {Inductive arrangements (H01L 23/647, H01L 23/66 take precedence)}

23/647 . . . {Resistive arrangements (H01L 23/66, H01L 23/62 take precedence)}

23/66 . . . High-frequency adaptations

NOTE

When classifying in group H01L 23/66, details are to be further indexed by using the

H01L 23/66 (continued)

indexing codes chosen from H01L 2223/66 and subgroups

24/00 {Arrangements for connecting or disconnecting semiconductor or solid-state bodies; Methods or apparatus related thereto}

NOTES

1. This group does not cover:
   - details of semiconductor bodies or of electrodes of devices provided for in group H01L 29/00, which details are covered by that group;
   - details peculiar to devices provided for in a single main group of groups H01L 31/00, H01L 33/00, H10K 30/00, H10K 50/00, H10K 59/00, H10K 71/00, H10K 85/00, H10K 99/00, H10N 10/00, H10N 30/00, H10N 35/00, H10N 50/00, H10N 52/00, H10N 60/00, which details are covered by those groups.
   - printed circuits, which are covered by groups H05K 1/00 - H05K 1/189;
   - apparatus or manufacturing processes for printed circuits, which are covered by groups H05K 3/00 - H05K 3/4685;
   - manufacture or treatment of parts, which are covered by group H01L 21/48 and subgroups except H01L 21/4885 - H01L 21/4896;
   - assemblies of semiconductor devices, which are covered by groups H01L 21/50 - H01L 21/568;
   - applying interconnections to be used for carrying current between separate components within a device, which is covered by group H01L 21/768 and subgroups;
   - containers or seals, which are covered by groups H01L 23/02 - H01L 23/10;
   - mountings, which are covered by groups H01L 23/12 - H01L 23/15 and subgroups;
   - arrangements for cooling, heating, ventilating or temperature compensation, which are covered by groups H01L 23/34 - H01L 23/4735;
   - arrangements for conducting electric current, which are covered by groups H01L 23/48 - H01L 23/50, and by groups H01L 23/52 - H01L 23/5389;
   - structural electrical arrangements, which are covered by groups H01L 23/58 - H01L 23/66;
   - assemblies of semiconductor or other solid state devices, which are covered by groups H01L 25/00 - H01L 25/18.
2. In this group the following indexing codes are used : H01L 24/00, H01L 2224/00, H01L 2924/00, and subgroups thereof

24/01 . {Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chip-to-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto}

24/02 . . {Bonding areas (on insulating substrates, e.g. chip carriers, H01L 23/49816, H01L 23/49838, H01L 23/5389); Manufacturing methods related thereto}

24/03 . . . {Manufacturing methods}

24/04 . . . {Structure, shape, material or disposition of the bonding areas prior to the connecting process}

24/05 . . . . {of an individual bonding area}

24/06 . . . . {of a plurality of bonding areas}

24/07 . . . {Structure, shape, material or disposition of the bonding areas after the connecting process}

24/08 . . . . {of an individual bonding area}

24/09 . . . . {of a plurality of bonding areas}

24/10 . . {Bump connectors (bumps on insulating substrates, e.g. chip carriers, H01L 23/49816); Manufacturing methods related thereto}

24/11 . . . {Manufacturing methods (for bumps on insulating substrates H01L 21/4853)}

24/12 . . . {Structure, shape, material or disposition of the bump connectors prior to the connecting process}

24/13 . . . . {of an individual bump connector}

24/14 . . . . {of a plurality of bump connectors}

24/15 . . . {Structure, shape, material or disposition of the bump connectors after the connecting process}

24/16 . . . . {of an individual bump connector}

24/17 . . . . {of a plurality of bump connectors}

24/18 . . {High density interconnect [HDI] connectors; Manufacturing methods related thereto (interconnection structure between a plurality of semiconductor chips H01L 23/5389)}

24/19 . . . {Manufacturing methods of high density interconnect preforms}

24/20 . . . {Structure, shape, material or disposition of high density interconnect preforms}

24/23 . . . {Structure, shape, material or disposition of the high density interconnect connectors after the connecting process}

24/24 . . . . {of an individual high density interconnect connector}

24/25 . . . . {of a plurality of high density interconnect connectors}

24/26 . . {Layer connectors, e.g. plate connectors, solder or adhesive layers; Manufacturing methods related thereto}

24/27 . . . {Manufacturing methods}

24/28 . . . {Structure, shape, material or disposition of the layer connectors prior to the connecting process}

24/29 . . . . {of an individual layer connector}

24/30 . . . . {of a plurality of layer connectors}

24/31 . . . {Structure, shape, material or disposition of the layer connectors after the connecting process}

24/32 . . . . {of an individual layer connector}

24/33 . . . . {of a plurality of layer connectors}

24/34 . . {Strap connectors, e.g. copper straps for grounding power devices; Manufacturing methods related thereto}

24/35 . . . {Manufacturing methods}

24/36 . . . {Structure, shape, material or disposition of the strap connectors prior to the connecting process}

24/37 . . . . {of an individual strap connector}

24/38 . . . . {of a plurality of strap connectors}

24/39 . . . {Structure, shape, material or disposition of the strap connectors after the connecting process}

24/40 . . . . {of an individual strap connector}

24/41 . . . . {of a plurality of strap connectors}

24/42 . . {Wire connectors; Manufacturing methods related thereto}

24/43 . . . {Manufacturing methods}

24/44 . . . {Structure, shape, material or disposition of the wire connectors prior to the connecting process}
24/45 . . . . {of an individual wire connector}
24/46 . . . . {of a plurality of wire connectors}
24/47 . . . {Structure, shape, material or disposition of the wire connectors after the connecting process}
24/48 . . . . {of an individual wire connector}
24/49 . . . . {of a plurality of wire connectors}
24/50 . . {Tape automated bonding [TAB] connectors, i.e. film carriers; Manufacturing methods related thereto (thin flexible metallic tape with or without a film carrier H01L 23/49572, flexible insulating substrates H01L 23/4985, H01L 23/5387)}
24/63 . . {Connectors not provided for in any of the groups H01L 24/10 - H01L 24/50 and subgroups; Manufacturing methods related thereto}
24/64 . . . {Manufacturing methods}
24/65 . . . {Structure, shape, material or disposition of the connectors prior to the connecting process}
24/66 . . . . {of an individual connector}
24/67 . . . . {of a plurality of connectors}
24/68 . . . {Structure, shape, material or disposition of the connectors after the connecting process}
24/69 . . . . {of an individual connector}
24/70 . . . . {of a plurality of connectors}
24/71 . {Means for bonding not being attached to, or not being formed on, the surface to be connected (holders for supporting the complete device in operation H01L 23/32)}
24/72 . . {Detachable connecting means consisting of mechanical auxiliary parts connecting the device, e.g. pressure contacts using springs or clips}
24/73 . {Means for bonding being of different types provided for in two or more of groups H01L 24/10, H01L 24/18, H01L 24/26, H01L 24/34, H01L 24/42, H01L 24/50, H01L 24/63, H01L 24/71}
24/74 . {Apparatus for manufacturing arrangements for connecting or disconnecting semiconductor or solid-state bodies}
24/741 . . {Apparatus for manufacturing means for bonding, e.g. connectors}
24/742 . . . {Apparatus for manufacturing bump connectors}
24/743 . . . {Apparatus for manufacturing layer connectors}
24/744 . . . {Apparatus for manufacturing strap connectors}
24/745 . . . {Apparatus for manufacturing wire connectors}
24/75 . . {Apparatus for connecting with bump connectors or layer connectors}
24/76 . . {Apparatus for connecting with build-up interconnects}
24/77 . . {Apparatus for connecting with strap connectors}
24/78 . . {Apparatus for connecting with wire connectors}
24/79 . . {Apparatus for Tape Automated Bonding [TAB]}
24/799 . . {Apparatus for disconnecting}
24/80 . {Methods for connecting semiconductor or other solid state bodies using means for bonding being attached to, or being formed on, the surface to be connected}
24/81 . . {using a bump connector}
24/82 . . {by forming build-up interconnects at chip-level, e.g. for high density interconnects [HDI] (interconnection structure between a plurality of semiconductor chips H01L 23/5389)}
24/83 . . {using a layer connector}
24/84 . . {using a strap connector}
24/85 . . {using a wire connector (wire bonding in general B23K 20/004)}
24/86 . . {using tape automated bonding [TAB]}
24/89 . . {using at least one connector not provided for in any of the groups H01L 24/81 - H01L 24/86}
24/90 . {Methods for connecting semiconductor or solid state bodies using means for bonding not being attached to, or not being formed on, the body surface to be connected, e.g. pressure contacts using springs or clips}
24/91 . {Methods for connecting semiconductor or solid state bodies including different methods provided for in two or more of groups H01L 24/80 - H01L 24/90}
24/92 . . {Specific sequence of method steps}
24/93 . {Batch processes}
24/94 . . {at wafer-level, i.e. with connecting carried out on a wafer comprising a plurality of undiced individual devices}
24/95 . . {at chip-level, i.e. with connecting carried out on a plurality of singulated devices, i.e. on diced chips}
24/96 . . . {the devices being encapsulated in a common layer, e.g. neo-wafer or pseudo-wafer, said common layer being separable into individual assemblies after connecting}
24/97 . . . {the devices being connected to a common substrate, e.g. interposer, said common substrate being separable into individual assemblies after connecting}
24/98 . {Methods for disconnecting semiconductor or solid-state bodies}

25/00 **Assemblies consisting of a plurality of individual semiconductor or other solid state devices {; Multistep manufacturing processes thereof}** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00; photovoltaic modules or arrays of photovoltaic cells H01L 31/042 {; panels or arrays of photo electrochemical cells H01G 9/2068})

NOTE

{This group does not cover:
- · assemblies of electronic memory devices only, which are covered by H10B 80/00;
- assemblies of organic devices only, which are covered by groups H10K 19/00, H10K 39/00, H10K 59/00 or H10K 65/00;
- assemblies of electric solid-state devices only, which are covered by groups H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 or H10N 89/00.}

25/03 . all the devices being of a type provided for in the same subgroup of groups H01L 27/00 - H01L 33/00, or in a single subclass of H10K, H10N, e.g. assemblies of rectifier diodes

25/04 . . the devices not having separate containers

WARNING

Group H01L 25/04 is impacted by reclassification into groups H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00.

All groups listed in this Warning should be considered in order to perform a complete search.

25/041 . . . {the devices being of a type provided for in group H01L 31/00}

25/042 . . . . {the devices being arranged next to each other (solar cells H01L 31/042)}

25/043 . . . . {Stacked arrangements of devices}

25/065 . . . the devices being of a type provided for in group H01L 27/00

NOTE

Group H01L 25/0652 takes precedence over groups H01L 25/0655 and H01L 25/0657

WARNING

Group H01L 25/065 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00.

All groups listed in this Warning should be considered in order to perform a complete search.

25/0652 . . . . {the devices being arranged next and on each other, i.e. mixed assemblies}

WARNING

Group H01L 25/0652 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00.

All groups listed in this Warning should be considered in order to perform a complete search.

25/0655 . . . . {the devices being arranged next to each other}

WARNING

Group H01L 25/0655 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00.

All groups listed in this Warning should be considered in order to perform a complete search.

25/0657 . . . . {Stacked arrangements of devices}

WARNING

Group H01L 25/0657 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00.

All groups listed in this Warning should be considered in order to perform a complete search.

25/07 . . . the devices being of a type provided for in group H01L 29/00

NOTE

Group H01L 25/071 takes precedence over groups H01L 25/072 - H01L 25/074

25/071 . . . . {the devices being arranged next and on each other, i.e. mixed assemblies}

25/072 . . . . {the devices being arranged next to each other}

25/073 . . . . {Apertured devices mounted on one or more rods passed through the apertures}

25/074 . . . . {Stacked arrangements of non-apertured devices}

25/075 . . . the devices being of a type provided for in group H01L 33/00

25/0753 . . . . {the devices being arranged next to each other}

25/0756 . . . . {Stacked arrangements of devices}

25/10 . . the devices having separate containers

25/105 . . . {the devices being of a type provided for in group H01L 27/00}

NOTE

When classifying in group H01L 25/105, details of the assemblies are to be further indexed by using the indexing codes chosen from H01L 2225/1005 and subgroups

25/11 . . . the devices being of a type provided for in group H01L 29/00

NOTE

Group H01L 25/112 takes precedence over groups H01L 25/115 and H01L 25/117

25/112 . . . . {Mixed assemblies}

25/115 . . . . {the devices being arranged next to each other}

25/117 . . . . {Stacked arrangements of devices}

25/13 . . . the devices being of a type provided for in group H01L 33/00

25/16 . the devices being of types provided for in two or more different main groups of groups H01L 27/00 - H01L 33/00, or in a single subclass of H10K, H10N, e.g. forming hybrid circuits

WARNING

Group H01L 25/16 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00.

All groups listed in this Warning should be considered in order to perform a complete search.

25/162 . . {the devices being mounted on two or more different substrates}

WARNING

Group H01L 25/162 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00.

All groups listed in this Warning should be considered in order to perform a complete search.

25/165 . . {Containers}

WARNING

Group H01L 25/165 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00.

All groups listed in this Warning should be considered in order to perform a complete search.

25/167 . . {comprising optoelectronic devices, e.g. LED, photodiodes}

WARNING

Group H01L 25/167 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00.

All groups listed in this Warning should be considered in order to perform a complete search.

25/18 . the devices being of types provided for in two or more different subgroups of the same main group of groups H01L 27/00 - H01L 33/00, or in a single subclass of H10K, H10N

WARNING

Group H01L 25/18 is impacted by reclassification into groups H10B 80/00, H10K 19/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10K 65/00, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00.

All groups listed in this Warning should be considered in order to perform a complete search.

25/50 . {Multistep manufacturing processes of assemblies consisting of devices, each device being of a type provided for in group H01L 27/00 or H01L 29/00 (H01L 21/50 takes precedence)}

27/00 Devices consisting of a plurality of semiconductor or other solid-state components formed in or on a common substrate (details thereof H01L 23/00, H01L 29/00 - H10K 10/00; assemblies consisting of a plurality of individual solid state devices H01L 25/00)

NOTE

In this group the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place.

27/01 . comprising only passive thin-film or thick-film elements formed on a common insulating substrate {(passive two-terminal components without a potential-jump or surface barrier for integrated circuits, details thereof and multistep manufacturing processes therefor H01L 28/00)}

27/013 . . {Thick-film circuits}

27/016 . . {Thin-film circuits}

27/02 . including semiconductor components specially adapted for rectifying, oscillating, amplifying or switching and having potential barriers; including integrated passive circuit elements having potential barriers

27/0203 . . {Particular design considerations for integrated circuits}

27/0207 . . . {Geometrical layout of the components, e.g. computer aided design; custom LSI, semi-custom LSI, standard cell technique}

27/0211 . . . . {adapted for requirements of temperature}

27/0214 . . . {for internal polarisation, e.g. I2L}

27/0218 . . . . {of field effect structures}

27/0222 . . . . . {Charge pumping, substrate bias generation structures}

27/0225 . . . . . {Charge injection in static induction transistor logic structures [SITL]}

27/0229 . . . . {of bipolar structures}

27/0233 . . . . . {Integrated injection logic structures [I2L]}

27/0237 . . . . . {using vertical injector structures}

27/024 . . . . . {using field effect injector structures}

27/0244 . . . . . {I2L structures integrated in combination with analog structures}
27/0248 . . . {for electrical or thermal protection, e.g. electrostatic discharge [ESD] protection}
27/0251 . . . . {for MOS devices}
27/0255 . . . . . {using diodes as protective elements}
27/0259 . . . . . {using bipolar transistors as protective elements}
27/0262 . . . . . {including a PNP transistor and a NPN transistor, wherein each of said transistors has its base coupled to the collector of the other transistor, e.g. silicon controlled rectifier [SCR] devices}
27/0266 . . . . . {using field effect transistors as protective elements}
27/027 . . . . . {specially adapted to provide an electrical current path other than the field effect induced current path}
27/0274 . . . . . {involving a parasitic bipolar transistor triggered by the electrical biasing of the gate electrode of the field effect transistor, e.g. gate coupled transistors}
27/0277 . . . . . {involving a parasitic bipolar transistor triggered by the local electrical biasing of the layer acting as base of said parasitic bipolar transistor}
27/0281 . . . . . {field effect transistors in a "Darlington-like" configuration}
27/0285 . . . . . {bias arrangements for gate electrode of field effect transistors, e.g. RC networks, voltage partitioning circuits (H01L 27/0281 takes precedence)}
27/0288 . . . . . {using passive elements as protective elements, e.g. resistors, capacitors, inductors, spark-gaps}
27/0292 . . . . . {using a specific configuration of the conducting means connecting the protective devices, e.g. ESD buses}
27/0296 . . . . . {involving a specific disposition of the protective devices}
27/04 . . the substrate being a semiconductor body
27/06 . . . including a plurality of individual components in a non-repetitive configuration
27/0605 . . . . {integrated circuits made of compound material, e.g. $A_{III}B_V$}
27/0611 . . . . {integrated circuits having a two-dimensional layout of components without a common active region}
27/0617 . . . . . {comprising components of the field-effect type (H01L 27/0251 takes precedence)}
27/0623 . . . . . {in combination with bipolar transistors}
27/0629 . . . . . {in combination with diodes, or resistors, or capacitors}
27/0635 . . . . . {in combination with bipolar transistors and diodes, or resistors, or capacitors}
27/0641 . . . . . {without components of the field effect type}
27/0647 . . . . . {Bipolar transistors in combination with diodes, or capacitors, or resistors, e.g. vertical bipolar transistor and bipolar lateral transistor and resistor}
27/0652 . . . . . {Vertical bipolar transistor in combination with diodes, or capacitors, or resistors}
27/0658 . . . . . {Vertical bipolar transistor in combination with resistors or capacitors}
27/0664 . . . . . {Vertical bipolar transistor in combination with diodes}
27/067 . . . . . {Lateral bipolar transistor in combination with diodes, or capacitors, or resistors}
27/0676 . . . . . {comprising combinations of diodes, or capacitors or resistors}
27/0682 . . . . . {comprising combinations of capacitors and resistors}
27/0688 . . . . {Integrated circuits having a three-dimensional layout}
27/0694 . . . . . {comprising components formed on opposite sides of a semiconductor substrate}
27/07 . . . . the components having an active region in common
27/0705 . . . . . {comprising components of the field effect type}
27/0711 . . . . . {in combination with bipolar transistors and diodes, or capacitors, or resistors}
27/0716 . . . . . {in combination with vertical bipolar transistors and diodes, or capacitors, or resistors}
27/0722 . . . . . {in combination with lateral bipolar transistors and diodes, or capacitors, or resistors}
27/0727 . . . . . {in combination with diodes, or capacitors or resistors}
27/0733 . . . . . {in combination with capacitors only}
27/0738 . . . . . {in combination with resistors only}
27/0744 . . . . . {without components of the field effect type}
27/075 . . . . . {Bipolar transistors in combination with diodes, or capacitors, or resistors, e.g. lateral bipolar transistor, and vertical bipolar transistor and resistor}
27/0755 . . . . . {Vertical bipolar transistor in combination with diodes, or capacitors, or resistors}
27/0761 . . . . . {Vertical bipolar transistor in combination with diodes only}
27/0766 . . . . . {with Schottky diodes only}
27/0772 . . . . . {Vertical bipolar transistor in combination with resistors only}
27/0777 . . . . . {Vertical bipolar transistor in combination with capacitors only}
27/0783 . . . . . {Lateral bipolar transistors in combination with diodes, or capacitors, or resistors}
27/0788 . . . . . {comprising combinations of diodes or capacitors or resistors}
27/0794 . . . . . {Combinations of capacitors and resistors}
27/08 . . . including only semiconductor components of a single kind
27/0802 . . . . {Resistors only}
27/0805 . . . . {Capacitors only}
27/0808 . . . . . {Varactor diodes}

27/0811 . . . . . {MIS diodes}
27/0814 . . . . {Diodes only}
27/0817 . . . . {Thyristors only}
27/082 . . . . including bipolar components only
27/0821 . . . . . {Combination of lateral and vertical transistors only}
27/0823 . . . . . {including vertical bipolar transistors only}
27/0825 . . . . . {Combination of vertical direct transistors of the same conductivity type having different characteristics,(e.g. Darlington transistors)}
27/0826 . . . . . {Combination of vertical complementary transistors}
27/0828 . . . . . {Combination of direct and inverse vertical transistors}
27/085 . . . . including field-effect components only
27/088 . . . . . the components being field-effect transistors with insulated gate
27/0883 . . . . . {Combination of depletion and enhancement field effect transistors}
27/0886 . . . . . {including transistors with a horizontal current flow in a vertical sidewall of a semiconductor body, e.g. FinFET, MuGFET}
27/092 . . . . . complementary MIS field-effect transistors
27/0921 . . . . . {Means for preventing a bipolar, e.g. thyristor, action between the different transistor regions, e.g. Latchup prevention}
27/0922 . . . . . {Combination of complementary transistors having a different structure, e.g. stacked CMOS, high-voltage and low-voltage CMOS}
27/0924 . . . . . {including transistors with a horizontal current flow in a vertical sidewall of a semiconductor body, e.g. FinFET, MuGFET}
27/0925 . . . . . {comprising an N-well only in the substrate}
27/0927 . . . . . {comprising a P-well only in the substrate}
27/0928 . . . . . {comprising both N- and P- wells in the substrate, e.g. twin-tub}
27/095 . . . . . the components being Schottky barrier gate field-effect transistors
27/098 . . . . . the components being PN junction gate field-effect transistors
27/10 . . . including a plurality of individual components in a repetitive configuration

WARNING

Group H01L 27/10 is impacted by reclassification into group H10B 99/10.

Groups H01L 27/10 and H10B 99/10 should be considered in order to perform a complete search.

27/101 . . . . {including resistors or capacitors only}

WARNING

Group H01L 27/101 is impacted by reclassification into group H10B 99/14.

Groups H01L 27/101 and H10B 99/14 should be considered in order to perform a complete search.

27/102 . . . . including bipolar components

WARNING

Group H01L 27/102 is impacted by reclassification into group H10B 99/00.

Groups H01L 27/102 and H10B 99/00 should be considered in order to perform a complete search.

27/1021 . . . . . {including diodes only}

WARNING

Group H01L 27/1021 is impacted by reclassification into group H10B 99/16.

Groups H01L 27/1021 and H10B 99/16 should be considered in order to perform a complete search.

27/1022 . . . . . {including bipolar transistors}

WARNING

Group H01L 27/1022 is impacted by reclassification into group H10B 99/00.

Groups H01L 27/1022 and H10B 99/00 should be considered in order to perform a complete search.

27/1027 . . . . . {Thyristors}

WARNING

Group H01L 27/1027 is impacted by reclassification into groups H10B 10/10, H10B 12/10, H10B 20/10, H10B 69/00 and H10B 99/20.

All groups listed in this Warning should be considered in order to perform a complete search.

27/1028 . . . . . {Double base diodes}

WARNING

Group H01L 27/1028 is impacted by reclassification into groups H10B 10/10, H10B 12/10, H10B 20/10, H10B 69/00 and H10B 99/20.

All groups listed in this Warning should be considered in order to perform a complete search.

27/105 . . . . including field-effect components

NOTE

In this group and its subgroups classification is made in any appropriate place

H01L 27/105 (continued)

WARNING

Group H01L 27/105 is impacted by reclassification into group H10B 99/22.

Groups H01L 27/105 and H10B 99/22 should be considered in order to perform a complete search.

27/1055 . . . . . {comprising charge coupled devices of the so-called bucket brigade type}
27/1057 . . . . . {comprising charge coupled devices [CCD] or charge injection devices [CID]}
27/118 . . . . Masterslice integrated circuits
27/11801 . . . . . {using bipolar technology}
27/11803 . . . . . {using field effect technology}
2027/11805 . . . . . {A3B5 or A3B6 gate arrays}
27/11807 . . . . . {CMOS gate arrays}
2027/11809 . . . . . {Microarchitecture}
2027/11811 . . . . . {Basic cell P to N transistor count}
2027/11812 . . . . . {4-T CMOS basic cell}
2027/11814 . . . . . {5-T CMOS basic cell}
2027/11816 . . . . . {6-T CMOS basic cell}
2027/11818 . . . . . {7-T CMOS basic cell}
2027/1182 . . . . . {8-T CMOS basic cell}
2027/11822 . . . . . {relative P to N transistor sizes}
2027/11824 . . . . . {for current drive capability}
2027/11825 . . . . . {for delay time adaptation}
2027/11827 . . . . . {for capacitive loading}
2027/11829 . . . . . {Isolation techniques}
2027/11831 . . . . . {FET isolation}
2027/11833 . . . . . {LOCOS}
2027/11835 . . . . . {Degree of specialisation for implementing specific functions}
2027/11837 . . . . . {Implementation of digital circuits}
2027/11838 . . . . . {Implementation of memory functions}
2027/1184 . . . . . {Implementation of analog circuits}
2027/11842 . . . . . {Resistors and capacitors}
2027/11844 . . . . . {Hybrid analog or digital}
2027/11846 . . . . . {Embedded IO cells}
2027/11848 . . . . . {Transmission gate}
2027/1185 . . . . . {Porous cells, i.e. pass-through elements}
2027/11851 . . . . . {Technology used, i.e. design rules}
2027/11853 . . . . . {Sub-micron technology}
2027/11855 . . . . . {Twin-tub technology}
2027/11857 . . . . . {SOS, SOI technology}
2027/11859 . . . . . {Connectibility characteristics, i.e. diffusion and polysilicon geometries}
2027/11861 . . . . . {Substrate and well contacts}
2027/11862 . . . . . {Horizontal or vertical grid line density}
2027/11864 . . . . . {Yield or reliability}
2027/11866 . . . . . {Gate electrode terminals or contacts}
2027/11868 . . . . . {Macro-architecture}
2027/1187 . . . . . {Number of core or basic cells in the macro (RAM, ROM)}
2027/11872 . . . . . {Distribution function, e.g. Sea of Gates}
2027/11874 . . . . . {Layout specification, i.e. inner core region}
2027/11875 . . . . . {Wiring region, routing}
2027/11877 . . . . . {Avoiding clock-skew or clock-delay}
2027/11879 . . . . . {Data lines (buses)}
2027/11881 . . . . . {Power supply lines}
2027/11883 . . . . . {Levels of metallisation}
2027/11885 . . . . . {Two levels of metal}
2027/11887 . . . . . {Three levels of metal}
2027/11888 . . . . . {More than 3 levels of metal}
2027/1189 . . . . . {Latch-up prevention}
2027/11892 . . . . . {Noise prevention (crosstalk)}
2027/11894 . . . . . {Radiation hardened circuits}
27/11896 . . . . . {using combined field effect/bipolar technology}
27/11898 . . . . . {Input and output buffer/driver structures}
27/12 . . the substrate being other than a semiconductor body, e.g. an insulating body
27/1203 . . . {the substrate comprising an insulating body on a semiconductor body, e.g. SOI (three-dimensional layout H01L 27/0688)}
27/1207 . . . . {combined with devices in contact with the semiconductor body, i.e. bulk/SOI hybrid circuits}
27/1211 . . . . {combined with field-effect transistors with a horizontal current flow in a vertical sidewall of a semiconductor body, e.g. FinFET, MuGFET}
27/1214 . . . {comprising a plurality of TFTs formed on a non-semiconducting substrate, e.g. driving circuits for AMLCDs}

WARNING

Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214.

Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search.

27/1218 . . . . {with a particular composition or structure of the substrate}
27/1222 . . . . {with a particular composition, shape or crystalline structure of the active layer}
27/1225 . . . . . {with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO}
27/1229 . . . . . {with different crystal properties within a device or between different devices}
27/1233 . . . . . {with different thicknesses of the active layer in different devices}
27/1237 . . . . {with a different composition, shape, layout or thickness of the gate insulator in different devices}
27/124 . . . . {with a particular composition, shape or layout of the wiring layers specially adapted to the circuit arrangement, e.g. scanning lines in LCD pixel circuits (wiring structures per se H01L 23/52)}
27/1244 . . . . . {for preventing breakage, peeling or short circuiting}
27/1248 . . . . {with a particular composition or shape of the interlayer dielectric specially adapted to the circuit arrangement}

27/1251 . . . . {comprising TFTs having a different architecture, e.g. top- and bottom gate TFTs}
27/1255 . . . . {integrated with passive devices, e.g. auxiliary capacitors}
27/1259 . . . . {Multistep manufacturing methods}
27/1262 . . . . . {with a particular formation, treatment or coating of the substrate}
27/1266 . . . . . . {the substrate on which the devices are formed not being the final device substrate, e.g. using a temporary substrate}
27/127 . . . . . {with a particular formation, treatment or patterning of the active layer specially adapted to the circuit arrangement}
27/1274 . . . . . {using crystallisation of amorphous semiconductor or recrystallisation of crystalline semiconductor}
27/1277 . . . . . {using a crystallisation promoting species, e.g. local introduction of Ni catalyst}
27/1281 . . . . . {by using structural features to control crystal growth, e.g. placement of grain filters}
27/1285 . . . . . {using control of the annealing or irradiation parameters, e.g. using different scanning direction or intensity for different transistors}
27/1288 . . . . . {employing particular masking sequences or specially adapted masks, e.g. half-tone mask}
27/1292 . . . . . {using liquid deposition, e.g. printing}
27/1296 . . . . . {adapted to increase the uniformity of device parameters}
27/13 . . . combined with thin-film or thick-film passive components
27/14 . including semiconductor components sensitive to infrared radiation, light, electromagnetic radiation of shorter wavelength or corpuscular radiation and specially adapted either for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation (radiation-sensitive components structurally associated with one or more electric light sources only H01L 31/14; couplings of light guides with optoelectronic elements G02B 6/42)
27/142 . . Energy conversion devices (photovoltaic modules or arrays of single photovoltaic cells comprising bypass diodes integrated or directly associated with the devices H01L 31/0443; photovoltaic modules composed of a plurality of thin film solar cells deposited on the same substrate H01L 31/046)
27/1421 . . . {comprising bypass diodes integrated or directly associated with the device, e.g. bypass diode integrated or formed in or on the same substrate as the solar cell}
27/144 . . Devices controlled by radiation
27/1443 . . . {with at least one potential jump or surface barrier}
27/1446 . . . {in a repetitive configuration}
27/146 . . . Imager structures
27/14601 . . . . {Structural or functional details thereof}
27/14603 . . . . . {Special geometry or disposition of pixel-elements, address-lines or gate-electrodes}
27/14605 . . . . . {Structural or functional details relating to the position of the pixel elements, e.g. smaller pixel elements in the center of the imager compared to pixel elements at the periphery}
27/14607 . . . . . {Geometry of the photosensitive area}
27/14609 . . . . . {Pixel-elements with integrated switching, control, storage or amplification elements (scanning details of imagers (circuitry of solid-state image sensors H04N 25/00); circuitry of imagers H04N 25/70)}
27/1461 . . . . . {characterised by the photosensitive area}
27/14612 . . . . . {involving a transistor}
27/14614 . . . . . {having a special gate structure}
27/14616 . . . . . {characterised by the channel of the transistor, e.g. channel having a doping gradient}
27/14618 . . . . . {Containers}
27/1462 . . . . . {Coatings}
27/14621 . . . . . {Colour filter arrangements}
27/14623 . . . . . {Optical shielding}
27/14625 . . . . . {Optical elements or arrangements associated with the device}
27/14627 . . . . . {Microlenses}
27/14629 . . . . . {Reflectors}
27/1463 . . . . . {Pixel isolation structures}
27/14632 . . . . . {Wafer-level processed structures}
27/14634 . . . . . {Assemblies, i.e. Hybrid structures}
27/14636 . . . . . {Interconnect structures}
27/14638 . . . . . {Structures specially adapted for transferring the charges across the imager perpendicular to the imaging plane}
27/1464 . . . . . {Back illuminated imager structures}
27/14641 . . . . . {Electronic components shared by two or more pixel-elements, e.g. one amplifier shared by two pixel elements}
27/14643 . . . . {Photodiode arrays; MOS imagers}
27/14645 . . . . . {Colour imagers}
27/14647 . . . . . {Multicolour imagers having a stacked pixel-element structure, e.g. npn, npnpn or MQW elements}
27/14649 . . . . . {Infrared imagers}
27/1465 . . . . . {of the hybrid type}
27/14652 . . . . . {Multispectral infrared imagers, having a stacked pixel-element structure, e.g. npn, npnpn or MQW structures}
27/14654 . . . . . {Blooming suppression}
27/14656 . . . . . {Overflow drain structures}
27/14658 . . . . . {X-ray, gamma-ray or corpuscular radiation imagers (measuring X-, gamma- or corpuscular radiation G01T 1/00)}
27/14659 . . . . . {Direct radiation imagers structures}
27/14661 . . . . . {of the hybrid type}
27/14663 . . . . . {Indirect radiation imagers, e.g. using luminescent members}
27/14665 . . . . {Imagers using a photoconductor layer}
27/14667 . . . . . {Colour imagers}
27/14669 . . . . . {Infrared imagers}
27/1467 . . . . . {of the hybrid type}
27/14672 . . . . . {Blooming suppression}
27/14674 . . . . . {Overflow drain structures}

27/14676 . . . . . {X-ray, gamma-ray or corpuscular radiation imagers (measuring X-, gamma- or corpuscular radiation G01T 1/00)}
27/14678 . . . . {Contact-type imagers}
27/14679 . . . . {Junction field effect transistor [JFET] imagers; static induction transistor [SIT] imagers}
27/14681 . . . . {Bipolar transistor imagers}
27/14683 . . . . {Processes or apparatus peculiar to the manufacture or treatment of these devices or parts thereof (not peculiar thereto H01L 21/00)}
27/14685 . . . . . {Process for coatings or optical elements}
27/14687 . . . . . {Wafer level processing}
27/14689 . . . . . {MOS based technologies}
27/1469 . . . . . {Assemblies, i.e. hybrid integration}
27/14692 . . . . . {Thin film technologies, e.g. amorphous, poly, micro- or nanocrystalline silicon}
27/14694 . . . . . {The active layers comprising only $A_{III}B_{V}$ compounds, e.g. GaAs, InP}
27/14696 . . . . . {The active layers comprising only $A_{II}B_{VI}$ compounds, e.g. CdS, ZnS, CdTe}
27/14698 . . . . . {Post-treatment for the devices, e.g. annealing, impurity-gettering, shor-circuit elimination, recrystallisation}
27/148 . . . . Charge coupled imagers {(individual charge coupled devices H01L 29/765)}
27/14806 . . . . . {Structural or functional details thereof}
27/14812 . . . . . {Special geometry or disposition of pixel-elements, address lines or gate-electrodes}
27/14818 . . . . . {Optical shielding}
27/14825 . . . . . {Linear CCD imagers}
27/14831 . . . . . {Area CCD imagers}
27/14837 . . . . . {Frame-interline transfer}
27/14843 . . . . . {Interline transfer}
27/1485 . . . . . {Frame transfer}
27/14856 . . . . . {Time-delay and integration}
27/14862 . . . . . {CID imagers}
27/14868 . . . . . {CCD or CID colour imagers}
27/14875 . . . . . {Infrared CCD or CID imagers}
27/14881 . . . . . {of the hybrid type}
27/14887 . . . . . {Blooming suppression}
27/14893 . . . . . {comprising a photoconductive layer deposited on the CCD structure}
27/15 . including semiconductor components having potential barriers, specially adapted for light emission
27/153 . . {in a repetitive configuration, e.g. LED bars}
27/156 . . . {two-dimensional arrays}

28/00 **{Passive two-terminal components without a potential-jump or surface barrier for integrated circuits; Details thereof; Multistep manufacturing processes therefor** (testing or measuring during manufacture H01L 22/00; integration methods H01L 21/70; integrated circuits H01L 27/00; two-terminal components with a potential-jump or surface barrier H01L 29/00; resistors in general H01C; inductors in general H01F; capacitors in general H01G)**}**
28/10 . {Inductors}
28/20 . {Resistors}
28/22 . . {with an active material comprising carbon, e.g. diamond or diamond-like carbon [DLC]}
28/24 . . {with an active material comprising a refractory, transition or noble metal, metal compound or metal alloy, e.g. silicides, oxides, nitrides}
28/26 . . {with an active material comprising an organic conducting material, e.g. conducting polymers}
28/40 . {Capacitors}
28/55 . . {with a dielectric comprising a perovskite structure material}
28/56 . . . {the dielectric comprising two or more layers, e.g. comprising buffer layers, seed layers, gradient layers}
28/57 . . . {comprising a barrier layer to prevent diffusion of hydrogen or oxygen}
28/60 . . {Electrodes}
28/65 . . . {comprising a noble metal or a noble metal oxide, e.g. platinum (Pt), ruthenium (Ru), ruthenium dioxide (RuO_2), iridium (Ir), iridium dioxide (IrO_2)}
28/75 . . . {comprising two or more layers, e.g. comprising a barrier layer and a metal layer}
28/82 . . . {with an enlarged surface, e.g. formed by texturisation}
28/84 . . . . {being a rough surface, e.g. using hemispherical grains}
28/86 . . . . {having horizontal extensions}
28/87 . . . . . {made by depositing layers, e.g. by depositing alternating conductive and insulating layers}
28/88 . . . . . {made by patterning layers, e.g. by etching conductive layers}
28/90 . . . . {having vertical extensions}
28/91 . . . . . {made by depositing layers, e.g. by depositing alternating conductive and insulating layers}
28/92 . . . . . {made by patterning layers, e.g. by etching conductive layers}

29/00 **Semiconductor devices specially adapted for rectifying, amplifying, oscillating or switching and having potential barriers; Capacitors or resistors having potential barriers, e.g. a PN-junction depletion layer or carrier concentration layer; Details of semiconductor bodies or of electrodes thereof {; Multistep manufacturing processes therefor}** (H01L 31/00 - H01L 33/00, H10K 10/00, H10N take precedence; details other than of semiconductor bodies or of electrodes thereof H01L 23/00; devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00)

NOTE

In this main group, classification is made both in groups H01L 29/02 - H01L 29/51 and in groups H01L 29/66 - H01L 29/94 if both of these sets of groups are relevant.

29/02 . Semiconductor bodies {; Multistep manufacturing processes therefor}
29/04 . . characterised by their crystalline structure, e.g. polycrystalline, cubic or particular orientation of crystalline planes (characterised by physical imperfections H01L 29/30)

29/045 . . . {by their particular orientation of crystalline planes}

29/06 . . characterised by their shape; characterised by the shapes, relative sizes, or dispositions of the semiconductor regions {; characterised by the concentration or distribution of impurities within semiconductor regions}

29/0603 . . . {characterised by particular constructional design considerations, e.g. for preventing surface leakage, for controlling electric field concentration or for internal isolations regions (isolation regions between components H01L 21/76; design considerations for integrated circuits H01L 27/00; geometrical design considerations for devices H01L 29/0657)}

29/0607 . . . . {for preventing surface leakage or controlling electric field concentration}

29/0611 . . . . . {for increasing or controlling the breakdown voltage of reverse biased devices (H01L 29/0661 takes precedence)}

29/0615 . . . . . {by the doping profile or the shape or the arrangement of the PN junction, or with supplementary regions, e.g. junction termination extension [JTE] (LDD or drain offset regions H01L 29/7833)}

29/0619 . . . . . {with a supplementary region doped oppositely to or in rectifying contact with the semiconductor containing or contacting region, e.g. guard rings with PN or Schottky junction}

29/0623 . . . . . {Buried supplementary region, e.g. buried guard ring (multi-RESURF H01L 29/0634)}

29/0626 . . . . . {with a localised breakdown region, e.g. built-in avalanching region (in self-protected thyristors H01L 29/7424)}

29/063 . . . . . {Reduced surface field [RESURF] pn-junction structures}

29/0634 . . . . . {Multiple reduced surface field (multi-RESURF) structures, e.g. double RESURF, charge compensation, cool, superjunction (SJ), 3D-RESURF, composite buffer (CB) structures}

29/0638 . . . . . {for preventing surface leakage due to surface inversion layer, e.g. with channel stopper (channel stoppers in combination with isolation region for integrated circuits H01L 21/762)}

29/0642 . . . . {Isolation within the component, i.e. internal isolation}

29/0646 . . . . . {PN junctions}

29/0649 . . . . . {Dielectric regions, e.g. SiO_2 regions, air gaps}

29/0653 . . . . . {adjoining the input or output region of a field-effect device, e.g. the source or drain region}

29/0657 . . . {characterised by the shape of the body}

29/0661 . . . . {specially adapted for altering the breakdown voltage by removing semiconductor material at, or in the neighbourhood of, a reverse biased junction, e.g. by bevelling, moat etching, depletion etching}

29/0665 . . . . {the shape of the body defining a nanostructure (nanotechnology per se B82B)}

29/0669 . . . . . {Nanowires or nanotubes (carbon nanotubes as material of solid-state device active part H10K 85/211)}

29/0673 . . . . . {oriented parallel to a substrate}

29/0676 . . . . . {oriented perpendicular or at an angle to a substrate}

29/068 . . . . . {comprising a junction}

29/0684 . . . {characterised by the shape, relative sizes or dispositions of the semiconductor regions or junctions between the regions}

29/0688 . . . . {characterised by the particular shape of a junction between semiconductor regions}

29/0692 . . . . {Surface layout}

29/0696 . . . . . {of cellular field-effect devices, e.g. multicellular DMOS transistors or IGBTs}

29/08 . . . with semiconductor regions connected to an electrode carrying current to be rectified, amplified or switched and such electrode being part of a semiconductor device which comprises three or more electrodes

29/0804 . . . . {Emitter regions of bipolar transistors}

29/0808 . . . . . {of lateral transistors}

29/0813 . . . . . {Non-interconnected multi-emitter structures}

29/0817 . . . . . {of heterojunction bipolar transistors (H01L 29/7375 takes precedence)}

29/0821 . . . . {Collector regions of bipolar transistors}

29/0826 . . . . . {Pedestal collectors}

29/083 . . . . {Anode or cathode regions of thyristors or gated bipolar-mode devices}

29/0834 . . . . . {Anode regions of thyristors or gated bipolar-mode devices, e.g. supplementary regions surrounding anode regions}

29/0839 . . . . . {Cathode regions of thyristors}

29/0843 . . . . {Source or drain regions of field-effect devices}

29/0847 . . . . . {of field-effect transistors with insulated gate (H01L 29/0653 takes precedence; with a passive supplementary region between source or drain and substrate related to punch-through, capacity or isolation phenomena H01L 29/1079; with LDD or DDD structure H01L 29/7833; for thin film transistors H01L 29/78618)}

29/0852 . . . . . {of DMOS transistors}

WARNING

Groups H01L 29/0852 – H01L 29/0886 are incomplete pending reclassification of documents from group H01L 29/0847 and H01L 29/7801.

Groups H01L 29/0852 – H01L 29/0886 and H01L 29/0847, H01L 29/7801 should be considered in order to perform a complete search.

29/0856 . . . . . {Source regions}
29/086 . . . . . {Impurity concentration or distribution}
29/0865 . . . . . {Disposition}
29/0869 . . . . . {Shape (cell layout H01L 29/0696)}
29/0873 . . . . . {Drain regions}
29/0878 . . . . . {Impurity concentration or distribution}
29/0882 . . . . . {Disposition}
29/0886 . . . . . {Shape}
29/0891 . . . . {of field-effect transistors with Schottky gate}
29/0895 . . . {Tunnel injectors}
29/10 . . with semiconductor regions connected to an electrode not carrying current to be rectified, amplified or switched and such electrode being part of a semiconductor device which comprises three or more electrodes
29/1004 . . . {Base region of bipolar transistors}
29/1008 . . . . {of lateral transistors}
29/1012 . . . {Base regions of thyristors (H01L 29/083 takes precedence)}
29/1016 . . . . {Anode base regions of thyristors}
29/102 . . . . {Cathode base regions of thyristors}
29/1025 . . . {Channel region of field-effect devices}
29/1029 . . . . {of field-effect transistors}
29/1033 . . . . . {with insulated gate, e.g. characterised by the length, the width, the geometric contour or the doping structure (with channel and gate aligned in the lengthwise direction H01L 29/42376; with buried channel H01L 29/7838)}
29/1037 . . . . . {and non-planar channel (resulting from the gate electrode disposition, e.g. within a trench, H01L 29/42356)}
29/1041 . . . . . {with a non-uniform doping structure in the channel region surface}
29/1045 . . . . . {the doping structure being parallel to the channel length, e.g. DMOS like}
29/105 . . . . . {with vertical doping variation (H01L 29/7827 takes precedence)}
29/1054 . . . . . {with a variation of the composition, e.g. channel with strained layer for increasing the mobility}
29/1058 . . . . . {with PN junction gate}
29/1062 . . . . . {of charge coupled devices}
29/1066 . . . . {Gate region of field-effect devices with PN junction gate}
29/107 . . . . {Substrate region of field-effect devices}
29/1075 . . . . . {of field-effect transistors}
29/1079 . . . . . {with insulated gate}
29/1083 . . . . . {with an inactive supplementary region, e.g. for preventing punch-through, improving capacity effect or leakage current}
29/1087 . . . . . {characterised by the contact structure of the substrate region, e.g. for controlling or preventing bipolar effect}
29/1091 . . . . . {of charge coupled devices}
29/1095 . . . . {Body region, i.e. base region, of DMOS transistors or IGBTs (cell layout H01L 29/0696)}
29/12 . . characterised by the materials of which they are formed
29/122 . . . {Single quantum well structures (single heterojunctions, couples of materials H01L 29/165, H01L 29/205, H01L 29/225, H01L 29/267)}
29/125 . . . . {Quantum wire structures}
29/127 . . . . {Quantum box structures}
29/15 . . . Structures with periodic or quasi periodic potential variation, e.g. multiple quantum wells, superlattices (such structures applied for the control of light G02F 1/017, applied in semiconductor lasers H01S 5/34)

NOTE

Group H01L 29/15 takes precedence over groups H01L 29/16 - H01L 29/26.

29/151 . . . . {Compositional structures (H01L 29/157 and H01L 29/158 take precedence)}
29/152 . . . . . {with quantum effects only in vertical direction, i.e. layered structures with quantum effects solely resulting from vertical potential variation}
29/154 . . . . . {comprising at least one long range structurally disordered material, e.g. one-dimensional vertical amorphous superlattices}
29/155 . . . . . {Comprising only semiconductor materials (H01L 29/154 takes precedence)}
29/157 . . . . {Doping structures, e.g. doping superlattices, nipi superlattices (delta doping in general H01L 29/365)}
29/158 . . . . {Structures without potential periodicity in a direction perpendicular to a major surface of the substrate, i.e. vertical direction, e.g. lateral superlattices, lateral surface superlattices [LSS]}
29/16 . . . including, apart from doping materials or other impurities, only elements of Group IV of the Periodic Table
29/1602 . . . . {Diamond}
29/1604 . . . . {Amorphous materials}
29/1606 . . . . {Graphene}
29/1608 . . . . {Silicon carbide}
29/161 . . . . including two or more of the elements provided for in group H01L 29/16 {, e.g. alloys (H01L 29/1604 takes precedence)}

29/165 . . . . . in different semiconductor regions {, e.g. heterojunctions}
29/167 . . . . further characterised by the doping material {(H01L 29/1604 takes precedence)}
29/18 . . . Selenium or tellurium only, apart from doping materials or other impurities
29/185 . . . . {Amorphous materials}
29/20 . . . including, apart from doping materials or other impurities, only $A_{III}B_{V}$ compounds
29/2003 . . . . {Nitride compounds}
29/2006 . . . . {Amorphous materials}
29/201 . . . . including two or more compounds {, e.g. alloys (H01L 29/2006 takes precedence)}
29/205 . . . . . in different semiconductor regions {, e.g. heterojunctions}
29/207 . . . . further characterised by the doping material {(H01L 29/2006 takes precedence)}
29/22 . . . including, apart from doping materials or other impurities, only $A_{II}B_{VI}$ compounds
29/2203 . . . . {Cd X compounds being one element of the 6th group of the Periodic Table (H01L 29/2206 takes precedence)}
29/2206 . . . . {Amorphous materials}
29/221 . . . . including two or more compounds {, e.g. alloys (H01L 29/2206 takes precedence)}
29/225 . . . . . in different semiconductor regions {, e.g. heterojunctions}
29/227 . . . . further characterised by the doping material {(H01L 29/2206 takes precedence)}
29/24 . . . including, apart from doping materials or other impurities, only semiconductor materials not provided for in groups H01L 29/16, H01L 29/18, H01L 29/20, H01L 29/22 (including organic materials H10K 99/00)
29/242 . . . . {$A_{I}B_{VI}$ or $A_{I}B_{VII}$ compounds, e.g. $Cu_{2}O$, Cu I (H01L 29/247 takes precedence)}
29/245 . . . . {Pb compounds, e.g. PbO (H01L 29/247 takes precedence)}
29/247 . . . . {Amorphous materials}
29/26 . . . including, apart from doping materials or other impurities, elements provided for in two or more of the groups H01L 29/16, H01L 29/18, H01L 29/20, H01L 29/22, H01L 29/24 {, e.g. alloys}
29/263 . . . . {Amorphous materials}
29/267 . . . . in different semiconductor regions {, e.g. heterojunctions (H01L 29/263 takes precedence)}
29/30 . . characterised by physical imperfections; having polished or roughened surface
29/32 . . . the imperfections being within the semiconductor body
29/34 . . . the imperfections being on the surface
29/36 . . characterised by the concentration or distribution of impurities {in the bulk material (within semiconductor regions H01L 29/06)}
29/365 . . . {Planar doping, e.g. atomic-plane doping, delta-doping}
29/40 . Electrodes {; Multistep manufacturing processes therefor}
29/401 . . {Multistep manufacturing processes}
29/4011 . . . {for data storage electrodes}
29/40111 . . . . {the electrodes comprising a layer which is used for its ferroelectric properties}
29/40114 . . . . {the electrodes comprising a conductor-insulator-conductor-insulator-semiconductor structure}
29/40117 . . . . {the electrodes comprising a charge-trapping insulator}
29/402 . . {Field plates}
29/404 . . . {Multiple field plate structures}
29/405 . . . {Resistive arrangements, e.g. resistive or semi-insulating field plates}
29/407 . . . {Recessed field plates, e.g. trench field plates, buried field plates}
29/408 . . {with an insulating layer with a particular dielectric or electrostatic property, e.g. with static charges or for controlling trapped charges or moving ions, or with a plate acting on the insulator potential or the insulator charges, e.g. for controlling charges effect or potential distribution in the insulating layer, or with a semi-insulating layer contacting directly the semiconductor surface}
29/41 . . characterised by their shape, relative sizes or dispositions
29/413 . . . {Nanosized electrodes, e.g. nanowire electrodes comprising one or a plurality of nanowires (nanosized carbon materials, e.g. carbon nanotubes, per se C01B 32/15; transparent electrodes comprising carbon nanotubes H10K 30/821, nanotechnology per se B82B)}
29/417 . . . carrying the current to be rectified, amplified or switched
29/41708 . . . . {Emitter or collector electrodes for bipolar transistors}
29/41716 . . . . {Cathode or anode electrodes for thyristors}
29/41725 . . . . {Source or drain electrodes for field effect devices (with monocrystalline semiconductor on source/drain region H01L 29/0843)}
29/41733 . . . . . {for thin film transistors with insulated gate}
29/41741 . . . . . {for vertical or pseudo-vertical devices}

NOTE

A pseudo-vertical device is a device with the drain and source electrodes on the same main surface and where the main current is vertical at least in a part of its path

29/4175 . . . . . {for lateral devices where the connection to the source or drain region is done through at least one part of the semiconductor substrate thickness, e.g. with connecting sink or with via-hole}

NOTE

The sink or via-hole leading to the source or drain region is considered to form part of the source or drain electrode

29/41758 . . . . . {for lateral devices with structured layout for source or drain region, i.e. the source or drain region having cellular, interdigitated or ring structure or being curved or angular (H01L 29/41733 - H01L 29/4175 take precedence)}

NOTE

Interdigitated structure means that at least one of the source or drain region has two or more fingers

29/41766 . . . . . {with at least part of the source or drain electrode having contact below the semiconductor surface, e.g. the source or drain electrode formed at least partially in a groove or with inclusions of conductor inside the semiconductor (H01L 29/41733 - H01L 29/41758 take precedence)}

29/41775 . . . . . {characterised by the proximity or the relative position of the source or drain electrode and the gate electrode, e.g. the source or drain electrode separated from the gate electrode by side-walls or spreading around or above the gate electrode}

29/41783 . . . . . {Raised source or drain electrodes self aligned with the gate}

29/41791 . . . . . {for transistors with a horizontal current flow in a vertical sidewall, e.g. FinFET, MuGFET}

29/423 . . . not carrying the current to be rectified, amplified or switched

29/42304 . . . . {Base electrodes for bipolar transistors}

29/42308 . . . . {Gate electrodes for thyristors}

29/42312 . . . . {Gate electrodes for field effect devices}

29/42316 . . . . . {for field-effect transistors}

29/4232 . . . . . {with insulated gate}

29/42324 . . . . . {Gate electrodes for transistors with a floating gate}

29/42328 . . . . . {with at least one additional gate other than the floating gate and the control gate, e.g. program gate, erase gate or select gate}

29/42332 . . . . . {with the floating gate formed by two or more non connected parts, e.g. multi-particles flating gate}

29/42336 . . . . . {with one gate at least partly formed in a trench}

29/4234 . . . . . {Gate electrodes for transistors with charge trapping gate insulator}

29/42344 . . . . . {with at least one additional gate, e.g. program gate, erase gate or select gate}

29/42348 . . . . . {with trapping site formed by at least two separated sites, e.g. multi-particles trapping site}

29/42352 . . . . . {with the gate at least partly formed in a trench}

29/42356 . . . . . {Disposition, e.g. buried gate electrode (H01L 29/42324 and H01L 29/4234 take precedence)}

29/4236 . . . . . {within a trench, e.g. trench gate electrode, groove gate electrode}

29/42364 . . . . . {characterised by the insulating layer, e.g. thickness or uniformity (H01L 29/42324 and H01L 29/4234 take precedence)}

29/42368 . . . . . {the thickness being non-uniform}

29/42372 . . . . . {characterised by the conducting layer, e.g. the length, the sectional shape or the lay-out (H01L 29/42324 takes precedence)}

29/42376 . . . . . {characterised by the length or the sectional shape}

29/4238 . . . . . {characterised by the surface lay-out}

29/42384 . . . . . {for thin film field effect transistors, e.g. characterised by the thickness or the shape of the insulator or the dimensions, the shape or the lay-out of the conductor}

2029/42388 . . . . . {characterised by the shape of the insulating material}

29/42392 . . . . . {fully surrounding the channel, e.g. gate-all-around}

29/42396 . . . . . {for charge coupled devices}

29/43 . . characterised by the materials of which they are formed

29/432 . . . {Heterojunction gate for field effect devices}

29/435 . . . {Resistive materials for field effect devices, e.g. resistive gate for MOSFET or MESFET}

29/437 . . . {Superconductor materials}

29/45 . . . Ohmic electrodes

29/452 . . . . {on AIII-BV compounds}

29/454 . . . . . {on thin film AIII-BV compounds}

29/456 . . . . {on silicon}

29/458 . . . . . {for thin film silicon, e.g. source or drain electrode}

29/47 . . . Schottky barrier electrodes {(H01L 29/435 takes precedence)}

29/475 . . . . {on AIII-BV compounds}

29/49 . . . Metal-insulator-semiconductor electrodes, {e.g. gates of MOSFET (H01L 29/435 takes precedence)}

NOTE

This group covers also devices using any other conductor material in place of metal

29/4908 . . . . {for thin film semiconductor, e.g. gate of TFT}

29/4916 . . . . {the conductor material next to the insulator being a silicon layer, e.g. polysilicon doped with boron, phosphorus or nitrogen (H01L 29/4908, H01L 29/4983 take precedence)}

29/4925 . . . . . {with a multiple layer structure, e.g. several silicon layers with different crystal structure or grain arrangement (with only a vertical doping structure or vertical doping variation H01L 29/4916)}

29/4933 . . . . . {with a silicide layer contacting the silicon layer, e.g. Polycide gate (with a barrier layer between the silicide and silicon layers H01L 29/4941)}

29/4941 . . . . . {with a barrier layer between the silicon and the metal or metal silicide upper layer, e.g. Silicide/TiN/Polysilicon}

29/495 . . . . {the conductor material next to the insulator being a simple metal, e.g. W, Mo (H01L 29/4908, H01L 29/4983 take precedence)}

29/4958 . . . . . {with a multiple layer structure}

29/4966 . . . . {the conductor material next to the insulator being a composite material, e.g. organic material, TiN, $MoSi_2$ (H01L 29/4908, H01L 29/4983 take precedence)}

29/4975 . . . . . {being a silicide layer, e.g. $TiSi_2$}

29/4983 . . . . {with a lateral structure, e.g. a Polysilicon gate with a lateral doping variation or with a lateral composition variation or characterised by the sidewalls being composed of conductive, resistive or dielectric material}

29/4991 . . . . . {comprising an air gap}

WARNING

Group H01L 29/4991 is incomplete pending reclassification of documents from group H01L 29/4983.

Groups H01L 29/4991 and H01L 29/4983 should be considered in order to perform a complete search.

29/51 . . . . Insulating materials associated therewith {(for MIS structures on thin film semiconductor H01L 29/4908)}

29/511 . . . . . {with a compositional variation, e.g. multilayer structures (H01L 29/516 takes precedence)}

29/512 . . . . . {the variation being parallel to the channel plane}

29/513 . . . . . {the variation being perpendicular to the channel plane}

29/515 . . . . . {with cavities, e.g. containing a gas}

29/516 . . . . . {with at least one ferroelectric layer}

29/517 . . . . . {the insulating material comprising a metallic compound, e.g. metal oxide, metal silicate (H01L 29/518 takes precedence)}

29/518 . . . . . {the insulating material containing nitrogen, e.g. nitride, oxynitride, nitrogen-doped material}

29/66 . Types of semiconductor device {; Multistep manufacturing processes therefor}

29/66007 . . {Multistep manufacturing processes}

29/66015 . . . {of devices having a semiconductor body comprising semiconducting carbon, e.g. diamond, diamond-like carbon, graphene}

29/66022 . . . . {the devices being controllable only by variation of the electric current supplied or the electric potential applied, to one or more of the electrodes carrying the current to be rectified, amplified, oscillated or switched, e.g. two-terminal devices}

29/6603 . . . . . {Diodes}

29/66037 . . . . {the devices being controllable only by the electric current supplied or the electric potential applied, to an electrode which does not carry the current to be rectified, amplified or switched, e.g. three-terminal devices}

29/66045 . . . . . {Field-effect transistors}

29/66053 . . . {of devices having a semiconductor body comprising crystalline silicon carbide}

29/6606 . . . . {the devices being controllable only by variation of the electric current supplied or the electric potential applied, to one or more of the electrodes carrying the current to be rectified, amplified, oscillated or switched, e.g. two-terminal devices}

29/66068 . . . . {the devices being controllable only by the electric current supplied or the electric potential applied, to an electrode which does not carry the current to be rectified, amplified or switched, e.g. three-terminal devices}

29/66075 . . . {of devices having semiconductor bodies comprising group 14 or group 13/15 materials (comprising semiconducting carbon H01L 29/66015; comprising crystalline silicon carbide H01L 29/66053)}

29/66083 . . . . {the devices being controllable only by variation of the electric current supplied or the electric potential applied, to one or more of the electrodes carrying the current to be rectified, amplified, oscillated or switched, e.g. two-terminal devices}

29/6609 . . . . . {Diodes}

29/66098 . . . . . {Breakdown diodes}

29/66106 . . . . . {Zener diodes}

29/66113 . . . . . {Avalanche diodes}

29/66121 . . . . . {Multilayer diodes, e.g. PNPN diodes}

29/66128 . . . . . {Planar diodes}

29/66136 . . . . . {PN junction diodes}

29/66143 . . . . . {Schottky diodes}

29/66151 . . . . . {Tunnel diodes (group 13/15 resonant tunneling diodes H01L 29/66219)}

29/66159 . . . . . {Transit time diodes, e.g. IMPATT, TRAPATT diodes}

29/66166 . . . . . {Resistors with PN junction}

29/66174 . . . . . {Capacitors with PN or Schottky junction, e.g. varactors (capacitors with PN junction combined with MOS control H01L 29/66189)}

29/66181 . . . . . {Conductor-insulator-semiconductor capacitors, e.g. trench capacitors}

29/66189 . . . . . {with PN junction, e.g. hybrid capacitors}

29/66196 . . . . . {with an active layer made of a group 13/15 material}

29/66204 . . . . . {Diodes}

29/66212 . . . . . {Schottky diodes}

29/66219 . . . . . {with a heterojunction, e.g. resonant tunneling diodes [RTD]}

29/66227 . . . . {the devices being controllable only by the electric current supplied or the electric potential applied, to an electrode which does not carry the current to be rectified, amplified or switched, e.g. three-terminal devices}

29/66234 . . . . . {Bipolar junction transistors [BJT]}

29/66242 . . . . . {Heterojunction transistors [HBT] (with an active layer made of a group 13/15 material H01L 29/66318)}

29/6625 . . . . . {Lateral transistors (H01L 29/66242 and H01L 29/66265 take precedence)}
29/66257 . . . . . {Schottky transistors}
29/66265 . . . . . {Thin film bipolar transistors (H01L 29/66242 takes precedence)}
29/66272 . . . . . {Silicon vertical transistors (H01L 29/66242, H01L 29/66257 and H01L 29/66265 take precedence)}
29/6628 . . . . . {Inverse transistors}
29/66287 . . . . . {with a single crystalline emitter, collector or base including extrinsic, link or graft base formed on the silicon substrate, e.g. by epitaxy, recrystallisation, after insulating device isolation (H01L 29/6628 takes precedence)}
29/66295 . . . . . {with main current going through the whole silicon substrate, e.g. power bipolar transistor}
29/66303 . . . . . {with multi-emitter, e.g. interdigitated, multi-cellular or distributed emitter}
29/6631 . . . . . {with an active layer made of a group 13/15 material}
29/66318 . . . . . {Heterojunction transistors}
29/66325 . . . . . {controlled by field-effect, e.g. insulated gate bipolar transistors [IGBT]}
29/66333 . . . . . {Vertical insulated gate bipolar transistors}
29/6634 . . . . . {with a recess formed by etching in the source/emitter contact region (H01L 29/66348 takes precedence; etching of semiconductor bodies H01L 21/302)}
29/66348 . . . . . {with a recessed gate}
29/66356 . . . . . {Gated diodes, e.g. field controlled diodes [FCD], static induction thyristors [SITh], field controlled thyristors [FCTh]}
29/66363 . . . . . {Thyristors}
29/66371 . . . . . {structurally associated with another device, e.g. built-in diode (making integrated circuits H01L 21/82)}
29/66378 . . . . . {the other device being a controlling field-effect device}
29/66386 . . . . . {Bidirectional thyristors}
29/66393 . . . . . {Lateral or planar thyristors}
29/66401 . . . . . {with an active layer made of a group 13/15 material}
29/66409 . . . . . {Unipolar field-effect transistors}
29/66416 . . . . . {Static induction transistors [SIT] (with an active layer made of a group 13/15 material H01L 29/66454)}
29/66424 . . . . . {Permeable base transistors [PBT]}
29/66431 . . . . . {with a heterojunction interface channel or gate, e.g. HFET, HIGFET, SISFET, HJFET, HEMT (with an active layer made of a group 13/15 material H01L 29/66462)}
29/66439 . . . . . {with a one- or zero-dimensional channel, e.g. quantum wire FET, in-plane gate transistor [IPG], single electron transistor [SET], striped channel transistor, Coulomb blockade transistor (with an active layer made of a group 13/15 material H01L 29/66469)}
29/66446 . . . . . {with an active layer made of a group 13/15 material, e.g. group 13/15 velocity modulation transistor [VMT], group 13/15 negative resistance FET [NERFET]}
29/66454 . . . . . {Static induction transistors [SIT], e.g. permeable base transistors [PBT]}
29/66462 . . . . . {with a heterojunction interface channel or gate, e.g. HFET, HIGFET, SISFET, HJFET, HEMT}
29/66469 . . . . . {with one- or zero-dimensional channel, e.g. quantum wire field-effect transistors, in-plane gate transistors [IPG], single electron transistors [SET], Coulomb blockade transistors, striped channel transistors}
29/66477 . . . . . {with an insulated gate, i.e. MISFET}
29/66484 . . . . . {with multiple gate, at least one gate being an insulated gate (H01L 29/66742 takes precedence)}
29/66492 . . . . . {with a pocket or a lightly doped drain selectively formed at the side of the gate}
29/665 . . . . . {using self aligned silicidation, i.e. salicide (formation of conductive layers comprising silicides H01L 21/28518)}
29/66507 . . . . . {providing different silicide thicknesses on the gate and on source or drain}
29/66515 . . . . . {using self aligned selective metal deposition simultaneously on the gate and on source or drain}
29/66522 . . . . . {with an active layer made of a group 13/15 material (H01L 29/66446 takes precedence)}
29/6653 . . . . . {using the removal of at least part of spacer, e.g. disposable spacer}
29/66537 . . . . . {using a self aligned punch through stopper or threshold implant under the gate region (H01L 29/66606 takes precedence)}
29/66545 . . . . . {using a dummy, i.e. replacement gate in a process wherein at least a part of the final gate is self aligned to the dummy gate}
29/66553 . . . . . {using inside spacers, permanent or not}
29/6656 . . . . . {using multiple spacer layers, e.g. multiple sidewall spacers}
29/66568 . . . . . {Lateral single gate silicon transistors}
29/66575 . . . . . {where the source and drain or source and drain extensions are self-aligned to the sides of the gate (H01L 29/66606 takes precedence)}
29/66583 . . . . . {with initial gate mask or masking layer complementary to the prospective gate location, e.g. with dummy source and drain contacts}

29/6659 . . . . . {with both lightly doped source and drain extensions and source and drain self-aligned to the sides of the gate, e.g. lightly doped drain [LDD] MOSFET, double diffused drain [DDD] MOSFET}

29/66598 . . . . . {forming drain [D] and lightly doped drain [LDD] simultaneously, e.g. using implantation through the wings a T-shaped layer, or through a specially shaped layer}

29/66606 . . . . . {with final source and drain contacts formation strictly before final or dummy gate formation, e.g. contact first technology (H01L 29/66621 takes precedence)}

29/66613 . . . . . {with a gate recessing step, e.g. using local oxidation (making recessed gate LDMOS transistors H01L 29/66704)}

29/66621 . . . . . {using etching to form a recess at the gate location (etching of semiconductor bodies H01L 21/302)}

29/66628 . . . . . {recessing the gate by forming single crystalline semiconductor material at the source or drain location}

29/66636 . . . . . {with source or drain recessed by etching or first recessed by etching and then refilled}

29/66643 . . . . . {with source or drain regions formed by a Schottky barrier or a conductor-insulator-semiconductor structure}

29/66651 . . . . . {with a single crystalline channel formed on the silicon substrate after insulating device isolation}

29/66659 . . . . . {with asymmetry in the channel direction, e.g. lateral high-voltage MISFETs with drain offset region, extended drain MISFETs}

29/66666 . . . . . {Vertical transistors (H01L 29/66712, H01L 29/66742 take precedence)}

29/66674 . . . . . {DMOS transistors, i.e. MISFETs with a channel accommodating body or base region adjoining a drain drift region (making lateral high-voltage MISFETs with channel well and drain offset region H01L 29/66659)}

29/66681 . . . . . {Lateral DMOS transistors, i.e. LDMOS transistors}

29/66689 . . . . . {with a step of forming an insulating sidewall spacer (forming insulating material on a substrate H01L 21/02107)}

29/66696 . . . . . {with a step of recessing the source electrode}

29/66704 . . . . . {with a step of recessing the gate electrode, e.g. to form a trench gate electrode}

29/66712 . . . . . {Vertical DMOS transistors, i.e. VDMOS transistors}

29/66719 . . . . . {With a step of forming an insulating sidewall spacer}

29/66727 . . . . . {with a step of recessing the source electrode}

29/66734 . . . . . {with a step of recessing the gate electrode, e.g. to form a trench gate electrode}

29/66742 . . . . . {Thin film unipolar transistors}

29/6675 . . . . . {Amorphous silicon or polysilicon transistors}

29/66757 . . . . . {Lateral single gate single channel transistors with non-inverted structure, i.e. the channel layer is formed before the gate}

29/66765 . . . . . {Lateral single gate single channel transistors with inverted structure, i.e. the channel layer is formed after the gate}

29/66772 . . . . . {Monocristalline silicon transistors on insulating substrates, e.g. quartz substrates (H01L 29/66666 takes precedence; thin film FinFETs H01L 29/66795)}

29/6678 . . . . . {on sapphire substrates, e.g. SOS transistors}

29/66787 . . . . . {with a gate at the side of the channel}

29/66795 . . . . . {with a horizontal current flow in a vertical sidewall of a semiconductor body, e.g. FinFET, MuGFET}

29/66803 . . . . . {with a step of doping the vertical sidewall, e.g. using tilted or multi-angled implants}

29/6681 . . . . . {using dummy structures having essentially the same shape as the semiconductor body, e.g. to provide stability}

29/66818 . . . . . {the channel being thinned after patterning, e.g. sacrificial oxidation on fin}

29/66825 . . . . . {with a floating gate (H01L 29/6684 takes precedence)}

29/66833 . . . . . {with a charge trapping gate insulator, e.g. MNOS transistors}

29/6684 . . . . . {with a ferroelectric gate insulator}

29/66848 . . . . . {with a Schottky gate, i.e. MESFET}

29/66856 . . . . . {with an active layer made of a group 13/15 material (H01L 29/66446 takes precedence)}

29/66863 . . . . . {Lateral single gate transistors}

29/66871 . . . . . {Processes wherein the final gate is made after the formation of the source and drain regions in the active layer, e.g. dummy-gate processes}

29/66878 . . . . . {Processes wherein the final gate is made before the formation, e.g. activation anneal, of the source and drain regions in the active layer}

29/66886 . . . . . {Lateral transistors with two or more independent gates}

29/66893 . . . . . {with a PN junction gate, i.e. JFET}

29/66901 . . . . . {with a PN homojunction gate}
29/66909 . . . . . {Vertical transistors, e.g. tecnetrons}
29/66916 . . . . . {with a PN heterojunction gate}
29/66924 . . . . . {with an active layer made of a group 13/15 material (H01L 29/66446 takes precedence)}
29/66931 . . . . . {BJT-like unipolar transistors, e.g. hot electron transistors [HET], metal base transistors [MBT], resonant tunneling transistor [RTT], bulk barrier transistor [BBT], planar doped barrier transistor [PDBT], charge injection transistor [CHINT]}
29/66939 . . . . . {with an active layer made of a group 13/15 material}
29/66946 . . . . . {Charge transfer devices}
29/66954 . . . . . {with an insulated gate}
29/66962 . . . . . {with a Schottky gate}
29/66969 . . . {of devices having semiconductor bodies not comprising group 14 or group 13/15 materials (comprising selenium or tellurium in uncombined form other than as impurities in semiconductor bodies of other materials, comprising cuprous oxide or cuprous iodide H01L 21/02365)}
29/66977 . . {Quantum effect devices, e.g. using quantum reflection, diffraction or interference effects, i.e. Bragg- or Aharonov-Bohm effects}
29/66984 . . {Devices using spin polarized carriers}
29/66992 . . {controllable only by the variation of applied heat (controllable by IR radiation H01L 31/00; measuring quantity of heat G01K 17/00)}
29/68 . . controllable by only the electric current supplied, or only the electric potential applied, to an electrode which does not carry the current to be rectified, amplified or switched
29/685 . . . {Hi-Lo semiconductor devices, e.g. memory devices}
29/70 . . . Bipolar devices
29/705 . . . . {Double base diodes}
29/72 . . . . Transistor-type devices, i.e. able to continuously respond to applied control signals
29/73 . . . . . Bipolar junction transistors
29/7302 . . . . . {structurally associated with other devices (assemblies of devices H01L 25/00; integrated circuits H01L 27/00; IGBT H01L 29/7393)}
29/7304 . . . . . {the device being a resistive element, e.g. ballasting resistor (transistors integrated with resistors H01L 27/075)}
29/7306 . . . . . {Point contact transistors}
29/7308 . . . . . {Schottky transistors}
29/7311 . . . . . {Tunnel transistors}
29/7313 . . . . . {Avalanche transistors}
29/7315 . . . . . {Transistors with hook collector}
29/7317 . . . . . {Bipolar thin film transistors}
29/732 . . . . . Vertical transistors
29/7322 . . . . . {having emitter-base and base-collector junctions leaving at the same surface of the body, e.g. planar transistor}
29/7325 . . . . . {having an emitter-base junction leaving at a main surface and a base-collector junction leaving at a peripheral surface of the body, e.g. mesa planar transistor}
29/7327 . . . . . {Inverse vertical transistors}
29/735 . . . . . Lateral transistors
29/737 . . . . . Hetero-junction transistors
29/7371 . . . . . {Vertical transistors}
29/7373 . . . . . {having a two-dimensional base, e.g. modulation-doped base, inversion layer base, delta-doped base}
29/7375 . . . . . {having an emitter comprising one or more non-monocrystalline elements of group IV, e.g. amorphous silicon, alloys comprising group IV elements}
29/7376 . . . . . {Resonant tunnelling transistors}
29/7378 . . . . . {comprising lattice mismatched active layers, e.g. SiGe strained layer transistors}
29/739 . . . . . controlled by field-effect, {e.g. bipolar static induction transistors [BSIT] (unijunction transistors H01L 29/705)}
29/7391 . . . . . {Gated diode structures}
29/7392 . . . . . {with PN junction gate, e.g. field controlled thyristors (FCTh), static induction thyristors (SITh)}
29/7393 . . . . . {Insulated gate bipolar mode transistors, i.e. IGBT; IGT; COMFET}
29/7394 . . . . . {on an insulating layer or substrate, e.g. thin film device or device isolated from the bulk substrate (H01L 29/7398 takes precedence)}
29/7395 . . . . . {Vertical transistors, e.g. vertical IGBT}

NOTE

The transistor is called vertical if the emitter and the collector are not on the same main surface or, if they are on the same main surface, at least a part of the main current has a component substantially not parallel to the main surface

29/7396 . . . . . {with a non planar surface, e.g. with a non planar gate or with a trench or recess or pillar in the surface of the emitter, base or collector region for improving current density or short circuiting the emitter and base regions (H01L 29/7398 takes precedence)}
29/7397 . . . . . {and a gate structure lying on a slanted or vertical surface or formed in a groove, e.g. trench gate IGBT}
29/7398 . . . . . {with both emitter and collector contacts in the same substrate side}
29/74 . . . . Thyristor-type devices, e.g. having four-zone regenerative action {(two-terminal thyristors H01L 29/87)}

29/7404 . . . . . {structurally associated with at least one other device (assemblies H01L 25/00; integrated circuits H01L 27/00)}
29/7408 . . . . . {the device being a capacitor or a resistor}
29/7412 . . . . . {the device being a diode}
29/7416 . . . . . {the device being an antiparallel diode, e.g. RCT (shorted anode structures enabling reverse conduction H01L 29/0834)}
29/742 . . . . . {the device being a field effect transistor (for turn-on or turn-off by field effect H01L 29/745, H01L 29/749)}
29/7424 . . . . . {having a built-in localised breakdown/ breakover region, e.g. self-protected against destructive spontaneous, e.g. voltage breakover, firing}
29/7428 . . . . . {having an amplifying gate structure, e.g. cascade (Darlington) configuration}
29/7432 . . . . . {Asymmetrical thyristors (with a particular shorted anode structure H01L 29/0834)}
29/7436 . . . . . {Lateral thyristors}
29/744 . . . . . Gate-turn-off devices
29/745 . . . . . with turn-off by field effect
29/7455 . . . . . {produced by an insulated gate structure}
29/747 . . . . . Bidirectional devices, e.g. triacs
29/749 . . . . . with turn-on by field effect
29/76 . . . Unipolar devices {, e.g. field effect transistors}
29/7606 . . . . {Transistor-like structures, e.g. hot electron transistor [HET]; metal base transistor [MBT]}
29/7613 . . . . {Single electron transistors; Coulomb blockade devices (H01L 29/7888 takes precedence)}
29/762 . . . . Charge transfer devices
29/765 . . . . . Charge-coupled devices {(peripheral circuits for CCD storage devices G11C 19/285)}
29/768 . . . . . with field effect produced by an insulated gate
29/76808 . . . . . {Input structures}
29/76816 . . . . . {Output structures}
29/76825 . . . . . {Structures for regeneration, refreshing, leakage compensation or the like}
29/76833 . . . . . {Buried channel CCD}
29/76841 . . . . . {Two-Phase CCD}
29/7685 . . . . . {Three-Phase CCD}
29/76858 . . . . . {Four-Phase CCD}
29/76866 . . . . . {Surface Channel CCD}
29/76875 . . . . . {Two-Phase CCD}
29/76883 . . . . . {Three-Phase CCD}
29/76891 . . . . . {Four-Phase CCD}
29/772 . . . . Field effect transistors
29/7722 . . . . . {using static field induced regions, e.g. SIT, PBT}
29/7725 . . . . . {with delta-doped channel (H01L 29/778 takes precedence)}
29/7727 . . . . . {Velocity modulation transistors, i.e. VMT}
29/775 . . . . . with one dimensional charge carrier gas channel, e.g. quantum wire FET
29/778 . . . . . with two-dimensional charge carrier gas channel, e.g. HEMT {; with two-dimensional charge-carrier layer formed at a heterojunction interface (H01L 29/803 takes precedence)}
29/7781 . . . . . {with inverted single heterostructure, i.e. with active layer formed on top of wide bandgap layer, e.g. IHEMT}
29/7782 . . . . . {with confinement of carriers by at least two heterojunctions, e.g. DHHEMT, quantum well HEMT, DHMODFET}
29/7783 . . . . . {using III-V semiconductor material}
29/7784 . . . . . {with delta or planar doped donor layer (H01L 29/7785 takes precedence)}
29/7785 . . . . . {with more than one donor layer}
29/7786 . . . . . {with direct single heterostructure, i.e. with wide bandgap layer formed on top of active layer, e.g. direct single heterostructure MIS-like HEMT}
29/7787 . . . . . {with wide bandgap charge-carrier supplying layer, e.g. direct single heterostructure MODFET}
29/7788 . . . . . {Vertical transistors}
29/7789 . . . . . {the two-dimensional charge carrier gas being at least partially not parallel to a main surface of the semiconductor body}
29/78 . . . . . with field effect produced by an insulated gate {(H01L 29/7725, H01L 29/775, H01L 29/778 take precedence)}
29/7801 . . . . . {DMOS transistors, i.e. MISFETs with a channel accommodating body or base region adjoining a drain drift region (lateral high-voltage MISFETs with channel well and drain offset region H01L 29/7835)}
29/7802 . . . . . {Vertical DMOS transistors, i.e. VDMOS transistors}
29/7803 . . . . . {structurally associated with at least one other device (assemblies H01L 25/00; integrated circuits H01L 27/00)}

WARNING

Groups H01L 29/7803 – H01L 29/7808 are incomplete pending reclassification of documents from group H01L 29/7802.

Groups H01L 29/7803 – H01L 29/7808 and H01L 29/7802 should be considered in order to perform a complete search.

29/7804 . . . . . {the other device being a pn-junction diode}
29/7805 . . . . . {in antiparallel, e.g. freewheel diode}
29/7806 . . . . . {the other device being a Schottky barrier diode}
29/7808 . . . . . {the other device being a breakdown diode, e.g. Zener diode}

29/7809 . . . . . {having both source and drain contacts on the same surface, i.e. Up-Drain VDMOS transistors}

29/781 . . . . . {Inverted VDMOS transistors, i.e. Source-Down VDMOS transistors}

29/7811 . . . . . {with an edge termination structure (guard regions per se H01L 29/0619; field plates per se H01L 29/402)}

WARNING

Group H01L 29/7811 is incomplete pending reclassification of documents from group H01L 29/7802.

Groups H01L 29/7811 and H01L 29/7802 should be considered in order to perform a complete search.

29/7812 . . . . . {with a substrate comprising an insulating layer, e.g. SOI-VDMOS transistors}

29/7813 . . . . . {with trench gate electrode, e.g. UMOS transistors (trench gate electrodes per se H01L 29/4236)}

29/7815 . . . . . {with voltage or current sensing structure, e.g. emulator section, overcurrent sensing cell}

WARNING

Group H01L 29/7815 is incomplete pending reclassification of documents from group H01L 29/7802.

Groups H01L 29/7815 and H01L 29/7802 should be considered in order to perform a complete search.

29/7816 . . . . . {Lateral DMOS transistors, i.e. LDMOS transistors}

29/7817 . . . . . {structurally associated with at least one other device (assemblies H01L 25/00; integrated circuits H01L 27/00)}

29/7818 . . . . . {the other device being a pn-junction diode}

29/7819 . . . . . {in antiparallel, e.g. freewheel diode}

29/782 . . . . . {the other device being a Schottky barrier diode}

29/7821 . . . . . {the other device being a breakdown diode, e.g. Zener diode}

29/7823 . . . . . {with an edge termination structure (guard regions per se H01L 29/0619; field plates per se H01L 29/402)}

29/7824 . . . . . {with a substrate comprising an insulating layer, e.g. SOI-LDMOS transistors}

29/7825 . . . . . {with trench gate electrode (trench gate electrodes per se H01L 29/4236)}

29/7826 . . . . . {with voltage or current sensing structure, e.g. emulator section, overcurrent sensing cell}

29/7827 . . . . . {Vertical transistors (H01L 29/7802, H01L 29/78642 take precedence)}

29/7828 . . . . . {without inversion channel, e.g. vertical ACCUFETs, normally-on vertical MISFETs}

29/783 . . . . . {comprising a gate to body connection, i.e. bulk dynamic threshold voltage MOSFET (for thin film transistors H01L 29/78612, H01L 29/78696)}

29/7831 . . . . . {with multiple gate structure (FinFETs or MuGFETs H01L 29/7855, thin film transistors H01L 29/78645)}

29/7832 . . . . . {the structure comprising a MOS gate and at least one non-MOS gate, e.g. JFET or MESFET gate}

29/7833 . . . . . {with lightly doped drain or source extension, e.g. LDD MOSFET's; DDD MOSFET's (for thin film transistors H01L 29/78618)}

29/7834 . . . . . {with a non-planar structure, e.g. the gate or the source or the drain being non-planar}

NOTE

Field oxide sunken in the substrate and not filling a groove is not an element characterising a non-planar structure

29/7835 . . . . . {with asymmetrical source and drain regions, e.g. lateral high-voltage MISFETs with drain offset region, extended drain MISFETs}

29/7836 . . . . . {with a significant overlap between the lightly doped extension and the gate electrode (H01L 29/7834, H01L 29/7835 take precedence)}

29/7838 . . . . . {without inversion channel, e.g. buried channel lateral MISFETs, normally-on lateral MISFETs, depletion-mode lateral MISFETs}

29/7839 . . . . . {with Schottky drain or source contact}

29/78391 . . . . . {the gate comprising a layer which is used for its ferroelectric properties}

29/7841 . . . . . {with floating body, e.g. programmable transistors}

29/7842 . . . . . {means for exerting mechanical stress on the crystal lattice of the channel region, e.g. using a flexible substrate (variation of the composition of the channel H01L 29/1054)}

29/7843 . . . . . {the means being an applied insulating layer}

29/7845 . . . . . {the means being a conductive material, e.g. silicided S/D or Gate}

29/7846 . . . . . {the means being located in the lateral device isolation region, e.g. STI}

29/7847 . . . . . {using a memorization technique, e.g. re-crystallization under strain, bonding on a substrate having a thermal expansion coefficient different from the one of the region}

29/7848 . . . . . {the means being located in the source/drain region, e.g. SiGe source and drain}

29/7849 . . . . . {the means being provided under the channel}

29/785 . . . . . {having a channel with a horizontal current flow in a vertical sidewall of a semiconductor body, e.g. FinFET, MuGFET}

29/7851 . . . . . {with the body tied to the substrate}

29/7853 . . . . . {the body having a non-rectangular crossection}

29/7854 . . . . . {with rounded corners}

29/7855 . . . . . {with at least two independent gates}

29/7856 . . . . . {with an non-uniform gate, e.g. varying doping structure, shape or composition on different sides of the fin, or different gate insulator thickness or composition on opposing fin sides (H01L 29/7855 takes precedence)}

2029/7857 . . . . . {of the accumulation type}

2029/7858 . . . . . {having contacts specially adapted to the FinFET geometry, e.g. wrap-around contacts}

29/786 . . . . . Thin film transistors, {i.e. transistors with a channel being at least partly a thin film (transistors having only the source or the drain region on an insulator layer H01L 29/0653; thin film FinFETs H01L 29/785)}

NOTE

In groups H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region

29/78603 . . . . . {characterised by the insulating substrate or support (H01L 29/78657 takes precedence)}

29/78606 . . . . . {with supplementary region or layer in the thin film or in the insulated bulk substrate supporting it for controlling or increasing the safety of the device (H01L 29/78642, H01L 29/78645 take precedence)}

29/78609 . . . . . {for preventing leakage current (H01L 29/78618 takes precedence)}

29/78612 . . . . . {for preventing the kink- or the snapback effect, e.g. discharging the minority carriers of the channel region for preventing bipolar effect}

29/78615 . . . . . {with a body contact}

29/78618 . . . . . {characterised by the drain or the source properties, e.g. the doping structure, the composition, the sectional shape or the contact structure (silicide contacts, electrodes in general H01L 29/458)}

29/78621 . . . . . {with LDD structure or an extension or an offset region or characterised by the doping profile}

29/78624 . . . . . {the source and the drain regions being asymmetrical}

29/78627 . . . . . {with a significant overlap between the lightly doped drain and the gate electrode, e.g. GOLDD}

2029/7863 . . . . . {with an LDD consisting of more than one lightly doped zone or having a non-homogeneous dopant distribution, e.g. graded LDD}

29/78633 . . . . . {with a light shield}

29/78636 . . . . . {with supplementary region or layer for improving the flatness of the device}

29/78639 . . . . . {with a drain or source connected to a bulk conducting substrate}

29/78642 . . . . . {Vertical transistors}

29/78645 . . . . . {with multiple gate}

29/78648 . . . . . {arranged on opposing sides of the channel}

29/78651 . . . . . {Silicon transistors (H01L 29/78606 - H01L 29/78645 take precedence)}

29/78654 . . . . . {Monocrystalline silicon transistors}

29/78657 . . . . . {SOS transistors}

29/7866 . . . . . {Non-monocrystalline silicon transistors}

29/78663 . . . . . {Amorphous silicon transistors}

29/78666 . . . . . {with normal-type structure, e.g. with top gate}

29/78669 . . . . . {with inverted-type structure, e.g. with bottom gate}

29/78672 . . . . . {Polycrystalline or microcrystalline silicon transistor}

29/78675 . . . . . {with normal-type structure, e.g. with top gate}

29/78678 . . . . . {with inverted-type structure, e.g. with bottom gate}

29/78681 . . . . . {having a semiconductor body comprising $A_{III}B_{V}$ or $A_{II}B_{VI}$ or $A_{IV}B_{VI}$ semiconductor materials, or Se or Te}

29/78684 . . . . . {having a semiconductor body comprising semiconductor materials of Group IV not being silicon, or alloys including an element of the group IV, e.g. Ge, SiN alloys, SiC alloys (H01L 29/7869 takes precedence)}

29/78687 . . . . . {with a multilayer structure or superlattice structure}

29/7869 . . . . . {having a semiconductor body comprising an oxide semiconductor material, e.g. zinc oxide, copper aluminium oxide, cadmium stannate}

29/78693 . . . . . {the semiconducting oxide being amorphous}

29/78696 . . . . . {characterised by the structure of the channel, e.g. multichannel, transverse or longitudinal shape, length or width, doping structure, or the overlap or alignment between the channel and the gate, the source or the drain, or the contacting structure of the channel (H01L 29/78612 takes precedence; transistors having a drain offset region or a lightly doped drain [LDD] H01L 29/78621)}

29/788 . . . . . with floating gate {(H01L 29/78391 takes precedence)}

29/7881 . . . . . {Programmable transistors with only two possible levels of programmation (H01L 29/7888 takes precedence)}

29/7882 . . . . . {charging by injection of carriers through a conductive insulator, e.g. Poole-Frankel conduction}

29/7883 . . . . . {charging by tunnelling of carriers, e.g. Fowler-Nordheim tunnelling}

29/7884 . . . . . {charging by hot carrier injection}

29/7885 . . . . . {Hot carrier injection from the channel}

29/7886 . . . . . {Hot carrier produced by avalanche breakdown of a PN junction, e.g. FAMOS}

29/7887 . . . . . {Programmable transistors with more than two possible different levels of programmation}

29/7888 . . . . . {Transistors programmable by two single electrons}

29/7889 . . . . . {Vertical transistors, i.e. transistors having source and drain not in the same horizontal plane}

29/792 . . . . . with charge trapping gate insulator, e.g. MNOS-memory transistors

29/7923 . . . . . {Programmable transistors with more than two possible different levels of programmation}

29/7926 . . . . . {Vertical transistors, i.e. transistors having source and drain not in the same horizontal plane}

29/80 . . . . . with field effect produced by a PN or other rectifying junction gate {, i.e. potential-jump barrier}

29/802 . . . . . {with heterojunction gate, e.g. transistors with semiconductor layer acting as gate insulating layer, MIS-like transistors (H01L 29/806 takes precedence; with one dimensional electron gas H01L 29/775; with dimensional electron gas H01L 29/778)}

29/803 . . . . . {Programmable transistors, e.g. with charge-trapping quantum well}

29/806 . . . . . {with Schottky drain or source contact}

29/808 . . . . . with a PN junction gate {, e.g. PN homojunction gate (H01L 29/7725, H01L 29/775, H01L 29/778, H01L 29/806 take precedence)}

29/8083 . . . . . {Vertical transistors (SIT H01L 29/7722)}

29/8086 . . . . . {Thin film JFET's}

29/812 . . . . . with a Schottky gate {(H01L 29/7725, H01L 29/775, H01L 29/778, H01L 29/806 take precedence; with Schottky contact on top of heterojunction gate H01L 29/802)}

29/8122 . . . . . {Vertical transistors (SIT, PBT H01L 29/7722)}

29/8124 . . . . . {with multiple gate}

29/8126 . . . . . {Thin film MESFET's}

29/8128 . . . . . {with recessed gate}

29/82 . . controllable by variation of the magnetic field applied to the device

29/84 . . controllable by variation of applied mechanical force, e.g. of pressure

29/86 . . controllable only by variation of the electric current supplied, or only the electric potential applied, to one or more of the electrodes carrying the current to be rectified, amplified, oscillated or switched

29/8605 . . . Resistors with PN junctions

29/861 . . . Diodes

29/8611 . . . . {Planar PN junction diodes}

29/8613 . . . . {Mesa PN junction diodes}

29/8615 . . . . {Hi-lo semiconductor devices, e.g. memory devices}

29/8616 . . . . {Charge trapping diodes}

29/8618 . . . . {Diodes with bulk potential barrier, e.g. Camel diodes, Planar Doped Barrier diodes, Graded bandgap diodes}

29/862 . . . . Point contact diodes

29/864 . . . . Transit-time diodes, e.g. IMPATT, TRAPATT diodes

29/866 . . . . Zener diodes

29/868 . . . . PIN diodes

29/87 . . . . Thyristor diodes, e.g. Shockley diodes, break-over diodes

29/872 . . . . Schottky diodes

29/8725 . . . . . {of the trench MOS barrier type [TMBS]}

29/88 . . . . Tunnel-effect diodes

29/882 . . . . . {Resonant tunneling diodes, i.e. RTD, RTBD}

29/885 . . . . . Esaki diodes

29/92 . . . Capacitors having potential barriers

29/93 . . . . Variable capacitance diodes, e.g. varactors

29/94 . . . . Metal-insulator-semiconductors, e.g. MOS

29/945 . . . . . {Trench capacitors}

31/00 Semiconductor devices sensitive to infrared radiation, light, electromagnetic radiation of shorter wavelength or corpuscular radiation and specially adapted either for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation; Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof; Details thereof (H10K 30/00 takes precedence; devices consisting of a plurality of solid state components formed in, or on, a common substrate, other than combinations of radiation-sensitive components with one or more electric light sources, H01L 27/00)

31/02 . Details

31/02002 . . {Arrangements for conducting electric current to or from the device in operations}

31/02005 . . . {for device characterised by at least one potential jump barrier or surface barrier}
31/02008 . . . . {for solar cells or solar cell modules}
31/0201 . . . . . {comprising specially adapted module bus-bar structures}
31/02013 . . . . . {comprising output lead wires elements}
31/02016 . . {Circuit arrangements of general character for the devices}
31/02019 . . . {for devices characterised by at least one potential jump barrier or surface barrier}
31/02021 . . . . {for solar cells (electrical connection means, e.g. junction boxes, specially adapted for structural association with photovoltaic modules H02S 40/34)}
31/02024 . . . . {Position sensitive and lateral effect photodetectors; Quadrant photodiodes}
31/02027 . . . . {for devices working in avalanche mode}
31/0203 . . Containers; Encapsulations {, e.g. encapsulation of photodiodes}(for photovoltaic devices H01L 31/048; for organic photosensitive devices H10K 30/80)
31/0216 . . Coatings (H01L 31/041 takes precedence)
31/02161 . . . {for devices characterised by at least one potential jump barrier or surface barrier}
31/02162 . . . . {for filtering or shielding light, e.g. multicolour filters for photodetectors}
31/02164 . . . . . {for shielding light, e.g. light blocking layers, cold shields for infrared detectors}
31/02165 . . . . . {using interference filters, e.g. multilayer dielectric filters (interference filters G02B 5/28)}
31/02167 . . . . {for solar cells}
31/02168 . . . . . {the coatings being antireflective or having enhancing optical properties for the solar cells}
31/0224 . . Electrodes
31/022408 . . . {for devices characterised by at least one potential jump barrier or surface barrier}
31/022416 . . . . {comprising ring electrodes}
31/022425 . . . . {for solar cells}
31/022433 . . . . . {Particular geometry of the grid contacts}
31/022441 . . . . . {Electrode arrangements specially adapted for back-contact solar cells}
31/02245 . . . . . {for metallisation wrap-through [MWT] type solar cells}
31/022458 . . . . . {for emitter wrap-through [EWT] type solar cells, e.g. interdigitated emitter-base back-contacts}
31/022466 . . . {made of transparent conductive layers, e.g. TCO, ITO layers}
31/022475 . . . . {composed of indium tin oxide [ITO]}
31/022483 . . . . {composed of zinc oxide [ZnO]}
31/022491 . . . . {composed of a thin transparent metal layer, e.g. gold}
31/0232 . . Optical elements or arrangements associated with the device (H01L 31/0236 takes precedence; for photovoltaic cells H01L 31/054; for photovoltaic modules H02S 40/20)
31/02322 . . . {comprising luminescent members, e.g. fluorescent sheets upon the device}
31/02325 . . . {the optical elements not being integrated nor being directly associated with the device}
31/02327 . . . {the optical elements being integrated or being directly associated to the device, e.g. back reflectors (optical coatings H01L 31/0216)}
31/0236 . . Special surface textures
31/02363 . . . {of the semiconductor body itself, e.g. textured active layers}
31/02366 . . . {of the substrate or of a layer on the substrate, e.g. textured ITO/glass substrate or superstrate, textured polymer layer on glass substrate}
31/024 . . Arrangements for cooling, heating, ventilating or temperature compensation (for photovoltaic devices H01L 31/052)
31/0248 . characterised by their semiconductor bodies
31/0256 . . characterised by the material
31/0264 . . . Inorganic materials
31/0272 . . . . Selenium or tellurium
31/02725 . . . . . {characterised by the doping material}
31/028 . . . . including, apart from doping material or other impurities, only elements of Group IV of the Periodic Table
31/0284 . . . . . {comprising porous silicon as part of the active layer(s) (porous silicon as antireflective layer for photodiodes H01L 31/0216; for solar cells H01L 31/02168)}
31/0288 . . . . . characterised by the doping material
31/0296 . . . . including, apart from doping material or other impurities, only $A_{II}B_{VI}$ compounds, e.g. CdS, ZnS, HgCdTe
31/02963 . . . . . {characterised by the doping material}
31/02966 . . . . . {including ternary compounds, e.g. HgCdTe}
31/0304 . . . . including, apart from doping materials or other impurities, only $A_{III}B_{V}$ compounds
31/03042 . . . . . {characterised by the doping material}
31/03044 . . . . . {comprising a nitride compounds, e.g. GaN}
31/03046 . . . . . {including ternary or quaternary compounds, e.g. GaAlAs, InGaAs, InGaAsP}
31/03048 . . . . . {comprising a nitride compounds, e.g. InGaN}
31/0312 . . . . including, apart from doping materials or other impurities, only $A_{IV}B_{IV}$ compounds, e.g. SiC
31/03125 . . . . . {characterised by the doping material}
31/032 . . . . including, apart from doping materials or other impurities, only compounds not provided for in groups H01L 31/0272 - H01L 31/0312
31/0321 . . . . . {characterised by the doping material (H01L 31/0323, H01L 31/0325 take precedence)}
31/0322 . . . . . {comprising only $A_{I}B_{III}C_{VI}$ chalcopyrite compounds, e.g. Cu In Se_2, Cu Ga Se_2, Cu In Ga Se_2}
31/0323 . . . . . {characterised by the doping material}
31/0324 . . . . . {comprising only $A_{IV}B_{VI}$ or $A_{II}B_{IV}C_{VI}$ chalcogenide compounds, e.g. Pb Sn Te}
31/0325 . . . . . {characterised by the doping material}
31/0326 . . . . . {comprising $A_{I}B_{II}C_{IV}D_{VI}$ kesterite compounds, e.g. $Cu_2ZnSnSe_4$, Cu_2ZnSnS_4}
31/0327 . . . . . {characterised by the doping material}

31/0328 . . . . including, apart from doping materials or other impurities, semiconductor materials provided for in two or more of groups H01L 31/0272 - H01L 31/032

31/0336 . . . . . in different semiconductor regions, e.g. Cu_2X/CdX hetero- junctions, X being an element of Group VI of the Periodic Table

31/03365 . . . . . {comprising only Cu_2X / CdX heterojunctions, X being an element of Group VI of the Periodic Table}

2031/0344 . . . {Organic materials}

31/0352 . . characterised by their shape or by the shapes, relative sizes or disposition of the semiconductor regions

31/035209 . . . {comprising a quantum structures}

31/035218 . . . . {the quantum structure being quantum dots}

31/035227 . . . . {the quantum structure being quantum wires, or nanorods (carbon nanotubes H10K 85/211)}

31/035236 . . . {Superlattices; Multiple quantum well structures}

31/035245 . . . . {characterised by amorphous semiconductor layers}

31/035254 . . . . {including, apart from doping materials or other impurities, only elements of Group IV of the Periodic Table, e.g. Si-SiGe superlattices}

31/035263 . . . . {Doping superlattices, e.g. nipi superlattices}

31/035272 . . . {characterised by at least one potential jump barrier or surface barrier}

31/035281 . . . . {Shape of the body}

31/03529 . . . . {Shape of the potential jump barrier or surface barrier}

31/036 . . characterised by their crystalline structure or particular orientation of the crystalline planes

31/0368 . . . including polycrystalline semiconductors (H01L 31/0392 takes precedence)

31/03682 . . . . {including only elements of Group IV of the Periodic Table}

31/03685 . . . . . {including microcrystalline silicon, uc-Si}

31/03687 . . . . . {including microcrystalline $A_{IV}B_{IV}$ alloys, e.g. uc-SiGe, uc-SiC}

31/0376 . . . including amorphous semiconductors (H01L 31/0392 takes precedence)

31/03762 . . . . {including only elements of Group IV of the Periodic Table}

31/03765 . . . . . {including $A_{IV}B_{IV}$ compounds or alloys, e.g. SiGe, SiC}

31/03767 . . . . . {presenting light-induced characteristic variations, e.g. Staebler-Wronski effect}

31/0384 . . . including other non-monocrystalline materials, e.g. semiconductor particles embedded in an insulating material (H01L 31/0392 takes precedence)

31/03845 . . . . {comprising semiconductor nanoparticles embedded in a semiconductor matrix (in insulating matrix H01L 31/0384)}

31/0392 . . . including thin films deposited on metallic or insulating substrates {; characterised by specific substrate materials or substrate features or by the presence of intermediate layers, e.g. barrier layers, on the substrate (textured substrates H01L 31/02366)}

31/03921 . . . . {including only elements of Group IV of the Periodic Table}

31/03923 . . . . {including $A_IB_{III}C_{VI}$ compound materials, e.g. CIS, CIGS}

31/03925 . . . . {including $A_{II}B_{VI}$ compound materials, e.g. CdTe, CdS}

31/03926 . . . . {comprising a flexible substrate}

31/03928 . . . . . {including $A_IB_{III}C_{VI}$ compound, e.g. CIS, CIGS deposited on metal or polymer foils}

31/04 . adapted as photovoltaic [PV] conversion devices (testing thereof during manufacture {H01L 22/00}; testing thereof after manufacture H02S 50/10)

31/041 . . Provisions for preventing damage caused by corpuscular radiation, e.g. for space applications

31/042 . . PV modules or arrays of single PV cells (supporting structures for PV modules H02S 20/00)

31/043 . . . Mechanically stacked PV cells

31/044 . . . including bypass diodes (bypass diodes in the junction box H02S 40/34)

31/0443 . . . . comprising bypass diodes integrated or directly associated with the devices, e.g. bypass diodes integrated or formed in or on the same substrate as the photovoltaic cells

31/0445 . . . including thin film solar cells, e.g. single thin film a-Si, CIS or CdTe solar cells

31/046 . . . . PV modules composed of a plurality of thin film solar cells deposited on the same substrate

31/0463 . . . . . characterised by special patterning methods to connect the PV cells in a module, e.g. laser cutting of the conductive or active layers

31/0465 . . . . . comprising particular structures for the electrical interconnection of adjacent PV cells in the module (H01L 31/0463 takes precedence)

31/0468 . . . . . comprising specific means for obtaining partial light transmission through the module, e.g. partially transparent thin film solar modules for windows

31/047 . . . PV cell arrays including PV cells having multiple vertical junctions or multiple V-groove junctions formed in a semiconductor substrate

31/0475 . . . PV cell arrays made by cells in a planar, e.g. repetitive, configuration on a single semiconductor substrate; PV cell microarrays (PV modules composed of a plurality of thin film solar cells deposited on the same substrate H01L 31/046)

31/048 . . . Encapsulation of modules

31/0481 . . . . {characterised by the composition of the encapsulation material}

31/0488 . . . . {Double glass encapsulation, e.g. photovoltaic cells arranged between front and rear glass sheets}

31/049 . . . . Protective back sheets

31/05 . . . Electrical interconnection means between PV cells inside the PV module, e.g. series connection of PV cells (electrodes H01L 31/0224; electrical interconnection of thin film solar cells formed on a common substrate H01L 31/046; particular structures for electrical interconnecting of adjacent thin film solar cells in the module H01L 31/0465; electrical interconnection means specially adapted for electrically connecting two or more PV modules H02S 40/36)

31/0504 . . . . {specially adapted for series or parallel connection of solar cells in a module}

31/0508 . . . . . {the interconnection means having a particular shape}

31/0512 . . . . . {made of a particular material or composition of materials}

31/0516 . . . . . {specially adapted for interconnection of back-contact solar cells}

31/052 . . Cooling means directly associated or integrated with the PV cell, e.g. integrated Peltier elements for active cooling or heat sinks directly associated with the PV cells (cooling means in combination with the PV module H02S 40/42)

31/0521 . . . {using a gaseous or a liquid coolant, e.g. air flow ventilation, water circulation}

31/0525 . . . including means to utilise heat energy directly associated with the PV cell, e.g. integrated Seebeck elements

31/053 . . Energy storage means directly associated or integrated with the PV cell, e.g. a capacitor integrated with a PV cell (energy storage means associated with the PV module H02S 40/38)

31/054 . . Optical elements directly associated or integrated with the PV cell, e.g. light-reflecting means or light-concentrating means

31/0543 . . . {comprising light concentrating means of the refractive type, e.g. lenses}

31/0547 . . . {comprising light concentrating means of the reflecting type, e.g. parabolic mirrors, concentrators using total internal reflection}

31/0549 . . . {comprising spectrum splitting means, e.g. dichroic mirrors}

31/055 . . . where light is absorbed and re-emitted at a different wavelength by the optical element directly associated or integrated with the PV cell, e.g. by using luminescent material, fluorescent concentrators or up-conversion arrangements

31/056 . . . the light-reflecting means being of the back surface reflector [BSR] type

31/06 . . characterised by potential barriers

31/061 . . . the potential barriers being of the point-contact type (H01L 31/07 takes precedence)

31/062 . . . the potential barriers being only of the metal-insulator-semiconductor type

31/065 . . . the potential barriers being only of the graded gap type

31/068 . . . the potential barriers being only of the PN homojunction type, e.g. bulk silicon PN homojunction solar cells or thin film polycrystalline silicon PN homojunction solar cells

31/0682 . . . . {back-junction, i.e. rearside emitter, solar cells, e.g. interdigitated base-emitter regions back-junction cells}

31/0684 . . . . {double emitter cells, e.g. bifacial solar cells}

31/0687 . . . . Multiple junction or tandem solar cells

31/06875 . . . . . {inverted grown metamorphic [IMM] multiple junction solar cells, e.g. III-V compounds inverted metamorphic multi-junction cells}

31/0693 . . . . the devices including, apart from doping material or other impurities, only $A_{III}B_{V}$ compounds, e.g. GaAs or InP solar cells

31/07 . . . the potential barriers being only of the Schottky type

31/072 . . . the potential barriers being only of the PN heterojunction type

31/0725 . . . . Multiple junction or tandem solar cells

31/073 . . . . comprising only $A_{II}B_{VI}$ compound semiconductors, e.g. CdS/CdTe solar cells

31/0735 . . . . comprising only $A_{III}B_{V}$ compound semiconductors, e.g. GaAs/AlGaAs or InP/GaInAs solar cells

31/074 . . . . comprising a heterojunction with an element of Group IV of the Periodic Table, e.g. ITO/Si, GaAs/Si or CdTe/Si solar cells

31/0745 . . . . comprising a $A_{IV}B_{IV}$ heterojunction, e.g. Si/Ge, SiGe/Si or Si/SiC solar cells

31/0747 . . . . . comprising a heterojunction of crystalline and amorphous materials, e.g. heterojunction with intrinsic thin layer

31/0749 . . . . including a $A_{I}B_{III}C_{VI}$ compound, e.g. CdS/$CuInSe_2$ [CIS] heterojunction solar cells

31/075 . . . the potential barriers being only of the PIN type, e.g. amorphous silicon PIN solar cells

31/076 . . . . Multiple junction or tandem solar cells

31/077 . . . . the devices comprising monocrystalline or polycrystalline materials

31/078 . . . including different types of potential barriers provided for in two or more of groups H01L 31/062 - H01L 31/075

31/08 . in which radiation controls flow of current through the device, e.g. photoresistors

31/085 . . {the device being sensitive to very short wavelength, e.g. X-ray, Gamma-rays}

31/09 . . Devices sensitive to infrared, visible or ultraviolet radiation (H01L 31/101 takes precedence)

31/095 . . . {comprising amorphous semiconductors}

31/10 . . characterised by potential barriers, e.g. phototransistors

31/101 . . . Devices sensitive to infrared, visible or ultraviolet radiation

31/1013 . . . . {devices sensitive to two or more wavelengths, e.g. multi-spectrum radiation detection devices}

31/1016 . . . . {comprising transparent or semitransparent devices}

31/102 . . . . characterised by only one potential barrier

31/1025 . . . . . {the potential barrier being of the point contact type}

31/103 . . . . . the potential barrier being of the PN homojunction type

31/1032 . . . . . {the devices comprising active layers formed only by $A_{II}B_{VI}$ compounds, e.g. HgCdTe IR photodiodes}
31/1035 . . . . . {the devices comprising active layers formed only by $A_{III}B_{V}$ compounds}
31/1037 . . . . . {the devices comprising active layers formed only by $A_{IV}B_{VI}$ compounds}
31/105 . . . . . the potential barrier being of the PIN type
31/1055 . . . . . {the devices comprising amorphous materials of Group IV of the Periodic Table}
31/107 . . . . . the potential barrier working in avalanche mode, e.g. avalanche photodiodes
31/1075 . . . . . {in which the active layers, e.g. absorption or multiplication layers, form an heterostructure, e.g. SAM structure}
31/108 . . . . . the potential barrier being of the Schottky type
31/1085 . . . . . {the devices being of the Metal-Semiconductor-Metal [MSM] Schottky barrier type}
31/109 . . . . . the potential barrier being of the PN heterojunction type
31/11 . . . . characterised by two potential barriers, e.g. bipolar phototransistors
31/1105 . . . . . {the device being a bipolar phototransistor}
31/111 . . . . characterised by at least three potential barriers, e.g. photothyristors
31/1113 . . . . . {the device being a photothyristor}
31/1116 . . . . . {of the static induction type}
31/112 . . . . characterised by field-effect operation, e.g. junction field-effect phototransistor
31/1121 . . . . . {Devices with Schottky gate}
31/1122 . . . . . {the device being a CCD device}
31/1123 . . . . . {the device being a photo MESFET}
31/1124 . . . . . {Devices with PN homojunction gate}
31/1125 . . . . . {the device being a CCD device}
31/1126 . . . . . {the device being a field-effect phototransistor}
31/1127 . . . . . {Devices with PN heterojunction gate}
31/1128 . . . . . {the device being a CCD device}
31/1129 . . . . . {the device being a field-effect phototransistor}
31/113 . . . . . being of the conductor-insulator-semiconductor type, e.g. metal-insulator-semiconductor field-effect transistor
31/1133 . . . . . {the device being a conductor-insulator-semiconductor diode or a CCD device}
31/1136 . . . . . {the device being a metal-insulator-semiconductor field-effect transistor}
31/115 . . . Devices sensitive to very short wavelength, e.g. X-rays, gamma-rays or corpuscular radiation
31/117 . . . . of the bulk effect radiation detector type, e.g. Ge-Li compensated PIN gamma-ray detectors
31/1175 . . . . . {Li compensated PIN gamma-ray detectors}
31/118 . . . . of the surface barrier or shallow PN junction detector type, e.g. surface barrier alpha-particle detectors
31/1185 . . . . . {of the shallow PN junction detector type}
31/119 . . . . characterised by field-effect operation, e.g. MIS type detectors
31/12 . structurally associated with, e.g. formed in or on a common substrate with, one or more electric light sources, e.g. electroluminescent light sources, and electrically or optically coupled thereto (semiconductor devices with at least one potential barrier or surface barrier adapted for light emission H01L 33/00; amplifiers using electroluminescent element and photocell H03F 17/00; electroluminescent light sources per se H05B 33/00)
31/125 . . {Composite devices with photosensitive elements and electroluminescent elements within one single body}
31/14 . . the light source or sources being controlled by the semiconductor device sensitive to radiation, e.g. image converters, image amplifiers or image storage devices
31/141 . . . {the semiconductor device sensitive to radiation being without a potential-jump barrier or surface barrier}
31/143 . . . . {the light source being a semiconductor device with at least one potential-jump barrier or surface barrier, e.g. light emitting diode}
31/145 . . . {the semiconductor device sensitive to radiation being characterised by at least one potential-jump barrier or surface barrier}
31/147 . . . the light sources and the devices sensitive to radiation all being semiconductor devices characterised by potential barriers
31/153 . . . . formed in, or on, a common substrate
31/16 . . the semiconductor device sensitive to radiation being controlled by the light source or sources
31/161 . . . {Semiconductor device sensitive to radiation without a potential-jump or surface barrier, e.g. photoresistors}
31/162 . . . . {the light source being a semiconductor device with at least one potential-jump barrier or surface barrier, e.g. a light emitting diode}
31/164 . . . . {Optical potentiometers}
31/165 . . . {the semiconductor sensitive to radiation being characterised by at least one potential-jump or surface barrier}
31/167 . . . the light sources and the devices sensitive to radiation all being semiconductor devices characterised by potential barriers
31/173 . . . . formed in, or on, a common substrate
31/18 . Processes or apparatus specially adapted for the manufacture or treatment of these devices or of parts thereof
31/1804 . . {comprising only elements of Group IV of the Periodic Table}
31/1808 . . . {including only Ge}
31/1812 . . . {including only $A_{IV}B_{IV}$ alloys, e.g. SiGe}
31/1816 . . . . {Special manufacturing methods for microcrystalline layers, e.g. uc-SiGe, uc-SiC}
31/182 . . . {Special manufacturing methods for polycrystalline Si, e.g. Si ribbon, poly Si ingots, thin films of polycrystalline Si}
31/1824 . . . . {Special manufacturing methods for microcrystalline Si, uc-Si}
31/1828 . . {the active layers comprising only $A_{II}B_{VI}$ compounds, e.g. CdS, ZnS, CdTe}

31/1832 . . . {comprising ternary compounds, e.g. Hg Cd Te}
31/1836 . . . {comprising a growth substrate not being an $A_{II}B_{VI}$ compound}
31/184 . . {the active layers comprising only $A_{III}B_{V}$ compounds, e.g. GaAs, InP}
31/1844 . . . {comprising ternary or quaternary compounds, e.g. Ga Al As, In Ga As P}
31/1848 . . . . {comprising nitride compounds, e.g. InGaN, InGaAlN}
31/1852 . . . {comprising a growth substrate not being an $A_{III}B_{V}$ compound}
31/1856 . . . {comprising nitride compounds, e.g. GaN}
31/186 . . {Particular post-treatment for the devices, e.g. annealing, impurity gettering, short-circuit elimination, recrystallisation}
31/1864 . . . {Annealing}
31/1868 . . . {Passivation}
31/1872 . . . {Recrystallisation}
31/1876 . . {Particular processes or apparatus for batch treatment of the devices}
31/188 . . . {Apparatus specially adapted for automatic interconnection of solar cells in a module}
31/1884 . . {Manufacture of transparent electrodes, e.g. TCO, ITO}
31/1888 . . . {methods for etching transparent electrodes}
31/1892 . . {methods involving the use of temporary, removable substrates}
31/1896 . . . {for thin-film semiconductors}
31/20 . . such devices or parts thereof comprising amorphous semiconductor materials
31/202 . . . {including only elements of Group IV of the Periodic Table}
31/204 . . . . {including $A_{IV}B_{IV}$ alloys, e.g. SiGe, SiC}
31/206 . . . {Particular processes or apparatus for continuous treatment of the devices, e.g. roll-to roll processes, multi-chamber deposition}
31/208 . . . {Particular post-treatment of the devices, e.g. annealing, short-circuit elimination}

33/00 Semiconductor devices having potential barriers specially adapted for light emission; Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof; Details thereof (H10K 50/00 takes precedence; devices consisting of a plurality of semiconductor components formed in or on a common substrate and including semiconductor components having potential barriers, specially adapted for light emission H01L 27/15; semiconductor lasers H01S 5/00)

NOTES

1. This group covers light-emitting diodes [LED] or superluminescent diodes [SLD], which emit visible light, infrared [IR] light or ultraviolet [UV] light.
2. In this group, the first place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.

33/0004 . {Devices characterised by their operation}
33/0008 . . {having p-n or hi-lo junctions}
33/0012 . . . {p-i-n devices}
33/0016 . . . {having at least two p-n junctions}
33/002 . . {having heterojunctions or graded gap}
33/0025 . . . {comprising only $A_{III}B_{V}$ compounds}
33/0029 . . . {comprising only $A_{II}B_{VI}$ compounds}
33/0033 . . {having Schottky barriers}
33/0037 . . {having a MIS barrier layer}
33/0041 . . {characterised by field-effect operation}
33/0045 . . {the devices being superluminescent diodes}
33/005 . {Processes}
33/0054 . . {for devices with an active region comprising only group IV elements}
33/0058 . . . {comprising amorphous semiconductors}
33/0062 . . {for devices with an active region comprising only III-V compounds}
33/0066 . . . {with a substrate not being a III-V compound}
33/007 . . . . {comprising nitride compounds}
33/0075 . . . {comprising nitride compounds}
33/0083 . . {for devices with an active region comprising only II-VI compounds}
33/0087 . . . {with a substrate not being a II-VI compound}
33/0091 . . {for devices with an active region comprising only IV-VI compounds}
33/0093 . . {Wafer bonding; Removal of the growth substrate}
33/0095 . . {Post-treatment of devices, e.g. annealing, recrystallisation or short-circuit elimination}
33/02 . characterised by the semiconductor bodies
33/025 . . {Physical imperfections, e.g. particular concentration or distribution of impurities}
33/04 . . with a quantum effect structure or superlattice, e.g. tunnel junction
33/06 . . . within the light emitting region, e.g. quantum confinement structure or tunnel barrier
33/08 . . with a plurality of light emitting regions, e.g. laterally discontinuous light emitting layer or photoluminescent region integrated within the semiconductor body (H01L 27/15 takes precedence)
33/10 . . with a light reflecting structure, e.g. semiconductor Bragg reflector
33/105 . . . {with a resonant cavity structure}
33/12 . . with a stress relaxation structure, e.g. buffer layer
33/14 . . with a carrier transport control structure, e.g. highly-doped semiconductor layer or current-blocking structure
33/145 . . . {with a current-blocking structure}
33/16 . . with a particular crystal structure or orientation, e.g. polycrystalline, amorphous or porous
33/18 . . . within the light emitting region

NOTE

When classifying in this group, classification is also made in group H01L 33/26 or one of its subgroups in order to identify the chemical composition of the light emitting region

33/20 . . with a particular shape, e.g. curved or truncated substrate
33/22 . . . Roughened surfaces, e.g. at the interface between epitaxial layers
33/24 . . . of the light emitting region, e.g. non-planar junction
33/26 . . Materials of the light emitting region
33/28 . . . containing only elements of Group II and Group VI of the Periodic Table

33/285 . . . . {characterised by the doping materials}
33/30 . . . containing only elements of Group III and Group V of the Periodic Table
33/305 . . . . {characterised by the doping materials}
33/32 . . . . containing nitrogen
33/325 . . . . . {characterised by the doping materials}
33/34 . . . containing only elements of Group IV of the Periodic Table
33/343 . . . . {characterised by the doping materials}
33/346 . . . . {containing porous silicon}
33/36 . characterised by the electrodes
33/38 . . with a particular shape
33/382 . . . {the electrode extending partially in or entirely through the semiconductor body}
33/385 . . . {the electrode extending at least partially onto a side surface of the semiconductor body}
33/387 . . . {with a plurality of electrode regions in direct contact with the semiconductor body and being electrically interconnected by another electrode layer}
33/40 . . Materials therefor
33/405 . . . {Reflective materials}
33/42 . . . Transparent materials
33/44 . characterised by the coatings, e.g. passivation layer or anti-reflective coating
33/46 . . Reflective coating, e.g. dielectric Bragg reflector
33/465 . . . {with a resonant cavity structure}
33/48 . characterised by the semiconductor body packages

NOTE

This group covers elements in intimate contact with the semiconductor body or integrated with the package

33/483 . . {Containers}
33/486 . . . {adapted for surface mounting}
33/50 . . Wavelength conversion elements
33/501 . . . {characterised by the materials, e.g. binder}
33/502 . . . . {Wavelength conversion materials}
33/504 . . . . . {Elements with two or more wavelength conversion materials}
33/505 . . . {characterised by the shape, e.g. plate or foil}
33/507 . . . {the elements being in intimate contact with parts other than the semiconductor body or integrated with parts other than the semiconductor body}
33/508 . . . {having a non-uniform spatial arrangement or non-uniform concentration, e.g. patterned wavelength conversion layer, wavelength conversion layer with a concentration gradient of the wavelength conversion material}
33/52 . . Encapsulations
33/54 . . . having a particular shape
33/56 . . . Materials, e.g. epoxy or silicone resin
33/58 . . Optical field-shaping elements
33/60 . . . Reflective elements
33/62 . . Arrangements for conducting electric current to or from the semiconductor body, e.g. lead-frames, wire-bonds or solder balls
33/64 . . Heat extraction or cooling elements
33/641 . . . {characterized by the materials}
33/642 . . . {characterized by the shape}
33/644 . . . {in intimate contact or integrated with parts of the device other than the semiconductor body}
33/645 . . . {the elements being electrically controlled, e.g. Peltier elements}
33/647 . . . {the elements conducting electric current to or from the semiconductor body}
33/648 . . . {the elements comprising fluids, e.g. heat-pipes}

2221/00 Processes or apparatus adapted for the manufacture or treatment of semiconductor or solid state devices or of parts thereof covered by H01L 21/00

2221/10 . Applying interconnections to be used for carrying current between separate components within a device
2221/1005 . . Formation and after-treatment of dielectrics
2221/101 . . . Forming openings in dielectrics
2221/1015 . . . . for dual damascene structures
2221/1021 . . . . . Pre-forming the dual damascene structure in a resist layer
2221/1026 . . . . . the via being formed by burying a sacrificial pillar in the dielectric and removing the pillar
2221/1031 . . . . . Dual damascene by forming vias in the via-level dielectric prior to deposition of the trench-level dielectric
2221/1036 . . . . . Dual damascene with different via-level and trench-level dielectrics
2221/1042 . . . the dielectric comprising air gaps
2221/1047 . . . . the air gaps being formed by pores in the dielectric
2221/1052 . . . Formation of thin functional dielectric layers
2221/1057 . . . . in via holes or trenches
2221/1063 . . . . . Sacrificial or temporary thin dielectric films in openings in a dielectric
2221/1068 . . Formation and after-treatment of conductors
2221/1073 . . . Barrier, adhesion or liner layers
2221/1078 . . . . Multiple stacked thin films not being formed in openings in dielectrics
2221/1084 . . . . Layers specifically deposited to enhance or enable the nucleation of further layers, i.e. seed layers
2221/1089 . . . . . Stacks of seed layers
2221/1094 . . . Conducting structures comprising nanotubes or nanowires
2221/67 . Apparatus for handling semiconductor or electric solid state devices during manufacture or treatment thereof; Apparatus for handling wafers during manufacture or treatment of semiconductor or electric solid state devices or components; Apparatus not specifically provided for elsewhere
2221/683 . . for supporting or gripping
2221/68304 . . . using temporarily an auxiliary support
2221/68309 . . . . Auxiliary support including alignment aids
2221/68313 . . . . Auxiliary support including a cavity for storing a finished device, e.g. IC package, or a partly finished device, e.g. die, during manufacturing or mounting
2221/68318 . . . . Auxiliary support including means facilitating the separation of a device or wafer from the auxiliary support
2221/68322 . . . . . Auxiliary support including means facilitating the selective separation of some of a plurality of devices from the auxiliary support

2221/68327 . . . . used during dicing or grinding
2221/68331 . . . . . of passive members, e.g. die mounting substrate
2221/68336 . . . . . involving stretching of the auxiliary support post dicing
2221/6834 . . . . used to protect an active side of a device or wafer
2221/68345 . . . . used as a support during the manufacture of self supporting substrates
2221/6835 . . . . used as a support during build up manufacturing of active devices
2221/68354 . . . . used to support diced chips prior to mounting
2221/68359 . . . . used as a support during manufacture of interconnect decals or build up layers
2221/68363 . . . . used in a transfer process involving transfer directly from an origin substrate to a target substrate without use of an intermediate handle substrate
2221/68368 . . . . used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate
2221/68372 . . . . used to support a device or wafer when forming electrical connections thereto (when forming bonding pads H01L 24/03; when forming bump connectors H01L 24/11; when forming layer connectors H01L 24/27)
2221/68377 . . . . with parts of the auxiliary support remaining in the finished device
2221/68381 . . . . Details of chemical or physical process used for separating the auxiliary support from a device or wafer
2221/68386 . . . . . Separation by peeling
2221/6839 . . . . . using peeling wedge or knife or bar
2221/68395 . . . . . using peeling wheel

2223/00 **Details relating to semiconductor or other solid state devices covered by the group H01L 23/00**

2223/544 . Marks applied to semiconductor devices or parts
2223/54406 . . comprising alphanumeric information
2223/54413 . . comprising digital information, e.g. bar codes, data matrix
2223/5442 . . comprising non digital, non alphanumeric information, e.g. symbols
2223/54426 . . for alignment
2223/54433 . . containing identification or tracking information
2223/5444 . . . for electrical read out
2223/54446 . . . . Wireless electrical read out
2223/54453 . . for use prior to dicing
2223/5446 . . . Located in scribe lines
2223/54466 . . . Located in a dummy or reference die
2223/54473 . . for use after dicing
2223/5448 . . . Located on chip prior to dicing and remaining on chip after dicing
2223/54486 . . . Located on package parts, e.g. encapsulation, leads, package substrate
2223/54493 . . Peripheral marks on wafers, e.g. orientation flats, notches, lot number
2223/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for
2223/64 . . Impedance arrangements
2223/66 . . . High-frequency adaptations
2223/6605 . . . . High-frequency electrical connections
2223/6611 . . . . . Wire connections
2223/6616 . . . . . Vertical connections, e.g. vias
2223/6622 . . . . . Coaxial feed-throughs in active or passive substrates
2223/6627 . . . . . Waveguides, e.g. microstrip line, strip line, coplanar line
2223/6633 . . . . . Transition between different waveguide types
2223/6638 . . . . . Differential pair signal lines
2223/6644 . . . . Packaging aspects of high-frequency amplifiers (amplifiers per se H03F)
2223/665 . . . . . Bias feed arrangements
2223/6655 . . . . . Matching arrangements, e.g. arrangement of inductive and capacitive components
2223/6661 . . . . for passive devices (passive components per se H01L 28/00)
2223/6666 . . . . . for decoupling, e.g. bypass capacitors
2223/6672 . . . . . for integrated passive components, e.g. semiconductor device with passive components only (integrated circuits with passive components only per se H01L 27/01)
2223/6677 . . . . . for antenna, e.g. antenna included within housing of semiconductor device (antennas per se H01Q)
2223/6683 . . . . for monolithic microwave integrated circuit [MMIC]
2223/6688 . . . . Mixed frequency adaptations, i.e. for operation at different frequencies
2223/6694 . . . . Optical signal interface included within high-frequency semiconductor device housing

2224/00 **Indexing scheme for arrangements for connecting or disconnecting semiconductor or solid-state bodies and methods related thereto as covered by H01L 24/00**

2224/01 . Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chip-to-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto
2224/02 . . Bonding areas; Manufacturing methods related thereto
2224/0212 . . . Auxiliary members for bonding areas, e.g. spacers
2224/02122 . . . . being formed on the semiconductor or solid-state body
2224/02123 . . . . . inside the bonding area
2224/02125 . . . . . Reinforcing structures
2224/02126 . . . . . Collar structures
2224/0213 . . . . . Alignment aids
2224/02135 . . . . . Flow barrier
2224/0214 . . . . . Structure of the auxiliary member
2224/02141 . . . . . Multilayer auxiliary member
2224/02145 . . . . . Shape of the auxiliary member
2224/0215 . . . . . Material of the auxiliary member
2224/02163 . . . . . on the bonding area
2224/02165 . . . . . Reinforcing structures
2224/02166 . . . . . Collar structures
2224/0217 . . . . . Alignment aids
2224/02175 . . . . . Flow barrier
2224/0218 . . . . . Structure of the auxiliary member
2224/02181 . . . . . Multilayer auxiliary member
2224/02185 . . . . . Shape of the auxiliary member
2224/0219 . . . . . Material of the auxiliary member
2224/022 . . . . . Protective coating, i.e. protective bond-through coating

2224/02205 . . . . . Structure of the protective coating
2224/02206 . . . . . Multilayer protective coating
2224/0221 . . . . . Shape of the protective coating
2224/02215 . . . . . Material of the protective coating
2224/02233 . . . . not in direct contact with the bonding area
2224/02235 . . . . . Reinforcing structures
2224/0224 . . . . . Alignment aids
2224/02245 . . . . . Flow barrier
2224/0225 . . . . . Structure of the auxiliary member
2224/02251 . . . . . Multilayer auxiliary member
2224/02255 . . . . . Shape of the auxiliary member
2224/0226 . . . . . Material of the auxiliary member
2224/023 . . . Redistribution layers [RDL] for bonding areas
2224/0231 . . . . Manufacturing methods of the redistribution layers
2224/02311 . . . . . Additive methods
2224/02313 . . . . . Subtractive methods
2224/02315 . . . . . Self-assembly processes
2224/02317 . . . . . by local deposition
2224/02319 . . . . . by using a preform
2224/02321 . . . . . Reworking
2224/0233 . . . . Structure of the redistribution layers
2224/02331 . . . . . Multilayer structure
2224/02333 . . . . . being a bump
2224/02335 . . . . . Free-standing redistribution layers
2224/0235 . . . . Shape of the redistribution layers
2224/02351 . . . . . comprising interlocking features
2224/0236 . . . . Shape of the insulating layers therebetween
2224/0237 . . . . Disposition of the redistribution layers
2224/02371 . . . . . connecting the bonding area on a surface of the semiconductor or solid-state body with another surface of the semiconductor or solid-state body
2224/02372 . . . . . connecting to a via connection in the semiconductor or solid-state body
2224/02373 . . . . . Layout of the redistribution layers
2224/02375 . . . . . Top view
2224/02377 . . . . . Fan-in arrangement
2224/02379 . . . . . Fan-out arrangement
2224/02381 . . . . . Side view
2224/0239 . . . . Material of the redistribution layers
2224/024 . . . . Material of the insulating layers therebetween
2224/03 . . . Manufacturing methods
2224/03001 . . . . Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
2224/03002 . . . . . for supporting the semiconductor or solid-state body
2224/03003 . . . . . for holding or transferring a preform
2224/03005 . . . . . for aligning the bonding area, e.g. marks, spacers
2224/03009 . . . . . for protecting parts during manufacture
2224/03011 . . . . Involving a permanent auxiliary member, i.e. a member which is left at least partly in the finished device, e.g. coating, dummy feature
2224/03013 . . . . . for holding or confining the bonding area, e.g. solder flow barrier
2224/03015 . . . . . for aligning the bonding area, e.g. marks, spacers
2224/03019 . . . . . for protecting parts during the process
2224/031 . . . . Manufacture and pre-treatment of the bonding area preform
2224/0311 . . . . . Shaping
2224/0312 . . . . . Applying permanent coating
2224/033 . . . . by local deposition of the material of the bonding area
2224/0331 . . . . . in liquid form
2224/03312 . . . . . Continuous flow, e.g. using a microsyringe, a pump, a nozzle or extrusion
2224/03318 . . . . . by dispensing droplets
2224/0332 . . . . . Screen printing, i.e. using a stencil
2224/0333 . . . . . in solid form
2224/03332 . . . . . using a powder
2224/03334 . . . . . using a preform
2224/034 . . . . by blanket deposition of the material of the bonding area
2224/0341 . . . . . in liquid form
2224/03416 . . . . . Spin coating
2224/03418 . . . . . Spray coating
2224/0342 . . . . . Curtain coating
2224/03422 . . . . . by dipping, e.g. in a solder bath (hot-dipping C23C 2/00)
2224/03424 . . . . . Immersion coating, e.g. in a solder bath (immersion processes C23C 2/00)
2224/03426 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/03428 . . . . . Wave coating
2224/0343 . . . . . in solid form
2224/03436 . . . . . Lamination of a preform, e.g. foil, sheet or layer
2224/03438 . . . . . the preform being at least partly pre-patterned
2224/0344 . . . . . by transfer printing
2224/03442 . . . . . using a powder
2224/03444 . . . . . in gaseous form
2224/0345 . . . . . Physical vapour deposition [PVD], e.g. evaporation, or sputtering
2224/03452 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
2224/0346 . . . . . Plating
2224/03462 . . . . . Electroplating
2224/03464 . . . . . Electroless plating
2224/03466 . . . . . Conformal deposition, i.e. blanket deposition of a conformal layer on a patterned surface
2224/0347 . . . . using a lift-off mask
2224/03472 . . . . . Profile of the lift-off mask
2224/03474 . . . . . Multilayer masks
2224/0348 . . . . . Permanent masks, i.e. masks left in the finished device, e.g. passivation layers
2224/035 . . . . by chemical or physical modification of a pre-existing or pre-deposited material
2224/03502 . . . . . Pre-existing or pre-deposited material
2224/03505 . . . . . Sintering
2224/0351 . . . . . Anodisation
2224/03515 . . . . . Curing and solidification, e.g. of a photosensitive material
2224/0352 . . . . . Self-assembly, e.g. self-agglomeration of the material in a fluid
2224/03522 . . . . . Auxiliary means therefor, e.g. for self-assembly activation

2224/03524 . . . . . with special adaptation of the surface of the body to be connected or of an auxiliary substrate, e.g. surface shape specially adapted for the self-assembly process
2224/0355 . . . . . Selective modification
2224/03552 . . . . . using a laser or a focussed ion beam [FIB]
2224/03554 . . . . . Stereolithography, i.e. solidification of a pattern defined by a laser trace in a photosensitive resin
2224/036 . . . . by patterning a pre-deposited material (treatment of parts prior to assembly of the devices H01L 21/48)
2224/03602 . . . . . Mechanical treatment, e.g. polishing, grinding
2224/0361 . . . . . Physical or chemical etching
2224/03612 . . . . . by physical means only
2224/03614 . . . . . by chemical means only
2224/03616 . . . . . Chemical mechanical polishing [CMP]
2224/03618 . . . . . with selective exposure, development and removal of a photosensitive material, e.g. of a photosensitive conductive resin
2224/0362 . . . . . Photolithography
2224/03622 . . . . . using masks
2224/0363 . . . . . using a laser or a focused ion beam [FIB]
2224/03632 . . . . . Ablation by means of a laser or focused ion beam [FIB]
2224/037 . . . . involving monitoring, e.g. feedback loop
2224/038 . . . . Post-treatment of the bonding area
2224/0381 . . . . . Cleaning, e.g. oxide removal step, desmearing
2224/0382 . . . . . Applying permanent coating, e.g. in-situ coating
2224/03821 . . . . . Spray coating
2224/03822 . . . . . by dipping, e.g. in a solder bath
2224/03823 . . . . . Immersion coating, e.g. in a solder bath
2224/03824 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/03825 . . . . . Plating, e.g. electroplating, electroless plating
2224/03826 . . . . . Physical vapour deposition [PVD], e.g. evaporation, or sputtering
2224/03827 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
2224/03828 . . . . . Applying flux
2224/03829 . . . . . Applying a precursor material
2224/0383 . . . . . Reworking, e.g. shaping (reflowing H01L 2224/03849)
2224/03831 . . . . . involving a chemical process, e.g. etching the bonding area
2224/0384 . . . . . involving a mechanical process, e.g. planarising the bonding area
2224/03845 . . . . . Chemical mechanical polishing [CMP]
2224/03848 . . . . . Thermal treatments, e.g. annealing, controlled cooling
2224/03849 . . . . . Reflowing
2224/039 . . . . Methods of manufacturing bonding areas involving a specific sequence of method steps
2224/03901 . . . . . with repetition of the same manufacturing step
2224/03902 . . . . . Multiple masking steps
2224/03903 . . . . . using different masks
2224/03906 . . . . . with modification of the same mask
2224/0391 . . . . . Forming a passivation layer after forming the bonding area
2224/03912 . . . . . the bump being used as a mask for patterning the bonding area
2224/03914 . . . . . the bonding area, e.g. under bump metallisation [UBM], being used as a mask for patterning other parts
2224/03916 . . . . . a passivation layer being used as a mask for patterning the bonding area
2224/0392 . . . . . specifically adapted to include a probing step
2224/03921 . . . . . by repairing the bonding area damaged by the probing step
2224/04 . . . Structure, shape, material or disposition of the bonding areas prior to the connecting process
2224/0401 . . . . Bonding areas specifically adapted for bump connectors, e.g. under bump metallisation [UBM]
2224/04026 . . . . Bonding areas specifically adapted for layer connectors
2224/04034 . . . . Bonding areas specifically adapted for strap connectors
2224/04042 . . . . Bonding areas specifically adapted for wire connectors, e.g. wirebond pads
2224/0405 . . . . Bonding areas specifically adapted for tape automated bonding [TAB] connectors
2224/04073 . . . . Bonding areas specifically adapted for connectors of different types
2224/04105 . . . . Bonding areas formed on an encapsulation of the semiconductor or solid-state body, e.g. bonding areas on chip-scale packages
2224/05 . . . . of an individual bonding area
2224/05001 . . . . . Internal layers
2224/05005 . . . . . Structure
2224/05006 . . . . . Dual damascene structure
2224/05007 . . . . . comprising a core and a coating
2224/05008 . . . . . Bonding area integrally formed with a redistribution layer on the semiconductor or solid-state body, e.g.
2224/05009 . . . . . Bonding area integrally formed with a via connection of the semiconductor or solid-state body
2224/0501 . . . . . Shape
2224/05011 . . . . . comprising apertures or cavities
2224/05012 . . . . . in top view
2224/05013 . . . . . being rectangular
2224/05014 . . . . . being square
2224/05015 . . . . . being circular or elliptic
2224/05016 . . . . . in side view
2224/05017 . . . . . comprising protrusions or indentations
2224/05018 . . . . . being a conformal layer on a patterned surface
2224/05019 . . . . . being a non conformal layer on a patterned surface
2224/0502 . . . . . Disposition
2224/05022 . . . . . the internal layer being at least partially embedded in the surface
2224/05023 . . . . . the whole internal layer protruding from the surface

2224/05024 . . . . . the internal layer being disposed on a redistribution layer on the semiconductor or solid-state body
2224/05025 . . . . . the internal layer being disposed on a via connection of the semiconductor or solid-state body
2224/05026 . . . . . the internal layer being disposed in a recess of the surface
2224/05027 . . . . . the internal layer extending out of an opening
2224/05073 . . . . . Single internal layer
2224/05075 . . . . . Plural internal layers
2224/05076 . . . . . being mutually engaged together, e.g. through inserts
2224/05078 . . . . . being disposed next to each other, e.g. side-to-side arrangements
2224/0508 . . . . . being stacked
2224/05082 . . . . . Two-layer arrangements
2224/05083 . . . . . Three-layer arrangements
2224/05084 . . . . . Four-layer arrangements
2224/05085 . . . . . with additional elements, e.g. vias arrays, interposed between the stacked layers
2224/05086 . . . . . Structure of the additional element
2224/05087 . . . . . being a via with at least a lining layer
2224/05088 . . . . . Shape of the additional element
2224/05089 . . . . . Disposition of the additional element
2224/0509 . . . . . of a single via
2224/05091 . . . . . at the center of the internal layers
2224/05092 . . . . . at the periphery of the internal layers
2224/05093 . . . . . of a plurality of vias
2224/05094 . . . . . at the center of the internal layers
2224/05095 . . . . . at the periphery of the internal layers
2224/05096 . . . . . Uniform arrangement, i.e. array
2224/05097 . . . . . Random arrangement
2224/05098 . . . . . Material of the additional element
2224/05099 . . . . . Material
2224/051 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/05101 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/05105 . . . . . Gallium [Ga] as principal constituent
2224/05109 . . . . . Indium [In] as principal constituent
2224/05111 . . . . . Tin [Sn] as principal constituent
2224/05113 . . . . . Bismuth [Bi] as principal constituent
2224/05114 . . . . . Thallium [Tl] as principal constituent
2224/05116 . . . . . Lead [Pb] as principal constituent
2224/05117 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05118 . . . . . Zinc [Zn] as principal constituent
2224/0512 . . . . . Antimony [Sb] as principal constituent
2224/05123 . . . . . Magnesium [Mg] as principal constituent
2224/05124 . . . . . Aluminium [Al] as principal constituent
2224/05138 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05139 . . . . . Silver [Ag] as principal constituent
2224/05144 . . . . . Gold [Au] as principal constituent
2224/05147 . . . . . Copper [Cu] as principal constituent
2224/05149 . . . . . Manganese [Mn] as principal constituent
2224/05155 . . . . . Nickel [Ni] as principal constituent
2224/05157 . . . . . Cobalt [Co] as principal constituent
2224/0516 . . . . . Iron [Fe] as principal constituent
2224/05163 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/05164 . . . . . Palladium [Pd] as principal constituent
2224/05166 . . . . . Titanium [Ti] as principal constituent
2224/05169 . . . . . Platinum [Pt] as principal constituent
2224/0517 . . . . . Zirconium [Zr] as principal constituent
2224/05171 . . . . . Chromium [Cr] as principal constituent
2224/05172 . . . . . Vanadium [V] as principal constituent
2224/05173 . . . . . Rhodium [Rh] as principal constituent
2224/05176 . . . . . Ruthenium [Ru] as principal constituent
2224/05178 . . . . . Iridium [Ir] as principal constituent
2224/05179 . . . . . Niobium [Nb] as principal constituent
2224/0518 . . . . . Molybdenum [Mo] as principal constituent
2224/05181 . . . . . Tantalum [Ta] as principal constituent
2224/05183 . . . . . Rhenium [Re] as principal constituent
2224/05184 . . . . . Tungsten [W] as principal constituent
2224/05186 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05187 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/05188)

2224/05188 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/0519 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/05191 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/05193 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/051 - H01L 2224/05191, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/05194 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/051 - H01L 2224/05191
2224/05195 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/051 - H01L 2224/05191
2224/05198 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/05199 . . . . . Material of the matrix
2224/052 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/05201 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/05205 . . . . . Gallium [Ga] as principal constituent
2224/05209 . . . . . Indium [In] as principal constituent
2224/05211 . . . . . Tin [Sn] as principal constituent
2224/05213 . . . . . Bismuth [Bi] as principal constituent
2224/05214 . . . . . Thallium [Tl] as principal constituent
2224/05216 . . . . . Lead [Pb] as principal constituent
2224/05217 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05218 . . . . . Zinc [Zn] as principal constituent
2224/0522 . . . . . Antimony [Sb] as principal constituent
2224/05223 . . . . . Magnesium [Mg] as principal constituent
2224/05224 . . . . . Aluminium [Al] as principal constituent
2224/05238 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05239 . . . . . Silver [Ag] as principal constituent
2224/05244 . . . . . Gold [Au] as principal constituent
2224/05247 . . . . . Copper [Cu] as principal constituent
2224/05249 . . . . . Manganese [Mn] as principal constituent
2224/05255 . . . . . Nickel [Ni] as principal constituent
2224/05257 . . . . . Cobalt [Co] as principal constituent
2224/0526 . . . . . Iron [Fe] as principal constituent
2224/05263 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/05264 . . . . . Palladium [Pd] as principal constituent
2224/05266 . . . . . Titanium [Ti] as principal constituent
2224/05269 . . . . . Platinum [Pt] as principal constituent
2224/0527 . . . . . Zirconium [Zr] as principal constituent
2224/05271 . . . . . Chromium [Cr] as principal constituent
2224/05272 . . . . . Vanadium [V] as principal constituent
2224/05273 . . . . . Rhodium [Rh] as principal constituent
2224/05276 . . . . . Ruthenium [Ru] as principal constituent
2224/05278 . . . . . Iridium [Ir] as principal constituent
2224/05279 . . . . . Niobium [Nb] as principal constituent
2224/0528 . . . . . Molybdenum [Mo] as principal constituent
2224/05281 . . . . . Tantalum [Ta] as principal constituent
2224/05283 . . . . . Rhenium [Re] as principal constituent
2224/05284 . . . . . Tungsten [W] as principal constituent
2224/05286 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05287 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/05288)
2224/05288 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/0529 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy

2224/05291 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/05293 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/052 - H01L 2224/05291, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/05294 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/052 - H01L 2224/05291
2224/05295 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/052 - H01L 2224/05291
2224/05298 . . . . . Fillers
2224/05299 . . . . . Base material
2224/053 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/05301 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/05305 . . . . . Gallium [Ga] as principal constituent
2224/05309 . . . . . Indium [In] as principal constituent
2224/05311 . . . . . Tin [Sn] as principal constituent
2224/05313 . . . . . Bismuth [Bi] as principal constituent
2224/05314 . . . . . Thallium [Tl] as principal constituent
2224/05316 . . . . . Lead [Pb] as principal constituent
2224/05317 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05318 . . . . . Zinc [Zn] as principal constituent
2224/0532 . . . . . Antimony [Sb] as principal constituent
2224/05323 . . . . . Magnesium [Mg] as principal constituent
2224/05324 . . . . . Aluminium [Al] as principal constituent
2224/05338 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05339 . . . . . Silver [Ag] as principal constituent
2224/05344 . . . . . Gold [Au] as principal constituent
2224/05347 . . . . . Copper [Cu] as principal constituent
2224/05349 . . . . . Manganese [Mn] as principal constituent
2224/05355 . . . . . Nickel [Ni] as principal constituent
2224/05357 . . . . . Cobalt [Co] as principal constituent
2224/0536 . . . . . Iron [Fe] as principal constituent
2224/05363 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/05364 . . . . . Palladium [Pd] as principal constituent
2224/05366 . . . . . Titanium [Ti] as principal constituent
2224/05369 . . . . . Platinum [Pt] as principal constituent
2224/0537 . . . . . Zirconium [Zr] as principal constituent
2224/05371 . . . . . Chromium [Cr] as principal constituent
2224/05372 . . . . . Vanadium [V] as principal constituent
2224/05373 . . . . . Rhodium [Rh] as principal constituent
2224/05376 . . . . . Ruthenium [Ru] as principal constituent
2224/05378 . . . . . Iridium [Ir] as principal constituent
2224/05379 . . . . . Niobium [Nb] as principal constituent
2224/0538 . . . . . Molybdenum [Mo] as principal constituent
2224/05381 . . . . . Tantalum [Ta] as principal constituent
2224/05383 . . . . . Rhenium [Re] as principal constituent
2224/05384 . . . . . Tungsten [W] as principal constituent
2224/05386 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05387 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/05388)
2224/05388 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/0539 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/05391 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/05393 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/053 - H01L 2224/05391, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

2224/05394 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/053 - H01L 2224/05391
2224/05395 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/053 - H01L 2224/05391
2224/05398 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/05399 . . . . . Coating material
2224/054 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/05401 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/05405 . . . . . Gallium [Ga] as principal constituent
2224/05409 . . . . . Indium [In] as principal constituent
2224/05411 . . . . . Tin [Sn] as principal constituent
2224/05413 . . . . . Bismuth [Bi] as principal constituent
2224/05414 . . . . . Thallium [Tl] as principal constituent
2224/05416 . . . . . Lead [Pb] as principal constituent
2224/05417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05418 . . . . . Zinc [Zn] as principal constituent
2224/0542 . . . . . Antimony [Sb] as principal constituent
2224/05423 . . . . . Magnesium [Mg] as principal constituent
2224/05424 . . . . . Aluminium [Al] as principal constituent
2224/05438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05439 . . . . . Silver [Ag] as principal constituent
2224/05444 . . . . . Gold [Au] as principal constituent
2224/05447 . . . . . Copper [Cu] as principal constituent
2224/05449 . . . . . Manganese [Mn] as principal constituent
2224/05455 . . . . . Nickel [Ni] as principal constituent
2224/05457 . . . . . Cobalt [Co] as principal constituent
2224/0546 . . . . . Iron [Fe] as principal constituent
2224/05463 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/05464 . . . . . Palladium [Pd] as principal constituent
2224/05466 . . . . . Titanium [Ti] as principal constituent
2224/05469 . . . . . Platinum [Pt] as principal constituent
2224/0547 . . . . . Zirconium [Zr] as principal constituent
2224/05471 . . . . . Chromium [Cr] as principal constituent
2224/05472 . . . . . Vanadium [V] as principal constituent
2224/05473 . . . . . Rhodium [Rh] as principal constituent
2224/05476 . . . . . Ruthenium [Ru] as principal constituent
2224/05478 . . . . . Iridium [Ir] as principal constituent
2224/05479 . . . . . Niobium [Nb] as principal constituent
2224/0548 . . . . . Molybdenum [Mo] as principal constituent
2224/05481 . . . . . Tantalum [Ta] as principal constituent
2224/05483 . . . . . Rhenium [Re] as principal constituent
2224/05484 . . . . . Tungsten [W] as principal constituent
2224/05486 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05487 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/05488)
2224/05488 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/0549 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/05491 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/05493 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/054 - H01L 2224/05491, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/05494 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/054 - H01L 2224/05491

2224/05495 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/054 - H01L 2224/05491
2224/05498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/05499 . . . . . Shape or distribution of the fillers
2224/0554 . . . . . External layer
2224/05541 . . . . . Structure
2224/05546 . . . . . Dual damascene structure
2224/05547 . . . . . comprising a core and a coating
2224/05548 . . . . . Bonding area integrally formed with a redistribution layer on the semiconductor or solid-state body
2224/0555 . . . . . Shape
2224/05551 . . . . . comprising apertures or cavities
2224/05552 . . . . . in top view
2224/05553 . . . . . being rectangular
2224/05554 . . . . . being square
2224/05555 . . . . . being circular or elliptic
2224/05556 . . . . . in side view
2224/05557 . . . . . comprising protrusions or indentations
2224/05558 . . . . . conformal layer on a patterned surface
2224/05559 . . . . . non conformal layer on a patterned surface
2224/0556 . . . . . Disposition
2224/05561 . . . . . On the entire surface of the internal layer
2224/05562 . . . . . On the entire exposed surface of the internal layer
2224/05563 . . . . . Only on parts of the surface of the internal layer
2224/05564 . . . . . Only on the bonding interface of the bonding area
2224/05565 . . . . . Only outside the bonding interface of the bonding area
2224/05566 . . . . . Both on and outside the bonding interface of the bonding area
2224/05567 . . . . . the external layer being at least partially embedded in the surface
2224/05568 . . . . . the whole external layer protruding from the surface
2224/05569 . . . . . the external layer being disposed on a redistribution layer on the semiconductor or solid-state body
2224/0557 . . . . . the external layer being disposed on a via connection of the semiconductor or solid-state body
2224/05571 . . . . . the external layer being disposed in a recess of the surface
2224/05572 . . . . . the external layer extending out of an opening
2224/05573 . . . . . Single external layer
2224/05575 . . . . . Plural external layers
2224/05576 . . . . . being mutually engaged together, e.g. through inserts
2224/05578 . . . . . being disposed next to each other, e.g. side-to-side arrangements
2224/0558 . . . . . being stacked
2224/05582 . . . . . Two-layer coating
2224/05583 . . . . . Three-layer coating
2224/05584 . . . . . Four-layer coating
2224/05599 . . . . . Material
2224/056 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/05601 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/05605 . . . . . Gallium [Ga] as principal constituent
2224/05609 . . . . . Indium [In] as principal constituent
2224/05611 . . . . . Tin [Sn] as principal constituent
2224/05613 . . . . . Bismuth [Bi] as principal constituent
2224/05614 . . . . . Thallium [Tl] as principal constituent
2224/05616 . . . . . Lead [Pb] as principal constituent
2224/05617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05618 . . . . . Zinc [Zn] as principal constituent
2224/0562 . . . . . Antimony [Sb] as principal constituent
2224/05623 . . . . . Magnesium [Mg] as principal constituent
2224/05624 . . . . . Aluminium [Al] as principal constituent
2224/05638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05639 . . . . . Silver [Ag] as principal constituent
2224/05644 . . . . . Gold [Au] as principal constituent
2224/05647 . . . . . Copper [Cu] as principal constituent
2224/05649 . . . . . Manganese [Mn] as principal constituent
2224/05655 . . . . . Nickel [Ni] as principal constituent
2224/05657 . . . . . Cobalt [Co] as principal constituent
2224/0566 . . . . . Iron [Fe] as principal constituent
2224/05663 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/05664 . . . . . Palladium [Pd] as principal constituent
2224/05666 . . . . . Titanium [Ti] as principal constituent
2224/05669 . . . . . Platinum [Pt] as principal constituent
2224/0567 . . . . . Zirconium [Zr] as principal constituent

2224/05671 . . . . . Chromium [Cr] as principal constituent
2224/05672 . . . . . Vanadium [V] as principal constituent
2224/05673 . . . . . Rhodium [Rh] as principal constituent
2224/05676 . . . . . Ruthenium [Ru] as principal constituent
2224/05678 . . . . . Iridium [Ir] as principal constituent
2224/05679 . . . . . Niobium [Nb] as principal constituent
2224/0568 . . . . . Molybdenum [Mo] as principal constituent
2224/05681 . . . . . Tantalum [Ta] as principal constituent
2224/05683 . . . . . Rhenium [Re] as principal constituent
2224/05684 . . . . . Tungsten [W] as principal constituent
2224/05686 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/05688)
2224/05688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/0569 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/05691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/05693 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/056 - H01L 2224/05691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/05694 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/056 - H01L 2224/05691
2224/05695 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/056 - H01L 2224/05691
2224/05698 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/05699 . . . . . Material of the matrix
2224/057 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/05701 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/05705 . . . . . Gallium [Ga] as principal constituent
2224/05709 . . . . . Indium [In] as principal constituent
2224/05711 . . . . . Tin [Sn] as principal constituent
2224/05713 . . . . . Bismuth [Bi] as principal constituent
2224/05714 . . . . . Thallium [Tl] as principal constituent
2224/05716 . . . . . Lead [Pb] as principal constituent
2224/05717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05718 . . . . . Zinc [Zn] as principal constituent
2224/0572 . . . . . Antimony [Sb] as principal constituent
2224/05723 . . . . . Magnesium [Mg] as principal constituent
2224/05724 . . . . . Aluminium [Al] as principal constituent
2224/05738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05739 . . . . . Silver [Ag] as principal constituent
2224/05744 . . . . . Gold [Au] as principal constituent
2224/05747 . . . . . Copper [Cu] as principal constituent
2224/05749 . . . . . Manganese [Mn] as principal constituent
2224/05755 . . . . . Nickel [Ni] as principal constituent
2224/05757 . . . . . Cobalt [Co] as principal constituent
2224/0576 . . . . . Iron [Fe] as principal constituent
2224/05763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/05764 . . . . . Palladium [Pd] as principal constituent
2224/05766 . . . . . Titanium [Ti] as principal constituent
2224/05769 . . . . . Platinum [Pt] as principal constituent
2224/0577 . . . . . Zirconium [Zr] as principal constituent
2224/05771 . . . . . Chromium [Cr] as principal constituent
2224/05772 . . . . . Vanadium [V] as principal constituent
2224/05773 . . . . . Rhodium [Rh] as principal constituent
2224/05776 . . . . . Ruthenium [Ru] as principal constituent

2224/05778 . . . . . Iridium [Ir] as principal constituent
2224/05779 . . . . . Niobium [Nb] as principal constituent
2224/0578 . . . . . Molybdenum [Mo] as principal constituent
2224/05781 . . . . . Tantalum [Ta] as principal constituent
2224/05783 . . . . . Rhenium [Re] as principal constituent
2224/05784 . . . . . Tungsten [W] as principal constituent
2224/05786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/05788)
2224/05788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/0579 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/05791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/05793 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/057 - H01L 2224/05791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/05794 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/057 - H01L 2224/05791
2224/05795 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/057 - H01L 2224/05791
2224/05798 . . . . . Fillers
2224/05799 . . . . . Base material
2224/058 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/05801 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/05805 . . . . . Gallium [Ga] as principal constituent
2224/05809 . . . . . Indium [In] as principal constituent
2224/05811 . . . . . Tin [Sn] as principal constituent
2224/05813 . . . . . Bismuth [Bi] as principal constituent
2224/05814 . . . . . Thallium [Tl] as principal constituent
2224/05816 . . . . . Lead [Pb] as principal constituent
2224/05817 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05818 . . . . . Zinc [Zn] as principal constituent
2224/0582 . . . . . Antimony [Sb] as principal constituent
2224/05823 . . . . . Magnesium [Mg] as principal constituent
2224/05824 . . . . . Aluminium [Al] as principal constituent
2224/05838 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05839 . . . . . Silver [Ag] as principal constituent
2224/05844 . . . . . Gold [Au] as principal constituent
2224/05847 . . . . . Copper [Cu] as principal constituent
2224/05849 . . . . . Manganese [Mn] as principal constituent
2224/05855 . . . . . Nickel [Ni] as principal constituent
2224/05857 . . . . . Cobalt [Co] as principal constituent
2224/0586 . . . . . Iron [Fe] as principal constituent
2224/05863 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/05864 . . . . . Palladium [Pd] as principal constituent
2224/05866 . . . . . Titanium [Ti] as principal constituent
2224/05869 . . . . . Platinum [Pt] as principal constituent
2224/0587 . . . . . Zirconium [Zr] as principal constituent
2224/05871 . . . . . Chromium [Cr] as principal constituent
2224/05872 . . . . . Vanadium [V] as principal constituent
2224/05873 . . . . . Rhodium [Rh] as principal constituent
2224/05876 . . . . . Ruthenium [Ru] as principal constituent
2224/05878 . . . . . Iridium [Ir] as principal constituent
2224/05879 . . . . . Niobium [Nb] as principal constituent
2224/0588 . . . . . Molybdenum [Mo] as principal constituent
2224/05881 . . . . . Tantalum [Ta] as principal constituent
2224/05883 . . . . . Rhenium [Re] as principal constituent
2224/05884 . . . . . Tungsten [W] as principal constituent

2224/05886 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05887 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/05888)
2224/05888 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/0589 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/05891 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/05893 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/058 - H01L 2224/05891 e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/05894 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/058 - H01L 2224/05891
2224/05895 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/058 - H01L 2224/05891
2224/05898 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/05899 . . . . . Coating material
2224/059 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/05901 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/05905 . . . . . Gallium [Ga] as principal constituent
2224/05909 . . . . . Indium [In] as principal constituent
2224/05911 . . . . . Tin [Sn] as principal constituent
2224/05913 . . . . . Bismuth [Bi] as principal constituent
2224/05914 . . . . . Thallium [Tl] as principal constituent
2224/05916 . . . . . Lead [Pb] as principal constituent
2224/05917 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05918 . . . . . Zinc [Zn] as principal constituent
2224/0592 . . . . . Antimony [Sb] as principal constituent
2224/05923 . . . . . Magnesium [Mg] as principal constituent
2224/05924 . . . . . Aluminium [Al] as principal constituent
2224/05938 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05939 . . . . . Silver [Ag] as principal constituent
2224/05944 . . . . . Gold [Au] as principal constituent
2224/05947 . . . . . Copper [Cu] as principal constituent
2224/05949 . . . . . Manganese [Mn] as principal constituent
2224/05955 . . . . . Nickel [Ni] as principal constituent
2224/05957 . . . . . Cobalt [Co] as principal constituent
2224/0596 . . . . . Iron [Fe] as principal constituent
2224/05963 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/05964 . . . . . Palladium [Pd] as principal constituent
2224/05966 . . . . . Titanium [Ti] as principal constituent
2224/05969 . . . . . Platinum [Pt] as principal constituent
2224/0597 . . . . . Zirconium [Zr] as principal constituent
2224/05971 . . . . . Chromium [Cr] as principal constituent
2224/05972 . . . . . Vanadium [V] as principal constituent
2224/05973 . . . . . Rhodium [Rh] as principal constituent
2224/05976 . . . . . Ruthenium [Ru] as principal constituent
2224/05978 . . . . . Iridium [Ir] as principal constituent
2224/05979 . . . . . Niobium [Nb] as principal constituent
2224/0598 . . . . . Molybdenum [Mo] as principal constituent
2224/05981 . . . . . Tantalum [Ta] as principal constituent
2224/05983 . . . . . Rhenium [Re] as principal constituent
2224/05984 . . . . . Tungsten [W] as principal constituent

2224/05986 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05987 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/05988)
2224/05988 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/0599 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/05991 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/05993 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/059 - H01L 2224/05991, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/05994 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/059 - H01L 2224/05991
2224/05995 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/059 - H01L 2224/05991
2224/05998 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/05999 . . . . . Shape or distribution of the fillers
2224/06 . . . . of a plurality of bonding areas
2224/0601 . . . . . Structure
2224/0603 . . . . . Bonding areas having different sizes, e.g. different heights or widths
2224/0605 . . . . . Shape
2224/06051 . . . . . Bonding areas having different shapes
2224/061 . . . . . Disposition
2224/06102 . . . . . the bonding areas being at different heights
2224/0612 . . . . . Layout
2224/0613 . . . . . Square or rectangular array
2224/06131 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/06132 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/06133 . . . . . with a staggered arrangement, e.g. depopulated array
2224/06134 . . . . . covering only portions of the surface to be connected
2224/06135 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/06136 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/06137 . . . . . with specially adapted redistribution layers [RDL]
2224/06138 . . . . . being disposed in a single wiring level, i.e. planar layout
2224/06139 . . . . . being disposed in different wiring levels, i.e. resurf layout
2224/0614 . . . . . Circular array, i.e. array with radial symmetry
2224/06141 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/06142 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/06143 . . . . . with a staggered arrangement, e.g. depopulated array
2224/06144 . . . . . covering only portions of the surface to be connected
2224/06145 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/06146 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/06147 . . . . . with specially adapted redistribution layers [RDL]
2224/06148 . . . . . being disposed in a single wiring level, i.e. planar layout
2224/06149 . . . . . being disposed in different wiring levels, i.e. resurf layout
2224/0615 . . . . . Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/06151 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/06152 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/06153 . . . . . with a staggered arrangement, e.g. depopulated array
2224/06154 . . . . . covering only portions of the surface to be connected
2224/06155 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/06156 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/06157 . . . . . with specially adapted redistribution layers [RDL]
2224/06158 . . . . . being disposed in a single wiring level, i.e. planar layout
2224/06159 . . . . . being disposed in different wiring levels, i.e. resurf layout
2224/0616 . . . . . Random array, i.e. array with no symmetry
2224/06163 . . . . . with a staggered arrangement
2224/06164 . . . . . covering only portions of the surface to be connected
2224/06165 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/06166 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/06167 . . . . . with specially adapted redistribution layers [RDL]

2224/06168 . . . . . being disposed in a single wiring level, i.e. planar layout
2224/06169 . . . . . being disposed in different wiring levels, i.e. resurf layout
2224/06177 . . . . . Combinations of arrays with different layouts
2224/06179 . . . . . Corner adaptations, i.e. disposition of the bonding areas at the corners of the semiconductor or solid-state body
2224/0618 . . . . . being disposed on at least two different sides of the body, e.g. dual array
2224/06181 . . . . . On opposite sides of the body
2224/06182 . . . . . with specially adapted redistribution layers [RDL]
2224/06183 . . . . . On contiguous sides of the body
2224/06187 . . . . . with specially adapted redistribution layers [RDL]
2224/06188 . . . . . being disposed in a single wiring level, i.e. planar layout
2224/06189 . . . . . being disposed in different wiring levels, i.e. resurf layout
2224/065 . . . . . Material
2224/06505 . . . . . Bonding areas having different materials
2224/0651 . . . . . Function
2224/06515 . . . . . Bonding areas having different functions
2224/06517 . . . . . including bonding areas providing primarily mechanical bonding
2224/06519 . . . . . including bonding areas providing primarily thermal dissipation
2224/07 . . . Structure, shape, material or disposition of the bonding areas after the connecting process
2224/08 . . . . of an individual bonding area
2224/0801 . . . . . Structure
2224/0805 . . . . . Shape
2224/08052 . . . . . in top view
2224/08053 . . . . . being non uniform along the bonding area
2224/08054 . . . . . being rectangular
2224/08055 . . . . . being square
2224/08056 . . . . . being circular or elliptic
2224/08057 . . . . . in side view
2224/08058 . . . . . being non uniform along the bonding area
2224/08059 . . . . . comprising protrusions or indentations
2224/0807 . . . . . of bonding interfaces, e.g. interlocking features
2224/081 . . . . . Disposition
2224/08111 . . . . . the bonding area being disposed in a recess of the surface of the body
2224/08112 . . . . . the bonding area being at least partially embedded in the surface of the body
2224/08113 . . . . . the whole bonding area protruding from the surface of the body
2224/0812 . . . . . the bonding area connecting directly to another bonding area, i.e. connectorless bonding, e.g. bumpless bonding
2224/08121 . . . . . the connected bonding areas being not aligned with respect to each other
2224/08123 . . . . . the bonding area connecting directly to at least two bonding areas
2224/08135 . . . . . the bonding area connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip
2224/08137 . . . . . the bodies being arranged next to each other, e.g. on a common substrate
2224/08145 . . . . . the bodies being stacked
2224/08146 . . . . . the bonding area connecting to a via connection in the body
2224/08147 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the body
2224/08148 . . . . . the bonding area connecting to a bonding area protruding from the surface of the body
2224/08151 . . . . . the bonding area connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/08153 . . . . . the body and the item being arranged next to each other, e.g. on a common substrate
2224/08155 . . . . . the item being non-metallic, e.g. being an insulating substrate with or without metallisation
2224/0816 . . . . . the bonding area connecting to a pin of the item
2224/08163 . . . . . the bonding area connecting to a potential ring of the item
2224/08165 . . . . . the bonding area connecting to a via metallisation of the item
2224/08167 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the item
2224/08168 . . . . . the bonding area connecting to a bonding area protruding from the surface of the item
2224/08175 . . . . . the item being metallic
2224/08183 . . . . . the bonding area connecting to a potential ring of the item
2224/08187 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the item
2224/08188 . . . . . the bonding area connecting to a bonding area protruding from the surface of the item
2224/08195 . . . . . the item being a discrete passive component
2224/08197 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the item
2224/08198 . . . . . the bonding area connecting to a bonding area protruding from the surface of the item
2224/08221 . . . . . the body and the item being stacked
2224/08225 . . . . . the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/0823 . . . . . the bonding area connecting to a pin of the item

2224/08233 . . . . . the bonding area connecting to a potential ring of the item
2224/08235 . . . . . the bonding area connecting to a via metallisation of the item
2224/08237 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the item
2224/08238 . . . . . the bonding area connecting to a bonding area protruding from the surface of the item
2224/08245 . . . . . the item being metallic
2224/08253 . . . . . the bonding area connecting to a potential ring of the item
2224/08257 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the item
2224/08258 . . . . . the bonding area connecting to a bonding area protruding from the surface of the item
2224/08265 . . . . . the item being a discrete passive component
2224/08267 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the item
2224/08268 . . . . . the bonding area connecting to a bonding area protruding from the surface of the item
2224/085 . . . . . Material
2224/08501 . . . . . at the bonding interface
2224/08502 . . . . . comprising an eutectic alloy
2224/08503 . . . . . comprising an intermetallic compound
2224/08505 . . . . . outside the bonding interface
2224/08506 . . . . . comprising an eutectic alloy
2224/09 . . . . of a plurality of bonding areas
2224/0901 . . . . . Structure
2224/0903 . . . . . Bonding areas having different sizes, e.g. different diameters, heights or widths
2224/0905 . . . . . Shape
2224/09051 . . . . . Bonding areas having different shapes
2224/09055 . . . . . of their bonding interfaces
2224/091 . . . . . Disposition
2224/09102 . . . . . the bonding areas being at different heights
2224/09103 . . . . . on the semiconductor or solid-state body
2224/09104 . . . . . outside the semiconductor or solid-state body
2224/0912 . . . . . Layout (layout of bonding areas prior to the connecting process H01L 2224/0612)
2224/0913 . . . . . Square or rectangular array
2224/09132 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/09133 . . . . . with a staggered arrangement, e.g. depopulated array
2224/09134 . . . . . covering only portions of the surface to be connected
2224/09135 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/0914 . . . . . Circular array, i.e. array with radial symmetry
2224/09142 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/09143 . . . . . with a staggered arrangement
2224/09144 . . . . . covering only portions of the surface to be connected
2224/09145 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/0915 . . . . . Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/09151 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/09152 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/09153 . . . . . with a staggered arrangement, e.g. depopulated array
2224/09154 . . . . . covering only portions of the surface to be connected
2224/09155 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/09156 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/0916 . . . . . Random array, i.e. array with no symmetry
2224/09163 . . . . . with a staggered arrangement
2224/09164 . . . . . covering only portions of the surface to be connected
2224/09165 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/09177 . . . . . Combinations of arrays with different layouts
2224/09179 . . . . . Corner adaptations, i.e. disposition of the bonding areas at the corners of the semiconductor or solid-state body
2224/0918 . . . . . being disposed on at least two different sides of the body, e.g. dual array
2224/09181 . . . . . On opposite sides of the body
2224/09183 . . . . . On contiguous sides of the body
2224/095 . . . . . Material
2224/09505 . . . . . Bonding areas having different materials
2224/0951 . . . . . Function
2224/09515 . . . . . Bonding areas having different functions
2224/09517 . . . . . including bonding areas providing primarily mechanical support
2224/09519 . . . . . including bonding areas providing primarily thermal dissipation
2224/10 . . Bump connectors; Manufacturing methods related thereto
2224/1012 . . . Auxiliary members for bump connectors, e.g. spacers
2224/10122 . . . . being formed on the semiconductor or solid-state body to be connected
2224/10125 . . . . . Reinforcing structures
2224/10126 . . . . . Bump collar

2224/10135 . . . . . Alignment aids
2224/10145 . . . . . Flow barriers
2224/10152 . . . . being formed on an item to be connected not being a semiconductor or solid-state body
2224/10155 . . . . . Reinforcing structures
2224/10156 . . . . . Bump collar
2224/10165 . . . . . Alignment aids
2224/10175 . . . . . Flow barriers
2224/11 . . . Manufacturing methods
2224/11001 . . . . Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
2224/11002 . . . . . for supporting the semiconductor or solid-state body
2224/11003 . . . . . for holding or transferring the bump preform
2224/11005 . . . . . for aligning the bump connector, e.g. marks, spacers
2224/11009 . . . . . for protecting parts during manufacture
2224/11011 . . . . Involving a permanent auxiliary member, i.e. a member which is left at least partly in the finished device, e.g. coating, dummy feature
2224/11013 . . . . . for holding or confining the bump connector, e.g. solder flow barrier
2224/11015 . . . . . for aligning the bump connector, e.g. marks, spacers
2224/11019 . . . . . for protecting parts during the process
2224/111 . . . . Manufacture and pre-treatment of the bump connector preform
2224/1111 . . . . . Shaping
2224/1112 . . . . . Applying permanent coating
2224/113 . . . . by local deposition of the material of the bump connector
2224/1131 . . . . . in liquid form
2224/11312 . . . . . Continuous flow, e.g. using a microsyringe, a pump, a nozzle or extrusion
2224/11318 . . . . . by dispensing droplets
2224/1132 . . . . . Screen printing, i.e. using a stencil
2224/1133 . . . . . in solid form
2224/11332 . . . . . using a powder
2224/11334 . . . . . using preformed bumps
2224/1134 . . . . . Stud bumping, i.e. using a wire-bonding apparatus
2224/114 . . . . by blanket deposition of the material of the bump connector
2224/1141 . . . . . in liquid form
2224/11416 . . . . . Spin coating
2224/11418 . . . . . Spray coating
2224/1142 . . . . . Curtain coating
2224/11422 . . . . . by dipping, e.g. in a solder bath (hot-dipping C23C 2/00)
2224/11424 . . . . . Immersion coating, e.g. in a solder bath (immersion processes C23C 2/00)
2224/11426 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/11428 . . . . . Wave coating
2224/1143 . . . . . in solid form
2224/11436 . . . . . Lamination of a preform, e.g. foil, sheet or layer
2224/11438 . . . . . the preform being at least partly pre-patterned
2224/1144 . . . . . by transfer printing
2224/11442 . . . . . using a powder
2224/11444 . . . . . in gaseous form
2224/1145 . . . . . Physical vapour deposition [PVD], e.g. evaporation, or sputtering
2224/11452 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
2224/1146 . . . . . Plating
2224/11462 . . . . . Electroplating
2224/11464 . . . . . Electroless plating
2224/11466 . . . . . Conformal deposition, i.e. blanket deposition of a conformal layer on a patterned surface
2224/1147 . . . . using a lift-off mask
2224/11472 . . . . . Profile of the lift-off mask
2224/11474 . . . . . Multilayer masks
2224/1148 . . . . . Permanent masks, i.e. masks left in the finished device, e.g. passivation layers
2224/115 . . . . by chemical or physical modification of a pre-existing or pre-deposited material
2224/11502 . . . . . Pre-existing or pre-deposited material
2224/11505 . . . . . Sintering
2224/1151 . . . . . Anodisation
2224/11515 . . . . . Curing and solidification, e.g. of a photosensitive bump material
2224/1152 . . . . . Self-assembly, e.g. self-agglomeration of the bump material in a fluid
2224/11522 . . . . . Auxiliary means therefor, e.g. for self-assembly activation
2224/11524 . . . . . with special adaptation of the surface or of an auxiliary substrate, e.g. surface shape specially adapted for the self-assembly process
2224/11526 . . . . . involving the material of the bonding area, e.g. bonding pad or under bump metallisation [UBM]
2224/1155 . . . . . Selective modification
2224/11552 . . . . . using a laser or a focussed ion beam [FIB]
2224/11554 . . . . . Stereolithography, i.e. solidification of a pattern defined by a laser trace in a photosensitive resin
2224/116 . . . . by patterning a pre-deposited material (treatment of parts prior to assembly of the devices H01L 21/48)
2224/11602 . . . . . Mechanical treatment, e.g. polishing, grinding
2224/1161 . . . . . Physical or chemical etching
2224/11612 . . . . . by physical means only
2224/11614 . . . . . by chemical means only
2224/11616 . . . . . Chemical mechanical polishing [CMP]
2224/11618 . . . . . with selective exposure, development and removal of a photosensitive bump material, e.g. of a photosensitive conductive resin
2224/1162 . . . . . using masks
2224/11622 . . . . . Photolithography
2224/1163 . . . . . using a laser or a focused ion beam [FIB]
2224/11632 . . . . . Ablation by means of a laser or focused ion beam [FIB]
2224/117 . . . . involving monitoring, e.g. feedback loop
2224/118 . . . . Post-treatment of the bump connector

2224/1181 . . . . . Cleaning, e.g. oxide removal step, desmearing
2224/1182 . . . . . Applying permanent coating, e.g. in-situ coating
2224/11821 . . . . . Spray coating
2224/11822 . . . . . by dipping, e.g. in a solder bath
2224/11823 . . . . . Immersion coating, e.g. in a solder bath
2224/11824 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/11825 . . . . . Plating, e.g. electroplating, electroless plating
2224/11826 . . . . . Physical vapour deposition [PVD], e.g. evaporation, or sputtering
2224/11827 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
2224/1183 . . . . . Reworking, e.g. shaping (reflowing H01L 2224/11849)
2224/11831 . . . . . involving a chemical process, e.g. etching the bump connector
2224/1184 . . . . . involving a mechanical process, e.g. planarising the bump connector
2224/11845 . . . . . Chemical mechanical polishing [CMP]
2224/11848 . . . . . Thermal treatments, e.g. annealing, controlled cooling
2224/11849 . . . . . Reflowing
2224/119 . . . . Methods of manufacturing bump connectors involving a specific sequence of method steps
2224/11901 . . . . . with repetition of the same manufacturing step
2224/11902 . . . . . Multiple masking steps
2224/11903 . . . . . using different masks
2224/11906 . . . . . with modification of the same mask
2224/1191 . . . . . Forming a passivation layer after forming the bump connector
2224/11912 . . . . . the bump being used as a mask for patterning other parts
2224/11914 . . . . . the under bump metallisation [UBM] being used as a mask for patterning other parts
2224/11916 . . . . . a passivation layer being used as a mask for patterning other parts
2224/12 . . . Structure, shape, material or disposition of the bump connectors prior to the connecting process
2224/12105 . . . . Bump connectors formed on an encapsulation of the semiconductor or solid-state body, e.g. bumps on chip-scale packages
2224/13 . . . . of an individual bump connector
2224/13001 . . . . . Core members of the bump connector
2224/13005 . . . . . Structure
2224/13006 . . . . . Bump connector larger than the underlying bonding area, e.g. than the under bump metallisation [UBM]
2224/13007 . . . . . Bump connector smaller than the underlying bonding area, e.g. than the under bump metallisation [UBM]
2224/13008 . . . . . Bump connector integrally formed with a redistribution layer on the semiconductor or solid-state body
2224/13009 . . . . . Bump connector integrally formed with a via connection of the semiconductor or solid-state body
2224/1301 . . . . . Shape
2224/13011 . . . . . comprising apertures or cavities, e.g. hollow bump
2224/13012 . . . . . in top view
2224/13013 . . . . . being rectangular or square
2224/13014 . . . . . being circular or elliptic
2224/13015 . . . . . comprising protrusions or indentations
2224/13016 . . . . . in side view
2224/13017 . . . . . being non uniform along the bump connector
2224/13018 . . . . . comprising protrusions or indentations
2224/13019 . . . . . at the bonding interface of the bump connector, i.e. on the surface of the bump connector
2224/1302 . . . . . Disposition
2224/13021 . . . . . the bump connector being disposed in a recess of the surface
2224/13022 . . . . . the bump connector being at least partially embedded in the surface
2224/13023 . . . . . the whole bump connector protruding from the surface
2224/13024 . . . . . the bump connector being disposed on a redistribution layer on the semiconductor or solid-state body
2224/13025 . . . . . the bump connector being disposed on a via connection of the semiconductor or solid-state body
2224/13026 . . . . . relative to the bonding area, e.g. bond pad, of the semiconductor or solid-state body
2224/13027 . . . . . the bump connector being offset with respect to the bonding area, e.g. bond pad
2224/13028 . . . . . the bump connector being disposed on at least two separate bonding areas, e.g. bond pads
2224/13075 . . . . . Plural core members
2224/13076 . . . . . being mutually engaged together, e.g. through inserts
2224/13078 . . . . . being disposed next to each other, e.g. side-to-side arrangements
2224/1308 . . . . . being stacked
2224/13082 . . . . . Two-layer arrangements
2224/13083 . . . . . Three-layer arrangements
2224/13084 . . . . . Four-layer arrangements
2224/13099 . . . . . Material
2224/131 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13101 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/13105 . . . . . Gallium [Ga] as principal constituent
2224/13109 . . . . . Indium [In] as principal constituent
2224/13111 . . . . . Tin [Sn] as principal constituent
2224/13113 . . . . . Bismuth [Bi] as principal constituent

2224/13114 . . . . . Thallium [Tl] as principal constituent
2224/13116 . . . . . Lead [Pb] as principal constituent
2224/13117 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13118 . . . . . Zinc [Zn] as principal constituent
2224/1312 . . . . . Antimony [Sb] as principal constituent
2224/13123 . . . . . Magnesium [Mg] as principal constituent
2224/13124 . . . . . Aluminium [Al] as principal constituent
2224/13138 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13139 . . . . . Silver [Ag] as principal constituent
2224/13144 . . . . . Gold [Au] as principal constituent
2224/13147 . . . . . Copper [Cu] as principal constituent
2224/13149 . . . . . Manganese [Mn] as principal constituent
2224/13155 . . . . . Nickel [Ni] as principal constituent
2224/13157 . . . . . Cobalt [Co] as principal constituent
2224/1316 . . . . . Iron [Fe] as principal constituent
2224/13163 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/13164 . . . . . Palladium [Pd] as principal constituent
2224/13166 . . . . . Titanium [Ti] as principal constituent
2224/13169 . . . . . Platinum [Pt] as principal constituent
2224/1317 . . . . . Zirconium [Zr] as principal constituent
2224/13171 . . . . . Chromium [Cr] as principal constituent
2224/13172 . . . . . Vanadium [V] as principal constituent
2224/13173 . . . . . Rhodium [Rh] as principal constituent
2224/13176 . . . . . Ruthenium [Ru] as principal constituent
2224/13178 . . . . . Iridium [Ir] as principal constituent
2224/13179 . . . . . Niobium [Nb] as principal constituent
2224/1318 . . . . . Molybdenum [Mo] as principal constituent
2224/13181 . . . . . Tantalum [Ta] as principal constituent
2224/13183 . . . . . Rhenium [Re] as principal constituent
2224/13184 . . . . . Tungsten [W] as principal constituent
2224/13186 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/13187 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/13188)
2224/13188 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/1319 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/13191 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/13193 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/131 - H01L 2224/13191, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/13194 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/131 - H01L 2224/13191
2224/13195 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/131 - H01L 2224/13191
2224/13198 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/13199 . . . . . Material of the matrix
2224/132 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13201 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/13205 . . . . . Gallium [Ga] as principal constituent
2224/13209 . . . . . Indium [In] as principal constituent
2224/13211 . . . . . Tin [Sn] as principal constituent
2224/13213 . . . . . Bismuth [Bi] as principal constituent
2224/13214 . . . . . Thallium [Tl] as principal constituent
2224/13216 . . . . . Lead [Pb] as principal constituent
2224/13217 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13218 . . . . . Zinc [Zn] as principal constituent
2224/1322 . . . . . Antimony [Sb] as principal constituent
2224/13223 . . . . . Magnesium [Mg] as principal constituent

2224/13224 . . . . . Aluminium [Al] as principal constituent
2224/13238 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13239 . . . . . Silver [Ag] as principal constituent
2224/13244 . . . . . Gold [Au] as principal constituent
2224/13247 . . . . . Copper [Cu] as principal constituent
2224/13249 . . . . . Manganese [Mn] as principal constituent
2224/13255 . . . . . Nickel [Ni] as principal constituent
2224/13257 . . . . . Cobalt [Co] as principal constituent
2224/1326 . . . . . Iron [Fe] as principal constituent
2224/13263 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/13264 . . . . . Palladium [Pd] as principal constituent
2224/13266 . . . . . Titanium [Ti] as principal constituent
2224/13269 . . . . . Platinum [Pt] as principal constituent
2224/1327 . . . . . Zirconium [Zr] as principal constituent
2224/13271 . . . . . Chromium [Cr] as principal constituent
2224/13272 . . . . . Vanadium [V] as principal constituent
2224/13273 . . . . . Rhodium [Rh] as principal constituent
2224/13276 . . . . . Ruthenium [Ru] as principal constituent
2224/13278 . . . . . Iridium [Ir] as principal constituent
2224/13279 . . . . . Niobium [Nb] as principal constituent
2224/1328 . . . . . Molybdenum [Mo] as principal constituent
2224/13281 . . . . . Tantalum [Ta] as principal constituent
2224/13283 . . . . . Rhenium [Re] as principal constituent
2224/13284 . . . . . Tungsten [W] as principal constituent
2224/13286 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/13287 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/13288)
2224/13288 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/1329 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/13291 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/13293 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/132 - H01L 2224/13291, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/13294 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/132 - H01L 2224/13291
2224/13295 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/132 - H01L 2224/13291
2224/13298 . . . . . Fillers
2224/13299 . . . . . Base material
2224/133 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13301 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/13305 . . . . . Gallium [Ga] as principal constituent
2224/13309 . . . . . Indium [In] as principal constituent
2224/13311 . . . . . Tin [Sn] as principal constituent
2224/13313 . . . . . Bismuth [Bi] as principal constituent
2224/13314 . . . . . Thallium [Tl] as principal constituent
2224/13316 . . . . . Lead [Pb] as principal constituent
2224/13317 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13318 . . . . . Zinc [Zn] as principal constituent
2224/1332 . . . . . Antimony [Sb] as principal constituent
2224/13323 . . . . . Magnesium [Mg] as principal constituent
2224/13324 . . . . . Aluminium [Al] as principal constituent
2224/13338 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13339 . . . . . Silver [Ag] as principal constituent
2224/13344 . . . . . Gold [Au] as principal constituent
2224/13347 . . . . . Copper [Cu] as principal constituent

2224/13349 . . . . . Manganese [Mn] as principal constituent
2224/13355 . . . . . Nickel [Ni] as principal constituent
2224/13357 . . . . . Cobalt [Co] as principal constituent
2224/1336 . . . . . Iron [Fe] as principal constituent
2224/13363 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/13364 . . . . . Palladium [Pd] as principal constituent
2224/13366 . . . . . Titanium [Ti] as principal constituent
2224/13369 . . . . . Platinum [Pt] as principal constituent
2224/1337 . . . . . Zirconium [Zr] as principal constituent
2224/13371 . . . . . Chromium [Cr] as principal constituent
2224/13372 . . . . . Vanadium [V] as principal constituent
2224/13373 . . . . . Rhodium [Rh] as principal constituent
2224/13376 . . . . . Ruthenium [Ru] as principal constituent
2224/13378 . . . . . Iridium [Ir] as principal constituent
2224/13379 . . . . . Niobium [Nb] as principal constituent
2224/1338 . . . . . Molybdenum [Mo] as principal constituent
2224/13381 . . . . . Tantalum [Ta] as principal constituent
2224/13383 . . . . . Rhenium [Re] as principal constituent
2224/13384 . . . . . Tungsten [W] as principal constituent
2224/13386 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/13387 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/13388)
2224/13388 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/1339 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/13391 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/13393 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/133 - H01L 2224/13391, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/13394 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/133 - H01L 2224/13391
2224/13395 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/133 - H01L 2224/13391
2224/13398 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/13399 . . . . . Coating material
2224/134 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13401 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/13405 . . . . . Gallium [Ga] as principal constituent
2224/13409 . . . . . Indium [In] as principal constituent
2224/13411 . . . . . Tin [Sn] as principal constituent
2224/13413 . . . . . Bismuth [Bi] as principal constituent
2224/13414 . . . . . Thallium [Tl] as principal constituent
2224/13416 . . . . . Lead [Pb] as principal constituent
2224/13417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13418 . . . . . Zinc [Zn] as principal constituent
2224/1342 . . . . . Antimony [Sb] as principal constituent
2224/13423 . . . . . Magnesium [Mg] as principal constituent
2224/13424 . . . . . Aluminium [Al] as principal constituent
2224/13438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13439 . . . . . Silver [Ag] as principal constituent
2224/13444 . . . . . Gold [Au] as principal constituent
2224/13447 . . . . . Copper [Cu] as principal constituent
2224/13449 . . . . . Manganese [Mn] as principal constituent
2224/13455 . . . . . Nickel [Ni] as principal constituent

2224/13457 . . . . . Cobalt [Co] as principal constituent
2224/1346 . . . . . Iron [Fe] as principal constituent
2224/13463 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/13464 . . . . . Palladium [Pd] as principal constituent
2224/13466 . . . . . Titanium [Ti] as principal constituent
2224/13469 . . . . . Platinum [Pt] as principal constituent
2224/1347 . . . . . Zirconium [Zr] as principal constituent
2224/13471 . . . . . Chromium [Cr] as principal constituent
2224/13472 . . . . . Vanadium [V] as principal constituent
2224/13473 . . . . . Rhodium [Rh] as principal constituent
2224/13476 . . . . . Ruthenium [Ru] as principal constituent
2224/13478 . . . . . Iridium [Ir] as principal constituent
2224/13479 . . . . . Niobium [Nb] as principal constituent
2224/1348 . . . . . Molybdenum [Mo] as principal constituent
2224/13481 . . . . . Tantalum [Ta] as principal constituent
2224/13483 . . . . . Rhenium [Re] as principal constituent
2224/13484 . . . . . Tungsten [W] as principal constituent
2224/13486 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/13487 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/13488)
2224/13488 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/1349 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/13491 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/13493 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/134 - H01L 2224/13491, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/13494 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/134 - H01L 2224/13491
2224/13495 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/134 - H01L 2224/13491
2224/13498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/13499 . . . . . Shape or distribution of the fillers
2224/1354 . . . . . Coating
2224/13541 . . . . . Structure
2224/1355 . . . . . Shape
2224/13551 . . . . . being non uniform
2224/13552 . . . . . comprising protrusions or indentations
2224/13553 . . . . . at the bonding interface of the bump connector, i.e. on the surface of the bump connector
2224/1356 . . . . . Disposition
2224/13561 . . . . . On the entire surface of the core, i.e. integral coating
2224/13562 . . . . . On the entire exposed surface of the core
2224/13563 . . . . . Only on parts of the surface of the core, i.e. partial coating
2224/13564 . . . . . Only on the bonding interface of the bump connector
2224/13565 . . . . . Only outside the bonding interface of the bump connector
2224/13566 . . . . . Both on and outside the bonding interface of the bump connector
2224/1357 . . . . . Single coating layer
2224/13575 . . . . . Plural coating layers
2224/13576 . . . . . being mutually engaged together, e.g. through inserts
2224/13578 . . . . . being disposed next to each other, e.g. side-to-side arrangements
2224/1358 . . . . . being stacked
2224/13582 . . . . . Two-layer coating
2224/13583 . . . . . Three-layer coating
2224/13584 . . . . . Four-layer coating
2224/13599 . . . . . Material
2224/136 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13601 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/13605 . . . . . Gallium [Ga] as principal constituent
2224/13609 . . . . . Indium [In] as principal constituent
2224/13611 . . . . . Tin [Sn] as principal constituent
2224/13613 . . . . . Bismuth [Bi] as principal constituent
2224/13614 . . . . . Thallium [Tl] as principal constituent
2224/13616 . . . . . Lead [Pb] as principal constituent

2224/13617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13618 . . . . . Zinc [Zn] as principal constituent
2224/1362 . . . . . Antimony [Sb] as principal constituent
2224/13623 . . . . . Magnesium [Mg] as principal constituent
2224/13624 . . . . . Aluminium [Al] as principal constituent
2224/13638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13639 . . . . . Silver [Ag] as principal constituent
2224/13644 . . . . . Gold [Au] as principal constituent
2224/13647 . . . . . Copper [Cu] as principal constituent
2224/13649 . . . . . Manganese [Mn] as principal constituent
2224/13655 . . . . . Nickel [Ni] as principal constituent
2224/13657 . . . . . Cobalt [Co] as principal constituent
2224/1366 . . . . . Iron [Fe] as principal constituent
2224/13663 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/13664 . . . . . Palladium [Pd] as principal constituent
2224/13666 . . . . . Titanium [Ti] as principal constituent
2224/13669 . . . . . Platinum [Pt] as principal constituent
2224/1367 . . . . . Zirconium [Zr] as principal constituent
2224/13671 . . . . . Chromium [Cr] as principal constituent
2224/13672 . . . . . Vanadium [V] as principal constituent
2224/13673 . . . . . Rhodium [Rh] as principal constituent
2224/13676 . . . . . Ruthenium [Ru] as principal constituent
2224/13678 . . . . . Iridium [Ir] as principal constituent
2224/13679 . . . . . Niobium [Nb] as principal constituent
2224/1368 . . . . . Molybdenum [Mo] as principal constituent
2224/13681 . . . . . Tantalum [Ta] as principal constituent
2224/13683 . . . . . Rhenium [Re] as principal constituent
2224/13684 . . . . . Tungsten [W] as principal constituent
2224/13686 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/13687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/13688)
2224/13688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/1369 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/13691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/13693 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/136 - H01L 2224/13691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/13694 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/136 - H01L 2224/13691
2224/13695 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/136 - H01L 2224/13691
2224/13698 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/13699 . . . . . Material of the matrix
2224/137 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13701 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/13705 . . . . . Gallium [Ga] as principal constituent
2224/13709 . . . . . Indium [In] as principal constituent
2224/13711 . . . . . Tin [Sn] as principal constituent
2224/13713 . . . . . Bismuth [Bi] as principal constituent
2224/13714 . . . . . Thallium [Tl] as principal constituent
2224/13716 . . . . . Lead [Pb] as principal constituent
2224/13717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13718 . . . . . Zinc [Zn] as principal constituent
2224/1372 . . . . . Antimony [Sb] as principal constituent
2224/13723 . . . . . Magnesium [Mg] as principal constituent
2224/13724 . . . . . Aluminium [Al] as principal constituent

2224/13738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13739 . . . . . Silver [Ag] as principal constituent
2224/13744 . . . . . Gold [Au] as principal constituent
2224/13747 . . . . . Copper [Cu] as principal constituent
2224/13749 . . . . . Manganese [Mn] as principal constituent
2224/13755 . . . . . Nickel [Ni] as principal constituent
2224/13757 . . . . . Cobalt [Co] as principal constituent
2224/1376 . . . . . Iron [Fe] as principal constituent
2224/13763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/13764 . . . . . Palladium [Pd] as principal constituent
2224/13766 . . . . . Titanium [Ti] as principal constituent
2224/13769 . . . . . Platinum [Pt] as principal constituent
2224/1377 . . . . . Zirconium [Zr] as principal constituent
2224/13771 . . . . . Chromium [Cr] as principal constituent
2224/13772 . . . . . Vanadium [V] as principal constituent
2224/13773 . . . . . Rhodium [Rh] as principal constituent
2224/13776 . . . . . Ruthenium [Ru] as principal constituent
2224/13778 . . . . . Iridium [Ir] as principal constituent
2224/13779 . . . . . Niobium [Nb] as principal constituent
2224/1378 . . . . . Molybdenum [Mo] as principal constituent
2224/13781 . . . . . Tantalum [Ta] as principal constituent
2224/13783 . . . . . Rhenium [Re] as principal constituent
2224/13784 . . . . . Tungsten [W] as principal constituent
2224/13786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/13787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/13788)
2224/13788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/1379 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/13791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/13793 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/137 - H01L 2224/13791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/13794 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/137 - H01L 2224/13791
2224/13795 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/137 - H01L 2224/13791
2224/13798 . . . . . Fillers
2224/13799 . . . . . Base material
2224/138 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13801 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/13805 . . . . . Gallium [Ga] as principal constituent
2224/13809 . . . . . Indium [In] as principal constituent
2224/13811 . . . . . Tin [Sn] as principal constituent
2224/13813 . . . . . Bismuth [Bi] as principal constituent
2224/13814 . . . . . Thallium [Tl] as principal constituent
2224/13816 . . . . . Lead [Pb] as principal constituent
2224/13817 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13818 . . . . . Zinc [Zn] as principal constituent
2224/1382 . . . . . Antimony [Sb] as principal constituent
2224/13823 . . . . . Magnesium [Mg] as principal constituent
2224/13824 . . . . . Aluminium [Al] as principal constituent
2224/13838 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13839 . . . . . Silver [Ag] as principal constituent
2224/13844 . . . . . Gold [Au] as principal constituent
2224/13847 . . . . . Copper [Cu] as principal constituent

2224/13849 . . . . . Manganese [Mn] as principal constituent
2224/13855 . . . . . Nickel [Ni] as principal constituent
2224/13857 . . . . . Cobalt [Co] as principal constituent
2224/1386 . . . . . Iron [Fe] as principal constituent
2224/13863 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/13864 . . . . . Palladium [Pd] as principal constituent
2224/13866 . . . . . Titanium [Ti] as principal constituent
2224/13869 . . . . . Platinum [Pt] as principal constituent
2224/1387 . . . . . Zirconium [Zr] as principal constituent
2224/13871 . . . . . Chromium [Cr] as principal constituent
2224/13872 . . . . . Vanadium [V] as principal constituent
2224/13873 . . . . . Rhodium [Rh] as principal constituent
2224/13876 . . . . . Ruthenium [Ru] as principal constituent
2224/13878 . . . . . Iridium [Ir] as principal constituent
2224/13879 . . . . . Niobium [Nb] as principal constituent
2224/1388 . . . . . Molybdenum [Mo] as principal constituent
2224/13881 . . . . . Tantalum [Ta] as principal constituent
2224/13883 . . . . . Rhenium [Re] as principal constituent
2224/13884 . . . . . Tungsten [W] as principal constituent
2224/13886 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/13887 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/13888)
2224/13888 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/1389 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/13891 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/13893 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/138 - H01L 2224/13891, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/13894 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/138 - H01L 2224/13891
2224/13895 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/138 - H01L 2224/13891
2224/13898 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/13899 . . . . . Coating material
2224/139 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13901 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/13905 . . . . . Gallium [Ga] as principal constituent
2224/13909 . . . . . Indium [In] as principal constituent
2224/13911 . . . . . Tin [Sn] as principal constituent
2224/13913 . . . . . Bismuth [Bi] as principal constituent
2224/13914 . . . . . Thallium [Tl] as principal constituent
2224/13916 . . . . . Lead [Pb] as principal constituent
2224/13917 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13918 . . . . . Zinc [Zn] as principal constituent
2224/1392 . . . . . Antimony [Sb] as principal constituent
2224/13923 . . . . . Magnesium [Mg] as principal constituent
2224/13924 . . . . . Aluminium [Al] as principal constituent
2224/13938 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13939 . . . . . Silver [Ag] as principal constituent
2224/13944 . . . . . Gold [Au] as principal constituent
2224/13947 . . . . . Copper [Cu] as principal constituent
2224/13949 . . . . . Manganese [Mn] as principal constituent
2224/13955 . . . . . Nickel [Ni] as principal constituent

2224/13957 . . . . . Cobalt [Co] as principal constituent
2224/1396 . . . . . Iron [Fe] as principal constituent
2224/13963 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/13964 . . . . . Palladium [Pd] as principal constituent
2224/13966 . . . . . Titanium [Ti] as principal constituent
2224/13969 . . . . . Platinum [Pt] as principal constituent
2224/1397 . . . . . Zirconium [Zr] as principal constituent
2224/13971 . . . . . Chromium [Cr] as principal constituent
2224/13972 . . . . . Vanadium [V] as principal constituent
2224/13973 . . . . . Rhodium [Rh] as principal constituent
2224/13976 . . . . . Ruthenium [Ru] as principal constituent
2224/13978 . . . . . Iridium [Ir] as principal constituent
2224/13979 . . . . . Niobium [Nb] as principal constituent
2224/1398 . . . . . Molybdenum [Mo] as principal constituent
2224/13981 . . . . . Tantalum [Ta] as principal constituent
2224/13983 . . . . . Rhenium [Re] as principal constituent
2224/13984 . . . . . Tungsten [W] as principal constituent
2224/13986 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/13987 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/13988)
2224/13988 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/1399 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/13991 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/13993 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/139 - H01L 2224/13991 e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/13994 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/139 - H01L 2224/13991
2224/13995 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/139 - H01L 2224/13991
2224/13998 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/13999 . . . . . Shape or distribution of the fillers
2224/14 . . . . of a plurality of bump connectors
2224/1401 . . . . . Structure
2224/1403 . . . . . Bump connectors having different sizes, e.g. different diameters, heights or widths
2224/1405 . . . . . Shape
2224/14051 . . . . . Bump connectors having different shapes
2224/141 . . . . . Disposition
2224/14104 . . . . . relative to the bonding areas, e.g. bond pads, of the semiconductor or solid-state body
2224/1411 . . . . . the bump connectors being bonded to at least one common bonding area
2224/1412 . . . . . Layout
2224/1413 . . . . . Square or rectangular array
2224/14131 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/14132 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/14133 . . . . . with a staggered arrangement, e.g. depopulated array
2224/14134 . . . . . covering only portions of the surface to be connected
2224/14135 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/14136 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/1414 . . . . . Circular array, i.e. array with radial symmetry
2224/14141 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/14142 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/14143 . . . . . with a staggered arrangement, e.g. depopulated array
2224/14144 . . . . . covering only portions of the surface to be connected
2224/14145 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/14146 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/1415 . . . . . Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/14151 . . . . . being uniform, i.e. having a uniform pitch across the array

2224/14152 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/14153 . . . . . with a staggered arrangement, e.g. depopulated array
2224/14154 . . . . . covering only portions of the surface to be connected
2224/14155 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/14156 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/1416 . . . . . Random layout, i.e. layout with no symmetry
2224/14163 . . . . . with a staggered arrangement
2224/14164 . . . . . covering only portions of the surface to be connected
2224/14165 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/14166 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/14177 . . . . . Combinations of arrays with different layouts
2224/14179 . . . . . Corner adaptations, i.e. disposition of the bump connectors at the corners of the semiconductor or solid-state body
2224/1418 . . . . . being disposed on at least two different sides of the body, e.g. dual array
2224/14181 . . . . . On opposite sides of the body
2224/14183 . . . . . On contiguous sides of the body
2224/145 . . . . . Material
2224/14505 . . . . . Bump connectors having different materials
2224/1451 . . . . . Function
2224/14515 . . . . . Bump connectors having different functions
2224/14517 . . . . . including bump connectors providing primarily mechanical bonding
2224/14519 . . . . . including bump connectors providing primarily thermal dissipation
2224/15 . . . Structure, shape, material or disposition of the bump connectors after the connecting process
2224/16 . . . . of an individual bump connector
2224/1601 . . . . . Structure
2224/16012 . . . . . relative to the bonding area, e.g. bond pad
2224/16013 . . . . . the bump connector being larger than the bonding area, e.g. bond pad
2224/16014 . . . . . the bump connector being smaller than the bonding area, e.g. bond pad
2224/1605 . . . . . Shape
2224/16052 . . . . . in top view
2224/16054 . . . . . being rectangular or square
2224/16055 . . . . . being circular or elliptic
2224/16056 . . . . . comprising protrusions or indentations
2224/16057 . . . . . in side view
2224/16058 . . . . . being non uniform along the bump connector
2224/16059 . . . . . comprising protrusions or indentations
2224/1607 . . . . . of bonding interfaces, e.g. interlocking features
2224/161 . . . . . Disposition
2224/16104 . . . . . relative to the bonding area, e.g. bond pad
2224/16105 . . . . . the bump connector connecting bonding areas being not aligned with respect to each other
2224/16106 . . . . . the bump connector connecting one bonding area to at least two respective bonding areas
2224/16108 . . . . . the bump connector not being orthogonal to the surface
2224/16111 . . . . . the bump connector being disposed in a recess of the surface
2224/16112 . . . . . the bump connector being at least partially embedded in the surface
2224/16113 . . . . . the whole bump connector protruding from the surface
2224/1613 . . . . . the bump connector connecting within a semiconductor or solid-state body, i.e. connecting two bonding areas on the same semiconductor or solid-state body
2224/16135 . . . . . the bump connector connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip
2224/16137 . . . . . the bodies being arranged next to each other, e.g. on a common substrate
2224/16141 . . . . . the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements
2224/16145 . . . . . the bodies being stacked
2224/16146 . . . . . the bump connector connecting to a via connection in the semiconductor or solid-state body
2224/16147 . . . . . the bump connector connecting to a bonding area disposed in a recess of the surface
2224/16148 . . . . . the bump connector connecting to a bonding area protruding from the surface
2224/16151 . . . . . the bump connector connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/16153 . . . . . the body and the item being arranged next to each other, e.g. on a common substrate
2224/16155 . . . . . the item being non-metallic, e.g. being an insulating substrate with or without metallisation
2224/16157 . . . . . the bump connector connecting to a bond pad of the item
2224/1616 . . . . . the bump connector connecting to a pin of the item
2224/16163 . . . . . the bump connector connecting to a potential ring of the item
2224/16165 . . . . . the bump connector connecting to a via metallisation of the item
2224/16167 . . . . . the bump connector connecting to a bonding area disposed in a recess of the surface of the item

2224/16168 . . . . . the bump connector connecting to a bonding area protruding from the surface of the item
2224/16175 . . . . . the item being metallic
2224/16183 . . . . . the bump connector connecting to a potential ring of the item
2224/16187 . . . . . the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16188 . . . . . the bump connector connecting to a bonding area protruding from the surface of the item
2224/16195 . . . . . the item being a discrete passive component
2224/16197 . . . . . the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16198 . . . . . the bump connector connecting to a bonding area protruding from the surface of the item
2224/16221 . . . . . the body and the item being stacked
2224/16225 . . . . . the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/16227 . . . . . the bump connector connecting to a bond pad of the item
2224/1623 . . . . . the bump connector connecting to a pin of the item
2224/16233 . . . . . the bump connector connecting to a potential ring of the item
2224/16235 . . . . . the bump connector connecting to a via metallisation of the item
2224/16237 . . . . . the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16238 . . . . . the bump connector connecting to a bonding area protruding from the surface of the item
2224/1624 . . . . . the bump connector connecting between the body and an opposite side of the item with respect to the body
2224/16245 . . . . . the item being metallic
2224/16253 . . . . . the bump connector connecting to a potential ring of the item
2224/16257 . . . . . the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16258 . . . . . the bump connector connecting to a bonding area protruding from the surface of the item
2224/1626 . . . . . the bump connector connecting between the body and an opposite side of the item with respect to the body
2224/16265 . . . . . the item being a discrete passive component
2224/16267 . . . . . the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16268 . . . . . the bump connector connecting to a bonding area protruding from the surface of the item
2224/165 . . . . . Material
2224/16501 . . . . . at the bonding interface
2224/16502 . . . . . comprising an eutectic alloy
2224/16503 . . . . . comprising an intermetallic compound
2224/16505 . . . . . outside the bonding interface, e.g. in the bulk of the bump connector
2224/16506 . . . . . comprising an eutectic alloy
2224/16507 . . . . . comprising an intermetallic compound
2224/17 . . . . of a plurality of bump connectors
2224/1701 . . . . . Structure
2224/1703 . . . . . Bump connectors having different sizes, e.g. different diameters, heights or widths
2224/1705 . . . . . Shape
2224/17051 . . . . . Bump connectors having different shapes
2224/17055 . . . . . of their bonding interfaces
2224/171 . . . . . Disposition
2224/17104 . . . . . relative to the bonding areas, e.g. bond pads
2224/17106 . . . . . the bump connectors being bonded to at least one common bonding area
2224/17107 . . . . . the bump connectors connecting two common bonding areas
2224/1712 . . . . . Layout (layout of bump connectors prior to the connecting process H01L 2224/1412)
2224/1713 . . . . . Square or rectangular array
2224/17132 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/17133 . . . . . with a staggered arrangement, e.g. depopulated array
2224/17134 . . . . . covering only portions of the surface to be connected
2224/17135 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/17136 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/1714 . . . . . Circular array, i.e. array with radial symmetry
2224/17142 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/17143 . . . . . with a staggered arrangement
2224/17144 . . . . . covering only portions of the surface to be connected
2224/17145 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/17146 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/1715 . . . . . Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/17151 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/17152 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/17153 . . . . . with a staggered arrangement, e.g. depopulated array

2224/17154 . . . . . covering only portions of the surface to be connected
2224/17155 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/17156 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/1716 . . . . . Random layout, i.e. layout with no symmetry
2224/17163 . . . . . with a staggered arrangement
2224/17164 . . . . . covering only portions of the surface to be connected
2224/17165 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/17166 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/17177 . . . . . Combinations of arrays with different layouts
2224/17179 . . . . . Corner adaptations, i.e. disposition of the bump connectors at the corners of the semiconductor or solid-state body
2224/1718 . . . . . being disposed on at least two different sides of the body, e.g. dual array
2224/17181 . . . . . On opposite sides of the body
2224/17183 . . . . . On contiguous sides of the body
2224/175 . . . . . Material
2224/17505 . . . . . Bump connectors having different materials
2224/1751 . . . . . Function
2224/17515 . . . . . Bump connectors having different functions
2224/17517 . . . . . including bump connectors providing primarily mechanical support
2224/17519 . . . . . including bump connectors providing primarily thermal dissipation
2224/18 . . High density interconnect [HDI] connectors; Manufacturing methods related thereto
2224/19 . . . Manufacturing methods of high density interconnect preforms
2224/20 . . . Structure, shape, material or disposition of high density interconnect preforms
2224/21 . . . . of an individual HDI interconnect
2224/2101 . . . . . Structure
2224/2105 . . . . . Shape
2224/211 . . . . . Disposition
2224/214 . . . . . Connecting portions
2224/215 . . . . . Material
2224/22 . . . . of a plurality of HDI interconnects
2224/2201 . . . . . Structure
2224/2205 . . . . . Shape
2224/221 . . . . . Disposition
2224/224 . . . . . Connecting portions
2224/225 . . . . . Material
2224/22505 . . . . . HDI interconnects having different materials
2224/23 . . . Structure, shape, material or disposition of the high density interconnect connectors after the connecting process
2224/24 . . . . of an individual high density interconnect connector
2224/2401 . . . . . Structure
2224/24011 . . . . . Deposited, e.g. MCM-D type
2224/2402 . . . . . Laminated, e.g. MCM-L type
2224/2405 . . . . . Shape
2224/24051 . . . . . Conformal with the semiconductor or solid-state device
2224/241 . . . . . Disposition
2224/24101 . . . . . Connecting bonding areas at the same height
2224/24105 . . . . . Connecting bonding areas at different heights
2224/2413 . . . . . Connecting within a semiconductor or solid-state body
2224/24135 . . . . . Connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip
2224/24137 . . . . . the bodies being arranged next to each other, e.g. on a common substrate
2224/24141 . . . . . the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements
2224/24145 . . . . . the bodies being stacked
2224/24146 . . . . . the HDI interconnect connecting to the same level of the lower semiconductor or solid-state body at which the upper semiconductor or solid-state body is mounted
2224/24147 . . . . . the HDI interconnect not connecting to the same level of the lower semiconductor or solid-state body at which the upper semiconductor or solid-state body is mounted, e.g. the upper semiconductor or solid-state body being mounted in a cavity or on a protrusion of the lower semiconductor or solid-state body
2224/24151 . . . . . Connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/24153 . . . . . the body and the item being arranged next to each other, e.g. on a common substrate
2224/24155 . . . . . the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/24175 . . . . . the item being metallic
2224/24195 . . . . . the item being a discrete passive component
2224/24221 . . . . . the body and the item being stacked
2224/24225 . . . . . the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/24226 . . . . . the HDI interconnect connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the item being planar

2224/24227 . . . . . the HDI interconnect not connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the semiconductor or solid-state body being mounted in a cavity or on a protrusion of the item
2224/24245 . . . . . the item being metallic
2224/24246 . . . . . the HDI interconnect connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the item being planar
2224/24247 . . . . . the HDI interconnect not connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the semiconductor or solid-state body being mounted in a cavity or on a protrusion of the item
2224/24265 . . . . . the item being a discrete passive component
2224/244 . . . . . Connecting portions
2224/245 . . . . . Material
2224/2499 . . . . . Auxiliary members for HDI interconnects, e.g. spacers, alignment aids
2224/24991 . . . . . being formed on the semiconductor or solid-state body to be connected
2224/24992 . . . . . Flow barrier
2224/24996 . . . . . being formed on an item to be connected not being a semiconductor or solid-state body
2224/24997 . . . . . Flow barrier
2224/24998 . . . . . Reinforcing structures, e.g. ramp-like support
2224/25 . . . . of a plurality of high density interconnect connectors
2224/2501 . . . . . Structure
2224/2505 . . . . . Shape
2224/251 . . . . . Disposition
2224/25105 . . . . . Connecting at different heights
2224/2511 . . . . . the connectors being bonded to at least one common bonding area
2224/25111 . . . . . the connectors connecting two common bonding areas
2224/25112 . . . . . the connectors connecting a common bonding area on the semiconductor or solid-state body to different bonding areas outside the body
2224/25113 . . . . . the connectors connecting different bonding areas on the semiconductor or solid-state body to a common bonding area outside the body
2224/2512 . . . . . Layout
2224/25171 . . . . . Fan-out arrangements
2224/25174 . . . . . Stacked arrangements
2224/25175 . . . . . Parallel arrangements
2224/25177 . . . . . Combinations of a plurality of arrangements
2224/2518 . . . . . being disposed on at least two different sides of the body, e.g. dual array
2224/254 . . . . . Connecting portions
2224/2541 . . . . . the connecting portions being stacked
2224/2543 . . . . . the connecting portions being staggered
2224/255 . . . . . Material
2224/26 . . Layer connectors, e.g. plate connectors, solder or adhesive layers; Manufacturing methods related thereto
2224/2612 . . . Auxiliary members for layer connectors, e.g. spacers
2224/26122 . . . . being formed on the semiconductor or solid-state body to be connected
2224/26125 . . . . . Reinforcing structures
2224/26135 . . . . . Alignment aids
2224/26145 . . . . . Flow barriers
2224/26152 . . . . being formed on an item to be connected not being a semiconductor or solid-state body
2224/26155 . . . . . Reinforcing structures
2224/26165 . . . . . Alignment aids
2224/26175 . . . . . Flow barriers
2224/27 . . . Manufacturing methods
2224/27001 . . . . Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
2224/27002 . . . . . for supporting the semiconductor or solid-state body
2224/27003 . . . . . for holding or transferring the layer preform
2224/27005 . . . . . for aligning the layer connector, e.g. marks, spacers
2224/27009 . . . . . for protecting parts during manufacture
2224/27011 . . . . Involving a permanent auxiliary member, i.e. a member which is left at least partly in the finished device, e.g. coating, dummy feature
2224/27013 . . . . . for holding or confining the layer connector, e.g. solder flow barrier
2224/27015 . . . . . for aligning the layer connector, e.g. marks, spacers
2224/27019 . . . . . for protecting parts during the process
2224/271 . . . . Manufacture and pre-treatment of the layer connector preform
2224/2711 . . . . . Shaping
2224/2712 . . . . . Applying permanent coating
2224/273 . . . . by local deposition of the material of the layer connector
2224/2731 . . . . . in liquid form
2224/27312 . . . . . Continuous flow, e.g. using a microsyringe, a pump, a nozzle or extrusion
2224/27318 . . . . . by dispensing droplets
2224/2732 . . . . . Screen printing, i.e. using a stencil
2224/2733 . . . . . in solid form
2224/27332 . . . . . using a powder
2224/27334 . . . . . using preformed layer
2224/274 . . . . by blanket deposition of the material of the layer connector
2224/2741 . . . . . in liquid form
2224/27416 . . . . . Spin coating
2224/27418 . . . . . Spray coating
2224/2742 . . . . . Curtain coating
2224/27422 . . . . . by dipping, e.g. in a solder bath (hot-dipping C23C 2/00)
2224/27424 . . . . . Immersion coating, e.g. in a solder bath (immersion processes C23C 2/00)

2224/27426 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/27428 . . . . . Wave coating
2224/2743 . . . . in solid form
2224/27436 . . . . . Lamination of a preform, e.g. foil, sheet or layer
2224/27438 . . . . . the preform being at least partly pre-patterned
2224/2744 . . . . . by transfer printing
2224/27442 . . . . . using a powder
2224/27444 . . . . in gaseous form
2224/2745 . . . . . Physical vapour deposition [PVD], e.g. evaporation, or sputtering
2224/27452 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
2224/2746 . . . . Plating
2224/27462 . . . . . Electroplating
2224/27464 . . . . . Electroless plating
2224/27466 . . . . Conformal deposition, i.e. blanket deposition of a conformal layer on a patterned surface
2224/2747 . . . using a lift-off mask
2224/27472 . . . . Profile of the lift-off mask
2224/27474 . . . . Multilayer masks
2224/2748 . . . . Permanent masks, i.e. masks left in the finished device, e.g. passivation layers
2224/275 . . . by chemical or physical modification of a pre-existing or pre-deposited material
2224/27502 . . . . Pre-existing or pre-deposited material
2224/27505 . . . . Sintering
2224/2751 . . . . Anodisation
2224/27515 . . . . Curing and solidification, e.g. of a photosensitive layer material
2224/2752 . . . . Self-assembly, e.g. self-agglomeration of the layer material in a fluid
2224/27522 . . . . . Auxiliary means therefor, e.g. for self-assembly activation
2224/27524 . . . . . with special adaptation of the surface or of an auxiliary substrate, e.g. surface shape specially adapted for the self-assembly process
2224/27526 . . . . . involving the material of the bonding area, e.g. bonding pad
2224/2755 . . . . Selective modification
2224/27552 . . . . . using a laser or a focussed ion beam [FIB]
2224/27554 . . . . . Stereolithography, i.e. solidification of a pattern defined by a laser trace in a photosensitive resin
2224/276 . . . by patterning a pre-deposited material (treatment of parts prior to assembly of the devices H01L 21/48)
2224/27602 . . . . Mechanical treatment, e.g. polishing, grinding
2224/2761 . . . . Physical or chemical etching
2224/27612 . . . . . by physical means only
2224/27614 . . . . . by chemical means only
2224/27616 . . . . . Chemical mechanical polishing [CMP]
2224/27618 . . . . with selective exposure, development and removal of a photosensitive layer material, e.g. of a photosensitive conductive resin
2224/2762 . . . . using masks
2224/27622 . . . . . Photolithography
2224/2763 . . . . using a laser or a focused ion beam [FIB]
2224/27632 . . . . . Ablation by means of a laser or focused ion beam [FIB]
2224/277 . . . involving monitoring, e.g. feedback loop
2224/278 . . . Post-treatment of the layer connector
2224/2781 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/2782 . . . . Applying permanent coating, e.g. in-situ coating
2224/27821 . . . . . Spray coating
2224/27822 . . . . . by dipping, e.g. in a solder bath
2224/27823 . . . . . Immersion coating, e.g. in a solder bath
2224/27824 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/27825 . . . . . Plating, e.g. electroplating, electroless plating
2224/27826 . . . . . Physical vapour deposition [PVD], e.g. evaporation, or sputtering
2224/27827 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
2224/2783 . . . . Reworking, e.g. shaping (reflowing H01L 2224/27849)
2224/27831 . . . . . involving a chemical process, e.g. etching the layer connector
2224/2784 . . . . . involving a mechanical process, e.g. planarising the layer connector
2224/27845 . . . . . Chemical mechanical polishing [CMP]
2224/27848 . . . . Thermal treatments, e.g. annealing, controlled cooling
2224/27849 . . . . . Reflowing
2224/279 . . . . Methods of manufacturing layer connectors involving a specific sequence of method steps
2224/27901 . . . . . with repetition of the same manufacturing step
2224/27902 . . . . . Multiple masking steps
2224/27903 . . . . . using different masks
2224/27906 . . . . . with modification of the same mask
2224/2791 . . . . Forming a passivation layer after forming the layer connector
2224/27912 . . . . the layer being used as a mask for patterning other parts
2224/27916 . . . . a passivation layer being used as a mask for patterning other parts
2224/28 . . . Structure, shape, material or disposition of the layer connectors prior to the connecting process
2224/28105 . . . . Layer connectors formed on an encapsulation of the semiconductor or solid-state body, e.g. layer connectors on chip-scale packages
2224/29 . . . . of an individual layer connector
2224/29001 . . . . . Core members of the layer connector
2224/29005 . . . . . Structure
2224/29006 . . . . . Layer connector larger than the underlying bonding area
2224/29007 . . . . . Layer connector smaller than the underlying bonding area
2224/29008 . . . . . Layer connector integrally formed with a redistribution layer on the semiconductor or solid-state body
2224/29009 . . . . . Layer connector integrally formed with a via connection of the semiconductor or solid-state body
2224/2901 . . . . . Shape

2224/29011 . . . . . comprising apertures or cavities
2224/29012 . . . . . in top view
2224/29013 . . . . . being rectangular or square
2224/29014 . . . . . being circular or elliptic
2224/29015 . . . . . comprising protrusions or indentations
2224/29016 . . . . . in side view
2224/29017 . . . . . being non uniform along the layer connector
2224/29018 . . . . . comprising protrusions or indentations
2224/29019 . . . . . at the bonding interface of the layer connector, i.e. on the surface of the layer connector
2224/2902 . . . . . Disposition
2224/29021 . . . . . the layer connector being disposed in a recess of the surface (embedded layer connector H01L 2224/29022)
2224/29022 . . . . . the layer connector being at least partially embedded in the surface
2224/29023 . . . . . the whole layer connector protruding from the surface
2224/29024 . . . . . the layer connector being disposed on a redistribution layer on the semiconductor or solid-state body
2224/29025 . . . . . the layer connector being disposed on a via connection of the semiconductor or solid-state body
2224/29026 . . . . . relative to the bonding area, e.g. bond pad, of the semiconductor or solid-state body
2224/29027 . . . . . the layer connector being offset with respect to the bonding area, e.g. bond pad
2224/29028 . . . . . the layer connector being disposed on at least two separate bonding areas, e.g. bond pads
2224/29034 . . . . . the layer connector covering only portions of the surface to be connected
2224/29035 . . . . . covering only the peripheral area of the surface to be connected
2224/29036 . . . . . covering only the central area of the surface to be connected
2224/29075 . . . . . Plural core members
2224/29076 . . . . . being mutually engaged together, e.g. through inserts
2224/29078 . . . . . being disposed next to each other, e.g. side-to-side arrangements
2224/2908 . . . . . being stacked
2224/29082 . . . . . Two-layer arrangements
2224/29083 . . . . . Three-layer arrangements
2224/29084 . . . . . Four-layer arrangements
2224/29099 . . . . . Material
2224/291 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29101 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/29105 . . . . . Gallium [Ga] as principal constituent
2224/29109 . . . . . Indium [In] as principal constituent
2224/29111 . . . . . Tin [Sn] as principal constituent
2224/29113 . . . . . Bismuth [Bi] as principal constituent
2224/29114 . . . . . Thallium [Tl] as principal constituent
2224/29116 . . . . . Lead [Pb] as principal constituent
2224/29117 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29118 . . . . . Zinc [Zn] as principal constituent
2224/2912 . . . . . Antimony [Sb] as principal constituent
2224/29123 . . . . . Magnesium [Mg] as principal constituent
2224/29124 . . . . . Aluminium [Al] as principal constituent
2224/29138 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29139 . . . . . Silver [Ag] as principal constituent
2224/29144 . . . . . Gold [Au] as principal constituent
2224/29147 . . . . . Copper [Cu] as principal constituent
2224/29149 . . . . . Manganese [Mn] as principal constituent
2224/29155 . . . . . Nickel [Ni] as principal constituent
2224/29157 . . . . . Cobalt [Co] as principal constituent
2224/2916 . . . . . Iron [Fe] as principal constituent
2224/29163 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/29164 . . . . . Palladium [Pd] as principal constituent
2224/29166 . . . . . Titanium [Ti] as principal constituent
2224/29169 . . . . . Platinum [Pt] as principal constituent
2224/2917 . . . . . Zirconium [Zr] as principal constituent
2224/29171 . . . . . Chromium [Cr] as principal constituent
2224/29172 . . . . . Vanadium [V] as principal constituent
2224/29173 . . . . . Rhodium [Rh] as principal constituent
2224/29176 . . . . . Ruthenium [Ru] as principal constituent
2224/29178 . . . . . Iridium [Ir] as principal constituent
2224/29179 . . . . . Niobium [Nb] as principal constituent
2224/2918 . . . . . Molybdenum [Mo] as principal constituent
2224/29181 . . . . . Tantalum [Ta] as principal constituent
2224/29183 . . . . . Rhenium [Re] as principal constituent

2224/29184 . . . . . Tungsten [W] as principal constituent
2224/29186 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29187 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/29188)
2224/29188 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/2919 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/29191 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29193 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/291 - H01L 2224/29191, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29194 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/291 - H01L 2224/29191
2224/29195 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/291 - H01L 2224/29191
2224/29198 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29199 . . . . . Material of the matrix
2224/292 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29201 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/29205 . . . . . Gallium [Ga] as principal constituent
2224/29209 . . . . . Indium [In] as principal constituent
2224/29211 . . . . . Tin [Sn] as principal constituent
2224/29213 . . . . . Bismuth [Bi] as principal constituent
2224/29214 . . . . . Thallium [Tl] as principal constituent
2224/29216 . . . . . Lead [Pb] as principal constituent
2224/29217 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29218 . . . . . Zinc [Zn] as principal constituent
2224/2922 . . . . . Antimony [Sb] as principal constituent
2224/29223 . . . . . Magnesium [Mg] as principal constituent
2224/29224 . . . . . Aluminium [Al] as principal constituent
2224/29238 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29239 . . . . . Silver [Ag] as principal constituent
2224/29244 . . . . . Gold [Au] as principal constituent
2224/29247 . . . . . Copper [Cu] as principal constituent
2224/29249 . . . . . Manganese [Mn] as principal constituent
2224/29255 . . . . . Nickel [Ni] as principal constituent
2224/29257 . . . . . Cobalt [Co] as principal constituent
2224/2926 . . . . . Iron [Fe] as principal constituent
2224/29263 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/29264 . . . . . Palladium [Pd] as principal constituent
2224/29266 . . . . . Titanium [Ti] as principal constituent
2224/29269 . . . . . Platinum [Pt] as principal constituent
2224/2927 . . . . . Zirconium [Zr] as principal constituent
2224/29271 . . . . . Chromium [Cr] as principal constituent
2224/29272 . . . . . Vanadium [V] as principal constituent
2224/29273 . . . . . Rhodium [Rh] as principal constituent
2224/29276 . . . . . Ruthenium [Ru] as principal constituent
2224/29278 . . . . . Iridium [Ir] as principal constituent
2224/29279 . . . . . Niobium [Nb] as principal constituent
2224/2928 . . . . . Molybdenum [Mo] as principal constituent
2224/29281 . . . . . Tantalum [Ta] as principal constituent
2224/29283 . . . . . Rhenium [Re] as principal constituent
2224/29284 . . . . . Tungsten [W] as principal constituent
2224/29286 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29287 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/29288)

2224/29288 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/2929 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/29291 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29293 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/292 - H01L 2224/29291, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29294 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/292 - H01L 2224/29291
2224/29295 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/292 - H01L 2224/29291
2224/29298 . . . . . Fillers
2224/29299 . . . . . Base material
2224/293 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29301 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/29305 . . . . . Gallium [Ga] as principal constituent
2224/29309 . . . . . Indium [In] as principal constituent
2224/29311 . . . . . Tin [Sn] as principal constituent
2224/29313 . . . . . Bismuth [Bi] as principal constituent
2224/29314 . . . . . Thallium [Tl] as principal constituent
2224/29316 . . . . . Lead [Pb] as principal constituent
2224/29317 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29318 . . . . . Zinc [Zn] as principal constituent
2224/2932 . . . . . Antimony [Sb] as principal constituent
2224/29323 . . . . . Magnesium [Mg] as principal constituent
2224/29324 . . . . . Aluminium [Al] as principal constituent
2224/29338 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29339 . . . . . Silver [Ag] as principal constituent
2224/29344 . . . . . Gold [Au] as principal constituent
2224/29347 . . . . . Copper [Cu] as principal constituent
2224/29349 . . . . . Manganese [Mn] as principal constituent
2224/29355 . . . . . Nickel [Ni] as principal constituent
2224/29357 . . . . . Cobalt [Co] as principal constituent
2224/2936 . . . . . Iron [Fe] as principal constituent
2224/29363 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/29364 . . . . . Palladium [Pd] as principal constituent
2224/29366 . . . . . Titanium [Ti] as principal constituent
2224/29369 . . . . . Platinum [Pt] as principal constituent
2224/2937 . . . . . Zirconium [Zr] as principal constituent
2224/29371 . . . . . Chromium [Cr] as principal constituent
2224/29372 . . . . . Vanadium [V] as principal constituent
2224/29373 . . . . . Rhodium [Rh] as principal constituent
2224/29376 . . . . . Ruthenium [Ru] as principal constituent
2224/29378 . . . . . Iridium [Ir] as principal constituent
2224/29379 . . . . . Niobium [Nb] as principal constituent
2224/2938 . . . . . Molybdenum [Mo] as principal constituent
2224/29381 . . . . . Tantalum [Ta] as principal constituent
2224/29383 . . . . . Rhenium [Re] as principal constituent
2224/29384 . . . . . Tungsten [W] as principal constituent
2224/29386 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29387 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/29388)
2224/29388 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/2939 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/29391 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2224/29393 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/293 - H01L 2224/29391, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

2224/29394 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/293 - H01L 2224/29391

2224/29395 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/293 - H01L 2224/29391

2224/29398 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams

2224/29399 . . . . . Coating material

2224/294 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof

2224/29401 . . . . . the principal constituent melting at a temperature of less than 400°C

2224/29405 . . . . . Gallium [Ga] as principal constituent

2224/29409 . . . . . Indium [In] as principal constituent

2224/29411 . . . . . Tin [Sn] as principal constituent

2224/29413 . . . . . Bismuth [Bi] as principal constituent

2224/29414 . . . . . Thallium [Tl] as principal constituent

2224/29416 . . . . . Lead [Pb] as principal constituent

2224/29417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C

2224/29418 . . . . . Zinc [Zn] as principal constituent

2224/2942 . . . . . Antimony [Sb] as principal constituent

2224/29423 . . . . . Magnesium [Mg] as principal constituent

2224/29424 . . . . . Aluminium [Al] as principal constituent

2224/29438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C

2224/29439 . . . . . Silver [Ag] as principal constituent

2224/29444 . . . . . Gold [Au] as principal constituent

2224/29447 . . . . . Copper [Cu] as principal constituent

2224/29449 . . . . . Manganese [Mn] as principal constituent

2224/29455 . . . . . Nickel [Ni] as principal constituent

2224/29457 . . . . . Cobalt [Co] as principal constituent

2224/2946 . . . . . Iron [Fe] as principal constituent

2224/29463 . . . . . the principal constituent melting at a temperature of greater than 1550°C

2224/29464 . . . . . Palladium [Pd] as principal constituent

2224/29466 . . . . . Titanium [Ti] as principal constituent

2224/29469 . . . . . Platinum [Pt] as principal constituent

2224/2947 . . . . . Zirconium [Zr] as principal constituent

2224/29471 . . . . . Chromium [Cr] as principal constituent

2224/29472 . . . . . Vanadium [V] as principal constituent

2224/29473 . . . . . Rhodium [Rh] as principal constituent

2224/29476 . . . . . Ruthenium [Ru] as principal constituent

2224/29478 . . . . . Iridium [Ir] as principal constituent

2224/29479 . . . . . Niobium [Nb] as principal constituent

2224/2948 . . . . . Molybdenum [Mo] as principal constituent

2224/29481 . . . . . Tantalum [Ta] as principal constituent

2224/29483 . . . . . Rhenium [Re] as principal constituent

2224/29484 . . . . . Tungsten [W] as principal constituent

2224/29486 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material

2224/29487 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/29488)

2224/29488 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides

2224/2949 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy

2224/29491 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2224/29493 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/294 - H01L 2224/29491, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

2224/29494 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/294 - H01L 2224/29491
2224/29495 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/294 - H01L 2224/29491
2224/29498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29499 . . . . . Shape or distribution of the fillers
2224/2954 . . . . . Coating
2224/29541 . . . . . Structure
2224/2955 . . . . . Shape
2224/29551 . . . . . being non uniform
2224/29552 . . . . . comprising protrusions or indentations
2224/29553 . . . . . at the bonding interface of the layer connector, i.e. on the surface of the layer connector
2224/2956 . . . . . Disposition
2224/29561 . . . . . On the entire surface of the core, i.e. integral coating
2224/29562 . . . . . On the entire exposed surface of the core
2224/29563 . . . . . Only on parts of the surface of the core, i.e. partial coating
2224/29564 . . . . . Only on the bonding interface of the layer connector
2224/29565 . . . . . Only outside the bonding interface of the layer connector
2224/29566 . . . . . Both on and outside the bonding interface of the layer connector
2224/2957 . . . . . Single coating layer
2224/29575 . . . . . Plural coating layers
2224/29576 . . . . . being mutually engaged together, e.g. through inserts
2224/29578 . . . . . being disposed next to each other, e.g. side-to-side arrangements
2224/2958 . . . . . being stacked
2224/29582 . . . . . Two-layer coating
2224/29583 . . . . . Three-layer coating
2224/29584 . . . . . Four-layer coating
2224/29599 . . . . . Material
2224/296 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29601 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/29605 . . . . . Gallium [Ga] as principal constituent
2224/29609 . . . . . Indium [In] as principal constituent
2224/29611 . . . . . Tin [Sn] as principal constituent
2224/29613 . . . . . Bismuth [Bi] as principal constituent
2224/29614 . . . . . Thallium [Tl] as principal constituent
2224/29616 . . . . . Lead [Pb] as principal constituent
2224/29617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29618 . . . . . Zinc [Zn] as principal constituent
2224/2962 . . . . . Antimony [Sb] as principal constituent
2224/29623 . . . . . Magnesium [Mg] as principal constituent
2224/29624 . . . . . Aluminium [Al] as principal constituent
2224/29638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29639 . . . . . Silver [Ag] as principal constituent
2224/29644 . . . . . Gold [Au] as principal constituent
2224/29647 . . . . . Copper [Cu] as principal constituent
2224/29649 . . . . . Manganese [Mn] as principal constituent
2224/29655 . . . . . Nickel [Ni] as principal constituent
2224/29657 . . . . . Cobalt [Co] as principal constituent
2224/2966 . . . . . Iron [Fe] as principal constituent
2224/29663 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/29664 . . . . . Palladium [Pd] as principal constituent
2224/29666 . . . . . Titanium [Ti] as principal constituent
2224/29669 . . . . . Platinum [Pt] as principal constituent
2224/2967 . . . . . Zirconium [Zr] as principal constituent
2224/29671 . . . . . Chromium [Cr] as principal constituent
2224/29672 . . . . . Vanadium [V] as principal constituent
2224/29673 . . . . . Rhodium [Rh] as principal constituent
2224/29676 . . . . . Ruthenium [Ru] as principal constituent
2224/29678 . . . . . Iridium [Ir] as principal constituent
2224/29679 . . . . . Niobium [Nb] as principal constituent
2224/2968 . . . . . Molybdenum [Mo] as principal constituent
2224/29681 . . . . . Tantalum [Ta] as principal constituent
2224/29683 . . . . . Rhenium [Re] as principal constituent
2224/29684 . . . . . Tungsten [W] as principal constituent
2224/29686 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material

2224/29687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/29688)
2224/29688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/2969 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/29691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29693 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/296 - H01L 2224/29691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29694 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/296 - H01L 2224/29691
2224/29695 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/296 - H01L 2224/29691
2224/29698 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29699 . . . . . Material of the matrix
2224/297 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29701 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/29705 . . . . . Gallium [Ga] as principal constituent
2224/29709 . . . . . Indium [In] as principal constituent
2224/29711 . . . . . Tin [Sn] as principal constituent
2224/29713 . . . . . Bismuth [Bi] as principal constituent
2224/29714 . . . . . Thallium [Tl] as principal constituent
2224/29716 . . . . . Lead [Pb] as principal constituent
2224/29717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29718 . . . . . Zinc [Zn] as principal constituent
2224/2972 . . . . . Antimony [Sb] as principal constituent
2224/29723 . . . . . Magnesium [Mg] as principal constituent
2224/29724 . . . . . Aluminium [Al] as principal constituent
2224/29738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29739 . . . . . Silver [Ag] as principal constituent
2224/29744 . . . . . Gold [Au] as principal constituent
2224/29747 . . . . . Copper [Cu] as principal constituent
2224/29749 . . . . . Manganese [Mn] as principal constituent
2224/29755 . . . . . Nickel [Ni] as principal constituent
2224/29757 . . . . . Cobalt [Co] as principal constituent
2224/2976 . . . . . Iron [Fe] as principal constituent
2224/29763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/29764 . . . . . Palladium [Pd] as principal constituent
2224/29766 . . . . . Titanium [Ti] as principal constituent
2224/29769 . . . . . Platinum [Pt] as principal constituent
2224/2977 . . . . . Zirconium [Zr] as principal constituent
2224/29771 . . . . . Chromium [Cr] as principal constituent
2224/29772 . . . . . Vanadium [V] as principal constituent
2224/29773 . . . . . Rhodium [Rh] as principal constituent
2224/29776 . . . . . Ruthenium [Ru] as principal constituent
2224/29778 . . . . . Iridium [Ir] as principal constituent
2224/29779 . . . . . Niobium [Nb] as principal constituent
2224/2978 . . . . . Molybdenum [Mo] as principal constituent
2224/29781 . . . . . Tantalum [Ta] as principal constituent
2224/29783 . . . . . Rhenium [Re] as principal constituent
2224/29784 . . . . . Tungsten [W] as principal constituent
2224/29786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/29788)
2224/29788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/2979 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy

2224/29791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29793 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/297 - H01L 2224/29791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29794 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/297 - H01L 2224/29791
2224/29795 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/297 - H01L 2224/29791
2224/29798 . . . . . Fillers
2224/29799 . . . . . Base material
2224/298 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29801 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/29805 . . . . . Gallium [Ga] as principal constituent
2224/29809 . . . . . Indium [In] as principal constituent
2224/29811 . . . . . Tin [Sn] as principal constituent
2224/29813 . . . . . Bismuth [Bi] as principal constituent
2224/29814 . . . . . Thallium [Tl] as principal constituent
2224/29816 . . . . . Lead [Pb] as principal constituent
2224/29817 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29818 . . . . . Zinc [Zn] as principal constituent
2224/2982 . . . . . Antimony [Sb] as principal constituent
2224/29823 . . . . . Magnesium [Mg] as principal constituent
2224/29824 . . . . . Aluminium [Al] as principal constituent
2224/29838 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29839 . . . . . Silver [Ag] as principal constituent
2224/29844 . . . . . Gold [Au] as principal constituent
2224/29847 . . . . . Copper [Cu] as principal constituent
2224/29849 . . . . . Manganese [Mn] as principal constituent
2224/29855 . . . . . Nickel [Ni] as principal constituent
2224/29857 . . . . . Cobalt [Co] as principal constituent
2224/2986 . . . . . Iron [Fe] as principal constituent
2224/29863 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/29864 . . . . . Palladium [Pd] as principal constituent
2224/29866 . . . . . Titanium [Ti] as principal constituent
2224/29869 . . . . . Platinum [Pt] as principal constituent
2224/2987 . . . . . Zirconium [Zr] as principal constituent
2224/29871 . . . . . Chromium [Cr] as principal constituent
2224/29872 . . . . . Vanadium [V] as principal constituent
2224/29873 . . . . . Rhodium [Rh] as principal constituent
2224/29876 . . . . . Ruthenium [Ru] as principal constituent
2224/29878 . . . . . Iridium [Ir] as principal constituent
2224/29879 . . . . . Niobium [Nb] as principal constituent
2224/2988 . . . . . Molybdenum [Mo] as principal constituent
2224/29881 . . . . . Tantalum [Ta] as principal constituent
2224/29883 . . . . . Rhenium [Re] as principal constituent
2224/29884 . . . . . Tungsten [W] as principal constituent
2224/29886 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29887 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/29888)
2224/29888 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/2989 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/29891 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29893 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/298 - H01L 2224/29891, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

2224/29894 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/298 - H01L 2224/29891
2224/29895 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/298 - H01L 2224/29891
2224/29898 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29899 . . . . . Coating material
2224/299 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29901 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/29905 . . . . . Gallium [Ga] as principal constituent
2224/29909 . . . . . Indium [In] as principal constituent
2224/29911 . . . . . Tin [Sn] as principal constituent
2224/29913 . . . . . Bismuth [Bi] as principal constituent
2224/29914 . . . . . Thallium [Tl] as principal constituent
2224/29916 . . . . . Lead [Pb] as principal constituent
2224/29917 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29918 . . . . . Zinc [Zn] as principal constituent
2224/2992 . . . . . Antimony [Sb] as principal constituent
2224/29923 . . . . . Magnesium [Mg] as principal constituent
2224/29924 . . . . . Aluminium [Al] as principal constituent
2224/29938 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29939 . . . . . Silver [Ag] as principal constituent
2224/29944 . . . . . Gold [Au] as principal constituent
2224/29947 . . . . . Copper [Cu] as principal constituent
2224/29949 . . . . . Manganese [Mn] as principal constituent
2224/29955 . . . . . Nickel [Ni] as principal constituent
2224/29957 . . . . . Cobalt [Co] as principal constituent
2224/2996 . . . . . Iron [Fe] as principal constituent
2224/29963 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/29964 . . . . . Palladium [Pd] as principal constituent
2224/29966 . . . . . Titanium [Ti] as principal constituent
2224/29969 . . . . . Platinum [Pt] as principal constituent
2224/2997 . . . . . Zirconium [Zr] as principal constituent
2224/29971 . . . . . Chromium [Cr] as principal constituent
2224/29972 . . . . . Vanadium [V] as principal constituent
2224/29973 . . . . . Rhodium [Rh] as principal constituent
2224/29976 . . . . . Ruthenium [Ru] as principal constituent
2224/29978 . . . . . Iridium [Ir] as principal constituent
2224/29979 . . . . . Niobium [Nb] as principal constituent
2224/2998 . . . . . Molybdenum [Mo] as principal constituent
2224/29981 . . . . . Tantalum [Ta] as principal constituent
2224/29983 . . . . . Rhenium [Re] as principal constituent
2224/29984 . . . . . Tungsten [W] as principal constituent
2224/29986 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29987 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/29988)
2224/29988 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/2999 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/29991 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29993 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/299 - H01L 2224/29991, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29994 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/299 - H01L 2224/29991

2224/29995 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/299 - H01L 2224/29991
2224/29998 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29999 . . . . . Shape or distribution of the fillers
2224/30 . . . . of a plurality of layer connectors
2224/3001 . . . . . Structure
2224/3003 . . . . . Layer connectors having different sizes, e.g. different heights or widths
2224/3005 . . . . . Shape
2224/30051 . . . . . Layer connectors having different shapes
2224/301 . . . . . Disposition
2224/30104 . . . . . relative to the bonding areas, e.g. bond pads, of the semiconductor or solid-state body
2224/3011 . . . . . the layer connectors being bonded to at least one common bonding area
2224/3012 . . . . . Layout
2224/3013 . . . . . Square or rectangular array
2224/30131 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/30132 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/30133 . . . . . with a staggered arrangement, e.g. depopulated array
2224/30134 . . . . . covering only portions of the surface to be connected
2224/30135 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/30136 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/3014 . . . . . Circular array, i.e. array with radial symmetry
2224/30141 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/30142 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/30143 . . . . . covering only portions of the surface to be connected
2224/30145 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/30146 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/3015 . . . . . Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/30151 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/30152 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/30153 . . . . . with a staggered arrangement, e.g. depopulated array
2224/30154 . . . . . covering only portions of the surface to be connected
2224/30155 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/30156 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/3016 . . . . . Random layout, i.e. layout with no symmetry
2224/30163 . . . . . with a staggered arrangement
2224/30164 . . . . . covering only portions of the surface to be connected
2224/30165 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/30166 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/30177 . . . . . Combinations of arrays with different layouts
2224/30179 . . . . . Corner adaptations, i.e. disposition of the layer connectors at the corners of the semiconductor or solid-state body
2224/3018 . . . . . being disposed on at least two different sides of the body, e.g. dual array
2224/30181 . . . . . On opposite sides of the body
2224/30183 . . . . . On contiguous sides of the body
2224/305 . . . . . Material
2224/30505 . . . . . Layer connectors having different materials
2224/3051 . . . . . Function
2224/30515 . . . . . Layer connectors having different functions
2224/30517 . . . . . including layer connectors providing primarily mechanical bonding
2224/30519 . . . . . including layer connectors providing primarily thermal dissipation
2224/31 . . . Structure, shape, material or disposition of the layer connectors after the connecting process
2224/32 . . . . of an individual layer connector
2224/3201 . . . . . Structure
2224/32012 . . . . . relative to the bonding area, e.g. bond pad
2224/32013 . . . . . the layer connector being larger than the bonding area, e.g. bond pad
2224/32014 . . . . . the layer connector being smaller than the bonding area, e.g. bond pad
2224/3205 . . . . . Shape
2224/32052 . . . . . in top view
2224/32053 . . . . . being non uniform along the layer connector
2224/32054 . . . . . being rectangular or square
2224/32055 . . . . . being circular or elliptic
2224/32056 . . . . . comprising protrusions or indentations
2224/32057 . . . . . in side view
2224/32058 . . . . . being non uniform along the layer connector
2224/32059 . . . . . comprising protrusions or indentations
2224/3207 . . . . . of bonding interfaces, e.g. interlocking features
2224/321 . . . . . Disposition

2224/32104 . . . . . relative to the bonding area, e.g. bond pad
2224/32105 . . . . . the layer connector connecting bonding areas being not aligned with respect to each other
2224/32106 . . . . . the layer connector connecting one bonding area to at least two respective bonding areas
2224/32111 . . . . . the layer connector being disposed in a recess of the surface
2224/32112 . . . . . the layer connector being at least partially embedded in the surface
2224/32113 . . . . . the whole layer connector protruding from the surface
2224/3213 . . . . . the layer connector connecting within a semiconductor or solid-state body, i.e. connecting two bonding areas on the same semiconductor or solid-state body
2224/32135 . . . . . the layer connector connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip
2224/32137 . . . . . the bodies being arranged next to each other, e.g. on a common substrate
2224/32141 . . . . . the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements
2224/32145 . . . . . the bodies being stacked
2224/32146 . . . . . the layer connector connecting to a via connection in the semiconductor or solid-state body
2224/32147 . . . . . the layer connector connecting to a bonding area disposed in a recess of the surface
2224/32148 . . . . . the layer connector connecting to a bonding area protruding from the surface
2224/32151 . . . . . the layer connector connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/32153 . . . . . the body and the item being arranged next to each other, e.g. on a common substrate
2224/32155 . . . . . the item being non-metallic, e.g. being an insulating substrate with or without metallisation
2224/32157 . . . . . the layer connector connecting to a bond pad of the item
2224/3216 . . . . . the layer connector connecting to a pin of the item
2224/32163 . . . . . the layer connector connecting to a potential ring of the item
2224/32165 . . . . . the layer connector connecting to a via metallisation of the item
2224/32167 . . . . . the layer connector connecting to a bonding area disposed in a recess of the surface of the item
2224/32168 . . . . . the layer connector connecting to a bonding area protruding from the surface of the item
2224/32175 . . . . . the item being metallic
2224/32183 . . . . . the layer connector connecting to a potential ring of the item
2224/32187 . . . . . the layer connector connecting to a bonding area disposed in a recess of the surface of the item
2224/32188 . . . . . the layer connector connecting to a bonding area protruding from the surface of the item
2224/32195 . . . . . the item being a discrete passive component
2224/32197 . . . . . the layer connector connecting to a bonding area disposed in a recess of the surface of the item
2224/32198 . . . . . the layer connector connecting to a bonding area protruding from the surface of the item
2224/32221 . . . . . the body and the item being stacked
2224/32225 . . . . . the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/32227 . . . . . the layer connector connecting to a bond pad of the item
2224/3223 . . . . . the layer connector connecting to a pin of the item
2224/32233 . . . . . the layer connector connecting to a potential ring of the item
2224/32235 . . . . . the layer connector connecting to a via metallisation of the item
2224/32237 . . . . . the layer connector connecting to a bonding area disposed in a recess of the surface of the item
2224/32238 . . . . . the layer connector connecting to a bonding area protruding from the surface of the item
2224/3224 . . . . . the layer connector connecting between the body and an opposite side of the item with respect to the body
2224/32245 . . . . . the item being metallic
2224/32253 . . . . . the layer connector connecting to a potential ring of the item
2224/32257 . . . . . the layer connector connecting to a bonding area disposed in a recess of the surface of the item
2224/32258 . . . . . the layer connector connecting to a bonding area protruding from the surface of the item
2224/3226 . . . . . the layer connector connecting between the body and an opposite side of the item with respect to the body
2224/32265 . . . . . the item being a discrete passive component
2224/32267 . . . . . the layer connector connecting to a bonding area disposed in a recess of the surface of the item
2224/32268 . . . . . the layer connector connecting to a bonding area protruding from the surface of the item
2224/325 . . . . . Material
2224/32501 . . . . . at the bonding interface
2224/32502 . . . . . comprising an eutectic alloy
2224/32503 . . . . . comprising an intermetallic compound
2224/32505 . . . . . outside the bonding interface, e.g. in the bulk of the layer connector

2224/32506 . . . . . comprising an eutectic alloy
2224/32507 . . . . . comprising an intermetallic compound
2224/33 . . . . of a plurality of layer connectors
2224/3301 . . . . . Structure
2224/3303 . . . . . Layer connectors having different sizes, e.g. different heights or widths
2224/3305 . . . . . Shape
2224/33051 . . . . . Layer connectors having different shapes
2224/33055 . . . . . of their bonding interfaces
2224/331 . . . . . Disposition
2224/33104 . . . . . relative to the bonding areas, e.g. bond pads
2224/33106 . . . . . the layer connectors being bonded to at least one common bonding area
2224/33107 . . . . . the layer connectors connecting two common bonding areas
2224/3312 . . . . . Layout (layout of layer connectors prior to the connecting process H01L 2224/3012)
2224/3313 . . . . . Square or rectangular array
2224/33132 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/33133 . . . . . with a staggered arrangement, e.g. depopulated array
2224/33134 . . . . . covering only portions of the surface to be connected
2224/33135 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/3314 . . . . . Circular array, i.e. array with radial symmetry
2224/33142 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/33143 . . . . . with a staggered arrangement
2224/33144 . . . . . covering only portions of the surface to be connected
2224/33145 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/3315 . . . . . Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/33151 . . . . . being uniform, i.e. having a uniform pitch across the array
2224/33152 . . . . . being non uniform, i.e. having a non uniform pitch across the array
2224/33153 . . . . . with a staggered arrangement, e.g. depopulated array
2224/33154 . . . . . covering only portions of the surface to be connected
2224/33155 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/33156 . . . . . Covering only the central area of the surface to be connected, i.e. central arrangements
2224/3316 . . . . . Random layout, i.e. layout with no symmetry
2224/33163 . . . . . with a staggered arrangement
2224/33164 . . . . . covering only portions of the surface to be connected
2224/33165 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/33177 . . . . . Combinations of arrays with different layouts
2224/33179 . . . . . Corner adaptations, i.e. disposition of the layer connectors at the corners of the semiconductor or solid-state body
2224/3318 . . . . . being disposed on at least two different sides of the body, e.g. dual array
2224/33181 . . . . . On opposite sides of the body
2224/33183 . . . . . On contiguous sides of the body
2224/335 . . . . . Material
2224/33505 . . . . . Layer connectors having different materials
2224/3351 . . . . . Function
2224/33515 . . . . . Layer connectors having different functions
2224/33517 . . . . . including layer connectors providing primarily mechanical support
2224/33519 . . . . . including layer connectors providing primarily thermal dissipation
2224/34 . . Strap connectors, e.g. copper straps for grounding power devices; Manufacturing methods related thereto
2224/35 . . . Manufacturing methods
2224/35001 . . . . Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
2224/351 . . . . Pre-treatment of the preform connector
2224/3512 . . . . . Applying permanent coating, e.g. in-situ coating
2224/35125 . . . . . Plating, e.g. electroplating, electroless plating
2224/352 . . . . Mechanical processes
2224/3521 . . . . . Pulling
2224/355 . . . . Modification of a pre-existing material
2224/3551 . . . . . Sintering
2224/3552 . . . . . Anodisation
2224/357 . . . . Involving monitoring, e.g. feedback loop
2224/358 . . . . Post-treatment of the connector
2224/3581 . . . . . Cleaning, e.g. oxide removal step, desmearing
2224/3582 . . . . . Applying permanent coating, e.g. in-situ coating
2224/35821 . . . . . Spray coating
2224/35822 . . . . . Dip coating
2224/35823 . . . . . Immersion coating, e.g. solder bath
2224/35824 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/35825 . . . . . Plating, e.g. electroplating, electroless plating
2224/35826 . . . . . Physical vapour deposition [PVD], e.g. evaporation, sputtering
2224/35827 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
2224/3583 . . . . . Reworking
2224/35831 . . . . . with a chemical process, e.g. with etching of the connector
2224/35847 . . . . . with a mechanical process, e.g. with flattening of the connector

2224/35848 . . . . . Thermal treatments, e.g. annealing, controlled cooling
2224/35985 . . . . Methods of manufacturing strap connectors involving a specific sequence of method steps
2224/35986 . . . . . with repetition of the same manufacturing step
2224/36 . . . Structure, shape, material or disposition of the strap connectors prior to the connecting process
2224/37 . . . . of an individual strap connector
2224/37001 . . . . . Core members of the connector
2224/37005 . . . . . Structure
2224/3701 . . . . . Shape
2224/37011 . . . . . comprising apertures or cavities
2224/37012 . . . . . Cross-sectional shape
2224/37013 . . . . . being non uniform along the connector
2224/3702 . . . . . Disposition
2224/37025 . . . . . Plural core members
2224/37026 . . . . . being mutually engaged together, e.g. through inserts
2224/37028 . . . . . Side-to-side arrangements
2224/3703 . . . . . Stacked arrangements
2224/37032 . . . . . Two-layer arrangements
2224/37033 . . . . . Three-layer arrangements
2224/37034 . . . . . Four-layer arrangements
2224/37099 . . . . . Material
2224/371 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/37101 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/37105 . . . . . Gallium [Ga] as principal constituent
2224/37109 . . . . . Indium [In] as principal constituent
2224/37111 . . . . . Tin [Sn] as principal constituent
2224/37113 . . . . . Bismuth [Bi] as principal constituent
2224/37114 . . . . . Thallium [Tl] as principal constituent
2224/37116 . . . . . Lead [Pb] as principal constituent
2224/37117 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37118 . . . . . Zinc [Zn] as principal constituent
2224/3712 . . . . . Antimony [Sb] as principal constituent
2224/37123 . . . . . Magnesium [Mg] as principal constituent
2224/37124 . . . . . Aluminium [Al] as principal constituent
2224/37138 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37139 . . . . . Silver [Ag] as principal constituent
2224/37144 . . . . . Gold [Au] as principal constituent
2224/37147 . . . . . Copper [Cu] as principal constituent
2224/37149 . . . . . Manganese [Mn] as principal constituent
2224/37155 . . . . . Nickel [Ni] as principal constituent
2224/37157 . . . . . Cobalt [Co] as principal constituent
2224/3716 . . . . . Iron [Fe] as principal constituent
2224/37163 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/37164 . . . . . Palladium [Pd] as principal constituent
2224/37166 . . . . . Titanium [Ti] as principal constituent
2224/37169 . . . . . Platinum [Pt] as principal constituent
2224/3717 . . . . . Zirconium [Zr] as principal constituent
2224/37171 . . . . . Chromium [Cr] as principal constituent
2224/37172 . . . . . Vanadium [V] as principal constituent
2224/37173 . . . . . Rhodium [Rh] as principal constituent
2224/37176 . . . . . Ruthenium [Ru] as principal constituent
2224/37178 . . . . . Iridium [Ir] as principal constituent
2224/37179 . . . . . Niobium [Nb] as principal constituent
2224/3718 . . . . . Molybdenum [Mo] as principal constituent
2224/37181 . . . . . Tantalum [Ta] as principal constituent
2224/37183 . . . . . Rhenium [Re] as principal constituent
2224/37184 . . . . . Tungsten [W] as principal constituent
2224/37186 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/37187 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/37188)
2224/37188 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/3719 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/37191 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/37193 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/371 - H01L 2224/37191, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

2224/37194 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/371 - H01L 2224/37191

2224/37195 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/371 - H01L 2224/37191

2224/37198 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams

2224/37199 . . . . . Material of the matrix

2224/372 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof

2224/37201 . . . . . the principal constituent melting at a temperature of less than 400°C

2224/37205 . . . . . Gallium [Ga] as principal constituent

2224/37209 . . . . . Indium [In] as principal constituent

2224/37211 . . . . . Tin [Sn] as principal constituent

2224/37213 . . . . . Bismuth [Bi] as principal constituent

2224/37214 . . . . . Thallium [Tl] as principal constituent

2224/37216 . . . . . Lead [Pb] as principal constituent

2224/37217 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C

2224/37218 . . . . . Zinc [Zn] as principal constituent

2224/3722 . . . . . Antimony [Sb] as principal constituent

2224/37223 . . . . . Magnesium [Mg] as principal constituent

2224/37224 . . . . . Aluminium [Al] as principal constituent

2224/37238 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C

2224/37239 . . . . . Silver [Ag] as principal constituent

2224/37244 . . . . . Gold [Au] as principal constituent

2224/37247 . . . . . Copper [Cu] as principal constituent

2224/37249 . . . . . Manganese [Mn] as principal constituent

2224/37255 . . . . . Nickel [Ni] as principal constituent

2224/37257 . . . . . Cobalt [Co] as principal constituent

2224/3726 . . . . . Iron [Fe] as principal constituent

2224/37263 . . . . . the principal constituent melting at a temperature of greater than 1550°C

2224/37264 . . . . . Palladium [Pd] as principal constituent

2224/37266 . . . . . Titanium [Ti] as principal constituent

2224/37269 . . . . . Platinum [Pt] as principal constituent

2224/3727 . . . . . Zirconium [Zr] as principal constituent

2224/37271 . . . . . Chromium [Cr] as principal constituent

2224/37272 . . . . . Vanadium [V] as principal constituent

2224/37273 . . . . . Rhodium [Rh] as principal constituent

2224/37276 . . . . . Ruthenium [Ru] as principal constituent

2224/37278 . . . . . Iridium [Ir] as principal constituent

2224/37279 . . . . . Niobium [Nb] as principal constituent

2224/3728 . . . . . Molybdenum [Mo] as principal constituent

2224/37281 . . . . . Tantalum [Ta] as principal constituent

2224/37283 . . . . . Rhenium [Re] as principal constituent

2224/37284 . . . . . Tungsten [W] as principal constituent

2224/37286 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material

2224/37287 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/37288)

2224/37288 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides

2224/3729 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy

2224/37291 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2224/37293 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/372 - H01L 2224/37291, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

2224/37294 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/372 - H01L 2224/37291

2224/37295 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/372 - H01L 2224/37291

2224/37298 . . . . . Fillers

2224/37299 . . . . . Base material
2224/373 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/37301 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/37305 . . . . . Gallium [Ga] as principal constituent
2224/37309 . . . . . Indium [In] as principal constituent
2224/37311 . . . . . Tin [Sn] as principal constituent
2224/37313 . . . . . Bismuth [Bi] as principal constituent
2224/37314 . . . . . Thallium [Tl] as principal constituent
2224/37316 . . . . . Lead [Pb] as principal constituent
2224/37317 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37318 . . . . . Zinc [Zn] as principal constituent
2224/3732 . . . . . Antimony [Sb] as principal constituent
2224/37323 . . . . . Magnesium [Mg] as principal constituent
2224/37324 . . . . . Aluminium [Al] as principal constituent
2224/37338 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37339 . . . . . Silver [Ag] as principal constituent
2224/37344 . . . . . Gold [Au] as principal constituent
2224/37347 . . . . . Copper [Cu] as principal constituent
2224/37349 . . . . . Manganese [Mn] as principal constituent
2224/37355 . . . . . Nickel [Ni] as principal constituent
2224/37357 . . . . . Cobalt [Co] as principal constituent
2224/3736 . . . . . Iron [Fe] as principal constituent
2224/37363 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/37364 . . . . . Palladium [Pd] as principal constituent
2224/37366 . . . . . Titanium [Ti] as principal constituent
2224/37369 . . . . . Platinum [Pt] as principal constituent
2224/3737 . . . . . Zirconium [Zr] as principal constituent
2224/37371 . . . . . Chromium [Cr] as principal constituent
2224/37372 . . . . . Vanadium [V] as principal constituent
2224/37373 . . . . . Rhodium [Rh] as principal constituent
2224/37376 . . . . . Ruthenium [Ru] as principal constituent
2224/37378 . . . . . Iridium [Ir] as principal constituent
2224/37379 . . . . . Niobium [Nb] as principal constituent
2224/3738 . . . . . Molybdenum [Mo] as principal constituent
2224/37381 . . . . . Tantalum [Ta] as principal constituent
2224/37383 . . . . . Rhenium [Re] as principal constituent
2224/37384 . . . . . Tungsten [W] as principal constituent
2224/37386 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/37387 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/37388)
2224/37388 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/3739 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/37391 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/37393 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/373 - H01L 2224/37391, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/37394 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/373 - H01L 2224/37391
2224/37395 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/373 - H01L 2224/37391
2224/37398 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/37399 . . . . . Coating material

2224/374 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/37401 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/37405 . . . . . Gallium [Ga] as principal constituent
2224/37409 . . . . . Indium [In] as principal constituent
2224/37411 . . . . . Tin [Sn] as principal constituent
2224/37413 . . . . . Bismuth [Bi] as principal constituent
2224/37414 . . . . . Thallium [Tl] as principal constituent
2224/37416 . . . . . Lead [Pb] as principal constituent
2224/37417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37418 . . . . . Zinc [Zn] as principal constituent
2224/3742 . . . . . Antimony [Sb] as principal constituent
2224/37423 . . . . . Magnesium [Mg] as principal constituent
2224/37424 . . . . . Aluminium [Al] as principal constituent
2224/37438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37439 . . . . . Silver [Ag] as principal constituent
2224/37444 . . . . . Gold [Au] as principal constituent
2224/37447 . . . . . Copper [Cu] as principal constituent
2224/37449 . . . . . Manganese [Mn] as principal constituent
2224/37455 . . . . . Nickel [Ni] as principal constituent
2224/37457 . . . . . Cobalt [Co] as principal constituent
2224/3746 . . . . . Iron [Fe] as principal constituent
2224/37463 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/37464 . . . . . Palladium [Pd] as principal constituent
2224/37466 . . . . . Titanium [Ti] as principal constituent
2224/37469 . . . . . Platinum [Pt] as principal constituent
2224/3747 . . . . . Zirconium [Zr] as principal constituent
2224/37471 . . . . . Chromium [Cr] as principal constituent
2224/37472 . . . . . Vanadium [V] as principal constituent
2224/37473 . . . . . Rhodium [Rh] as principal constituent
2224/37476 . . . . . Ruthenium [Ru] as principal constituent
2224/37478 . . . . . Iridium [Ir] as principal constituent
2224/37479 . . . . . Niobium [Nb] as principal constituent
2224/3748 . . . . . Molybdenum [Mo] as principal constituent
2224/37481 . . . . . Tantalum [Ta] as principal constituent
2224/37483 . . . . . Rhenium [Re] as principal constituent
2224/37484 . . . . . Tungsten [W] as principal constituent
2224/37486 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/37487 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/37488)
2224/37488 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/3749 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/37491 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/37493 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/374 - H01L 2224/37491, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/37494 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/374 - H01L 2224/37491
2224/37495 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/374 - H01L 2224/37491
2224/37498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/37499 . . . . . Shape or distribution of the fillers
2224/3754 . . . . . Coating
2224/37541 . . . . . Structure
2224/3755 . . . . . Shape
2224/3756 . . . . . Disposition, e.g. coating on a part of the core

2224/37565 . . . . . Single coating layer
2224/3757 . . . . . Plural coating layers
2224/37572 . . . . . Two-layer stack coating
2224/37573 . . . . . Three-layer stack coating
2224/37574 . . . . . Four-layer stack coating
2224/37576 . . . . . being mutually engaged together, e.g. through inserts
2224/37578 . . . . . being disposed next to each other, e.g. side-to-side arrangements
2224/37599 . . . . . Material
2224/376 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/37601 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/37605 . . . . . Gallium [Ga] as principal constituent
2224/37609 . . . . . Indium [In] as principal constituent
2224/37611 . . . . . Tin [Sn] as principal constituent
2224/37613 . . . . . Bismuth [Bi] as principal constituent
2224/37614 . . . . . Thallium [Tl] as principal constituent
2224/37616 . . . . . Lead [Pb] as principal constituent
2224/37617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37618 . . . . . Zinc [Zn] as principal constituent
2224/3762 . . . . . Antimony [Sb] as principal constituent
2224/37623 . . . . . Magnesium [Mg] as principal constituent
2224/37624 . . . . . Aluminium [Al] as principal constituent
2224/37638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37639 . . . . . Silver [Ag] as principal constituent
2224/37644 . . . . . Gold [Au] as principal constituent
2224/37647 . . . . . Copper [Cu] as principal constituent
2224/37649 . . . . . Manganese [Mn] as principal constituent
2224/37655 . . . . . Nickel [Ni] as principal constituent
2224/37657 . . . . . Cobalt [Co] as principal constituent
2224/3766 . . . . . Iron [Fe] as principal constituent
2224/37663 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/37664 . . . . . Palladium [Pd] as principal constituent
2224/37666 . . . . . Titanium [Ti] as principal constituent
2224/37669 . . . . . Platinum [Pt] as principal constituent
2224/3767 . . . . . Zirconium [Zr] as principal constituent
2224/37671 . . . . . Chromium [Cr] as principal constituent
2224/37672 . . . . . Vanadium [V] as principal constituent
2224/37673 . . . . . Rhodium [Rh] as principal constituent
2224/37676 . . . . . Ruthenium [Ru] as principal constituent
2224/37678 . . . . . Iridium [Ir] as principal constituent
2224/37679 . . . . . Niobium [Nb] as principal constituent
2224/3768 . . . . . Molybdenum [Mo] as principal constituent
2224/37681 . . . . . Tantalum [Ta] as principal constituent
2224/37683 . . . . . Rhenium [Re] as principal constituent
2224/37684 . . . . . Tungsten [W] as principal constituent
2224/37686 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/37687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/37688)
2224/37688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/3769 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/37691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/37693 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/376 - H01L 2224/37691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/37694 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/376 - H01L 2224/37691
2224/37695 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/376 - H01L 2224/37691
2224/37698 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/37699 . . . . . Material of the matrix
2224/377 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof

2224/37701 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/37705 . . . . . Gallium [Ga] as principal constituent
2224/37709 . . . . . Indium [In] as principal constituent
2224/37711 . . . . . Tin [Sn] as principal constituent
2224/37713 . . . . . Bismuth [Bi] as principal constituent
2224/37714 . . . . . Thallium [Tl] as principal constituent
2224/37716 . . . . . Lead [Pb] as principal constituent
2224/37717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37718 . . . . . Zinc [Zn] as principal constituent
2224/3772 . . . . . Antimony [Sb] as principal constituent
2224/37723 . . . . . Magnesium [Mg] as principal constituent
2224/37724 . . . . . Aluminium [Al] as principal constituent
2224/37738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37739 . . . . . Silver [Ag] as principal constituent
2224/37744 . . . . . Gold [Au] as principal constituent
2224/37747 . . . . . Copper [Cu] as principal constituent
2224/37749 . . . . . Manganese [Mn] as principal constituent
2224/37755 . . . . . Nickel [Ni] as principal constituent
2224/37757 . . . . . Cobalt [Co] as principal constituent
2224/3776 . . . . . Iron [Fe] as principal constituent
2224/37763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/37764 . . . . . Palladium [Pd] as principal constituent
2224/37766 . . . . . Titanium [Ti] as principal constituent
2224/37769 . . . . . Platinum [Pt] as principal constituent
2224/3777 . . . . . Zirconium [Zr] as principal constituent
2224/37771 . . . . . Chromium [Cr] as principal constituent
2224/37772 . . . . . Vanadium [V] as principal constituent
2224/37773 . . . . . Rhodium [Rh] as principal constituent
2224/37776 . . . . . Ruthenium [Ru] as principal constituent
2224/37778 . . . . . Iridium [Ir] as principal constituent
2224/37779 . . . . . Niobium [Nb] as principal constituent
2224/3778 . . . . . Molybdenum [Mo] as principal constituent
2224/37781 . . . . . Tantalum [Ta] as principal constituent
2224/37783 . . . . . Rhenium [Re] as principal constituent
2224/37784 . . . . . Tungsten [W] as principal constituent
2224/37786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/37787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/37788)
2224/37788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/3779 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/37791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/37793 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/377 - H01L 2224/37791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/37794 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/377 - H01L 2224/37791
2224/37795 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/377 - H01L 2224/37791
2224/37798 . . . . . Fillers
2224/37799 . . . . . Base material
2224/378 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/37801 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/37805 . . . . . Gallium [Ga] as principal constituent
2224/37809 . . . . . Indium [In] as principal constituent
2224/37811 . . . . . Tin [Sn] as principal constituent
2224/37813 . . . . . Bismuth [Bi] as principal constituent
2224/37814 . . . . . Thallium [Tl] as principal constituent

2224/37816 . . . . . Lead [Pb] as principal constituent
2224/37817 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37818 . . . . . Zinc [Zn] as principal constituent
2224/3782 . . . . . Antimony [Sb] as principal constituent
2224/37823 . . . . . Magnesium [Mg] as principal constituent
2224/37824 . . . . . Aluminium [Al] as principal constituent
2224/37838 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37839 . . . . . Silver [Ag] as principal constituent
2224/37844 . . . . . Gold [Au] as principal constituent
2224/37847 . . . . . Copper [Cu] as principal constituent
2224/37849 . . . . . Manganese [Mn] as principal constituent
2224/37855 . . . . . Nickel [Ni] as principal constituent
2224/37857 . . . . . Cobalt [Co] as principal constituent
2224/3786 . . . . . Iron [Fe] as principal constituent
2224/37863 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/37864 . . . . . Palladium [Pd] as principal constituent
2224/37866 . . . . . Titanium [Ti] as principal constituent
2224/37869 . . . . . Platinum [Pt] as principal constituent
2224/3787 . . . . . Zirconium [Zr] as principal constituent
2224/37871 . . . . . Chromium [Cr] as principal constituent
2224/37872 . . . . . Vanadium [V] as principal constituent
2224/37873 . . . . . Rhodium [Rh] as principal constituent
2224/37876 . . . . . Ruthenium [Ru] as principal constituent
2224/37878 . . . . . Iridium [Ir] as principal constituent
2224/37879 . . . . . Niobium [Nb] as principal constituent
2224/3788 . . . . . Molybdenum [Mo] as principal constituent
2224/37881 . . . . . Tantalum [Ta] as principal constituent
2224/37883 . . . . . Rhenium [Re] as principal constituent
2224/37884 . . . . . Tungsten [W] as principal constituent
2224/37886 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/37887 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/37888)
2224/37888 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/3789 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/37891 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/37893 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/378 - H01L 2224/37891, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/37894 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/378 - H01L 2224/37891
2224/37895 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/378 - H01L 2224/37891
2224/37898 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/37899 . . . . . Coating material
2224/379 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/37901 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/37905 . . . . . Gallium [Ga] as principal constituent
2224/37909 . . . . . Indium [In] as principal constituent
2224/37911 . . . . . Tin [Sn] as principal constituent
2224/37913 . . . . . Bismuth [Bi] as principal constituent
2224/37914 . . . . . Thallium [Tl] as principal constituent
2224/37916 . . . . . Lead [Pb] as principal constituent

2224/37917 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37918 . . . . . Zinc [Zn] as principal constituent
2224/3792 . . . . . Antimony [Sb] as principal constituent
2224/37923 . . . . . Magnesium [Mg] as principal constituent
2224/37924 . . . . . Aluminium [Al] as principal constituent
2224/37938 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37939 . . . . . Silver [Ag] as principal constituent
2224/37944 . . . . . Gold [Au] as principal constituent
2224/37947 . . . . . Copper [Cu] as principal constituent
2224/37949 . . . . . Manganese [Mn] as principal constituent
2224/37955 . . . . . Nickel [Ni] as principal constituent
2224/37957 . . . . . Cobalt [Co] as principal constituent
2224/3796 . . . . . Iron [Fe] as principal constituent
2224/37963 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/37964 . . . . . Palladium [Pd] as principal constituent
2224/37966 . . . . . Titanium [Ti] as principal constituent
2224/37969 . . . . . Platinum [Pt] as principal constituent
2224/3797 . . . . . Zirconium [Zr] as principal constituent
2224/37971 . . . . . Chromium [Cr] as principal constituent
2224/37972 . . . . . Vanadium [V] as principal constituent
2224/37973 . . . . . Rhodium [Rh] as principal constituent
2224/37976 . . . . . Ruthenium [Ru] as principal constituent
2224/37978 . . . . . Iridium [Ir] as principal constituent
2224/37979 . . . . . Niobium [Nb] as principal constituent
2224/3798 . . . . . Molybdenum [Mo] as principal constituent
2224/37981 . . . . . Tantalum [Ta] as principal constituent
2224/37983 . . . . . Rhenium [Re] as principal constituent
2224/37984 . . . . . Tungsten [W] as principal constituent
2224/37986 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/37987 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/37988)
2224/37988 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/3799 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/37991 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/37993 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/379 - H01L 2224/37991, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/37994 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/379 - H01L 2224/37991
2224/37995 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/379 - H01L 2224/37991
2224/37998 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/37999 . . . . . Shape or distribution of the fillers
2224/38 . . . . of a plurality of strap connectors
2224/39 . . . Structure, shape, material or disposition of the strap connectors after the connecting process
2224/40 . . . . of an individual strap connector
2224/4001 . . . . . Structure
2224/4005 . . . . . Shape
2224/4007 . . . . . of bonding interfaces, e.g. interlocking features
2224/4009 . . . . . Loop shape
2224/40091 . . . . . Arched
2224/40095 . . . . . Kinked
2224/401 . . . . . Disposition
2224/40101 . . . . . Connecting bonding areas at the same height, e.g. horizontal bond
2224/40105 . . . . . Connecting bonding areas at different heights
2224/40106 . . . . . the connector being orthogonal to a side surface of the semiconductor or solid-state body, e.g. parallel layout
2224/40108 . . . . . the connector not being orthogonal to a side surface of the semiconductor or solid-state body, e.g. fanned-out connectors, radial layout

2224/40111 . . . . . the strap connector extending above another semiconductor or solid-state body
2224/4013 . . . . . Connecting within a semiconductor or solid-state body, i.e. fly strap, bridge strap
2224/40132 . . . . . with an intermediate bond, e.g. continuous strap daisy chain
2224/40135 . . . . . Connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip
2224/40137 . . . . . the bodies being arranged next to each other, e.g. on a common substrate
2224/40139 . . . . . with an intermediate bond, e.g. continuous strap daisy chain
2224/40141 . . . . . the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements
2224/40145 . . . . . the bodies being stacked
2224/40147 . . . . . with an intermediate bond, e.g. continuous strap daisy chain
2224/40151 . . . . . Connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/40153 . . . . . the body and the item being arranged next to each other, e.g. on a common substrate
2224/40155 . . . . . the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/40157 . . . . . Connecting the strap to a bond pad of the item
2224/40158 . . . . . the bond pad being disposed in a recess of the surface of the item
2224/40159 . . . . . the bond pad protruding from the surface of the item
2224/4016 . . . . . Connecting the strap to a pin of the item
2224/40163 . . . . . Connecting the strap to a potential ring of the item
2224/40165 . . . . . Connecting the strap to a via metallisation of the item
2224/40175 . . . . . the item being metallic
2224/40177 . . . . . Connecting the strap to a bond pad of the item
2224/40178 . . . . . the bond pad being disposed in a recess of the surface of the item
2224/40179 . . . . . the bond pad protruding from the surface of the item
2224/40183 . . . . . Connecting the strap to a potential ring of the item
2224/40195 . . . . . the item being a discrete passive component
2224/40221 . . . . . the body and the item being stacked
2224/40225 . . . . . the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/40227 . . . . . Connecting the strap to a bond pad of the item
2224/40228 . . . . . the bond pad being disposed in a recess of the surface of the item
2224/40229 . . . . . the bond pad protruding from the surface of the item
2224/4023 . . . . . Connecting the strap to a pin of the item
2224/40233 . . . . . Connecting the strap to a potential ring of the item
2224/40235 . . . . . Connecting the strap to a via metallisation of the item
2224/40237 . . . . . Connecting the strap to a die pad of the item
2224/4024 . . . . . Connecting between the body and an opposite side of the item with respect to the body
2224/40245 . . . . . the item being metallic
2224/40247 . . . . . Connecting the strap to a bond pad of the item
2224/40248 . . . . . the bond pad being disposed in a recess of the surface of the item
2224/40249 . . . . . the bond pad protruding from the surface of the item
2224/40253 . . . . . Connecting the strap to a potential ring of the item
2224/40257 . . . . . Connecting the strap to a die pad of the item
2224/4026 . . . . . Connecting between the body and an opposite side of the item with respect to the body
2224/40265 . . . . . the item being a discrete passive component
2224/404 . . . . . Connecting portions
2224/4046 . . . . . with multiple bonds on the same bonding area
2224/40475 . . . . . connected to auxiliary connecting means on the bonding areas
2224/40477 . . . . . being a pre-ball (i.e. a ball formed by capillary bonding)
2224/40479 . . . . . on the semiconductor or solid-state body
2224/4048 . . . . . outside the semiconductor or solid-state body
2224/40484 . . . . . being a plurality of pre-balls disposed side-to-side
2224/40486 . . . . . on the semiconductor or solid-state body
2224/40487 . . . . . outside the semiconductor or solid-state body
2224/40491 . . . . . being an additional member attached to the bonding area through an adhesive or solder, e.g. buffer pad
2224/40496 . . . . . not being interposed between the connector and the bonding area
2224/40499 . . . . . Material of the auxiliary connecting means
2224/405 . . . . . Material
2224/40505 . . . . . at the bonding interface
2224/40506 . . . . . comprising an eutectic alloy
2224/40507 . . . . . comprising an intermetallic compound
2224/4051 . . . . . Morphology of the connecting portion, e.g. grain size distribution

2224/4052 . . . . . Bonding interface between the connecting portion and the bonding area
2224/4099 . . . . . Auxiliary members for strap connectors, e.g. flow-barriers, spacers
2224/40991 . . . . . being formed on the semiconductor or solid-state body to be connected
2224/40992 . . . . . Reinforcing structures
2224/40993 . . . . . Alignment aids
2224/40996 . . . . . being formed on an item to be connected not being a semiconductor or solid-state body
2224/40997 . . . . . Reinforcing structures
2224/40998 . . . . . Alignment aids
2224/41 . . . . of a plurality of strap connectors
2224/4101 . . . . . Structure
2224/4103 . . . . . Connectors having different sizes
2224/4105 . . . . . Shape
2224/41051 . . . . . Connectors having different shapes
2224/41052 . . . . . Different loop heights
2224/411 . . . . . Disposition
2224/41105 . . . . . Connecting at different heights
2224/41107 . . . . . on the semiconductor or solid-state body being
2224/41109 . . . . . outside the semiconductor or solid-state body
2224/4111 . . . . . the connectors being bonded to at least one common bonding area, e.g. daisy chain
2224/41111 . . . . . the connectors connecting two common bonding areas
2224/41112 . . . . . the connectors connecting a common bonding area on the semiconductor or solid-state body to different bonding areas outside the body, e.g. diverging straps
2224/41113 . . . . . the connectors connecting different bonding areas on the semiconductor or solid-state body to a common bonding area outside the body, e.g. converging straps
2224/4112 . . . . . Layout
2224/4117 . . . . . Crossed straps
2224/41171 . . . . . Fan-out arrangements
2224/41173 . . . . . Radial fan-out arrangements
2224/41174 . . . . . Stacked arrangements
2224/41175 . . . . . Parallel arrangements
2224/41176 . . . . . Strap connectors having the same loop shape and height
2224/41177 . . . . . Combinations of different arrangements
2224/41179 . . . . . Corner adaptations, i.e. disposition of the strap connectors at the corners of the semiconductor or solid-state body
2224/4118 . . . . . being disposed on at least two different sides of the body, e.g. dual array
2224/414 . . . . . Connecting portions
2224/4141 . . . . . the connecting portions being stacked
2224/41421 . . . . . on the semiconductor or solid-state body
2224/41422 . . . . . outside the semiconductor or solid-state body
2224/4143 . . . . . the connecting portions being staggered
2224/415 . . . . . Material
2224/41505 . . . . . Connectors having different materials
2224/42 . . Wire connectors; Manufacturing methods related thereto
2224/43 . . . Manufacturing methods
2224/43001 . . . . Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
2224/431 . . . . Pre-treatment of the preform connector
2224/4312 . . . . . Applying permanent coating, e.g. in-situ coating
2224/43125 . . . . . Plating, e.g. electroplating, electroless plating
2224/432 . . . . Mechanical processes
2224/4321 . . . . . Pulling
2224/435 . . . . Modification of a pre-existing material
2224/4351 . . . . . Sintering
2224/4352 . . . . . Anodisation
2224/437 . . . . Involving monitoring, e.g. feedback loop
2224/438 . . . . Post-treatment of the connector
2224/4381 . . . . . Cleaning, e.g. oxide removal step, desmearing
2224/4382 . . . . . Applying permanent coating, e.g. in-situ coating
2224/43821 . . . . . Spray coating
2224/43822 . . . . . Dip coating
2224/43823 . . . . . Immersion coating, e.g. solder bath
2224/43824 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
2224/43825 . . . . . Plating, e.g. electroplating, electroless plating
2224/43826 . . . . . Physical vapour deposition [PVD], e.g. evaporation, sputtering
2224/43827 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
2224/4383 . . . . . Reworking
2224/43831 . . . . . with a chemical process, e.g. with etching of the connector
2224/43847 . . . . . with a mechanical process, e.g. with flattening of the connector
2224/43848 . . . . . Thermal treatments, e.g. annealing, controlled cooling
2224/43985 . . . . Methods of manufacturing wire connectors involving a specific sequence of method steps
2224/43986 . . . . . with repetition of the same manufacturing step
2224/44 . . . Structure, shape, material or disposition of the wire connectors prior to the connecting process
2224/45 . . . . of an individual wire connector
2224/45001 . . . . . Core members of the connector
2224/45005 . . . . . Structure
2224/4501 . . . . . Shape
2224/45012 . . . . . Cross-sectional shape
2224/45013 . . . . . being non uniform along the connector
2224/45014 . . . . . Ribbon connectors, e.g. rectangular cross-section
2224/45015 . . . . . being circular
2224/45016 . . . . . being elliptic
2224/4502 . . . . . Disposition
2224/45025 . . . . . Plural core members

2224/45026 . . . . . being mutually engaged together, e.g. through inserts
2224/45028 . . . . . Side-to-side arrangements
2224/4503 . . . . . Stacked arrangements
2224/45032 . . . . . Two-layer arrangements
2224/45033 . . . . . Three-layer arrangements
2224/45034 . . . . . Four-layer arrangements
2224/45099 . . . . . Material
2224/451 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/45101 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/45105 . . . . . Gallium (Ga) as principal constituent
2224/45109 . . . . . Indium (In) as principal constituent
2224/45111 . . . . . Tin (Sn) as principal constituent
2224/45113 . . . . . Bismuth (Bi) as principal constituent
2224/45114 . . . . . Thallium (Tl) as principal constituent
2224/45116 . . . . . Lead (Pb) as principal constituent
2224/45117 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/45118 . . . . . Zinc (Zn) as principal constituent
2224/4512 . . . . . Antimony (Sb) as principal constituent
2224/45123 . . . . . Magnesium (Mg) as principal constituent
2224/45124 . . . . . Aluminium (Al) as principal constituent
2224/45138 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/45139 . . . . . Silver (Ag) as principal constituent
2224/45144 . . . . . Gold (Au) as principal constituent
2224/45147 . . . . . Copper (Cu) as principal constituent
2224/45149 . . . . . Manganese (Mn) as principal constituent
2224/45155 . . . . . Nickel (Ni) as principal constituent
2224/45157 . . . . . Cobalt (Co) as principal constituent
2224/4516 . . . . . Iron (Fe) as principal constituent
2224/45163 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/45164 . . . . . Palladium (Pd) as principal constituent
2224/45166 . . . . . Titanium (Ti) as principal constituent
2224/45169 . . . . . Platinum (Pt) as principal constituent
2224/4517 . . . . . Zirconium (Zr) as principal constituent
2224/45171 . . . . . Chromium (Cr) as principal constituent
2224/45172 . . . . . Vanadium (V) as principal constituent
2224/45173 . . . . . Rhodium (Rh) as principal constituent
2224/45176 . . . . . Ruthenium (Ru) as principal constituent
2224/45178 . . . . . Iridium (Ir) as principal constituent
2224/45179 . . . . . Niobium (Nb) as principal constituent
2224/4518 . . . . . Molybdenum (Mo) as principal constituent
2224/45181 . . . . . Tantalum (Ta) as principal constituent
2224/45183 . . . . . Rhenium (Re) as principal constituent
2224/45184 . . . . . Tungsten (W) as principal constituent
2224/45186 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45187 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/45188)
2224/45188 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4519 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45191 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45193 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/451 - H01L 2224/45191, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45194 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/451 - H01L 2224/45191
2224/45195 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/451 - H01L 2224/45191
2224/45198 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/45199 . . . . . Material of the matrix
2224/452 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof

2224/45201 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/45205 . . . . . Gallium (Ga) as principal constituent
2224/45209 . . . . . Indium (In) as principal constituent
2224/45211 . . . . . Tin (Sn) as principal constituent
2224/45213 . . . . . Bismuth (Bi) as principal constituent
2224/45214 . . . . . Thallium (Tl) as principal constituent
2224/45216 . . . . . Lead (Pb) as principal constituent
2224/45217 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/45218 . . . . . Zinc (Zn) as principal constituent
2224/4522 . . . . . Antimony (Sb) as principal constituent
2224/45223 . . . . . Magnesium (Mg) as principal constituent
2224/45224 . . . . . Aluminium (Al) as principal constituent
2224/45238 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/45239 . . . . . Silver (Ag) as principal constituent
2224/45244 . . . . . Gold (Au) as principal constituent
2224/45247 . . . . . Copper (Cu) as principal constituent
2224/45249 . . . . . Manganese (Mn) as principal constituent
2224/45255 . . . . . Nickel (Ni) as principal constituent
2224/45257 . . . . . Cobalt (Co) as principal constituent
2224/4526 . . . . . Iron (Fe) as principal constituent
2224/45263 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/45264 . . . . . Palladium (Pd) as principal constituent
2224/45266 . . . . . Titanium (Ti) as principal constituent
2224/45269 . . . . . Platinum (Pt) as principal constituent
2224/4527 . . . . . Zirconium (Zr) as principal constituent
2224/45271 . . . . . Chromium (Cr) as principal constituent
2224/45272 . . . . . Vanadium (V) as principal constituent
2224/45273 . . . . . Rhodium (Rh) as principal constituent
2224/45276 . . . . . Ruthenium (Ru) as principal constituent
2224/45278 . . . . . Iridium (Ir) as principal constituent
2224/45279 . . . . . Niobium (Nb) as principal constituent
2224/4528 . . . . . Molybdenum (Mo) as principal constituent
2224/45281 . . . . . Tantalum (Ta) as principal constituent
2224/45283 . . . . . Rhenium (Re) as principal constituent
2224/45284 . . . . . Tungsten (W) as principal constituent
2224/45286 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45287 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/45288)
2224/45288 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4529 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45291 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45293 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/452 - H01L 2224/45291, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45294 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/452 - H01L 2224/45291
2224/45295 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/452 - H01L 2224/45291
2224/45298 . . . . . Fillers
2224/45299 . . . . . Base material
2224/453 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/45301 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/45305 . . . . . Gallium (Ga) as principal constituent
2224/45309 . . . . . Indium (In) as principal constituent
2224/45311 . . . . . Tin (Sn) as principal constituent
2224/45313 . . . . . Bismuth (Bi) as principal constituent
2224/45314 . . . . . Thallium (Tl) as principal constituent

2224/45316 . . . . . Lead (Pb) as principal constituent
2224/45317 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/45318 . . . . . Zinc (Zn) as principal constituent
2224/4532 . . . . . Antimony (Sb) as principal constituent
2224/45323 . . . . . Magnesium (Mg) as principal constituent
2224/45324 . . . . . Aluminium (Al) as principal constituent
2224/45338 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/45339 . . . . . Silver (Ag) as principal constituent
2224/45344 . . . . . Gold (Au) as principal constituent
2224/45347 . . . . . Copper (Cu) as principal constituent
2224/45349 . . . . . Manganese (Mn) as principal constituent
2224/45355 . . . . . Nickel (Ni) as principal constituent
2224/45357 . . . . . Cobalt (Co) as principal constituent
2224/4536 . . . . . Iron (Fe) as principal constituent
2224/45363 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/45364 . . . . . Palladium (Pd) as principal constituent
2224/45366 . . . . . Titanium (Ti) as principal constituent
2224/45369 . . . . . Platinum (Pt) as principal constituent
2224/4537 . . . . . Zirconium (Zr) as principal constituent
2224/45371 . . . . . Chromium (Cr) as principal constituent
2224/45372 . . . . . Vanadium (V) as principal constituent
2224/45373 . . . . . Rhodium (Rh) as principal constituent
2224/45376 . . . . . Ruthenium (Ru) as principal constituent
2224/45378 . . . . . Iridium (Ir) as principal constituent
2224/45379 . . . . . Niobium (Nb) as principal constituent
2224/4538 . . . . . Molybdenum (Mo) as principal constituent
2224/45381 . . . . . Tantalum (Ta) as principal constituent
2224/45383 . . . . . Rhenium (Re) as principal constituent
2224/45384 . . . . . Tungsten (W) as principal constituent
2224/45386 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45387 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/45388)
2224/45388 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4539 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45391 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45393 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/453 - H01L 2224/45391, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45394 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/453 - H01L 2224/45391
2224/45395 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/453 - H01L 2224/45391
2224/45398 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/45399 . . . . . Coating material
2224/454 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/45401 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/45405 . . . . . Gallium (Ga) as principal constituent
2224/45409 . . . . . Indium (In) as principal constituent
2224/45411 . . . . . Tin (Sn) as principal constituent
2224/45413 . . . . . Bismuth (Bi) as principal constituent
2224/45414 . . . . . Thallium (Tl) as principal constituent
2224/45416 . . . . . Lead (Pb) as principal constituent

2224/45417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/45418 . . . . . Zinc (Zn) as principal constituent
2224/4542 . . . . . Antimony (Sb) as principal constituent
2224/45423 . . . . . Magnesium (Mg) as principal constituent
2224/45424 . . . . . Aluminium (Al) as principal constituent
2224/45438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/45439 . . . . . Silver (Ag) as principal constituent
2224/45444 . . . . . Gold (Au) as principal constituent
2224/45447 . . . . . Copper (Cu) as principal constituent
2224/45449 . . . . . Manganese (Mn) as principal constituent
2224/45455 . . . . . Nickel (Ni) as principal constituent
2224/45457 . . . . . Cobalt (Co) as principal constituent
2224/4546 . . . . . Iron (Fe) as principal constituent
2224/45463 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/45464 . . . . . Palladium (Pd) as principal constituent
2224/45466 . . . . . Titanium (Ti) as principal constituent
2224/45469 . . . . . Platinum (Pt) as principal constituent
2224/4547 . . . . . Zirconium (Zr) as principal constituent
2224/45471 . . . . . Chromium (Cr) as principal constituent
2224/45472 . . . . . Vanadium (V) as principal constituent
2224/45473 . . . . . Rhodium (Rh) as principal constituent
2224/45476 . . . . . Ruthenium (Ru) as principal constituent
2224/45478 . . . . . Iridium (Ir) as principal constituent
2224/45479 . . . . . Niobium (Nb) as principal constituent
2224/4548 . . . . . Molybdenum (Mo) as principal constituent
2224/45481 . . . . . Tantalum (Ta) as principal constituent
2224/45483 . . . . . Rhenium (Re) as principal constituent
2224/45484 . . . . . Tungsten (W) as principal constituent
2224/45486 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45487 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/45488)
2224/45488 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4549 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45491 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45493 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/454 - H01L 2224/45491, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45494 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/454 - H01L 2224/45491
2224/45495 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/454 - H01L 2224/45491
2224/45498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/45499 . . . . . Shape or distribution of the fillers
2224/4554 . . . . Coating
2224/45541 . . . . . Structure
2224/4555 . . . . . Shape
2224/4556 . . . . . Disposition, e.g. coating on a part of the core
2224/45565 . . . . . Single coating layer
2224/4557 . . . . . Plural coating layers
2224/45572 . . . . . Two-layer stack coating
2224/45573 . . . . . Three-layer stack coating
2224/45574 . . . . . Four-layer stack coating
2224/45576 . . . . . being mutually engaged together, e.g. through inserts
2224/45578 . . . . . being disposed next to each other, e.g. side-to-side arrangements
2224/45599 . . . . . Material
2224/456 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/45601 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/45605 . . . . . Gallium (Ga) as principal constituent

2224/45609 . . . . . Indium (In) as principal constituent
2224/45611 . . . . . Tin (Sn) as principal constituent
2224/45613 . . . . . Bismuth (Bi) as principal constituent
2224/45614 . . . . . Thallium (Tl) as principal constituent
2224/45616 . . . . . Lead (Pb) as principal constituent
2224/45617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/45618 . . . . . Zinc (Zn) as principal constituent
2224/4562 . . . . . Antimony (Sb) as principal constituent
2224/45623 . . . . . Magnesium (Mg) as principal constituent
2224/45624 . . . . . Aluminium (Al) as principal constituent
2224/45638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/45639 . . . . . Silver (Ag) as principal constituent
2224/45644 . . . . . Gold (Au) as principal constituent
2224/45647 . . . . . Copper (Cu) as principal constituent
2224/45649 . . . . . Manganese (Mn) as principal constituent
2224/45655 . . . . . Nickel (Ni) as principal constituent
2224/45657 . . . . . Cobalt (Co) as principal constituent
2224/4566 . . . . . Iron (Fe) as principal constituent
2224/45663 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/45664 . . . . . Palladium (Pd) as principal constituent
2224/45666 . . . . . Titanium (Ti) as principal constituent
2224/45669 . . . . . Platinum (Pt) as principal constituent
2224/4567 . . . . . Zirconium (Zr) as principal constituent
2224/45671 . . . . . Chromium (Cr) as principal constituent
2224/45672 . . . . . Vanadium (V) as principal constituent
2224/45673 . . . . . Rhodium (Rh) as principal constituent
2224/45676 . . . . . Ruthenium (Ru) as principal constituent
2224/45678 . . . . . Iridium (Ir) as principal constituent
2224/45679 . . . . . Niobium (Nb) as principal constituent
2224/4568 . . . . . Molybdenum (Mo) as principal constituent
2224/45681 . . . . . Tantalum (Ta) as principal constituent
2224/45683 . . . . . Rhenium (Re) as principal constituent
2224/45684 . . . . . Tungsten (W) as principal constituent
2224/45686 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/45688)
2224/45688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4569 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45693 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/456 - H01L 2224/45691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45694 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/456 - H01L 2224/45691
2224/45695 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/456 - H01L 2224/45691
2224/45698 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/45699 . . . . . Material of the matrix
2224/457 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/45701 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/45705 . . . . . Gallium (Ga) as principal constituent
2224/45709 . . . . . Indium (In) as principal constituent
2224/45711 . . . . . Tin (Sn) as principal constituent
2224/45713 . . . . . Bismuth (Bi) as principal constituent
2224/45714 . . . . . Thallium (Tl) as principal constituent
2224/45716 . . . . . Lead (Pb) as principal constituent
2224/45717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C

2224/45718 . . . . . Zinc (Zn) as principal constituent
2224/4572 . . . . . Antimony (Sb) as principal constituent
2224/45723 . . . . . Magnesium (Mg) as principal constituent
2224/45724 . . . . . Aluminium (Al) as principal constituent
2224/45738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/45739 . . . . . Silver (Ag) as principal constituent
2224/45744 . . . . . Gold (Au) as principal constituent
2224/45747 . . . . . Copper (Cu) as principal constituent
2224/45749 . . . . . Manganese (Mn) as principal constituent
2224/45755 . . . . . Nickel (Ni) as principal constituent
2224/45757 . . . . . Cobalt (Co) as principal constituent
2224/4576 . . . . . Iron (Fe) as principal constituent
2224/45763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/45764 . . . . . Palladium (Pd) as principal constituent
2224/45766 . . . . . Titanium (Ti) as principal constituent
2224/45769 . . . . . Platinum (Pt) as principal constituent
2224/4577 . . . . . Zirconium (Zr) as principal constituent
2224/45771 . . . . . Chromium (Cr) as principal constituent
2224/45772 . . . . . Vanadium (V) as principal constituent
2224/45773 . . . . . Rhodium (Rh) as principal constituent
2224/45776 . . . . . Ruthenium (Ru) as principal constituent
2224/45778 . . . . . Iridium (Ir) as principal constituent
2224/45779 . . . . . Niobium (Nb) as principal constituent
2224/4578 . . . . . Molybdenum (Mo) as principal constituent
2224/45781 . . . . . Tantalum (Ta) as principal constituent
2224/45783 . . . . . Rhenium (Re) as principal constituent
2224/45784 . . . . . Tungsten (W) as principal constituent
2224/45786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/45788)
2224/45788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4579 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45793 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/457 - H01L 2224/45791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45794 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/457 - H01L 2224/45791
2224/45795 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/457 - H01L 2224/45791
2224/45798 . . . . . Fillers
2224/45799 . . . . . Base material
2224/458 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/45801 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/45805 . . . . . Gallium (Ga) as principal constituent
2224/45809 . . . . . Indium (In) as principal constituent
2224/45811 . . . . . Tin (Sn) as principal constituent
2224/45813 . . . . . Bismuth (Bi) as principal constituent
2224/45814 . . . . . Thallium (Tl) as principal constituent
2224/45816 . . . . . Lead (Pb) as principal constituent
2224/45817 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/45818 . . . . . Zinc (Zn) as principal constituent
2224/4582 . . . . . Antimony (Sb) as principal constituent
2224/45823 . . . . . Magnesium (Mg) as principal constituent
2224/45824 . . . . . Aluminium (Al) as principal constituent
2224/45838 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C

2224/45839 . . . . . Silver (Ag) as principal constituent
2224/45844 . . . . . Gold (Au) as principal constituent
2224/45847 . . . . . Copper (Cu) as principal constituent
2224/45849 . . . . . Manganese (Mn) as principal constituent
2224/45855 . . . . . Nickel (Ni) as principal constituent
2224/45857 . . . . . Cobalt (Co) as principal constituent
2224/4586 . . . . . Iron (Fe) as principal constituent
2224/45863 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/45864 . . . . . Palladium (Pd) as principal constituent
2224/45866 . . . . . Titanium (Ti) as principal constituent
2224/45869 . . . . . Platinum (Pt) as principal constituent
2224/4587 . . . . . Zirconium (Zr) as principal constituent
2224/45871 . . . . . Chromium (Cr) as principal constituent
2224/45872 . . . . . Vanadium (V) as principal constituent
2224/45873 . . . . . Rhodium (Rh) as principal constituent
2224/45876 . . . . . Ruthenium (Ru) as principal constituent
2224/45878 . . . . . Iridium (Ir) as principal constituent
2224/45879 . . . . . Niobium (Nb) as principal constituent
2224/4588 . . . . . Molybdenum (Mo) as principal constituent
2224/45881 . . . . . Tantalum (Ta) as principal constituent
2224/45883 . . . . . Rhenium (Re) as principal constituent
2224/45884 . . . . . Tungsten (W) as principal constituent
2224/45886 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45887 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/45888)
2224/45888 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4589 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45891 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45893 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/458 - H01L 2224/45891, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45894 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/458 - H01L 2224/45891
2224/45895 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/458 - H01L 2224/45891
2224/45898 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/45899 . . . . . Coating material
2224/459 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/45901 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/45905 . . . . . Gallium (Ga) as principal constituent
2224/45909 . . . . . Indium (In) as principal constituent
2224/45911 . . . . . Tin (Sn) as principal constituent
2224/45913 . . . . . Bismuth (Bi) as principal constituent
2224/45914 . . . . . Thallium (Tl) as principal constituent
2224/45916 . . . . . Lead (Pb) as principal constituent
2224/45917 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/45918 . . . . . Zinc (Zn) as principal constituent
2224/4592 . . . . . Antimony (Sb) as principal constituent
2224/45923 . . . . . Magnesium (Mg) as principal constituent
2224/45924 . . . . . Aluminium (Al) as principal constituent
2224/45938 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/45939 . . . . . Silver (Ag) as principal constituent
2224/45944 . . . . . Gold (Au) as principal constituent

2224/45947 . . . . . Copper (Cu) as principal constituent
2224/45949 . . . . . Manganese (Mn) as principal constituent
2224/45955 . . . . . Nickel (Ni) as principal constituent
2224/45957 . . . . . Cobalt (Co) as principal constituent
2224/4596 . . . . . Iron (Fe) as principal constituent
2224/45963 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/45964 . . . . . Palladium (Pd) as principal constituent
2224/45966 . . . . . Titanium (Ti) as principal constituent
2224/45969 . . . . . Platinum (Pt) as principal constituent
2224/4597 . . . . . Zirconium (Zr) as principal constituent
2224/45971 . . . . . Chromium (Cr) as principal constituent
2224/45972 . . . . . Vanadium (V) as principal constituent
2224/45973 . . . . . Rhodium (Rh) as principal constituent
2224/45976 . . . . . Ruthenium (Ru) as principal constituent
2224/45978 . . . . . Iridium (Ir) as principal constituent
2224/45979 . . . . . Niobium (Nb) as principal constituent
2224/4598 . . . . . Molybdenum (Mo) as principal constituent
2224/45981 . . . . . Tantalum (Ta) as principal constituent
2224/45983 . . . . . Rhenium (Re) as principal constituent
2224/45984 . . . . . Tungsten (W) as principal constituent
2224/45986 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45987 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/45988)
2224/45988 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4599 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45991 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45993 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/459 - H01L 2224/45991, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45994 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/459 - H01L 2224/45991
2224/45995 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/459 - H01L 2224/45991
2224/45998 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/45999 . . . . . Shape or distribution of the fillers
2224/46 . . . . of a plurality of wire connectors
2224/47 . . . Structure, shape, material or disposition of the wire connectors after the connecting process
2224/48 . . . . of an individual wire connector
2224/4801 . . . . . Structure
2224/48011 . . . . . Length
2224/4805 . . . . . Shape
2224/4807 . . . . . of bonding interfaces, e.g. interlocking features
2224/4809 . . . . . Loop shape
2224/48091 . . . . . Arched
2224/48092 . . . . . Helix
2224/48095 . . . . . Kinked
2224/48096 . . . . . the kinked part being in proximity to the bonding area on the semiconductor or solid-state body
2224/48097 . . . . . the kinked part being in proximity to the bonding area outside the semiconductor or solid-state body
2224/481 . . . . . Disposition
2224/48101 . . . . . Connecting bonding areas at the same height, e.g. horizontal bond
2224/48105 . . . . . Connecting bonding areas at different heights
2224/48106 . . . . . the connector being orthogonal to a side surface of the semiconductor or solid-state body, e.g. parallel layout
2224/48108 . . . . . the connector not being orthogonal to a side surface of the semiconductor or solid-state body, e.g. fanned-out connectors, radial layout
2224/4811 . . . . . Connecting to a bonding area of the semiconductor or solid-state body located at the far end of the body with respect to the bonding area outside the semiconductor or solid-state body
2224/48111 . . . . . the wire connector extending above another semiconductor or solid-state body
2224/4813 . . . . . Connecting within a semiconductor or solid-state body, i.e. fly wire, bridge wire
2224/48132 . . . . . with an intermediate bond, e.g. continuous wire daisy chain
2224/48135 . . . . . Connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip

2224/48137 . . . . . the bodies being arranged next to each other, e.g. on a common substrate
2224/48138 . . . . . the wire connector connecting to a bonding area disposed in a recess of the surface
2224/48139 . . . . . with an intermediate bond, e.g. continuous wire daisy chain
2224/4814 . . . . . the wire connector connecting to a bonding area protruding from the surface
2224/48141 . . . . . the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements
2224/48145 . . . . . the bodies being stacked
2224/48147 . . . . . with an intermediate bond, e.g. continuous wire daisy chain
2224/48148 . . . . . the wire connector connecting to a bonding area disposed in a recess of the surface
2224/48149 . . . . . the wire connector connecting to a bonding area protruding from the surface
2224/48151 . . . . . Connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/48153 . . . . . the body and the item being arranged next to each other, e.g. on a common substrate
2224/48155 . . . . . the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/48157 . . . . . connecting the wire to a bond pad of the item
2224/48158 . . . . . the bond pad being disposed in a recess of the surface of the item
2224/48159 . . . . . the bond pad protruding from the surface of the item
2224/4816 . . . . . connecting the wire to a pin of the item
2224/48163 . . . . . connecting the wire to a potential ring of the item
2224/48165 . . . . . connecting the wire to a via metallisation of the item
2224/48175 . . . . . the item being metallic
2224/48177 . . . . . connecting the wire to a bond pad of the item
2224/48178 . . . . . the bond pad being disposed in a recess of the surface of the item
2224/48179 . . . . . the bond pad protruding from the surface of the item
2224/48183 . . . . . connecting the wire to a potential ring of the item
2224/48195 . . . . . the item being a discrete passive component
2224/48221 . . . . . the body and the item being stacked
2224/48225 . . . . . the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/48227 . . . . . connecting the wire to a bond pad of the item
2224/48228 . . . . . the bond pad being disposed in a recess of the surface of the item
2224/48229 . . . . . the bond pad protruding from the surface of the item
2224/4823 . . . . . connecting the wire to a pin of the item
2224/48233 . . . . . connecting the wire to a potential ring of the item
2224/48235 . . . . . connecting the wire to a via metallisation of the item
2224/48237 . . . . . connecting the wire to a die pad of the item
2224/4824 . . . . . Connecting between the body and an opposite side of the item with respect to the body
2224/48245 . . . . . the item being metallic
2224/48247 . . . . . connecting the wire to a bond pad of the item
2224/48248 . . . . . the bond pad being disposed in a recess of the surface of the item
2224/48249 . . . . . the bond pad protruding from the surface of the item
2224/48253 . . . . . connecting the wire to a potential ring of the item
2224/48257 . . . . . connecting the wire to a die pad of the item
2224/4826 . . . . . Connecting between the body and an opposite side of the item with respect to the body
2224/48265 . . . . . the item being a discrete passive component
2224/484 . . . . . Connecting portions
2224/4845 . . . . . Details of ball bonds
2224/48451 . . . . . Shape
2224/48453 . . . . . of the interface with the bonding area
2224/48455 . . . . . Details of wedge bonds
2224/48456 . . . . . Shape
2224/48458 . . . . . of the interface with the bonding area
2224/4846 . . . . . with multiple bonds on the same bonding area
2224/48463 . . . . . the connecting portion on the bonding area of the semiconductor or solid-state body being a ball bond
2224/48464 . . . . . the other connecting portion not on the bonding area also being a ball bond, i.e. ball-to-ball
2224/48465 . . . . . the other connecting portion not on the bonding area being a wedge bond, i.e. ball-to-wedge, regular stitch
2224/4847 . . . . . the connecting portion on the bonding area of the semiconductor or solid-state body being a wedge bond
2224/48471 . . . . . the other connecting portion not on the bonding area being a ball bond, i.e. wedge-to-ball, reverse stitch
2224/48472 . . . . . the other connecting portion not on the bonding area also being a wedge bond, i.e. wedge-to-wedge

2224/48475 . . . . . connected to auxiliary connecting means on the bonding areas, e.g. pre-ball, wedge-on-ball, ball-on-ball
2224/48476 . . . . . between the wire connector and the bonding area
2224/48477 . . . . . being a pre-ball (i.e. a ball formed by capillary bonding)
2224/48478 . . . . . the connecting portion being a wedge bond, i.e. wedge on pre-ball
2224/48479 . . . . . on the semiconductor or solid-state body
2224/4848 . . . . . outside the semiconductor or solid-state body
2224/48481 . . . . . the connecting portion being a ball bond, i.e. ball on pre-ball
2224/48482 . . . . . on the semiconductor or solid-state body
2224/48483 . . . . . outside the semiconductor or solid-state body
2224/48484 . . . . . being a plurality of pre-balls disposed side-to-side
2224/48485 . . . . . the connecting portion being a wedge bond, i.e. wedge on pre-ball
2224/48486 . . . . . on the semiconductor or solid-state body
2224/48487 . . . . . outside the semiconductor or solid-state body
2224/48488 . . . . . the connecting portion being a ball bond, i.e. ball on pre-ball
2224/48489 . . . . . on the semiconductor or solid-state body
2224/4849 . . . . . outside the semiconductor or solid-state body
2224/48491 . . . . . being an additional member attached to the bonding area through an adhesive or solder, e.g. buffer pad
2224/48496 . . . . . not being interposed between the wire connector and the bonding area
2224/48499 . . . . . Material of the auxiliary connecting means
2224/485 . . . . . Material
2224/48505 . . . . . at the bonding interface
2224/48506 . . . . . comprising an eutectic alloy
2224/48507 . . . . . comprising an intermetallic compound
2224/4851 . . . . . Morphology of the connecting portion, e.g. grain size distribution
2224/48511 . . . . . Heat affected zone [HAZ]
2224/4852 . . . . . Bonding interface between the connecting portion and the bonding area
2224/48599 . . . . . Principal constituent of the connecting portion of the wire connector being Gold (Au)
2224/486 . . . . . with a principal constituent of the bonding area being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/48601 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/48605 . . . . . Gallium (Ga) as principal constituent
2224/48609 . . . . . Indium (In) as principal constituent
2224/48611 . . . . . Tin (Sn) as principal constituent
2224/48613 . . . . . Bismuth (Bi) as principal constituent
2224/48614 . . . . . Thallium (Tl) as principal constituent
2224/48616 . . . . . Lead (Pb) as principal constituent
2224/48617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950 °C
2224/48618 . . . . . Zinc (Zn) as principal constituent
2224/4862 . . . . . Antimony (Sb) as principal constituent
2224/48623 . . . . . Magnesium (Mg) as principal constituent
2224/48624 . . . . . Aluminium (Al) as principal constituent
2224/48638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/48639 . . . . . Silver (Ag) as principal constituent
2224/48644 . . . . . Gold (Au) as principal constituent
2224/48647 . . . . . Copper (Cu) as principal constituent
2224/48649 . . . . . Manganese (Mn) as principal constituent
2224/48655 . . . . . Nickel (Ni) as principal constituent
2224/48657 . . . . . Cobalt (Co) as principal constituent
2224/4866 . . . . . Iron (Fe) as principal constituent
2224/48663 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/48664 . . . . . Palladium (Pd) as principal constituent
2224/48666 . . . . . Titanium (Ti) as principal constituent
2224/48669 . . . . . Platinum (Pt) as principal constituent
2224/4867 . . . . . Zirconium (Zr) as principal constituent
2224/48671 . . . . . Chromium (Cr) as principal constituent
2224/48672 . . . . . Vanadium (V) as principal constituent
2224/48673 . . . . . Rhodium (Rh) as principal constituent
2224/48678 . . . . . Iridium (Ir) as principal constituent

2224/48679 . . . . . Niobium (Nb) as principal constituent
2224/4868 . . . . . Molybdenum (Mo) as principal constituent
2224/48681 . . . . . Tantalum (Ta) as principal constituent
2224/48683 . . . . . Rhenium (Re) as principal constituent
2224/48684 . . . . . Tungsten (W) as principal constituent
2224/48686 . . . . . with a principal constituent of the bonding area being a non metallic, non metalloid inorganic material
2224/48687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/48688)
2224/48688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4869 . . . . . with a principal constituent of the bonding area being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/48691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/48693 . . . . . with a principal constituent of the bonding area being a solid not provided for in groups H01L 2224/486 - H01L 2224/4869, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/48694 . . . . . with a principal constituent of the bonding area being a liquid not provided for in groups H01L 2224/486 - H01L 2224/4869
2224/48698 . . . . . with a principal constituent of the bonding area being a combination of two or more material regions, i.e. being a hybrid material, e.g. segmented structures, island patterns
2224/48699 . . . . . Principal constituent of the connecting portion of the wire connector being Aluminium (Al)
2224/487 . . . . . with a principal constituent of the bonding area being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/48701 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/48705 . . . . . Gallium (Ga) as principal constituent
2224/48709 . . . . . Indium (In) as principal constituent
2224/48711 . . . . . Tin (Sn) as principal constituent
2224/48713 . . . . . Bismuth (Bi) as principal constituent
2224/48714 . . . . . Thallium (Tl) as principal constituent
2224/48716 . . . . . Lead (Pb) as principal constituent
2224/48717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950 °C
2224/48718 . . . . . Zinc (Zn) as principal constituent
2224/4872 . . . . . Antimony (Sb) as principal constituent
2224/48723 . . . . . Magnesium (Mg) as principal constituent
2224/48724 . . . . . Aluminium (Al) as principal constituent
2224/48738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/48739 . . . . . Silver (Ag) as principal constituent
2224/48744 . . . . . Gold (Au) as principal constituent
2224/48747 . . . . . Copper (Cu) as principal constituent
2224/48749 . . . . . Manganese (Mn) as principal constituent
2224/48755 . . . . . Nickel (Ni) as principal constituent
2224/48757 . . . . . Cobalt (Co) as principal constituent
2224/4876 . . . . . Iron (Fe) as principal constituent
2224/48763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/48764 . . . . . Palladium (Pd) as principal constituent
2224/48766 . . . . . Titanium (Ti) as principal constituent
2224/48769 . . . . . Platinum (Pt) as principal constituent
2224/4877 . . . . . Zirconium (Zr) as principal constituent
2224/48771 . . . . . Chromium (Cr) as principal constituent
2224/48772 . . . . . Vanadium (V) as principal constituent
2224/48773 . . . . . Rhodium (Rh) as principal constituent
2224/48778 . . . . . Iridium (Ir) as principal constituent
2224/48779 . . . . . Niobium (Nb) as principal constituent
2224/4878 . . . . . Molybdenum (Mo) as principal constituent
2224/48781 . . . . . Tantalum (Ta) as principal constituent
2224/48783 . . . . . Rhenium (Re) as principal constituent
2224/48784 . . . . . Tungsten (W) as principal constituent
2224/48786 . . . . . with a principal constituent of the bonding area being a non metallic, non metalloid inorganic material

2224/48787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/48788)
2224/48788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4879 . . . . . with a principal constituent of the bonding area being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/48791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/48793 . . . . . with a principal constituent of the bonding area being a solid not provided for in groups H01L 2224/487 - H01L 2224/4879, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/48794 . . . . . with a principal constituent of the bonding area being a liquid not provided for in groups H01L 2224/487 - H01L 2224/4879
2224/48798 . . . . . with a principal constituent of the bonding area being a combination of two or more material regions, i.e. being a hybrid material, e.g. segmented structures, island patterns
2224/48799 . . . . . Principal constituent of the connecting portion of the wire connector being Copper (Cu)
2224/488 . . . . . with a principal constituent of the bonding area being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/48801 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/48805 . . . . . Gallium (Ga) as principal constituent
2224/48809 . . . . . Indium (In) as principal constituent
2224/48811 . . . . . Tin (Sn) as principal constituent
2224/48813 . . . . . Bismuth (Bi) as principal constituent
2224/48814 . . . . . Thallium (Tl) as principal constituent
2224/48816 . . . . . Lead (Pb) as principal constituent
2224/48817 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950 °C
2224/48818 . . . . . Zinc (Zn) as principal constituent
2224/4882 . . . . . Antimony (Sb) as principal constituent
2224/48823 . . . . . Magnesium (Mg) as principal constituent
2224/48824 . . . . . Aluminium (Al) as principal constituent
2224/48838 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/48839 . . . . . Silver (Ag) as principal constituent
2224/48844 . . . . . Gold (Au) as principal constituent
2224/48847 . . . . . Copper (Cu) as principal constituent
2224/48849 . . . . . Manganese (Mn) as principal constituent
2224/48855 . . . . . Nickel (Ni) as principal constituent
2224/48857 . . . . . Cobalt (Co) as principal constituent
2224/4886 . . . . . Iron (Fe) as principal constituent
2224/48863 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/48864 . . . . . Palladium (Pd) as principal constituent
2224/48866 . . . . . Titanium (Ti) as principal constituent
2224/48869 . . . . . Platinum (Pt) as principal constituent
2224/4887 . . . . . Zirconium (Zr) as principal constituent
2224/48871 . . . . . Chromium (Cr) as principal constituent
2224/48872 . . . . . Vanadium (V) as principal constituent
2224/48873 . . . . . Rhodium (Rh) as principal constituent
2224/48878 . . . . . Iridium (Ir) as principal constituent
2224/48879 . . . . . Niobium (Nb) as principal constituent
2224/4888 . . . . . Molybdenum (Mo) as principal constituent
2224/48881 . . . . . Tantalum (Ta) as principal constituent
2224/48883 . . . . . Rhenium (Re) as principal constituent
2224/48884 . . . . . Tungsten (W) as principal constituent
2224/48886 . . . . . with a principal constituent of the bonding area being a non metallic, non metalloid inorganic material
2224/48887 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/48888)
2224/48888 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4889 . . . . . with a principal constituent of the bonding area being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/48891 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2224/48893 . . . . . with a principal constituent of the bonding area being a solid not provided for in groups H01L 2224/488 - H01L 2224/4889, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/48894 . . . . . with a principal constituent of the bonding area being a liquid not provided for in groups H01L 2224/488 - H01L 2224/4889
2224/48898 . . . . . with a principal constituent of the bonding area being a combination of two or more material regions, i.e. being a hybrid material, e.g. segmented structures, island patterns
2224/4899 . . . . . Auxiliary members for wire connectors, e.g. flow-barriers, reinforcing structures, spacers, alignment aids
2224/48991 . . . . . being formed on the semiconductor or solid-state body to be connected
2224/48992 . . . . . Reinforcing structures
2224/48993 . . . . . Alignment aids
2224/48996 . . . . . being formed on an item to be connected not being a semiconductor or solid-state body
2224/48997 . . . . . Reinforcing structures
2224/48998 . . . . . Alignment aids
2224/49 . . . . of a plurality of wire connectors
2224/4901 . . . . . Structure
2224/4903 . . . . . Connectors having different sizes, e.g. different diameters
2224/4905 . . . . . Shape
2224/49051 . . . . . Connectors having different shapes
2224/49052 . . . . . Different loop heights
2224/4909 . . . . . Loop shape arrangement
2224/49095 . . . . . parallel in plane
2224/49096 . . . . . horizontal
2224/49097 . . . . . vertical
2224/491 . . . . . Disposition
2224/49105 . . . . . Connecting at different heights
2224/49107 . . . . . on the semiconductor or solid-state body
2224/49109 . . . . . outside the semiconductor or solid-state body
2224/4911 . . . . . the connectors being bonded to at least one common bonding area, e.g. daisy chain
2224/49111 . . . . . the connectors connecting two common bonding areas, e.g. Litz or braid wires
2224/49112 . . . . . the connectors connecting a common bonding area on the semiconductor or solid-state body to different bonding areas outside the body, e.g. diverging wires
2224/49113 . . . . . the connectors connecting different bonding areas on the semiconductor or solid-state body to a common bonding area outside the body, e.g. converging wires
2224/4912 . . . . . Layout
2224/4917 . . . . . Crossed wires
2224/49171 . . . . . Fan-out arrangements
2224/49173 . . . . . Radial fan-out arrangements
2224/49174 . . . . . Stacked arrangements
2224/49175 . . . . . Parallel arrangements
2224/49176 . . . . . Wire connectors having the same loop shape and height
2224/49177 . . . . . Combinations of different arrangements
2224/49179 . . . . . Corner adaptations, i.e. disposition of the wire connectors at the corners of the semiconductor or solid-state body
2224/4918 . . . . . being disposed on at least two different sides of the body, e.g. dual array
2224/494 . . . . . Connecting portions
2224/4941 . . . . . the connecting portions being stacked
2224/4942 . . . . . Ball bonds
2224/49421 . . . . . on the semiconductor or solid-state body
2224/49422 . . . . . outside the semiconductor or solid-state body
2224/49425 . . . . . Wedge bonds
2224/49426 . . . . . on the semiconductor or solid-state body
2224/49427 . . . . . outside the semiconductor or solid-state body
2224/49429 . . . . . Wedge and ball bonds
2224/4943 . . . . . the connecting portions being staggered
2224/49431 . . . . . on the semiconductor or solid-state body
2224/49433 . . . . . outside the semiconductor or solid-state body
2224/4945 . . . . . Wire connectors having connecting portions of different types on the semiconductor or solid-state body, e.g. regular and reverse stitches
2224/495 . . . . . Material
2224/49505 . . . . . Connectors having different materials
2224/50 . . Tape automated bonding [TAB] connectors, i.e. film carriers; Manufacturing methods related thereto
2224/63 . . Connectors not provided for in any of the groups H01L 2224/10 - H01L 2224/50 and subgroups; Manufacturing methods related thereto
2224/64 . . . Manufacturing methods
2224/65 . . . Structure, shape, material or disposition of the connectors prior to the connecting process
2224/66 . . . . of an individual connector
2224/67 . . . . of a plurality of connectors
2224/68 . . . Structure, shape, material or disposition of the connectors after the connecting process
2224/69 . . . . of an individual connector
2224/70 . . . . of a plurality of connectors
2224/71 . Means for bonding not being attached to, or not being formed on, the surface to be connected
2224/72 . . Detachable connecting means consisting of mechanical auxiliary parts connecting the device, e.g. pressure contacts using springs or clips
2224/73 . Means for bonding being of different types provided for in two or more of groups H01L 2224/10, H01L 2224/18, H01L 2224/26, H01L 2224/34, H01L 2224/42, H01L 2224/50, H01L 2224/63, H01L 2224/71
2224/731 . . Location prior to the connecting process

2224/73101 . . . on the same surface
2224/73103 . . . . Bump and layer connectors
2224/73104 . . . . . the bump connector being embedded into the layer connector
2224/73151 . . . on different surfaces
2224/73153 . . . . Bump and layer connectors
2224/732 . . Location after the connecting process
2224/73201 . . . on the same surface
2224/73203 . . . . Bump and layer connectors
2224/73204 . . . . . the bump connector being embedded into the layer connector
2224/73205 . . . . Bump and strap connectors
2224/73207 . . . . Bump and wire connectors
2224/73209 . . . . Bump and HDI connectors
2224/73211 . . . . Bump and TAB connectors
2224/73213 . . . . Layer and strap connectors
2224/73215 . . . . Layer and wire connectors
2224/73217 . . . . Layer and HDI connectors
2224/73219 . . . . Layer and TAB connectors
2224/73221 . . . . Strap and wire connectors
2224/73223 . . . . Strap and HDI connectors
2224/73225 . . . . Strap and TAB connectors
2224/73227 . . . . Wire and HDI connectors
2224/73229 . . . . Wire and TAB connectors
2224/73231 . . . . HDI and TAB connectors
2224/73251 . . . on different surfaces
2224/73253 . . . . Bump and layer connectors
2224/73255 . . . . Bump and strap connectors
2224/73257 . . . . Bump and wire connectors
2224/73259 . . . . Bump and HDI connectors
2224/73261 . . . . Bump and TAB connectors
2224/73263 . . . . Layer and strap connectors
2224/73265 . . . . Layer and wire connectors
2224/73267 . . . . Layer and HDI connectors
2224/73269 . . . . Layer and TAB connectors
2224/73271 . . . . Strap and wire connectors
2224/73273 . . . . Strap and HDI connectors
2224/73275 . . . . Strap and TAB connectors
2224/73277 . . . . Wire and HDI connectors
2224/73279 . . . . Wire and TAB connectors
2224/73281 . . . . HDI and TAB connectors
2224/74 . Apparatus for manufacturing arrangements for connecting or disconnecting semiconductor or solid-state bodies and for methods related thereto
2224/741 . . Apparatus for manufacturing means for bonding, e.g. connectors
2224/742 . . . Apparatus for manufacturing bump connectors
2224/743 . . . Apparatus for manufacturing layer connectors
2224/744 . . . Apparatus for manufacturing strap connectors
2224/745 . . . Apparatus for manufacturing wire connectors
2224/749 . . . Tools for reworking, e.g. for shaping
2224/75 . . Apparatus for connecting with bump connectors or layer connectors
2224/75001 . . . Calibration means
2224/7501 . . . Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma
2224/751 . . . Means for controlling the bonding environment, e.g. valves, vacuum pumps
2224/75101 . . . . Chamber
2224/75102 . . . . . Vacuum chamber
2224/7511 . . . . . High pressure chamber
2224/7515 . . . Means for applying permanent coating, e.g. in-situ coating
2224/75151 . . . . Means for direct writing
2224/75152 . . . . . Syringe
2224/75153 . . . . . integrated into the bonding head
2224/75155 . . . . . Jetting means, e.g. ink jet
2224/75158 . . . . . including a laser
2224/75161 . . . . Means for screen printing, e.g. roller, squeegee, screen stencil
2224/7517 . . . . Means for applying a preform, e.g. laminator
2224/75171 . . . . . including a vacuum-bag
2224/7518 . . . . Means for blanket deposition
2224/75181 . . . . . for spin coating, i.e. spin coater
2224/75182 . . . . . for curtain coating
2224/75183 . . . . . for immersion coating, i.e. bath
2224/75184 . . . . . for spray coating, i.e. nozzle
2224/75185 . . . . . Means for physical vapour deposition [PVD], e.g. evaporation, sputtering
2224/75186 . . . . . Means for sputtering, e.g. target
2224/75187 . . . . . Means for evaporation
2224/75188 . . . . . Means for chemical vapour deposition [CVD], e.g. for laser CVD
2224/75189 . . . . . Means for plating, e.g. for electroplating, electroless plating
2224/752 . . . Protection means against electrical discharge
2224/7525 . . . Means for applying energy, e.g. heating means
2224/75251 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75252 . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75253 . . . . adapted for localised heating
2224/7526 . . . . Polychromatic heating lamp
2224/75261 . . . . Laser
2224/75262 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75263 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75264 . . . . by induction heating, i.e. coils
2224/75265 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75266 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75267 . . . . Flame torch, e.g. hydrogen torch
2224/75268 . . . . Discharge electrode
2224/75269 . . . . . Shape of the discharge electrode
2224/7527 . . . . . Material of the discharge electrode
2224/75271 . . . . . Circuitry of the discharge electrode
2224/75272 . . . . Oven
2224/7528 . . . . Resistance welding electrodes, i.e. for ohmic heating
2224/75281 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75282 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75283 . . . . by infrared heating, e.g. infrared heating lamp
2224/753 . . . . by means of pressure
2224/75301 . . . . . Bonding head
2224/75302 . . . . . Shape
2224/75303 . . . . . of the pressing surface
2224/75304 . . . . . being curved
2224/75305 . . . . . comprising protrusions

2224/7531 . . . . . of other parts
2224/75312 . . . . . Material
2224/75313 . . . . . Removable bonding head
2224/75314 . . . . . Auxiliary members on the pressing surface
2224/75315 . . . . . Elastomer inlay
2224/75316 . . . . . with retaining mechanisms
2224/75317 . . . . . Removable auxiliary member
2224/75318 . . . . . Shape of the auxiliary member
2224/7532 . . . . . Material of the auxiliary member
2224/75343 . . . . by ultrasonic vibrations
2224/75344 . . . . . Eccentric cams
2224/75345 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75346 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75347 . . . . . Piezoelectric transducers
2224/75348 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75349 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/7535 . . . . . Stable and mobile yokes
2224/75351 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75352 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75353 . . . . . Ultrasonic horns
2224/75354 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75355 . . . . . Design, e.g. of the wave guide
2224/755 . . . Cooling means
2224/75501 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75502 . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/7555 . . . Mechanical means, e.g. for planarising, pressing, stamping
2224/756 . . . Means for supplying the connector to be connected in the bonding apparatus
2224/75601 . . . . Storing means
2224/75611 . . . . Feeding means
2224/75621 . . . . Holding means
2224/7565 . . . Means for transporting the components to be connected
2224/75651 . . . . Belt conveyor
2224/75652 . . . . Chain conveyor
2224/75653 . . . . Vibrating conveyor
2224/75654 . . . . Pneumatic conveyor
2224/75655 . . . . in a fluid
2224/757 . . . Means for aligning
2224/75701 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75702 . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75703 . . . . Mechanical holding means
2224/75704 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75705 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75723 . . . . Electrostatic holding means
2224/75724 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75725 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75733 . . . . Magnetic holding means
2224/75734 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75735 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75743 . . . . Suction holding means
2224/75744 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75745 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75753 . . . . Means for optical alignment, e.g. sensors
2224/75754 . . . . Guiding structures
2224/75755 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75756 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
2224/758 . . . Means for moving parts
2224/75801 . . . . Lower part of the bonding apparatus, e.g. XY table
2224/75802 . . . . . Rotational mechanism
2224/75803 . . . . . Pivoting mechanism
2224/75804 . . . . . Translational mechanism
2224/75821 . . . . Upper part of the bonding apparatus, i.e. bonding head
2224/75822 . . . . . Rotational mechanism
2224/75823 . . . . . Pivoting mechanism
2224/75824 . . . . . Translational mechanism
2224/75841 . . . . of the bonding head
2224/75842 . . . . . Rotational mechanism
2224/75843 . . . . . Pivoting mechanism
2224/759 . . . Means for monitoring the connection process
2224/75901 . . . . using a computer, e.g. fully- or semi-automatic bonding
2224/7592 . . . . Load or pressure adjusting means, e.g. sensors
2224/75925 . . . . Vibration adjusting means, e.g. sensors
2224/7595 . . . Means for forming additional members
2224/7598 . . . specially adapted for batch processes
2224/75981 . . . Apparatus chuck
2224/75982 . . . . Shape
2224/75983 . . . . . of the mounting surface
2224/75984 . . . . . of other portions
2224/75985 . . . . Material
2224/75986 . . . . Auxiliary members on the pressing surface
2224/75987 . . . . . Shape of the auxiliary member
2224/75988 . . . . . Material of the auxiliary member
2224/76 . . Apparatus for connecting with build-up interconnects
2224/76001 . . . Calibration means
2224/7601 . . . Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma
2224/761 . . . Means for controlling the bonding environment, e.g. valves, vacuum pumps
2224/76101 . . . . Chamber
2224/76102 . . . . . Vacuum chamber
2224/7611 . . . . . High pressure chamber
2224/7615 . . . Means for depositing
2224/76151 . . . . Means for direct writing
2224/76152 . . . . . Syringe

2224/76155 . . . . . Jetting means, e.g. ink jet
2224/76158 . . . . . including a laser
2224/76161 . . . . Means for screen printing, e.g. roller, squeegee, screen stencil
2224/7617 . . . . Means for applying a preform, e.g. laminator
2224/76171 . . . . . including a vacuum-bag
2224/7618 . . . . Means for blanket deposition
2224/76181 . . . . . for spin coating, i.e. spin coater
2224/76182 . . . . . for curtain coating
2224/76183 . . . . . for immersion coating, i.e. bath
2224/76184 . . . . . for spray coating, i.e. nozzle
2224/76185 . . . . . Means for physical vapour deposition [PVD]
2224/76186 . . . . . Means for sputtering, e.g. target
2224/76187 . . . . . Means for evaporation
2224/76188 . . . . . Means for chemical vapour deposition [CVD], e.g. for laser CVD
2224/76189 . . . . . Means for plating, e.g. for electroplating, electroless plating
2224/762 . . . Protection means against electrical discharge
2224/7625 . . . Means for applying energy, e.g. heating means
2224/76251 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76252 . . . . in the upper part of the bonding apparatus
2224/76253 . . . . adapted for localised heating
2224/7626 . . . . Polychromatic heating lamp
2224/76261 . . . . Laser
2224/76262 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76263 . . . . . in the upper part of the bonding apparatus
2224/76264 . . . . by induction heating, i.e. coils
2224/76265 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76266 . . . . . in the upper part of the bonding apparatus
2224/76267 . . . . Flame torch, e.g. hydrogen torch
2224/76268 . . . . Discharge electrode
2224/76269 . . . . . Shape of the discharge electrode
2224/7627 . . . . . Material of the discharge electrode
2224/76271 . . . . . Circuitry of the discharge electrode
2224/76272 . . . . Oven
2224/7628 . . . . Resistance welding electrodes, i.e. for ohmic heating
2224/76281 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76282 . . . . . in the upper part of the bonding apparatus
2224/76283 . . . . by infrared heating, e.g. infrared heating lamp
2224/763 . . . . by means of pressure
2224/76301 . . . . . Pressing head
2224/76302 . . . . . Shape
2224/76303 . . . . . of the pressing surface
2224/76304 . . . . . being curved
2224/76305 . . . . . comprising protrusions
2224/7631 . . . . . of other parts
2224/76312 . . . . . Material
2224/76313 . . . . . Removable pressing head
2224/76314 . . . . . Auxiliary members on the pressing surface
2224/76315 . . . . . Elastomer inlay
2224/76316 . . . . . with retaining mechanisms
2224/76317 . . . . . Removable auxiliary member
2224/76318 . . . . . Shape of the auxiliary member
2224/7632 . . . . . Material of the auxiliary member
2224/76343 . . . . . by ultrasonic vibrations
2224/76344 . . . . . Eccentric cams
2224/76345 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76346 . . . . . in the upper part of the bonding apparatus
2224/76347 . . . . . Piezoelectric transducers
2224/76348 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76349 . . . . . in the upper part of the bonding apparatus
2224/7635 . . . . . Stable and mobile yokes
2224/76351 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76352 . . . . . in the upper part of the bonding apparatus
2224/76353 . . . . . Ultrasonic horns
2224/76354 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76355 . . . . . Design, e.g. of the wave guide
2224/765 . . . Cooling means
2224/76501 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76502 . . . . in the upper part of the bonding apparatus
2224/7655 . . . Mechanical means, e.g. for planarising, pressing, stamping
2224/76552 . . . . for drilling
2224/76554 . . . . for abrasive blasting, e.g. sand blasting, wet blasting, hydro-blasting, dry ice blasting
2224/766 . . . Means for supplying the material of the interconnect
2224/76601 . . . . Storing means
2224/76611 . . . . Feeding means
2224/76621 . . . . Holding means
2224/7665 . . . Means for transporting the components to be connected
2224/76651 . . . . Belt conveyor
2224/76652 . . . . Chain conveyor
2224/76653 . . . . Vibrating conveyor
2224/76654 . . . . Pneumatic conveyor
2224/76655 . . . . in a fluid
2224/767 . . . Means for aligning
2224/76701 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76702 . . . . in the upper part of the bonding apparatus
2224/76703 . . . . Mechanical holding means
2224/76704 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76705 . . . . . in the upper part of the bonding apparatus
2224/76723 . . . . Electrostatic holding means
2224/76724 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76725 . . . . . in the upper part of the bonding apparatus
2224/76733 . . . . Magnetic holding means
2224/76734 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76735 . . . . . in the upper part of the bonding apparatus
2224/76743 . . . . Suction holding means
2224/76744 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76745 . . . . . in the upper part of the bonding apparatus
2224/76753 . . . . Means for optical alignment, e.g. sensors

2224/76754 . . . . Guiding structures
2224/76755 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/76756 . . . . . in the upper part of the bonding apparatus
2224/768 . . . Means for moving parts
2224/76801 . . . . Lower part of the bonding apparatus, e.g. XY table
2224/76802 . . . . . Rotational mechanism
2224/76803 . . . . . Pivoting mechanism
2224/76804 . . . . . Translational mechanism
2224/76821 . . . . Upper part of the bonding apparatus, i.e. bonding head
2224/76822 . . . . . Rotational mechanism
2224/76823 . . . . . Pivoting mechanism
2224/76824 . . . . . Translational mechanism
2224/76841 . . . . of the bonding head
2224/76842 . . . . . Rotational mechanism
2224/76843 . . . . . Pivoting mechanism
2224/769 . . . Means for monitoring the connection process
2224/76901 . . . . using a computer, e.g. fully- or semi-automatic bonding
2224/7692 . . . . Load or pressure adjusting means, e.g. sensors
2224/76925 . . . . Vibration adjusting means, e.g. sensors
2224/7695 . . . Means for forming additional members
2224/7698 . . . specially adapted for batch processes
2224/76981 . . . Apparatus chuck
2224/76982 . . . . Shape
2224/76983 . . . . . of the mounting surface
2224/76984 . . . . . of other portions
2224/76985 . . . . Material
2224/76986 . . . . Auxiliary members on the pressing surface
2224/76987 . . . . . Shape of the auxiliary member
2224/76988 . . . . . Material of the auxiliary member
2224/77 . . Apparatus for connecting with strap connectors
2224/77001 . . . Calibration means
2224/7701 . . . Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma
2224/771 . . . Means for controlling the bonding environment, e.g. valves, vacuum pumps
2224/77101 . . . . Chamber
2224/77102 . . . . . Vacuum chamber
2224/7711 . . . . . High pressure chamber
2224/7715 . . . Means for applying permanent coating, e.g. in-situ coating
2224/77151 . . . . Means for direct writing
2224/77152 . . . . . Syringe
2224/77153 . . . . . integrated into the capillary or wedge
2224/77155 . . . . . Jetting means, e.g. ink jet
2224/77158 . . . . . including a laser
2224/77161 . . . . Means for screen printing, e.g. roller, squeegee, screen stencil
2224/7717 . . . . Means for applying a preform, e.g. laminator
2224/77171 . . . . . including a vacuum-bag
2224/7718 . . . . Means for blanket deposition
2224/77181 . . . . . for spin coating, i.e. spin coater
2224/77182 . . . . . for curtain coating
2224/77183 . . . . . for immersion coating, i.e. bath
2224/77184 . . . . . for spray coating, i.e. nozzle
2224/77185 . . . . . Means for physical vapour deposition [PVD], e.g. evaporation, sputtering
2224/77186 . . . . . Means for sputtering, e.g. target
2224/77187 . . . . . Means for evaporation
2224/77188 . . . . . Means for chemical vapour deposition [CVD], e.g. for laser CVD
2224/77189 . . . . . Means for plating, e.g. for electroplating, electroless plating
2224/772 . . . Protection means against electrical discharge
2224/7725 . . . Means for applying energy, e.g. heating means
2224/77251 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77252 . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77253 . . . . adapted for localised heating
2224/7726 . . . . Polychromatic heating lamp
2224/77261 . . . . Laser
2224/77262 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77263 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77264 . . . . by induction heating, i.e. coils
2224/77265 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77266 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77267 . . . . Flame torch, e.g. hydrogen torch
2224/77268 . . . . Discharge electrode
2224/77269 . . . . . Shape of the discharge electrode
2224/7727 . . . . . Material of the discharge electrode
2224/77271 . . . . . Circuitry of the discharge electrode
2224/77272 . . . . Oven
2224/7728 . . . . Resistance welding electrodes, i.e. for ohmic heating
2224/77281 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77282 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77283 . . . . by infrared heating, e.g. infrared heating lamp
2224/773 . . . . by means of pressure
2224/77313 . . . . . Wedge
2224/77314 . . . . . Shape
2224/77315 . . . . . of the pressing surface, e.g. tip or head
2224/77316 . . . . . comprising protrusions
2224/77317 . . . . . of other portions
2224/77318 . . . . . inside the capillary
2224/77319 . . . . . outside the capillary
2224/7732 . . . . . Removable wedge
2224/77321 . . . . . Material
2224/77325 . . . . . Auxiliary members on the pressing surface
2224/77326 . . . . . Removable auxiliary member
2224/77327 . . . . . Shape of the auxiliary member
2224/77328 . . . . . Material of the auxiliary member
2224/77343 . . . . . by ultrasonic vibrations
2224/77344 . . . . . Eccentric cams
2224/77345 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77346 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77347 . . . . . Piezoelectric transducers

2224/77348 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77349 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/7735 . . . . . Stable and mobile yokes
2224/77351 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77352 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77353 . . . . . Ultrasonic horns
2224/77354 . . . . . in the lower part of the bonding apparatus, e.g. in the mounting chuck
2224/77355 . . . . . Design, e.g. of the wave guide
2224/775 . . . Cooling means
2224/77501 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77502 . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/7755 . . . Mechanical means, e.g. for severing, pressing, stamping
2224/776 . . . Means for supplying the connector to be connected in the bonding apparatus
2224/77601 . . . . Storing means
2224/77611 . . . . Feeding means
2224/77621 . . . . Holding means, e.g. wire clampers
2224/77631 . . . . . Means for wire tension adjustments
2224/7765 . . . Means for transporting the components to be connected
2224/77651 . . . . Belt conveyor
2224/77652 . . . . Chain conveyor
2224/77653 . . . . Vibrating conveyor
2224/77654 . . . . Pneumatic conveyor
2224/77655 . . . . in a fluid
2224/777 . . . Means for aligning
2224/77701 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77702 . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77703 . . . . Mechanical holding means
2224/77704 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77705 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77723 . . . . Electrostatic holding means
2224/77724 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77725 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77733 . . . . Magnetic holding means
2224/77734 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77735 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77743 . . . . Suction holding means
2224/77744 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77745 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/77753 . . . . Means for optical alignment, e.g. sensors
2224/77754 . . . . Guiding structures
2224/77755 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/77756 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
2224/778 . . . Means for moving parts
2224/77801 . . . . Lower part of the bonding apparatus, e.g. XY table
2224/77802 . . . . . Rotational mechanism
2224/77803 . . . . . Pivoting mechanism
2224/77804 . . . . . Translational mechanism
2224/77821 . . . . Upper part of the bonding apparatus, i.e. bonding head, e.g. capillary or wedge
2224/77822 . . . . . Rotational mechanism
2224/77823 . . . . . Pivoting mechanism
2224/77824 . . . . . Translational mechanism
2224/77841 . . . . of the pressing portion, e.g. tip or head
2224/77842 . . . . . Rotational mechanism
2224/77843 . . . . . Pivoting mechanism
2224/779 . . . Means for monitoring the connection process
2224/77901 . . . . using a computer, e.g. fully- or semi-automatic bonding
2224/7792 . . . . Load or pressure adjusting means, e.g. sensors
2224/77925 . . . . Vibration adjusting means, e.g. sensors
2224/7795 . . . Means for forming additional members
2224/7798 . . . specially adapted for batch processes
2224/77981 . . . Apparatus chuck
2224/77982 . . . . Shape
2224/77983 . . . . . of the mounting surface
2224/77984 . . . . . of other portions
2224/77985 . . . . Material
2224/77986 . . . . Auxiliary members on the pressing surface
2224/77987 . . . . . Shape of the auxiliary member
2224/77988 . . . . . Material of the auxiliary member
2224/78 . . Apparatus for connecting with wire connectors
2224/78001 . . . Calibration means
2224/7801 . . . Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma
2224/781 . . . Means for controlling the bonding environment, e.g. valves, vacuum pumps
2224/78101 . . . . Chamber
2224/78102 . . . . . Vacuum chamber
2224/7811 . . . . . High pressure chamber
2224/7815 . . . Means for applying permanent coating, e.g. in-situ coating
2224/782 . . . Protection means against electrical discharge
2224/7825 . . . Means for applying energy, e.g. heating means
2224/78251 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78252 . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78253 . . . . adapted for localised heating
2224/7826 . . . . Polychromatic heating lamp
2224/78261 . . . . Laser
2224/78262 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78263 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78264 . . . . by induction heating, i.e. coils
2224/78265 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78266 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge

2224/78267 . . . . Flame torch, e.g. hydrogen torch
2224/78268 . . . . Discharge electrode
2224/78269 . . . . . Shape of the discharge electrode
2224/7827 . . . . . Material of the discharge electrode
2224/78271 . . . . . Circuitry of the discharge electrode
2224/78272 . . . . Oven
2224/7828 . . . . Resistance welding electrodes, i.e. for ohmic heating
2224/78281 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78282 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78283 . . . . by infrared heating, e.g. infrared heating lamp
2224/783 . . . . by means of pressure
2224/78301 . . . . . Capillary
2224/78302 . . . . . Shape
2224/78303 . . . . . of the pressing surface, e.g. tip or head
2224/78304 . . . . . comprising protrusions
2224/78305 . . . . . of other portions
2224/78306 . . . . . inside the capillary
2224/78307 . . . . . outside the capillary
2224/78308 . . . . . Removable capillary
2224/78309 . . . . . Material
2224/7831 . . . . . Auxiliary members on the pressing surface
2224/78311 . . . . . Removable auxiliary member
2224/78312 . . . . . Shape of the auxiliary member
2224/78313 . . . . . Wedge
2224/78314 . . . . . Shape
2224/78315 . . . . . of the pressing surface, e.g. tip or head
2224/78316 . . . . . comprising protrusions
2224/78317 . . . . . of other portions
2224/78318 . . . . . inside the capillary
2224/78319 . . . . . outside the capillary
2224/7832 . . . . . Removable wedge
2224/78321 . . . . . Material
2224/78325 . . . . . Auxiliary members on the pressing surface
2224/78326 . . . . . Removable auxiliary member
2224/78327 . . . . . Shape of the auxiliary member
2224/78328 . . . . . Material of the auxiliary member
2224/78343 . . . . . by ultrasonic vibrations
2224/78344 . . . . . Eccentric cams
2224/78345 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78346 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78347 . . . . . Piezoelectric transducers
2224/78348 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78349 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/7835 . . . . . Stable and mobile yokes
2224/78351 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78352 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78353 . . . . . Ultrasonic horns
2224/78354 . . . . . in the lower part of the bonding apparatus, e.g. in the mounting chuck
2224/78355 . . . . . Design, e.g. of the wave guide
2224/785 . . . Cooling means
2224/78501 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78502 . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/7855 . . . Mechanical means, e.g. for severing, pressing, stamping
2224/786 . . . Means for supplying the connector to be connected in the bonding apparatus
2224/78601 . . . . Storing means
2224/78611 . . . . Feeding means
2224/78621 . . . . Holding means, e.g. wire clampers
2224/78631 . . . . . Means for wire tension adjustments
2224/7865 . . . Means for transporting the components to be connected
2224/78651 . . . . Belt conveyor
2224/78652 . . . . Chain conveyor
2224/78653 . . . . Vibrating conveyor
2224/78654 . . . . Pneumatic conveyor
2224/78655 . . . . in a fluid
2224/787 . . . Means for aligning
2224/78701 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78702 . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78703 . . . . Mechanical holding means
2224/78704 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78705 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78723 . . . . Electrostatic holding means
2224/78724 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78725 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78733 . . . . Magnetic holding means
2224/78734 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78735 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78743 . . . . Suction holding means
2224/78744 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78745 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78753 . . . . Means for optical alignment, e.g. sensors
2224/78754 . . . . Guiding structures
2224/78755 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78756 . . . . . in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/788 . . . Means for moving parts
2224/78801 . . . . Lower part of the bonding apparatus, e.g. XY table
2224/78802 . . . . . Rotational mechanism
2224/78803 . . . . . Pivoting mechanism
2224/78804 . . . . . Translational mechanism
2224/78821 . . . . Upper part of the bonding apparatus, i.e. bonding head, e.g. capillary or wedge

2224/78822 . . . . . Rotational mechanism
2224/78823 . . . . . . Pivoting mechanism
2224/78824 . . . . . Translational mechanism
2224/78841 . . . . of the pressing portion, e.g. tip or head
2224/78842 . . . . . Rotational mechanism
2224/78843 . . . . . Pivoting mechanism
2224/789 . . . Means for monitoring the connection process
2224/78901 . . . . using a computer, e.g. fully- or semi-automatic bonding
2224/7892 . . . . Load or pressure adjusting means, e.g. sensors
2224/78925 . . . . Vibration adjusting means, e.g. sensors
2224/7895 . . . Means for forming additional members
2224/7898 . . . specially adapted for batch processes
2224/78981 . . . Apparatus chuck
2224/78982 . . . . Shape
2224/78983 . . . . . of the mounting surface
2224/78984 . . . . . of other portions
2224/78985 . . . . Material
2224/78986 . . . . Auxiliary members on the pressing surface
2224/78987 . . . . . Shape of the auxiliary member
2224/78988 . . . . . Material of the auxiliary member
2224/79 . . Apparatus for Tape Automated Bonding [TAB]
2224/79001 . . . Calibration means
2224/7901 . . . Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma
2224/791 . . . Means for controlling the bonding environment, e.g. valves, vacuum pumps
2224/79101 . . . . Chamber
2224/79102 . . . . . Vacuum chamber
2224/7911 . . . . . High pressure chamber
2224/7915 . . . Means for applying permanent coating
2224/79151 . . . . Means for direct writing
2224/79152 . . . . . Syringe
2224/79153 . . . . . integrated into the pressing head
2224/79155 . . . . . Jetting means, e.g. ink jet
2224/79158 . . . . . including a laser
2224/79161 . . . . Means for screen printing, e.g. roller, squeegee, screen stencil
2224/7917 . . . . Means for applying a preform, e.g. laminator
2224/79171 . . . . . including a vacuum-bag
2224/7918 . . . . Means for blanket deposition
2224/79181 . . . . . for spin coating, i.e. spin coater
2224/79182 . . . . . for curtain coating
2224/79183 . . . . . for immersion coating, i.e. bath
2224/79184 . . . . . for spray coating, i.e. nozzle
2224/79185 . . . . . Means for physical vapour deposition [PVD], e.g. evaporation, sputtering
2224/79186 . . . . . Means for sputtering, e.g. target
2224/79187 . . . . . Means for evaporation
2224/79188 . . . . . Means for chemical vapour deposition [CVD], e.g. for laser CVD
2224/79189 . . . . . Means for plating, e.g. for electroplating, electroless plating
2224/792 . . . Protection means against electrical discharge
2224/7925 . . . Means for applying energy, e.g. heating means
2224/79251 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79252 . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79253 . . . . adapted for localised heating
2224/7926 . . . . Polychromatic heating lamp
2224/79261 . . . . Laser
2224/79262 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79263 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79264 . . . . by induction heating, i.e. coils
2224/79265 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79266 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79267 . . . . Flame torch, e.g. hydrogen torch
2224/79268 . . . . Discharge electrode
2224/79269 . . . . . Shape of the discharge electrode
2224/7927 . . . . . Material of the discharge electrode
2224/79271 . . . . . Circuitry of the discharge electrode
2224/79272 . . . . Oven
2224/7928 . . . . Resistance welding electrodes, i.e. for ohmic heating
2224/79281 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79282 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79283 . . . . by infrared heating, e.g. infrared heating lamp
2224/793 . . . . by means of pressure
2224/79301 . . . . . Pressing head
2224/79302 . . . . . Shape
2224/79303 . . . . . of the pressing surface
2224/79304 . . . . . being curved
2224/79305 . . . . . comprising protrusions
2224/7931 . . . . . of other parts
2224/79312 . . . . . Material
2224/79313 . . . . . Removable pressing head
2224/79314 . . . . . Auxiliary members on the pressing surface
2224/79315 . . . . . Elastomer inlay
2224/79316 . . . . . with retaining mechanisms
2224/79317 . . . . . Removable auxiliary member
2224/79318 . . . . . Shape of the auxiliary member
2224/7932 . . . . . Material of the auxiliary member
2224/79343 . . . . . by ultrasonic vibrations
2224/79344 . . . . . Eccentric cams
2224/79345 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79346 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79347 . . . . . Piezoelectric transducers
2224/79348 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79349 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/7935 . . . . . Stable and mobile yokes
2224/79351 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79352 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79353 . . . . . Ultrasonic horns
2224/79354 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79355 . . . . . Design, e.g. of the wave guide
2224/795 . . . Cooling means

2224/79501 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79502 . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/7955 . . . Mechanical means, e.g. for pressing, stamping
2224/796 . . . Means for supplying the connector to be connected in the bonding apparatus
2224/79601 . . . . Storing means
2224/79611 . . . . Feeding means
2224/79621 . . . . Holding means
2224/7965 . . . Means for transporting the components to be connected
2224/79651 . . . . Belt conveyor
2224/79652 . . . . Chain conveyor
2224/79653 . . . . Vibrating conveyor
2224/79654 . . . . Pneumatic conveyor
2224/79655 . . . . in a fluid
2224/797 . . . Means for aligning
2224/79701 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79702 . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79703 . . . . Mechanical holding means
2224/79704 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79705 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79723 . . . . Electrostatic holding means
2224/79724 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79725 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79733 . . . . Magnetic holding means
2224/79734 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79735 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79743 . . . . Suction holding means
2224/79744 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79745 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79753 . . . . Means for optical alignment, e.g. sensors
2224/79754 . . . . Guiding structures
2224/79755 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79756 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
2224/798 . . . Means for moving parts
2224/79801 . . . . Lower part of the bonding apparatus, e.g. XY table
2224/79802 . . . . . Rotational mechanism
2224/79803 . . . . . Pivoting mechanism
2224/79804 . . . . . Translational mechanism
2224/79821 . . . . Upper part of the bonding apparatus, i.e. pressing head
2224/79822 . . . . . Rotational mechanism
2224/79823 . . . . . Pivoting mechanism
2224/79824 . . . . . Translational mechanism
2224/79841 . . . . of the pressing head
2224/79842 . . . . . Rotational mechanism
2224/79843 . . . . . Pivoting mechanism
2224/799 . . . Means for monitoring the connection process
2224/79901 . . . . using a computer, e.g. fully- or semi-automatic bonding
2224/7992 . . . . Load or pressure adjusting means, e.g. sensors
2224/79925 . . . . Vibration adjusting means, e.g. sensors
2224/7995 . . . Means for forming additional members
2224/7998 . . . specially adapted for batch processes
2224/79981 . . . Apparatus chuck
2224/79982 . . . . Shape
2224/79983 . . . . . of the mounting surface
2224/79984 . . . . . of other portions
2224/79985 . . . . Material
2224/79986 . . . . Auxiliary members on the pressing surface
2224/79987 . . . . . Shape of the auxiliary member
2224/79988 . . . . . Material of the auxiliary member
2224/7999 . . for disconnecting
2224/80 . Methods for connecting semiconductor or other solid state bodies using means for bonding being attached to, or being formed on, the surface to be connected
2224/80001 . . by connecting a bonding area directly to another bonding area, i.e. connectorless bonding, e.g. bumpless bonding
2224/80003 . . . involving a temporary auxiliary member not forming part of the bonding apparatus
2224/80004 . . . . being a removable or sacrificial coating
2224/80006 . . . . being a temporary or sacrificial substrate
2224/80007 . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for protecting the bonding area during or after the bonding process
2224/80009 . . . Pre-treatment of the bonding area
2224/8001 . . . . Cleaning the bonding area, e.g. oxide removal step, desmearing
2224/80011 . . . . . Chemical cleaning, e.g. etching, flux
2224/80012 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
2224/80013 . . . . . Plasma cleaning
2224/80014 . . . . . Thermal cleaning, e.g. decomposition, sublimation
2224/80019 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8001 - H01L 2224/80014
2224/8002 . . . . Applying permanent coating to the bonding area in the bonding apparatus, e.g. in-situ coating
2224/80024 . . . . Applying flux to the bonding area in the bonding apparatus
2224/8003 . . . . Reshaping the bonding area in the bonding apparatus, e.g. flattening the bonding area
2224/80031 . . . . . by chemical means, e.g. etching, anodisation
2224/80035 . . . . . by heating means
2224/80037 . . . . . using a polychromatic heating lamp
2224/80039 . . . . . using a laser
2224/80041 . . . . . Induction heating, i.e. eddy currents
2224/80047 . . . . . by mechanical means, e.g. severing, pressing, stamping
2224/80048 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
2224/80051 . . . . Forming additional members

2224/80052 . . . Detaching bonding areas, e.g. after testing (unsoldering in general B23K 1/018)
2224/80053 . . . Bonding environment
2224/80054 . . . . Composition of the atmosphere
2224/80055 . . . . . being oxidating
2224/80065 . . . . . being reducing
2224/80075 . . . . . being inert
2224/80085 . . . . being a liquid, e.g. for fluidic self-assembly
2224/8009 . . . . Vacuum
2224/80091 . . . . Under pressure
2224/80092 . . . . . Atmospheric pressure
2224/80093 . . . . . Transient conditions, e.g. gas-flow
2224/80095 . . . . Temperature settings
2224/80096 . . . . . Transient conditions
2224/80097 . . . . . Heating
2224/80098 . . . . . Cooling
2224/80099 . . . . . Ambient temperature
2224/8011 . . . involving protection against electrical discharge, e.g. removing electrostatic charge
2224/8012 . . . Aligning
2224/80121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
2224/80122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
2224/80123 . . . . . Shape or position of the body
2224/80125 . . . . . Bonding areas on the body
2224/80127 . . . . . Bonding areas outside the body
2224/80129 . . . . . Shape or position of the other item
2224/8013 . . . . . using marks formed on the semiconductor or solid-state body
2224/80132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
2224/80136 . . . . involving guiding structures, e.g. spacers or supporting members
2224/80138 . . . . . the guiding structures being at least partially left in the finished device
2224/80139 . . . . . Guiding structures on the body
2224/8014 . . . . . Guiding structures outside the body
2224/80141 . . . . . Guiding structures both on and outside the body
2224/80143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/80148 . . . . involving movement of a part of the bonding apparatus
2224/80149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
2224/8015 . . . . . Rotational movements
2224/8016 . . . . . Translational movements
2224/80169 . . . . . being the upper part of the bonding apparatus, i.e. bonding head
2224/8017 . . . . . Rotational movements
2224/8018 . . . . . Translational movements
2224/8019 . . . Arrangement of the bonding areas prior to mounting
2224/80194 . . . . Lateral distribution of the bonding areas
2224/802 . . . Applying energy for connecting
2224/80201 . . . . Compression bonding
2224/80203 . . . . . Thermocompression bonding, e.g. diffusion bonding, pressure joining, thermocompression welding or solid-state welding
2224/80204 . . . . . with a graded temperature profile
2224/80205 . . . . . Ultrasonic bonding
2224/80206 . . . . . Direction of oscillation
2224/80207 . . . . . Thermosonic bonding
2224/80209 . . . . . applying unidirectional static pressure
2224/80211 . . . . . applying isostatic pressure, e.g. degassing using vacuum or a pressurised liquid
2224/80213 . . . . using a reflow oven
2224/80215 . . . . . with a graded temperature profile
2224/8022 . . . . with energy being in the form of electromagnetic radiation
2224/80222 . . . . . Induction heating, i.e. eddy currents
2224/80224 . . . . . using a laser
2224/8023 . . . . . Polychromatic or infrared lamp heating
2224/80232 . . . . using an autocatalytic reaction, e.g. exothermic brazing
2224/80234 . . . . using means for applying energy being within the device, e.g. integrated heater
2224/80236 . . . . using electro-static corona discharge
2224/80237 . . . . using an electron beam (electron beam welding in general B23K 15/00)
2224/80238 . . . . using electric resistance welding, i.e. ohmic heating
2224/8034 . . . Bonding interfaces of the bonding area
2224/80345 . . . . Shape, e.g. interlocking features
2224/80355 . . . . having an external coating, e.g. protective bond-through coating
2224/80357 . . . . being flush with the surface
2224/80359 . . . . Material
2224/8036 . . . Bonding interfaces of the semiconductor or solid state body
2224/80365 . . . . Shape, e.g. interlocking features
2224/80375 . . . . having an external coating, e.g. protective bond-through coating
2224/80379 . . . . Material (material of the bonding area prior to the connecting process H01L 2224/05099 and H01L 2224/05599)
2224/8038 . . . Bonding interfaces outside the semiconductor or solid-state body
2224/80385 . . . . Shape, e.g. interlocking features
2224/80395 . . . . having an external coating, e.g. protective bond-through coating
2224/80399 . . . . Material
2224/804 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/80401 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/80405 . . . . . Gallium [Ga] as principal constituent
2224/80409 . . . . . Indium [In] as principal constituent
2224/80411 . . . . . Tin [Sn] as principal constituent
2224/80413 . . . . . Bismuth [Bi] as principal constituent
2224/80414 . . . . . Thallium [Tl] as principal constituent
2224/80416 . . . . . Lead [Pb] as principal constituent
2224/80417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C

2224/80418 . . . . . Zinc [Zn] as principal constituent
2224/8042 . . . . . Antimony [Sb] as principal constituent
2224/80423 . . . . . Magnesium [Mg] as principal constituent
2224/80424 . . . . . Aluminium [Al] as principal constituent
2224/80438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/80439 . . . . . Silver [Ag] as principal constituent
2224/80444 . . . . . Gold [Au] as principal constituent
2224/80447 . . . . . Copper [Cu] as principal constituent
2224/80449 . . . . . Manganese [Mn] as principal constituent
2224/80455 . . . . . Nickel [Ni] as principal constituent
2224/80457 . . . . . Cobalt [Co] as principal constituent
2224/8046 . . . . . Iron [Fe] as principal constituent
2224/80463 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/80464 . . . . . Palladium [Pd] as principal constituent
2224/80466 . . . . . Titanium [Ti] as principal constituent
2224/80469 . . . . . Platinum [Pt] as principal constituent
2224/8047 . . . . . Zirconium [Zr] as principal constituent
2224/80471 . . . . . Chromium [Cr] as principal constituent
2224/80472 . . . . . Vanadium [V] as principal constituent
2224/80473 . . . . . Rhodium [Rh] as principal constituent
2224/80476 . . . . . Ruthenium [Ru] as principal constituent
2224/80478 . . . . . Iridium [Ir] as principal constituent
2224/80479 . . . . . Niobium [Nb] as principal constituent
2224/8048 . . . . . Molybdenum [Mo] as principal constituent
2224/80481 . . . . . Tantalum [Ta] as principal constituent
2224/80483 . . . . . Rhenium [Re] as principal constituent
2224/80484 . . . . . Tungsten [W] as principal constituent
2224/80486 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/80487 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/80488)
2224/80488 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8049 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/80491 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/80493 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/804 - H01L 2224/80491, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/80494 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/804 - H01L 2224/80491
2224/80495 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/804 - H01L 2224/80491
2224/80498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/80499 . . . . . Material of the matrix
2224/805 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/80501 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/80505 . . . . . Gallium [Ga] as principal constituent
2224/80509 . . . . . Indium [In] as principal constituent
2224/80511 . . . . . Tin [Sn] as principal constituent
2224/80513 . . . . . Bismuth [Bi] as principal constituent
2224/80514 . . . . . Thallium [Tl] as principal constituent
2224/80516 . . . . . Lead [Pb] as principal constituent
2224/80517 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/80518 . . . . . Zinc [Zn] as principal constituent
2224/8052 . . . . . Antimony [Sb] as principal constituent
2224/80523 . . . . . Magnesium [Mg] as principal constituent
2224/80524 . . . . . Aluminium [Al] as principal constituent
2224/80538 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/80539 . . . . . Silver [Ag] as principal constituent
2224/80544 . . . . . Gold [Au] as principal constituent
2224/80547 . . . . . Copper [Cu] as principal constituent
2224/80549 . . . . . Manganese [Mn] as principal constituent
2224/80555 . . . . . Nickel [Ni] as principal constituent
2224/80557 . . . . . Cobalt [Co] as principal constituent
2224/8056 . . . . . Iron [Fe] as principal constituent
2224/80563 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/80564 . . . . . Palladium [Pd] as principal constituent
2224/80566 . . . . . Titanium [Ti] as principal constituent
2224/80569 . . . . . Platinum [Pt] as principal constituent
2224/8057 . . . . . Zirconium [Zr] as principal constituent
2224/80571 . . . . . Chromium [Cr] as principal constituent

2224/80572 . . . . . Vanadium [V] as principal constituent
2224/80573 . . . . . Rhodium [Rh] as principal constituent
2224/80576 . . . . . Ruthenium [Ru] as principal constituent
2224/80578 . . . . . Iridium [Ir] as principal constituent
2224/80579 . . . . . Niobium [Nb] as principal constituent
2224/8058 . . . . . Molybdenum [Mo] as principal constituent
2224/80581 . . . . . Tantalum [Ta] as principal constituent
2224/80583 . . . . . Rhenium [Re] as principal constituent
2224/80584 . . . . . Tungsten [W] as principal constituent
2224/80586 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/80587 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/80588)
2224/80588 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8059 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/80591 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/80593 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/805 - H01L 2224/80591, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/80594 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/805 - H01L 2224/80591
2224/80595 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/805 - H01L 2224/80591
2224/80598 . . . . . Fillers
2224/80599 . . . . . Base material
2224/806 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/80601 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/80605 . . . . . Gallium [Ga] as principal constituent
2224/80609 . . . . . Indium [In] as principal constituent
2224/80611 . . . . . Tin [Sn] as principal constituent
2224/80613 . . . . . Bismuth [Bi] as principal constituent
2224/80614 . . . . . Thallium [Tl] as principal constituent
2224/80616 . . . . . Lead [Pb] as principal constituent
2224/80617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/80618 . . . . . Zinc [Zn] as principal constituent
2224/8062 . . . . . Antimony [Sb] as principal constituent
2224/80623 . . . . . Magnesium [Mg] as principal constituent
2224/80624 . . . . . Aluminium [Al] as principal constituent
2224/80638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/80639 . . . . . Silver [Ag] as principal constituent
2224/80644 . . . . . Gold [Au] as principal constituent
2224/80647 . . . . . Copper [Cu] as principal constituent
2224/80649 . . . . . Manganese [Mn] as principal constituent
2224/80655 . . . . . Nickel [Ni] as principal constituent
2224/80657 . . . . . Cobalt [Co] as principal constituent
2224/8066 . . . . . Iron [Fe] as principal constituent
2224/80663 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/80664 . . . . . Palladium [Pd] as principal constituent
2224/80666 . . . . . Titanium [Ti] as principal constituent
2224/80669 . . . . . Platinum [Pt] as principal constituent
2224/8067 . . . . . Zirconium [Zr] as principal constituent
2224/80671 . . . . . Chromium [Cr] as principal constituent
2224/80672 . . . . . Vanadium [V] as principal constituent
2224/80673 . . . . . Rhodium [Rh] as principal constituent
2224/80676 . . . . . Ruthenium [Ru] as principal constituent
2224/80678 . . . . . Iridium [Ir] as principal constituent
2224/80679 . . . . . Niobium [Nb] as principal constituent
2224/8068 . . . . . Molybdenum [Mo] as principal constituent
2224/80681 . . . . . Tantalum [Ta] as principal constituent

2224/80683 . . . . . Rhenium [Re] as principal constituent
2224/80684 . . . . . Tungsten [W] as principal constituent
2224/80686 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/80687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/80688)
2224/80688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8069 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/80691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/80693 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/806 - H01L 2224/80691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/80694 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/806 - H01L 2224/80691
2224/80695 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/806 - H01L 2224/80691
2224/80698 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/80699 . . . . . Coating material
2224/807 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/80701 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/80705 . . . . . Gallium [Ga] as principal constituent
2224/80709 . . . . . Indium [In] as principal constituent
2224/80711 . . . . . Tin [Sn] as principal constituent
2224/80713 . . . . . Bismuth [Bi] as principal constituent
2224/80714 . . . . . Thallium [Tl] as principal constituent
2224/80716 . . . . . Lead [Pb] as principal constituent
2224/80717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/80718 . . . . . Zinc [Zn] as principal constituent
2224/8072 . . . . . Antimony [Sb] as principal constituent
2224/80723 . . . . . Magnesium [Mg] as principal constituent
2224/80724 . . . . . Aluminium [Al] as principal constituent
2224/80738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/80739 . . . . . Silver [Ag] as principal constituent
2224/80744 . . . . . Gold [Au] as principal constituent
2224/80747 . . . . . Copper [Cu] as principal constituent
2224/80749 . . . . . Manganese [Mn] as principal constituent
2224/80755 . . . . . Nickel [Ni] as principal constituent
2224/80757 . . . . . Cobalt [Co] as principal constituent
2224/8076 . . . . . Iron [Fe] as principal constituent
2224/80763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/80764 . . . . . Palladium [Pd] as principal constituent
2224/80766 . . . . . Titanium [Ti] as principal constituent
2224/80769 . . . . . Platinum [Pt] as principal constituent
2224/8077 . . . . . Zirconium [Zr] as principal constituent
2224/80771 . . . . . Chromium [Cr] as principal constituent
2224/80772 . . . . . Vanadium [V] as principal constituent
2224/80773 . . . . . Rhodium [Rh] as principal constituent
2224/80776 . . . . . Ruthenium [Ru] as principal constituent
2224/80778 . . . . . Iridium [Ir] as principal constituent
2224/80779 . . . . . Niobium [Nb] as principal constituent
2224/8078 . . . . . Molybdenum [Mo] as principal constituent
2224/80781 . . . . . Tantalum [Ta] as principal constituent
2224/80783 . . . . . Rhenium [Re] as principal constituent
2224/80784 . . . . . Tungsten [W] as principal constituent
2224/80786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material

2224/80787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/80788)
2224/80788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8079 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/80791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/80793 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/807 - H01L 2224/80791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/80794 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/807 - H01L 2224/80791
2224/80795 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/807 - H01L 2224/80791
2224/80798 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/80799 . . . . . Shape or distribution of the fillers
2224/808 . . . Bonding techniques
2224/80801 . . . . Soldering or alloying
2224/80805 . . . . . involving forming a eutectic alloy at the bonding interface
2224/8081 . . . . . involving forming an intermetallic compound at the bonding interface
2224/80815 . . . . . Reflow soldering
2224/8082 . . . . . Diffusion bonding
2224/80825 . . . . . Solid-liquid interdiffusion
2224/8083 . . . . . Solid-solid interdiffusion
2224/8084 . . . . Sintering
2224/8085 . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/80855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
2224/80856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
2224/80859 . . . . . Localised curing of parts of the bonding area
2224/80862 . . . . . Heat curing
2224/80865 . . . . . Microwave curing
2224/80868 . . . . . Infrared [IR] curing
2224/80871 . . . . . Visible light curing
2224/80874 . . . . . Ultraviolet [UV] curing
2224/80877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/8088 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/80885 . . . . . Combinations of two or more hardening methods provided for in at least two different groups from H01L 2224/80855 - H01L 2224/8088, e.g. for hybrid thermoplastic-thermosetting adhesives
2224/8089 . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
2224/80893 . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
2224/80894 . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/80895 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/80896 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
2224/80897 . . . . Mechanical interlocking, e.g. anchoring, hook and loop-type fastening or the like
2224/80898 . . . . . Press-fitting, i.e. pushing the parts together and fastening by friction, e.g. by compression of one part against the other
2224/80899 . . . . . using resilient parts in the bonding area
2224/809 . . . with the bonding area not providing any mechanical bonding
2224/80901 . . . . Pressing a bonding area against another bonding area by means of a further bonding area or connector (detachable pressure contact H01L 2224/72)
2224/80902 . . . . . by means of a further bonding area
2224/80903 . . . . . by means of a bump or layer connector
2224/80904 . . . . . by means of an encapsulation layer or foil
2224/80905 . . . Combinations of bonding methods provided for in at least two different groups from H01L 2224/808 - H01L 2224/80904
2224/80906 . . . . Specific sequence of method steps
2224/80907 . . . . Intermediate bonding, i.e. intermediate bonding step for temporarily bonding the semiconductor or solid-state body, followed by at least a further bonding step
2224/80908 . . . involving monitoring, e.g. feedback loop
2224/80909 . . . Post-treatment of the bonding area
2224/8091 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/80911 . . . . . Chemical cleaning, e.g. etching, flux
2224/80912 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
2224/80913 . . . . . Plasma cleaning
2224/80914 . . . . . Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
2224/80919 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8091 - H01L 2224/80914
2224/8092 . . . . Applying permanent coating, e.g. protective coating
2224/8093 . . . . Reshaping
2224/80931 . . . . . by chemical means, e.g. etching
2224/80935 . . . . . by heating means, e.g. reflowing

2224/80937 . . . . . using a polychromatic heating lamp
2224/80939 . . . . . using a laser
2224/80941 . . . . . Induction heating, i.e. eddy currents
2224/80943 . . . . . using a flame torch, e.g. hydrogen torch
2224/80945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/80947 . . . . . by mechanical means, e.g. pull-and-cut, pressing, stamping
2224/80948 . . . . Thermal treatments, e.g. annealing, controlled cooling
2224/80951 . . . . Forming additional members, e.g. for reinforcing
2224/80986 . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
2224/81 . . using a bump connector
2224/81001 . . . involving a temporary auxiliary member not forming part of the bonding apparatus
2224/81002 . . . . being a removable or sacrificial coating
2224/81005 . . . . being a temporary or sacrificial substrate
2224/81007 . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the bump connector during or after the bonding process
2224/81009 . . . Pre-treatment of the bump connector or the bonding area
2224/8101 . . . . Cleaning the bump connector, e.g. oxide removal step, desmearing
2224/81011 . . . . . Chemical cleaning, e.g. etching, flux
2224/81012 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
2224/81013 . . . . . Plasma cleaning
2224/81014 . . . . . Thermal cleaning, e.g. decomposition, sublimation
2224/81019 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8101 - H01L 2224/81014
2224/8102 . . . . Applying permanent coating to the bump connector in the bonding apparatus, e.g. in-situ coating
2224/81022 . . . . Cleaning the bonding area, e.g. oxide removal step, desmearing
2224/81024 . . . . Applying flux to the bonding area
2224/81026 . . . . Applying a precursor material to the bonding area
2224/8103 . . . . Reshaping the bump connector in the bonding apparatus, e.g. flattening the bump connector
2224/81031 . . . . . by chemical means, e.g. etching, anodisation
2224/81035 . . . . . by heating means
2224/81037 . . . . . using a polychromatic heating lamp
2224/81039 . . . . . using a laser
2224/81041 . . . . . Induction heating, i.e. eddy currents
2224/81047 . . . . . by mechanical means, e.g. severing, pressing, stamping
2224/81048 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
2224/81051 . . . . Forming additional members
2224/81052 . . . Detaching bump connectors, e.g. after testing (unsoldering in general B23K 1/018)
2224/81053 . . . Bonding environment
2224/81054 . . . . Composition of the atmosphere
2224/81055 . . . . . being oxidating
2224/81065 . . . . . being reducing
2224/81075 . . . . . being inert
2224/81085 . . . . being a liquid, e.g. for fluidic self-assembly
2224/8109 . . . . Vacuum
2224/81091 . . . . Under pressure
2224/81092 . . . . . Atmospheric pressure
2224/81093 . . . . . Transient conditions, e.g. gas-flow
2224/81095 . . . . Temperature settings
2224/81096 . . . . . Transient conditions
2224/81097 . . . . . Heating
2224/81098 . . . . . Cooling
2224/81099 . . . . . Ambient temperature
2224/811 . . . the bump connector being supplied to the parts to be connected in the bonding apparatus
2224/81101 . . . . as prepeg comprising a bump connector, e.g. provided in an insulating plate member
2224/8111 . . . involving protection against electrical discharge, e.g. removing electrostatic charge
2224/8112 . . . Aligning
2224/81121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
2224/81122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
2224/81123 . . . . . Shape or position of the body
2224/81125 . . . . . Bonding areas on the body
2224/81127 . . . . . Bonding areas outside the body
2224/81129 . . . . . Shape or position of the other item
2224/8113 . . . . . using marks formed on the semiconductor or solid-state body
2224/81132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
2224/81136 . . . . involving guiding structures, e.g. spacers or supporting members
2224/81138 . . . . . the guiding structures being at least partially left in the finished device
2224/81139 . . . . . Guiding structures on the body
2224/8114 . . . . . Guiding structures outside the body
2224/81141 . . . . . Guiding structures both on and outside the body
2224/81143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/81148 . . . . involving movement of a part of the bonding apparatus
2224/81149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
2224/8115 . . . . . Rotational movements
2224/8116 . . . . . Translational movements
2224/81169 . . . . . being the upper part of the bonding apparatus, i.e. bonding head
2224/8117 . . . . . Rotational movements
2224/8118 . . . . . Translational movements
2224/8119 . . . Arrangement of the bump connectors prior to mounting
2224/81191 . . . . wherein the bump connectors are disposed only on the semiconductor or solid-state body

2224/81192 . . . . wherein the bump connectors are disposed only on another item or body to be connected to the semiconductor or solid-state body
2224/81193 . . . . wherein the bump connectors are disposed on both the semiconductor or solid-state body and another item or body to be connected to the semiconductor or solid-state body
2224/81194 . . . . Lateral distribution of the bump connectors
2224/812 . . . Applying energy for connecting
2224/81201 . . . . Compression bonding
2224/81203 . . . . . Thermocompression bonding, e.g. diffusion bonding, pressure joining, thermocompression welding or solid-state welding
2224/81204 . . . . . with a graded temperature profile
2224/81205 . . . . . Ultrasonic bonding
2224/81206 . . . . . Direction of oscillation
2224/81207 . . . . . Thermosonic bonding
2224/81208 . . . . . applying unidirectional static pressure
2224/81209 . . . . . applying isostatic pressure, e.g. degassing using vacuum or a pressurised liquid
2224/8121 . . . . using a reflow oven
2224/81211 . . . . . with a graded temperature profile
2224/8122 . . . . with energy being in the form of electromagnetic radiation
2224/81222 . . . . . Induction heating, i.e. eddy currents
2224/81224 . . . . . using a laser
2224/8123 . . . . . Polychromatic or infrared lamp heating
2224/81232 . . . . using an autocatalytic reaction, e.g. exothermic brazing
2224/81234 . . . . using means for applying energy being within the device, e.g. integrated heater
2224/81236 . . . . using electro-static corona discharge
2224/81237 . . . . using an electron beam (electron beam welding in general B23K 15/00)
2224/81238 . . . . using electric resistance welding, i.e. ohmic heating
2224/8134 . . . Bonding interfaces of the bump connector
2224/81345 . . . . Shape, e.g. interlocking features
2224/81355 . . . . having an external coating, e.g. protective bond-through coating
2224/81359 . . . . Material
2224/8136 . . . Bonding interfaces of the semiconductor or solid state body
2224/81365 . . . . Shape, e.g. interlocking features
2224/81375 . . . . having an external coating, e.g. protective bond-through coating
2224/81379 . . . . Material (material of the bump connector prior to the connecting process H01L 2224/13099 and H01L 2224/13599, and subgroups)
2224/8138 . . . Bonding interfaces outside the semiconductor or solid-state body
2224/81385 . . . . Shape, e.g. interlocking features
2224/81395 . . . . having an external coating, e.g. protective bond-through coating
2224/81399 . . . . Material
2224/814 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/81401 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/81405 . . . . . Gallium [Ga] as principal constituent
2224/81409 . . . . . Indium [In] as principal constituent
2224/81411 . . . . . Tin [Sn] as principal constituent
2224/81413 . . . . . Bismuth [Bi] as principal constituent
2224/81414 . . . . . Thallium [Tl] as principal constituent
2224/81416 . . . . . Lead [Pb] as principal constituent
2224/81417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/81418 . . . . . Zinc [Zn] as principal constituent
2224/8142 . . . . . Antimony [Sb] as principal constituent
2224/81423 . . . . . Magnesium [Mg] as principal constituent
2224/81424 . . . . . Aluminium [Al] as principal constituent
2224/81438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/81439 . . . . . Silver [Ag] as principal constituent
2224/81444 . . . . . Gold [Au] as principal constituent
2224/81447 . . . . . Copper [Cu] as principal constituent
2224/81449 . . . . . Manganese [Mn] as principal constituent
2224/81455 . . . . . Nickel [Ni] as principal constituent
2224/81457 . . . . . Cobalt [Co] as principal constituent
2224/8146 . . . . . Iron [Fe] as principal constituent
2224/81463 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/81464 . . . . . Palladium [Pd] as principal constituent
2224/81466 . . . . . Titanium [Ti] as principal constituent
2224/81469 . . . . . Platinum [Pt] as principal constituent
2224/8147 . . . . . Zirconium [Zr] as principal constituent
2224/81471 . . . . . Chromium [Cr] as principal constituent
2224/81472 . . . . . Vanadium [V] as principal constituent
2224/81473 . . . . . Rhodium [Rh] as principal constituent
2224/81476 . . . . . Ruthenium [Ru] as principal constituent
2224/81478 . . . . . Iridium [Ir] as principal constituent
2224/81479 . . . . . Niobium [Nb] as principal constituent
2224/8148 . . . . . Molybdenum [Mo] as principal constituent
2224/81481 . . . . . Tantalum [Ta] as principal constituent
2224/81483 . . . . . Rhenium [Re] as principal constituent
2224/81484 . . . . . Tungsten [W] as principal constituent
2224/81486 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/81487 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/81488)
2224/81488 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8149 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy

2224/81491 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/81493 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/814 - H01L 2224/81491, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/81494 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/814 - H01L 2224/81491
2224/81495 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/814 - H01L 2224/81491
2224/81498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/81499 . . . . . Material of the matrix
2224/815 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/81501 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/81505 . . . . . Gallium [Ga] as principal constituent
2224/81509 . . . . . Indium [In] as principal constituent
2224/81511 . . . . . Tin [Sn] as principal constituent
2224/81513 . . . . . Bismuth [Bi] as principal constituent
2224/81514 . . . . . Thallium [Tl] as principal constituent
2224/81516 . . . . . Lead [Pb] as principal constituent
2224/81517 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/81518 . . . . . Zinc [Zn] as principal constituent
2224/8152 . . . . . Antimony [Sb] as principal constituent
2224/81523 . . . . . Magnesium [Mg] as principal constituent
2224/81524 . . . . . Aluminium [Al] as principal constituent
2224/81538 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/81539 . . . . . Silver [Ag] as principal constituent
2224/81544 . . . . . Gold [Au] as principal constituent
2224/81547 . . . . . Copper [Cu] as principal constituent
2224/81549 . . . . . Manganese [Mn] as principal constituent
2224/81555 . . . . . Nickel [Ni] as principal constituent
2224/81557 . . . . . Cobalt [Co] as principal constituent
2224/8156 . . . . . Iron [Fe] as principal constituent
2224/81563 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/81564 . . . . . Palladium [Pd] as principal constituent
2224/81566 . . . . . Titanium [Ti] as principal constituent
2224/81569 . . . . . Platinum [Pt] as principal constituent
2224/8157 . . . . . Zirconium [Zr] as principal constituent
2224/81571 . . . . . Chromium [Cr] as principal constituent
2224/81572 . . . . . Vanadium [V] as principal constituent
2224/81573 . . . . . Rhodium [Rh] as principal constituent
2224/81576 . . . . . Ruthenium [Ru] as principal constituent
2224/81578 . . . . . Iridium [Ir] as principal constituent
2224/81579 . . . . . Niobium [Nb] as principal constituent
2224/8158 . . . . . Molybdenum [Mo] as principal constituent
2224/81581 . . . . . Tantalum [Ta] as principal constituent
2224/81583 . . . . . Rhenium [Re] as principal constituent
2224/81584 . . . . . Tungsten [W] as principal constituent
2224/81586 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/81587 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/81588)
2224/81588 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8159 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/81591 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/81593 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/815 - H01L 2224/81591, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/81594 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/815 - H01L 2224/81591
2224/81595 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/815 - H01L 2224/81591
2224/81598 . . . . . Fillers
2224/81599 . . . . . Base material

2224/816 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof

2224/81601 . . . . . the principal constituent melting at a temperature of less than 400°C

2224/81605 . . . . . Gallium [Ga] as principal constituent

2224/81609 . . . . . Indium [In] as principal constituent

2224/81611 . . . . . Tin [Sn] as principal constituent

2224/81613 . . . . . Bismuth [Bi] as principal constituent

2224/81614 . . . . . Thallium [Tl] as principal constituent

2224/81616 . . . . . Lead [Pb] as principal constituent

2224/81617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C

2224/81618 . . . . . Zinc [Zn] as principal constituent

2224/8162 . . . . . Antimony [Sb] as principal constituent

2224/81623 . . . . . Magnesium [Mg] as principal constituent

2224/81624 . . . . . Aluminium [Al] as principal constituent

2224/81638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C

2224/81639 . . . . . Silver [Ag] as principal constituent

2224/81644 . . . . . Gold [Au] as principal constituent

2224/81647 . . . . . Copper [Cu] as principal constituent

2224/81649 . . . . . Manganese [Mn] as principal constituent

2224/81655 . . . . . Nickel [Ni] as principal constituent

2224/81657 . . . . . Cobalt [Co] as principal constituent

2224/8166 . . . . . Iron [Fe] as principal constituent

2224/81663 . . . . . the principal constituent melting at a temperature of greater than 1550°C

2224/81664 . . . . . Palladium [Pd] as principal constituent

2224/81666 . . . . . Titanium [Ti] as principal constituent

2224/81669 . . . . . Platinum [Pt] as principal constituent

2224/8167 . . . . . Zirconium [Zr] as principal constituent

2224/81671 . . . . . Chromium [Cr] as principal constituent

2224/81672 . . . . . Vanadium [V] as principal constituent

2224/81673 . . . . . Rhodium [Rh] as principal constituent

2224/81676 . . . . . Ruthenium [Ru] as principal constituent

2224/81678 . . . . . Iridium [Ir] as principal constituent

2224/81679 . . . . . Niobium [Nb] as principal constituent

2224/8168 . . . . . Molybdenum [Mo] as principal constituent

2224/81681 . . . . . Tantalum [Ta] as principal constituent

2224/81683 . . . . . Rhenium [Re] as principal constituent

2224/81684 . . . . . Tungsten [W] as principal constituent

2224/81686 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material

2224/81687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/81688)

2224/81688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides

2224/8169 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy

2224/81691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2224/81693 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/816 - H01L 2224/81691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

2224/81694 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/816 - H01L 2224/81691

2224/81695 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/816 - H01L 2224/81691

2224/81698 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams

2224/81699 . . . . . Coating material

2224/817 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof

2224/81701 . . . . . the principal constituent melting at a temperature of less than 400°C

2224/81705 . . . . . Gallium [Ga] as principal constituent
2224/81709 . . . . . Indium [In] as principal constituent
2224/81711 . . . . . Tin [Sn] as principal constituent
2224/81713 . . . . . Bismuth [Bi] as principal constituent
2224/81714 . . . . . Thallium [Tl] as principal constituent
2224/81716 . . . . . Lead [Pb] as principal constituent
2224/81717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/81718 . . . . . Zinc [Zn] as principal constituent
2224/8172 . . . . . Antimony [Sb] as principal constituent
2224/81723 . . . . . Magnesium [Mg] as principal constituent
2224/81724 . . . . . Aluminium [Al] as principal constituent
2224/81738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/81739 . . . . . Silver [Ag] as principal constituent
2224/81744 . . . . . Gold [Au] as principal constituent
2224/81747 . . . . . Copper [Cu] as principal constituent
2224/81749 . . . . . Manganese [Mn] as principal constituent
2224/81755 . . . . . Nickel [Ni] as principal constituent
2224/81757 . . . . . Cobalt [Co] as principal constituent
2224/8176 . . . . . Iron [Fe] as principal constituent
2224/81763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/81764 . . . . . Palladium [Pd] as principal constituent
2224/81766 . . . . . Titanium [Ti] as principal constituent
2224/81769 . . . . . Platinum [Pt] as principal constituent
2224/8177 . . . . . Zirconium [Zr] as principal constituent
2224/81771 . . . . . Chromium [Cr] as principal constituent
2224/81772 . . . . . Vanadium [V] as principal constituent
2224/81773 . . . . . Rhodium [Rh] as principal constituent
2224/81776 . . . . . Ruthenium [Ru] as principal constituent
2224/81778 . . . . . Iridium [Ir] as principal constituent
2224/81779 . . . . . Niobium [Nb] as principal constituent
2224/8178 . . . . . Molybdenum [Mo] as principal constituent
2224/81781 . . . . . Tantalum [Ta] as principal constituent
2224/81783 . . . . . Rhenium [Re] as principal constituent
2224/81784 . . . . . Tungsten [W] as principal constituent
2224/81786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/81787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/81788)
2224/81788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8179 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/81791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/81793 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/817 - H01L 2224/81791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/81794 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/817 - H01L 2224/81791
2224/81795 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/817 - H01L 2224/81791
2224/81798 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/81799 . . . . . Shape or distribution of the fillers
2224/818 . . . Bonding techniques
2224/81801 . . . . Soldering or alloying
2224/81805 . . . . . involving forming a eutectic alloy at the bonding interface
2224/8181 . . . . . involving forming an intermetallic compound at the bonding interface
2224/81815 . . . . . Reflow soldering
2224/8182 . . . . . Diffusion bonding
2224/81825 . . . . . Solid-liquid interdiffusion
2224/8183 . . . . . Solid-solid interdiffusion
2224/8184 . . . . Sintering
2224/8185 . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/81855 . . . . . Hardening the adhesive by curing, i.e. thermosetting

2224/81856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
2224/81859 . . . . . Localised curing of parts of the bump connector
2224/81862 . . . . . Heat curing
2224/81865 . . . . . Microwave curing
2224/81868 . . . . . Infrared [IR] curing
2224/81871 . . . . . Visible light curing
2224/81874 . . . . . Ultraviolet [UV] curing
2224/81877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/8188 . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/81885 . . . . Combinations of two or more hardening methods provided for in at least two different groups from H01L 2224/81855 - H01L 2224/8188, e.g. for hybrid thermoplastic-thermosetting adhesives
2224/8189 . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
2224/81893 . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
2224/81894 . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/81895 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/81896 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
2224/81897 . . . . Mechanical interlocking, e.g. anchoring, hook and loop-type fastening or the like
2224/81898 . . . . . Press-fitting, i.e. pushing the parts together and fastening by friction, e.g. by compression of one part against the other
2224/81899 . . . . . using resilient parts in the bump connector or in the bonding area
2224/819 . . . with the bump connector not providing any mechanical bonding
2224/81901 . . . . Pressing the bump connector against the bonding areas by means of another connector (detachable pressure contact H01L 2224/72)
2224/81902 . . . . . by means of another bump connector
2224/81903 . . . . . by means of a layer connector
2224/81904 . . . . . by means of an encapsulation layer or foil
2224/81905 . . . Combinations of bonding methods provided for in at least two different groups from H01L 2224/818 - H01L 2224/81904
2224/81906 . . . . Specific sequence of method steps
2224/81907 . . . . Intermediate bonding, i.e. intermediate bonding step for temporarily bonding the semiconductor or solid-state body, followed by at least a further bonding step
2224/81908 . . . involving monitoring, e.g. feedback loop
2224/81909 . . . Post-treatment of the bump connector or bonding area
2224/8191 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/81911 . . . . . Chemical cleaning, e.g. etching, flux
2224/81912 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
2224/81913 . . . . . Plasma cleaning
2224/81914 . . . . . Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
2224/81919 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8191 - H01L 2224/81914
2224/8192 . . . . Applying permanent coating, e.g. protective coating
2224/8193 . . . . Reshaping
2224/81931 . . . . . by chemical means, e.g. etching
2224/81935 . . . . . by heating means, e.g. reflowing
2224/81937 . . . . . using a polychromatic heating lamp
2224/81939 . . . . . using a laser
2224/81941 . . . . . Induction heating, i.e. eddy currents
2224/81943 . . . . . using a flame torch, e.g. hydrogen torch
2224/81945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/81947 . . . . . by mechanical means, e.g. "pull-and-cut", pressing, stamping
2224/81948 . . . . Thermal treatments, e.g. annealing, controlled cooling
2224/81951 . . . . Forming additional members, e.g. for reinforcing
2224/81986 . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
2224/82 . . by forming build-up interconnects at chip-level, e.g. for high density interconnects [HDI]
2224/82001 . . . involving a temporary auxiliary member not forming part of the bonding apparatus
2224/82002 . . . . being a removable or sacrificial coating
2224/82005 . . . . being a temporary or sacrificial substrate
2224/82007 . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting a build-up interconnect during or after the bonding process
2224/82009 . . . Pre-treatment of the connector or the bonding area
2224/8201 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/8203 . . . . Reshaping, e.g. forming vias
2224/82031 . . . . . by chemical means, e.g. etching, anodisation
2224/82035 . . . . . by heating means
2224/82039 . . . . . using a laser
2224/82045 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/82047 . . . . . by mechanical means, e.g. severing, pressing, stamping
2224/82048 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
2224/82051 . . . . Forming additional members
2224/82053 . . . Bonding environment
2224/82054 . . . . Composition of the atmosphere
2224/82085 . . . . being a liquid, e.g. for fluidic self-assembly
2224/8209 . . . . Vacuum
2224/82091 . . . . Under pressure
2224/82095 . . . . Temperature settings
2224/82096 . . . . . Transient conditions
2224/82097 . . . . . Heating

2224/82098 . . . . . Cooling
2224/82099 . . . . . Ambient temperature
2224/821 . . . Forming a build-up interconnect
2224/82101 . . . . by additive methods, e.g. direct writing
2224/82102 . . . . . using jetting, e.g. ink jet
2224/82103 . . . . . using laser direct writing
2224/82104 . . . . . using screen printing
2224/82105 . . . . . by using a preform
2224/82106 . . . . by subtractive methods
2224/82108 . . . . by self-assembly processes
2224/8211 . . . involving protection against electrical discharge, e.g. removing electrostatic charge
2224/8212 . . . Aligning
2224/82121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
2224/82122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
2224/8213 . . . . . using marks formed on the semiconductor or solid-state body
2224/82132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
2224/82136 . . . . involving guiding structures, e.g. spacers or supporting members
2224/82138 . . . . . the guiding structures being at least partially left in the finished device
2224/82143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/82148 . . . . involving movement of a part of the bonding apparatus
2224/82149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
2224/8215 . . . . . Rotational movements
2224/8216 . . . . . Translational movements
2224/82169 . . . . . being the upper part of the bonding apparatus, e.g. nozzle
2224/8217 . . . . . Rotational movement
2224/8218 . . . . . Translational movements
2224/82181 . . . . . connecting first on the semiconductor or solid-state body, i.e. on-chip,
2224/82186 . . . . . connecting first outside the semiconductor or solid-state body, i.e. off-chip
2224/82191 . . . . . connecting first both on and outside the semiconductor or solid-state body
2224/822 . . . Applying energy for connecting
2224/82201 . . . . Compression bonding
2224/82203 . . . . . Thermocompression bonding
2224/82205 . . . . . Ultrasonic bonding
2224/82207 . . . . . Thermosonic bonding
2224/8221 . . . . with energy being in the form of electromagnetic radiation
2224/82212 . . . . . Induction heating, i.e. eddy currents
2224/82214 . . . . . using a laser
2224/8223 . . . . . Polychromatic or infrared lamp heating
2224/82232 . . . . using an autocatalytic reaction, e.g. exothermic brazing
2224/82234 . . . . using means for applying energy being within the device, e.g. integrated heater
2224/82236 . . . . using electro-static corona discharge
2224/82237 . . . . using electron beam, (electron beam in general B23K 15/00)
2224/82238 . . . . using electric resistance welding, i.e. ohmic heating
2224/8234 . . . Bonding interfaces of the connector
2224/82345 . . . . Shape, e.g. interlocking features
2224/82355 . . . . having an external coating, e.g. protective bond-through coating
2224/82359 . . . . Material
2224/8236 . . . Bonding interfaces of the semiconductor or solid state body
2224/82365 . . . . Shape, e.g. interlocking features
2224/82375 . . . . having an external coating, e.g. protective bond-through coating
2224/82379 . . . . Material
2224/8238 . . . Bonding interfaces outside the semiconductor or solid-state body
2224/82385 . . . . Shape, e.g. interlocking features
2224/82395 . . . . having an external coating, e.g. protective bond-through coating
2224/82399 . . . . Material
2224/828 . . . Bonding techniques
2224/82801 . . . . Soldering or alloying
2224/82805 . . . . . involving forming a eutectic alloy at the bonding interface
2224/8281 . . . . . involving forming an intermetallic compound at the bonding interface
2224/82815 . . . . . Reflow soldering
2224/8282 . . . . . Diffusion bonding
2224/82825 . . . . . Solid-liquid interdiffusion
2224/8283 . . . . . Solid-solid interdiffusion
2224/8284 . . . . Sintering
2224/8285 . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/82855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
2224/82856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
2224/82859 . . . . . Localised curing of parts of the connector
2224/82862 . . . . . Heat curing
2224/82865 . . . . . Microwave curing
2224/82868 . . . . . Infrared [IR] curing
2224/82871 . . . . . Visible light curing
2224/82874 . . . . . Ultraviolet [UV] curing
2224/82877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/8288 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/82885 . . . . . Combinations of two or more hardening methods provided for in at least two different groups from H01L 2224/82855 - H01L 2224/8288, e.g. for hybrid thermoplastic-thermosetting adhesives
2224/8289 . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
2224/82893 . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond

2224/82895 . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/82896 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/82897 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
2224/82899 . . . . Combinations of bonding methods provided for in at least two different groups from H01L 2224/828 - H01L 2224/82897
2224/829 . . . involving monitoring, e.g. feedback loop
2224/82909 . . . Post-treatment of the connector or the bonding area
2224/8291 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/8293 . . . . Reshaping
2224/82931 . . . . . by chemical means, e.g. etching, anodisation
2224/82935 . . . . . by heating means
2224/82939 . . . . . using a laser
2224/82945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/82947 . . . . . by mechanical means, e.g. severing, pressing, stamping
2224/82948 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
2224/82951 . . . . Forming additional members
2224/82986 . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
2224/83 . . using a layer connector
2224/83001 . . . involving a temporary auxiliary member not forming part of the bonding apparatus
2224/83002 . . . . being a removable or sacrificial coating
2224/83005 . . . . being a temporary or sacrificial substrate
2224/83007 . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the layer connector during or after the bonding process
2224/83009 . . . Pre-treatment of the layer connector or the bonding area
2224/8301 . . . . Cleaning the layer connector, e.g. oxide removal step, desmearing
2224/83011 . . . . . Chemical cleaning, e.g. etching, flux
2224/83012 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
2224/83013 . . . . . Plasma cleaning
2224/83014 . . . . . Thermal cleaning, e.g. decomposition, sublimation
2224/83019 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8301 - H01L 2224/83014
2224/8302 . . . . Applying permanent coating to the layer connector in the bonding apparatus, e.g. in-situ coating
2224/83022 . . . . Cleaning the bonding area, e.g. oxide removal step, desmearing
2224/83024 . . . . Applying flux to the bonding area
2224/83026 . . . . Applying a precursor material to the bonding area
2224/8303 . . . . Reshaping the layer connector in the bonding apparatus, e.g. flattening the layer connector
2224/83031 . . . . . by chemical means, e.g. etching, anodisation
2224/83035 . . . . . by heating means
2224/83037 . . . . . using a polychromatic heating lamp
2224/83039 . . . . . using a laser
2224/83041 . . . . . Induction heating, i.e. eddy currents
2224/83047 . . . . . by mechanical means, e.g. severing, pressing, stamping
2224/83048 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
2224/83051 . . . . Forming additional members, e.g. dam structures
2224/83052 . . . Detaching layer connectors, e.g. after testing (unsoldering in general B23K 1/018)
2224/83053 . . . Bonding environment
2224/83054 . . . . Composition of the atmosphere
2224/83055 . . . . . being oxidating
2224/83065 . . . . . being reducing
2224/83075 . . . . . being inert
2224/83085 . . . . being a liquid, e.g. for fluidic self-assembly
2224/8309 . . . . Vacuum
2224/83091 . . . . Under pressure
2224/83092 . . . . . Atmospheric pressure
2224/83093 . . . . . Transient conditions, e.g. gas-flow
2224/83095 . . . . Temperature settings
2224/83096 . . . . . Transient conditions
2224/83097 . . . . . Heating
2224/83098 . . . . . Cooling
2224/83099 . . . . . Ambient temperature
2224/831 . . . the layer connector being supplied to the parts to be connected in the bonding apparatus
2224/83101 . . . . as prepeg comprising a layer connector, e.g. provided in an insulating plate member
2224/83102 . . . . using surface energy, e.g. capillary forces
2224/83104 . . . . by applying pressure, e.g. by injection
2224/8311 . . . involving protection against electrical discharge, e.g. removing electrostatic charge
2224/8312 . . . Aligning
2224/83121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
2224/83122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
2224/83123 . . . . . Shape or position of the body
2224/83125 . . . . . Bonding areas on the body
2224/83127 . . . . . Bonding areas outside the body
2224/83129 . . . . . Shape or position of the other item
2224/8313 . . . . . using marks formed on the semiconductor or solid-state body
2224/83132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
2224/83136 . . . . involving guiding structures, e.g. spacers or supporting members
2224/83138 . . . . . the guiding structures being at least partially left in the finished device
2224/83139 . . . . . Guiding structures on the body
2224/8314 . . . . . Guiding structures outside the body
2224/83141 . . . . . Guiding structures both on and outside the body

2224/83143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/83148 . . . . involving movement of a part of the bonding apparatus
2224/83149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
2224/8315 . . . . . Rotational movements
2224/8316 . . . . . Translational movements
2224/83169 . . . . . being the upper part of the bonding apparatus, i.e. bonding head
2224/8317 . . . . . Rotational movements
2224/8318 . . . . . Translational movements
2224/8319 . . . Arrangement of the layer connectors prior to mounting
2224/83191 . . . . wherein the layer connectors are disposed only on the semiconductor or solid-state body
2224/83192 . . . . wherein the layer connectors are disposed only on another item or body to be connected to the semiconductor or solid-state body
2224/83193 . . . . wherein the layer connectors are disposed on both the semiconductor or solid-state body and another item or body to be connected to the semiconductor or solid-state body
2224/83194 . . . . Lateral distribution of the layer connectors
2224/832 . . . Applying energy for connecting
2224/83201 . . . . Compression bonding
2224/83203 . . . . . Thermocompression bonding, e.g. diffusion bonding, pressure joining, thermocompression welding or solid-state welding
2224/83204 . . . . . with a graded temperature profile
2224/83205 . . . . . Ultrasonic bonding
2224/83206 . . . . . Direction of oscillation
2224/83207 . . . . . Thermosonic bonding
2224/83208 . . . . . applying unidirectional static pressure
2224/83209 . . . . . applying isostatic pressure, e.g. degassing using vacuum or a pressurised liquid
2224/8321 . . . . using a reflow oven
2224/83211 . . . . . with a graded temperature profile
2224/8322 . . . . with energy being in the form of electromagnetic radiation
2224/83222 . . . . . Induction heating, i.e. eddy currents
2224/83224 . . . . . using a laser
2224/8323 . . . . . Polychromatic or infrared lamp heating
2224/83232 . . . . using an autocatalytic reaction, e.g. exothermic brazing
2224/83234 . . . . using means for applying energy being within the device, e.g. integrated heater
2224/83236 . . . . using electro-static corona discharge
2224/83237 . . . . using an electron beam (electron beam welding in general B23K 15/00)
2224/83238 . . . . using electric resistance welding, i.e. ohmic heating
2224/8334 . . . Bonding interfaces of the layer connector
2224/83345 . . . . Shape, e.g. interlocking features
2224/83355 . . . . having an external coating, e.g. protective bond-through coating
2224/83359 . . . . Material
2224/8336 . . . Bonding interfaces of the semiconductor or solid state body
2224/83365 . . . . Shape, e.g. interlocking features
2224/83375 . . . . having an external coating, e.g. protective bond-through coating
2224/83379 . . . . Material (material of the layer connector prior to the connecting process H01L 2224/29099 and H01L 2224/29599, and subgroups)
2224/8338 . . . Bonding interfaces outside the semiconductor or solid-state body
2224/83385 . . . . Shape, e.g. interlocking features
2224/83395 . . . . having an external coating, e.g. protective bond-through coating
2224/83399 . . . . Material
2224/834 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/83401 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/83405 . . . . . Gallium [Ga] as principal constituent
2224/83409 . . . . . Indium [In] as principal constituent
2224/83411 . . . . . Tin [Sn] as principal constituent
2224/83413 . . . . . Bismuth [Bi] as principal constituent
2224/83414 . . . . . Thallium [Tl] as principal constituent
2224/83416 . . . . . Lead [Pb] as principal constituent
2224/83417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/83418 . . . . . Zinc [Zn] as principal constituent
2224/8342 . . . . . Antimony [Sb] as principal constituent
2224/83423 . . . . . Magnesium [Mg] as principal constituent
2224/83424 . . . . . Aluminium [Al] as principal constituent
2224/83438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/83439 . . . . . Silver [Ag] as principal constituent
2224/83444 . . . . . Gold [Au] as principal constituent
2224/83447 . . . . . Copper [Cu] as principal constituent
2224/83449 . . . . . Manganese [Mn] as principal constituent
2224/83455 . . . . . Nickel [Ni] as principal constituent
2224/83457 . . . . . Cobalt [Co] as principal constituent
2224/8346 . . . . . Iron [Fe] as principal constituent
2224/83463 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/83464 . . . . . Palladium [Pd] as principal constituent
2224/83466 . . . . . Titanium [Ti] as principal constituent
2224/83469 . . . . . Platinum [Pt] as principal constituent
2224/8347 . . . . . Zirconium [Zr] as principal constituent
2224/83471 . . . . . Chromium [Cr] as principal constituent
2224/83472 . . . . . Vanadium [V] as principal constituent
2224/83473 . . . . . Rhodium [Rh] as principal constituent
2224/83476 . . . . . Ruthenium [Ru] as principal constituent
2224/83478 . . . . . Iridium [Ir] as principal constituent
2224/83479 . . . . . Niobium [Nb] as principal constituent

2224/8348 . . . . . Molybdenum [Mo] as principal constituent
2224/83481 . . . . . Tantalum [Ta] as principal constituent
2224/83483 . . . . . Rhenium [Re] as principal constituent
2224/83484 . . . . . Tungsten [W] as principal constituent
2224/83486 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/83487 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/83488)
2224/83488 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8349 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/83491 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/83493 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/834 - H01L 2224/83491, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/83494 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/834 - H01L 2224/83491
2224/83495 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/834 - H01L 2224/83491
2224/83498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/83499 . . . . . Material of the matrix
2224/835 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/83501 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/83505 . . . . . Gallium [Ga] as principal constituent
2224/83509 . . . . . Indium [In] as principal constituent
2224/83511 . . . . . Tin [Sn] as principal constituent
2224/83513 . . . . . Bismuth [Bi] as principal constituent
2224/83514 . . . . . Thallium [Tl] as principal constituent
2224/83516 . . . . . Lead [Pb] as principal constituent
2224/83517 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/83518 . . . . . Zinc [Zn] as principal constituent
2224/8352 . . . . . Antimony [Sb] as principal constituent
2224/83523 . . . . . Magnesium [Mg] as principal constituent
2224/83524 . . . . . Aluminium [Al] as principal constituent
2224/83538 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/83539 . . . . . Silver [Ag] as principal constituent
2224/83544 . . . . . Gold [Au] as principal constituent
2224/83547 . . . . . Copper [Cu] as principal constituent
2224/83549 . . . . . Manganese [Mn] as principal constituent
2224/83555 . . . . . Nickel [Ni] as principal constituent
2224/83557 . . . . . Cobalt [Co] as principal constituent
2224/8356 . . . . . Iron [Fe] as principal constituent
2224/83563 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/83564 . . . . . Palladium [Pd] as principal constituent
2224/83566 . . . . . Titanium [Ti] as principal constituent
2224/83569 . . . . . Platinum [Pt] as principal constituent
2224/8357 . . . . . Zirconium [Zr] as principal constituent
2224/83571 . . . . . Chromium [Cr] as principal constituent
2224/83572 . . . . . Vanadium [V] as principal constituent
2224/83573 . . . . . Rhodium [Rh] as principal constituent
2224/83576 . . . . . Ruthenium [Ru] as principal constituent
2224/83578 . . . . . Iridium [Ir] as principal constituent
2224/83579 . . . . . Niobium [Nb] as principal constituent
2224/8358 . . . . . Molybdenum [Mo] as principal constituent
2224/83581 . . . . . Tantalum [Ta] as principal constituent
2224/83583 . . . . . Rhenium [Re] as principal constituent
2224/83584 . . . . . Tungsten [W] as principal constituent
2224/83586 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/83587 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/83588)
2224/83588 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8359 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/83591 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2224/83593 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/835 - H01L 2224/83591, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/83594 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/835 - H01L 2224/83591
2224/83595 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/835 - H01L 2224/83591
2224/83598 . . . . . Fillers
2224/83599 . . . . . Base material
2224/836 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/83601 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/83605 . . . . . Gallium [Ga] as principal constituent
2224/83609 . . . . . Indium [In] as principal constituent
2224/83611 . . . . . Tin [Sn] as principal constituent
2224/83613 . . . . . Bismuth [Bi] as principal constituent
2224/83614 . . . . . Thallium [Tl] as principal constituent
2224/83616 . . . . . Lead [Pb] as principal constituent
2224/83617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/83618 . . . . . Zinc [Zn] as principal constituent
2224/8362 . . . . . Antimony [Sb] as principal constituent
2224/83623 . . . . . Magnesium [Mg] as principal constituent
2224/83624 . . . . . Aluminium [Al] as principal constituent
2224/83638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/83639 . . . . . Silver [Ag] as principal constituent
2224/83644 . . . . . Gold [Au] as principal constituent
2224/83647 . . . . . Copper [Cu] as principal constituent
2224/83649 . . . . . Manganese [Mn] as principal constituent
2224/83655 . . . . . Nickel [Ni] as principal constituent
2224/83657 . . . . . Cobalt [Co] as principal constituent
2224/8366 . . . . . Iron [Fe] as principal constituent
2224/83663 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/83664 . . . . . Palladium [Pd] as principal constituent
2224/83666 . . . . . Titanium [Ti] as principal constituent
2224/83669 . . . . . Platinum [Pt] as principal constituent
2224/8367 . . . . . Zirconium [Zr] as principal constituent
2224/83671 . . . . . Chromium [Cr] as principal constituent
2224/83672 . . . . . Vanadium [V] as principal constituent
2224/83673 . . . . . Rhodium [Rh] as principal constituent
2224/83676 . . . . . Ruthenium [Ru] as principal constituent
2224/83678 . . . . . Iridium [Ir] as principal constituent
2224/83679 . . . . . Niobium [Nb] as principal constituent
2224/8368 . . . . . Molybdenum [Mo] as principal constituent
2224/83681 . . . . . Tantalum [Ta] as principal constituent
2224/83683 . . . . . Rhenium [Re] as principal constituent
2224/83684 . . . . . Tungsten [W] as principal constituent
2224/83686 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/83687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/83688)
2224/83688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8369 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/83691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/83693 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/836 - H01L 2224/83691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/83694 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/836 - H01L 2224/83691
2224/83695 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/836 - H01L 2224/83691

2224/83698 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/83699 . . . . . Coating material
2224/837 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/83701 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/83705 . . . . . Gallium [Ga] as principal constituent
2224/83709 . . . . . Indium [In] as principal constituent
2224/83711 . . . . . Tin [Sn] as principal constituent
2224/83713 . . . . . Bismuth [Bi] as principal constituent
2224/83714 . . . . . Thallium [Tl] as principal constituent
2224/83716 . . . . . Lead [Pb] as principal constituent
2224/83717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/83718 . . . . . Zinc [Zn] as principal constituent
2224/8372 . . . . . Antimony [Sb] as principal constituent
2224/83723 . . . . . Magnesium [Mg] as principal constituent
2224/83724 . . . . . Aluminium [Al] as principal constituent
2224/83738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/83739 . . . . . Silver [Ag] as principal constituent
2224/83744 . . . . . Gold [Au] as principal constituent
2224/83747 . . . . . Copper [Cu] as principal constituent
2224/83749 . . . . . Manganese [Mn] as principal constituent
2224/83755 . . . . . Nickel [Ni] as principal constituent
2224/83757 . . . . . Cobalt [Co] as principal constituent
2224/8376 . . . . . Iron [Fe] as principal constituent
2224/83763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/83764 . . . . . Palladium [Pd] as principal constituent
2224/83766 . . . . . Titanium [Ti] as principal constituent
2224/83769 . . . . . Platinum [Pt] as principal constituent
2224/8377 . . . . . Zirconium [Zr] as principal constituent
2224/83771 . . . . . Chromium [Cr] as principal constituent
2224/83772 . . . . . Vanadium [V] as principal constituent
2224/83773 . . . . . Rhodium [Rh] as principal constituent
2224/83776 . . . . . Ruthenium [Ru] as principal constituent
2224/83778 . . . . . Iridium [Ir] as principal constituent
2224/83779 . . . . . Niobium [Nb] as principal constituent
2224/8378 . . . . . Molybdenum [Mo] as principal constituent
2224/83781 . . . . . Tantalum [Ta] as principal constituent
2224/83783 . . . . . Rhenium [Re] as principal constituent
2224/83784 . . . . . Tungsten [W] as principal constituent
2224/83786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/83787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/83788)
2224/83788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8379 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/83791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/83793 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/837 - H01L 2224/83791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/83794 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/837 - H01L 2224/83791
2224/83795 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/837 - H01L 2224/83791
2224/83798 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/83799 . . . . . Shape or distribution of the fillers
2224/838 . . . Bonding techniques
2224/83801 . . . . Soldering or alloying
2224/83805 . . . . . involving forming a eutectic alloy at the bonding interface

2224/8381 . . . . . involving forming an intermetallic compound at the bonding interface
2224/83815 . . . . . Reflow soldering
2224/8382 . . . . . Diffusion bonding
2224/83825 . . . . . . Solid-liquid interdiffusion
2224/8383 . . . . . . Solid-solid interdiffusion
2224/8384 . . . . Sintering
2224/8385 . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/83851 . . . . . being an anisotropic conductive adhesive
2224/83855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
2224/83856 . . . . . . Pre-cured adhesive, i.e. B-stage adhesive
2224/83859 . . . . . . Localised curing of parts of the layer connector
2224/83862 . . . . . . Heat curing
2224/83865 . . . . . . Microwave curing
2224/83868 . . . . . . Infrared [IR] curing
2224/83871 . . . . . . Visible light curing
2224/83874 . . . . . . Ultraviolet [UV] curing
2224/83877 . . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/8388 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/83885 . . . . . Combinations of two or more hardening methods provided for in at least two different groups from H01L 2224/83855 - H01L 2224/8388, e.g. for hybrid thermoplastic-thermosetting adhesives
2224/83886 . . . . Involving a self-assembly process, e.g. self-agglomeration of a material dispersed in a fluid
2224/83887 . . . . . Auxiliary means therefor, e.g. for self-assembly activation
2224/83888 . . . . . with special adaptation of the surface of the body to be connected, e.g. surface shape specially adapted for the self-assembly process
2224/83889 . . . . . involving the material of the bonding area, e.g. bonding pad
2224/8389 . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
2224/83893 . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
2224/83894 . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/83895 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/83896 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
2224/83897 . . . . Mechanical interlocking, e.g. anchoring, hook and loop-type fastening or the like
2224/83898 . . . . . Press-fitting, i.e. pushing the parts together and fastening by friction, e.g. by compression of one part against the other
2224/83899 . . . . . using resilient parts in the layer connector or in the bonding area
2224/839 . . . with the layer connector not providing any mechanical bonding
2224/83901 . . . . Pressing the layer connector against the bonding areas by means of another connector
2224/83902 . . . . . by means of another layer connector
2224/83903 . . . . . by means of a bump connector
2224/83904 . . . . . by means of an encapsulation layer or foil
2224/83905 . . . Combinations of bonding methods provided for in at least two different groups from H01L 2224/838 - H01L 2224/83904
2224/83906 . . . . Specific sequence of method steps
2224/83907 . . . . Intermediate bonding, i.e. intermediate bonding step for temporarily bonding the semiconductor or solid-state body, followed by at least a further bonding step
2224/83908 . . . involving monitoring, e.g. feedback loop
2224/83909 . . . Post-treatment of the layer connector or bonding area
2224/8391 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/83911 . . . . . Chemical cleaning, e.g. etching, flux
2224/83912 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
2224/83913 . . . . . Plasma cleaning
2224/83914 . . . . . Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
2224/83919 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8391 - H01L 2224/83914
2224/8392 . . . . Applying permanent coating, e.g. protective coating
2224/8393 . . . . Reshaping
2224/83931 . . . . . by chemical means, e.g. etching
2224/83935 . . . . . by heating means, e.g. reflowing
2224/83937 . . . . . using a polychromatic heating lamp
2224/83939 . . . . . using a laser
2224/83941 . . . . . Induction heating, i.e. eddy currents
2224/83943 . . . . . using a flame torch, e.g. hydrogen torch
2224/83945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/83947 . . . . . by mechanical means, e.g. "pull-and-cut", pressing, stamping
2224/83948 . . . . Thermal treatments, e.g. annealing, controlled cooling
2224/83951 . . . . Forming additional members, e.g. for reinforcing, fillet sealant
2224/83986 . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
2224/84 . . using a strap connector
2224/84001 . . . involving a temporary auxiliary member not forming part of the bonding apparatus
2224/84002 . . . . being a removable or sacrificial coating
2224/84005 . . . . being a temporary substrate
2224/84007 . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the strap connector during or after the bonding process
2224/84009 . . . Pre-treatment of the connector and/or the bonding area

2224/8401 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/84011 . . . . . Chemical cleaning, e.g. etching, flux
2224/84012 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
2224/84013 . . . . . Plasma cleaning
2224/84014 . . . . . Thermal cleaning, e.g. decomposition, sublimation
2224/84019 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8401 - H01L 2224/84014
2224/8402 . . . . Applying permanent coating, e.g. in-situ coating
2224/8403 . . . . Reshaping
2224/84031 . . . . . by chemical means, e.g. etching, anodisation
2224/84035 . . . . . by heating means, e.g. "free-air-ball"
2224/84037 . . . . . using a polychromatic heating lamp
2224/84039 . . . . . using a laser
2224/84041 . . . . . Induction heating, i.e. eddy currents
2224/84043 . . . . . using a flame torch, e.g. hydrogen torch
2224/84045 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/84047 . . . . . by mechanical means, e.g. severing, pressing, stamping
2224/84048 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
2224/84051 . . . . Forming additional members
2224/84053 . . . Bonding environment
2224/84054 . . . . Composition of the atmosphere
2224/84055 . . . . . being oxidating
2224/84065 . . . . . being reducing
2224/84075 . . . . . being inert
2224/84085 . . . . being a liquid (e.g. for fluidic self-assembly)
2224/8409 . . . . Vacuum
2224/84091 . . . . Under pressure
2224/84092 . . . . . Atmospheric pressure
2224/84093 . . . . . Transient conditions, e.g. gas-flow
2224/84095 . . . . Temperature settings
2224/84096 . . . . . Transient conditions
2224/84097 . . . . . Heating
2224/84098 . . . . . Cooling
2224/84099 . . . . . Ambient temperature
2224/841 . . . the connector being supplied to the parts to be connected in the bonding apparatus
2224/8411 . . . involving protection against electrical discharge, e.g. removing electrostatic charge
2224/8412 . . . Aligning
2224/84121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
2224/84122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
2224/84123 . . . . . Shape or position of the body
2224/84125 . . . . . Bonding areas on the body
2224/84127 . . . . . Bonding areas outside the body
2224/84129 . . . . . Shape or position of the other item
2224/8413 . . . . . using marks formed on the semiconductor or solid-state body
2224/84132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
2224/84136 . . . . involving guiding structures, e.g. spacers or supporting members
2224/84138 . . . . . the guiding structures being at least partially left in the finished device
2224/84143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/84148 . . . . involving movement of a part of the bonding apparatus
2224/84149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
2224/8415 . . . . . Rotational movements
2224/8416 . . . . . Translational movements
2224/84169 . . . . . being the upper part of the bonding apparatus, i.e. bonding head,
2224/8417 . . . . . Rotational movements
2224/8418 . . . . . Translational movements
2224/84181 . . . . . connecting first on the semiconductor or solid-state body, i.e. on-chip, regular stitch
2224/84186 . . . . . connecting first outside the semiconductor or solid-state body, i.e. off-chip, reverse stitch
2224/84191 . . . . . connecting first both on and outside the semiconductor or solid-state body, i.e. regular and reverse stitches
2224/84196 . . . . . involving intermediate connecting steps before cutting the strap connector
2224/842 . . . Applying energy for connecting
2224/84201 . . . . Compression bonding
2224/84203 . . . . . Thermocompression bonding
2224/84205 . . . . . Ultrasonic bonding
2224/84206 . . . . . Direction of oscillation
2224/84207 . . . . . Thermosonic bonding
2224/8421 . . . . with energy being in the form of electromagnetic radiation
2224/84212 . . . . . Induction heating, i.e. eddy currents
2224/84214 . . . . . using a laser
2224/8423 . . . . . Polychromatic or infrared lamp heating
2224/84232 . . . . using an autocatalytic reaction, e.g. exothermic brazing
2224/84234 . . . . using means for applying energy being within the device, e.g. integrated heater
2224/84236 . . . . using electro-static corona discharge
2224/84237 . . . . using an electron beam (electron beam welding in general B23K 15/00)
2224/84238 . . . . using electric resistance welding, i.e. ohmic heating
2224/8434 . . . Bonding interfaces of the connector
2224/84345 . . . . Shape, e.g. interlocking features
2224/84355 . . . . having an external coating, e.g. protective bond-through coating
2224/84359 . . . . Material
2224/8436 . . . Bonding interfaces of the semiconductor or solid state body
2224/84365 . . . . Shape, e.g. interlocking features
2224/84375 . . . . having an external coating, e.g. protective bond-through coating

2224/84379 . . . . Material
2224/8438 . . . Bonding interfaces outside the semiconductor or solid-state body
2224/84385 . . . . Shape, e.g. interlocking features
2224/84395 . . . . having an external coating, e.g. protective bond-through coating
2224/84399 . . . . Material
2224/844 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/84401 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/84405 . . . . . Gallium [Ga] as principal constituent
2224/84409 . . . . . Indium [In] as principal constituent
2224/84411 . . . . . Tin [Sn] as principal constituent
2224/84413 . . . . . Bismuth [Bi] as principal constituent
2224/84414 . . . . . Thallium [Tl] as principal constituent
2224/84416 . . . . . Lead [Pb] as principal constituent
2224/84417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/84418 . . . . . Zinc [Zn] as principal constituent
2224/8442 . . . . . Antimony [Sb] as principal constituent
2224/84423 . . . . . Magnesium [Mg] as principal constituent
2224/84424 . . . . . Aluminium [Al] as principal constituent
2224/84438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/84439 . . . . . Silver [Ag] as principal constituent
2224/84444 . . . . . Gold [Au] as principal constituent
2224/84447 . . . . . Copper [Cu] as principal constituent
2224/84449 . . . . . Manganese [Mn] as principal constituent
2224/84455 . . . . . Nickel [Ni] as principal constituent
2224/84457 . . . . . Cobalt [Co] as principal constituent
2224/8446 . . . . . Iron [Fe] as principal constituent
2224/84463 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/84464 . . . . . Palladium [Pd] as principal constituent
2224/84466 . . . . . Titanium [Ti] as principal constituent
2224/84469 . . . . . Platinum [Pt] as principal constituent
2224/8447 . . . . . Zirconium [Zr] as principal constituent
2224/84471 . . . . . Chromium [Cr] as principal constituent
2224/84472 . . . . . Vanadium [V] as principal constituent
2224/84473 . . . . . Rhodium [Rh] as principal constituent
2224/84476 . . . . . Ruthenium [Ru] as principal constituent
2224/84478 . . . . . Iridium [Ir] as principal constituent
2224/84479 . . . . . Niobium [Nb] as principal constituent
2224/8448 . . . . . Molybdenum [Mo] as principal constituent
2224/84481 . . . . . Tantalum [Ta] as principal constituent
2224/84483 . . . . . Rhenium [Re] as principal constituent
2224/84484 . . . . . Tungsten [W] as principal constituent
2224/84486 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/84487 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/84488)
2224/84488 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8449 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/84491 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/84493 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/844 - H01L 2224/84491, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/84494 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/844 - H01L 2224/84491
2224/84495 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/844 - H01L 2224/84491
2224/84498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/84499 . . . . . Material of the matrix
2224/845 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/84501 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/84505 . . . . . Gallium [Ga] as principal constituent
2224/84509 . . . . . Indium [In] as principal constituent
2224/84511 . . . . . Tin [Sn] as principal constituent
2224/84513 . . . . . Bismuth [Bi] as principal constituent
2224/84514 . . . . . Thallium [Tl] as principal constituent
2224/84516 . . . . . Lead [Pb] as principal constituent
2224/84517 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/84518 . . . . . Zinc [Zn] as principal constituent
2224/8452 . . . . . Antimony [Sb] as principal constituent
2224/84523 . . . . . Magnesium [Mg] as principal constituent
2224/84524 . . . . . Aluminium [Al] as principal constituent
2224/84538 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/84539 . . . . . Silver [Ag] as principal constituent

2224/84544 . . . . . Gold [Au] as principal constituent
2224/84547 . . . . . Copper [Cu] as principal constituent
2224/84549 . . . . . Manganese [Mn] as principal constituent
2224/84555 . . . . . Nickel [Ni] as principal constituent
2224/84557 . . . . . Cobalt [Co] as principal constituent
2224/8456 . . . . . Iron [Fe] as principal constituent
2224/84563 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/84564 . . . . . Palladium [Pd] as principal constituent
2224/84566 . . . . . Titanium [Ti] as principal constituent
2224/84569 . . . . . Platinum [Pt] as principal constituent
2224/8457 . . . . . Zirconium [Zr] as principal constituent
2224/84571 . . . . . Chromium [Cr] as principal constituent
2224/84572 . . . . . Vanadium [V] as principal constituent
2224/84573 . . . . . Rhodium [Rh] as principal constituent
2224/84576 . . . . . Ruthenium [Ru] as principal constituent
2224/84578 . . . . . Iridium [Ir] as principal constituent
2224/84579 . . . . . Niobium [Nb] as principal constituent
2224/8458 . . . . . Molybdenum [Mo] as principal constituent
2224/84581 . . . . . Tantalum [Ta] as principal constituent
2224/84583 . . . . . Rhenium [Re] as principal constituent
2224/84584 . . . . . Tungsten [W] as principal constituent
2224/84586 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/84587 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/84588)
2224/84588 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8459 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/84591 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/84593 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/845 - H01L 2224/84591, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/84594 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/845 - H01L 2224/84591
2224/84595 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/845 - H01L 2224/84591
2224/84598 . . . . . Fillers
2224/84599 . . . . . Base material
2224/846 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/84601 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/84605 . . . . . Gallium [Ga] as principal constituent
2224/84609 . . . . . Indium [In] as principal constituent
2224/84611 . . . . . Tin [Sn] as principal constituent
2224/84613 . . . . . Bismuth [Bi] as principal constituent
2224/84614 . . . . . Thallium [Tl] as principal constituent
2224/84616 . . . . . Lead [Pb] as principal constituent
2224/84617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/84618 . . . . . Zinc [Zn] as principal constituent
2224/8462 . . . . . Antimony [Sb] as principal constituent
2224/84623 . . . . . Magnesium [Mg] as principal constituent
2224/84624 . . . . . Aluminium [Al] as principal constituent
2224/84638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/84639 . . . . . Silver [Ag] as principal constituent
2224/84644 . . . . . Gold [Au] as principal constituent
2224/84647 . . . . . Copper [Cu] as principal constituent
2224/84649 . . . . . Manganese [Mn] as principal constituent
2224/84655 . . . . . Nickel [Ni] as principal constituent
2224/84657 . . . . . Cobalt [Co] as principal constituent
2224/8466 . . . . . Iron [Fe] as principal constituent
2224/84663 . . . . . the principal constituent melting at a temperature of greater than 1550°C

2224/84664 . . . . . Palladium [Pd] as principal constituent
2224/84666 . . . . . Titanium [Ti] as principal constituent
2224/84669 . . . . . Platinum [Pt] as principal constituent
2224/8467 . . . . . Zirconium [Zr] as principal constituent
2224/84671 . . . . . Chromium [Cr] as principal constituent
2224/84672 . . . . . Vanadium [V] as principal constituent
2224/84673 . . . . . Rhodium [Rh] as principal constituent
2224/84676 . . . . . Ruthenium [Ru] as principal constituent
2224/84678 . . . . . Iridium [Ir] as principal constituent
2224/84679 . . . . . Niobium [Nb] as principal constituent
2224/8468 . . . . . Molybdenum [Mo] as principal constituent
2224/84681 . . . . . Tantalum [Ta] as principal constituent
2224/84683 . . . . . Rhenium [Re] as principal constituent
2224/84684 . . . . . Tungsten [W] as principal constituent
2224/84686 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/84687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/84688)
2224/84688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8469 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/84691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/84693 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/846 - H01L 2224/84691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/84694 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/846 - H01L 2224/84691
2224/84695 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/846 - H01L 2224/84691
2224/84698 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/84699 . . . . . Coating material
2224/847 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/84701 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/84705 . . . . . Gallium [Ga] as principal constituent
2224/84709 . . . . . Indium [In] as principal constituent
2224/84711 . . . . . Tin [Sn] as principal constituent
2224/84713 . . . . . Bismuth [Bi] as principal constituent
2224/84714 . . . . . Thallium [Tl] as principal constituent
2224/84716 . . . . . Lead [Pb] as principal constituent
2224/84717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/84718 . . . . . Zinc [Zn] as principal constituent
2224/8472 . . . . . Antimony [Sb] as principal constituent
2224/84723 . . . . . Magnesium [Mg] as principal constituent
2224/84724 . . . . . Aluminium [Al] as principal constituent
2224/84738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/84739 . . . . . Silver [Ag] as principal constituent
2224/84744 . . . . . Gold [Au] as principal constituent
2224/84747 . . . . . Copper [Cu] as principal constituent
2224/84749 . . . . . Manganese [Mn] as principal constituent
2224/84755 . . . . . Nickel [Ni] as principal constituent
2224/84757 . . . . . Cobalt [Co] as principal constituent
2224/8476 . . . . . Iron [Fe] as principal constituent
2224/84763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/84764 . . . . . Palladium [Pd] as principal constituent
2224/84766 . . . . . Titanium [Ti] as principal constituent
2224/84769 . . . . . Platinum [Pt] as principal constituent
2224/8477 . . . . . Zirconium [Zr] as principal constituent
2224/84771 . . . . . Chromium [Cr] as principal constituent

2224/84772 . . . . . Vanadium [V] as principal constituent
2224/84773 . . . . . Rhodium [Rh] as principal constituent
2224/84776 . . . . . Ruthenium [Ru] as principal constituent
2224/84778 . . . . . Iridium [Ir] as principal constituent
2224/84779 . . . . . Niobium [Nb] as principal constituent
2224/8478 . . . . . Molybdenum [Mo] as principal constituent
2224/84781 . . . . . Tantalum [Ta] as principal constituent
2224/84783 . . . . . Rhenium [Re] as principal constituent
2224/84784 . . . . . Tungsten [W] as principal constituent
2224/84786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/84787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/84788)
2224/84788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8479 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/84791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/84793 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/847 - H01L 2224/84791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/84794 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/847 - H01L 2224/84791
2224/84795 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/847 - H01L 2224/84791
2224/84798 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/84799 . . . . . Shape or distribution of the fillers
2224/848 . . . Bonding techniques
2224/84801 . . . . Soldering or alloying
2224/84805 . . . . . involving forming a eutectic alloy at the bonding interface
2224/8481 . . . . . involving forming an intermetallic compound at the bonding interface
2224/84815 . . . . . Reflow soldering
2224/8482 . . . . . Diffusion bonding
2224/84825 . . . . . Solid-liquid interdiffusion
2224/8483 . . . . . Solid-solid interdiffusion
2224/8484 . . . . Sintering
2224/8485 . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/84855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
2224/84856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
2224/84859 . . . . . Localised curing of parts of the connector
2224/84862 . . . . . Heat curing
2224/84865 . . . . . Microwave curing
2224/84868 . . . . . Infrared [IR] curing
2224/84871 . . . . . Visible light curing
2224/84874 . . . . . Ultraviolet [UV] curing
2224/84877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/8488 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/84885 . . . . . Combinations of two or more hardening methods provided for in at least two different groups from H01L 2224/84855 - H01L 2224/8488, e.g. for hybrid thermoplastic-thermosetting adhesives
2224/8489 . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
2224/84893 . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
2224/84895 . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/84897 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/84898 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layersg
2224/84899 . . . . Combinations of bonding methods provided for in at least two different groups from H01L 2224/848 - H01L 2224/84898
2224/849 . . . involving monitoring, e.g. feedback loop
2224/84909 . . . Post-treatment of the connector or bonding area
2224/8491 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/84911 . . . . . Chemical cleaning, e.g. etching, flux
2224/84912 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
2224/84913 . . . . . Plasma cleaning
2224/84914 . . . . . Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
2224/84919 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8491 - H01L 2224/84914
2224/8492 . . . . Applying permanent coating, e.g. protective coating
2224/8493 . . . . Reshaping, e.g. for severing the strap, modifying the loop shape

2224/84931 . . . . . by chemical means, e.g. etching
2224/84935 . . . . . by heating means, e.g. reflowing
2224/84937 . . . . . using a polychromatic heating lamp
2224/84939 . . . . . using a laser
2224/84941 . . . . . Induction heating, i.e. eddy currents
2224/84943 . . . . . using a flame torch, e.g. hydrogen torch
2224/84945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/84947 . . . . . by mechanical means, e.g. pressing, stamping
2224/84948 . . . . Thermal treatments, e.g. annealing, controlled cooling
2224/84951 . . . . Forming additional members, e.g. for reinforcing
2224/84986 . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
2224/85 . . using a wire connector
2224/85001 . . . involving a temporary auxiliary member not forming part of the bonding apparatus, e.g. removable or sacrificial coating, film or substrate
2224/85002 . . . . being a removable or sacrificial coating
2224/85005 . . . . being a temporary or sacrificial substrate
2224/85007 . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process
2224/85009 . . . Pre-treatment of the connector or the bonding area
2224/8501 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/85011 . . . . . Chemical cleaning, e.g. etching, flux
2224/85012 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
2224/85013 . . . . . Plasma cleaning
2224/85014 . . . . . Thermal cleaning, e.g. decomposition, sublimation
2224/85016 . . . . . using a laser
2224/85017 . . . . . Electron beam cleaning
2224/85019 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8501 - H01L 2224/85014
2224/8502 . . . . Applying permanent coating, e.g. in-situ coating
2224/8503 . . . . Reshaping, e.g. forming the ball or the wedge of the wire connector
2224/85031 . . . . . by chemical means, e.g. etching, anodisation
2224/85035 . . . . . by heating means, e.g. "free-air-ball"
2224/85037 . . . . . using a polychromatic heating lamp
2224/85039 . . . . . using a laser
2224/85041 . . . . . Induction heating, i.e. eddy currents
2224/85043 . . . . . using a flame torch, e.g. hydrogen torch
2224/85045 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/85047 . . . . . by mechanical means, e.g. severing, pressing, stamping
2224/85048 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
2224/85051 . . . . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-ball" connections
2224/85053 . . . Bonding environment
2224/85054 . . . . Composition of the atmosphere
2224/85055 . . . . . being oxidating
2224/85065 . . . . . being reducing
2224/85075 . . . . . being inert
2224/85085 . . . . being a liquid, e.g. for fluidic self-assembly
2224/8509 . . . . Vacuum
2224/85091 . . . . Under pressure
2224/85092 . . . . . Atmospheric pressure
2224/85093 . . . . . Transient conditions, e.g. gas-flow
2224/85095 . . . . Temperature settings
2224/85096 . . . . . Transient conditions
2224/85097 . . . . . Heating
2224/85098 . . . . . Cooling
2224/85099 . . . . . Ambient temperature
2224/851 . . . the connector being supplied to the parts to be connected in the bonding apparatus
2224/8511 . . . involving protection against electrical discharge, e.g. removing electrostatic charge
2224/8512 . . . Aligning
2224/85121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
2224/85122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
2224/85123 . . . . . Shape or position of the body
2224/85125 . . . . . Bonding areas on the body
2224/85127 . . . . . Bonding areas outside the body
2224/85129 . . . . . Shape or position of the other item
2224/8513 . . . . . using marks formed on the semiconductor or solid-state body
2224/85132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
2224/85136 . . . . involving guiding structures, e.g. spacers or supporting members
2224/85138 . . . . . the guiding structures being at least partially left in the finished device
2224/85143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/85148 . . . . involving movement of a part of the bonding apparatus
2224/85149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
2224/8515 . . . . . Rotational movements
2224/8516 . . . . . Translational movements
2224/85169 . . . . . being the upper part of the bonding apparatus, i.e. bonding head, e.g. capillary or wedge
2224/8517 . . . . . Rotational movements
2224/8518 . . . . . Translational movements
2224/85181 . . . . . connecting first on the semiconductor or solid-state body, i.e. on-chip, regular stitch
2224/85186 . . . . . connecting first outside the semiconductor or solid-state body, i.e. off-chip, reverse stitch
2224/85191 . . . . . connecting first both on and outside the semiconductor or solid-state body, i.e. regular and reverse stitches

2224/85196 . . . . . involving intermediate connecting steps before cutting the wire connector
2224/852 . . . Applying energy for connecting
2224/85201 . . . . Compression bonding
2224/85203 . . . . . Thermocompression bonding
2224/85205 . . . . . Ultrasonic bonding
2224/85206 . . . . . Direction of oscillation
2224/85207 . . . . . Thermosonic bonding
2224/8521 . . . . with energy being in the form of electromagnetic radiation
2224/85212 . . . . . Induction heating, i.e. eddy currents
2224/85214 . . . . . using a laser
2224/8523 . . . . . Polychromatic or infrared lamp heating
2224/85232 . . . . using an autocatalytic reaction, e.g. exothermic brazing
2224/85234 . . . . using means for applying energy being within the device, e.g. integrated heater
2224/85236 . . . . using electro-static corona discharge
2224/85237 . . . . using electron beam (using electron beam in general B23K 15/00)
2224/85238 . . . . using electric resistance welding, i.e. ohmic heating
2224/8534 . . . Bonding interfaces of the connector
2224/85345 . . . . Shape, e.g. interlocking features
2224/85355 . . . . having an external coating, e.g. protective bond-through coating
2224/85359 . . . . Material
2224/8536 . . . Bonding interfaces of the semiconductor or solid state body
2224/85365 . . . . Shape, e.g. interlocking features
2224/85375 . . . . having an external coating, e.g. protective bond-through coating
2224/85379 . . . . Material
2224/8538 . . . Bonding interfaces outside the semiconductor or solid-state body
2224/85385 . . . . Shape, e.g. interlocking features
2224/85395 . . . . having an external coating, e.g. protective bond-through coating
2224/85399 . . . . Material
2224/854 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/85401 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/85405 . . . . . Gallium (Ga) as principal constituent
2224/85409 . . . . . Indium (In) as principal constituent
2224/85411 . . . . . Tin (Sn) as principal constituent
2224/85413 . . . . . Bismuth (Bi) as principal constituent
2224/85414 . . . . . Thallium (Tl) as principal constituent
2224/85416 . . . . . Lead (Pb) as principal constituent
2224/85417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/85418 . . . . . Zinc (Zn) as principal constituent
2224/8542 . . . . . Antimony (Sb) as principal constituent
2224/85423 . . . . . Magnesium (Mg) as principal constituent
2224/85424 . . . . . Aluminium (Al) as principal constituent
2224/85438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/85439 . . . . . Silver (Ag) as principal constituent
2224/85444 . . . . . Gold (Au) as principal constituent
2224/85447 . . . . . Copper (Cu) as principal constituent
2224/85449 . . . . . Manganese (Mn) as principal constituent
2224/85455 . . . . . Nickel (Ni) as principal constituent
2224/85457 . . . . . Cobalt (Co) as principal constituent
2224/8546 . . . . . Iron (Fe) as principal constituent
2224/85463 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/85464 . . . . . Palladium (Pd) as principal constituent
2224/85466 . . . . . Titanium (Ti) as principal constituent
2224/85469 . . . . . Platinum (Pt) as principal constituent
2224/8547 . . . . . Zirconium (Zr) as principal constituent
2224/85471 . . . . . Chromium (Cr) as principal constituent
2224/85472 . . . . . Vanadium (V) as principal constituent
2224/85473 . . . . . Rhodium (Rh) as principal constituent
2224/85476 . . . . . Ruthenium (Ru) as principal constituent
2224/85478 . . . . . Iridium (Ir) as principal constituent
2224/85479 . . . . . Niobium (Nb) as principal constituent
2224/8548 . . . . . Molybdenum (Mo) as principal constituent
2224/85481 . . . . . Tantalum (Ta) as principal constituent
2224/85483 . . . . . Rhenium (Re) as principal constituent
2224/85484 . . . . . Tungsten (W) as principal constituent
2224/85486 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/85487 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/85488)
2224/85488 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8549 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85491 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85493 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/854 - H01L 2224/85491, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85494 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/854 - H01L 2224/85491
2224/85495 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/854 - H01L 2224/85491
2224/85498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/85499 . . . . . Material of the matrix

2224/855 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/85501 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/85505 . . . . . Gallium (Ga) as principal constituent
2224/85509 . . . . . Indium (In) as principal constituent
2224/85511 . . . . . Tin (Sn) as principal constituent
2224/85513 . . . . . Bismuth (Bi) as principal constituent
2224/85514 . . . . . Thallium (Tl) as principal constituent
2224/85516 . . . . . Lead (Pb) as principal constituent
2224/85517 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/85518 . . . . . Zinc (Zn) as principal constituent
2224/8552 . . . . . Antimony (Sb) as principal constituent
2224/85523 . . . . . Magnesium (Mg) as principal constituent
2224/85524 . . . . . Aluminium (Al) as principal constituent
2224/85538 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/85539 . . . . . Silver (Ag) as principal constituent
2224/85544 . . . . . Gold (Au) as principal constituent
2224/85547 . . . . . Copper (Cu) as principal constituent
2224/85549 . . . . . Manganese (Mn) as principal constituent
2224/85555 . . . . . Nickel (Ni) as principal constituent
2224/85557 . . . . . Cobalt (Co) as principal constituent
2224/8556 . . . . . Iron (Fe) as principal constituent
2224/85563 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/85564 . . . . . Palladium (Pd) as principal constituent
2224/85566 . . . . . Titanium (Ti) as principal constituent
2224/85569 . . . . . Platinum (Pt) as principal constituent
2224/8557 . . . . . Zirconium (Zr) as principal constituent
2224/85571 . . . . . Chromium (Cr) as principal constituent
2224/85572 . . . . . Vanadium (V) as principal constituent
2224/85573 . . . . . Rhodium (Rh) as principal constituent
2224/85576 . . . . . Ruthenium (Ru) as principal constituent
2224/85578 . . . . . Iridium (Ir) as principal constituent
2224/85579 . . . . . Niobium (Nb) as principal constituent
2224/8558 . . . . . Molybdenum (Mo) as principal constituent
2224/85581 . . . . . Tantalum (Ta) as principal constituent
2224/85583 . . . . . Rhenium (Re) as principal constituent
2224/85584 . . . . . Tungsten (W) as principal constituent
2224/85586 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/85587 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/85588)
2224/85588 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8559 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85591 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85593 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/855 - H01L 2224/85591, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85594 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/855 - H01L 2224/85591
2224/85595 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/855 - H01L 2224/85591
2224/85598 . . . . . Fillers
2224/85599 . . . . . Base material
2224/856 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/85601 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/85605 . . . . . Gallium (Ga) as principal constituent
2224/85609 . . . . . Indium (In) as principal constituent
2224/85611 . . . . . Tin (Sn) as principal constituent
2224/85613 . . . . . Bismuth (Bi) as principal constituent
2224/85614 . . . . . Thallium (Tl) as principal constituent
2224/85616 . . . . . Lead (Pb) as principal constituent

2224/85617 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/85618 . . . . . Zinc (Zn) as principal constituent
2224/8562 . . . . . Antimony (Sb) as principal constituent
2224/85623 . . . . . Magnesium (Mg) as principal constituent
2224/85624 . . . . . Aluminium (Al) as principal constituent
2224/85638 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/85639 . . . . . Silver (Ag) as principal constituent
2224/85644 . . . . . Gold (Au) as principal constituent
2224/85647 . . . . . Copper (Cu) as principal constituent
2224/85649 . . . . . Manganese (Mn) as principal constituent
2224/85655 . . . . . Nickel (Ni) as principal constituent
2224/85657 . . . . . Cobalt (Co) as principal constituent
2224/8566 . . . . . Iron (Fe) as principal constituent
2224/85663 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/85664 . . . . . Palladium (Pd) as principal constituent
2224/85666 . . . . . Titanium (Ti) as principal constituent
2224/85669 . . . . . Platinum (Pt) as principal constituent
2224/8567 . . . . . Zirconium (Zr) as principal constituent
2224/85671 . . . . . Chromium (Cr) as principal constituent
2224/85672 . . . . . Vanadium (V) as principal constituent
2224/85673 . . . . . Rhodium (Rh) as principal constituent
2224/85676 . . . . . Ruthenium (Ru) as principal constituent
2224/85678 . . . . . Iridium (Ir) as principal constituent
2224/85679 . . . . . Niobium (Nb) as principal constituent
2224/8568 . . . . . Molybdenum (Mo) as principal constituent
2224/85681 . . . . . Tantalum (Ta) as principal constituent
2224/85683 . . . . . Rhenium (Re) as principal constituent
2224/85684 . . . . . Tungsten (W) as principal constituent
2224/85686 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/85687 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/85688)
2224/85688 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8569 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85691 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85693 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/856 - H01L 2224/85691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85694 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/856 - H01L 2224/85691
2224/85695 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/856 - H01L 2224/85691
2224/85698 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/85699 . . . . . Coating material
2224/857 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/85701 . . . . . the principal constituent melting at a temperature of less than 400°C
2224/85705 . . . . . Gallium (Ga) as principal constituent
2224/85709 . . . . . Indium (In) as principal constituent
2224/85711 . . . . . Tin (Sn) as principal constituent
2224/85713 . . . . . Bismuth (Bi) as principal constituent
2224/85714 . . . . . Thallium (Tl) as principal constituent
2224/85716 . . . . . Lead (Pb) as principal constituent
2224/85717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/85718 . . . . . Zinc (Zn) as principal constituent
2224/8572 . . . . . Antimony (Sb) as principal constituent
2224/85723 . . . . . Magnesium (Mg) as principal constituent

2224/85724 . . . . . Aluminium (Al) as principal constituent
2224/85738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/85739 . . . . . Silver (Ag) as principal constituent
2224/85744 . . . . . Gold (Au) as principal constituent
2224/85747 . . . . . Copper (Cu) as principal constituent
2224/85749 . . . . . Manganese (Mn) as principal constituent
2224/85755 . . . . . Nickel (Ni) as principal constituent
2224/85757 . . . . . Cobalt (Co) as principal constituent
2224/8576 . . . . . Iron (Fe) as principal constituent
2224/85763 . . . . . the principal constituent melting at a temperature of greater than 1550°C
2224/85764 . . . . . Palladium (Pd) as principal constituent
2224/85766 . . . . . Titanium (Ti) as principal constituent
2224/85769 . . . . . Platinum (Pt) as principal constituent
2224/8577 . . . . . Zirconium (Zr) as principal constituent
2224/85771 . . . . . Chromium (Cr) as principal constituent
2224/85772 . . . . . Vanadium (V) as principal constituent
2224/85773 . . . . . Rhodium (Rh) as principal constituent
2224/85776 . . . . . Ruthenium (Ru) as principal constituent
2224/85778 . . . . . Iridium (Ir) as principal constituent
2224/85779 . . . . . Niobium (Nb) as principal constituent
2224/8578 . . . . . Molybdenum (Mo) as principal constituent
2224/85781 . . . . . Tantalum (Ta) as principal constituent
2224/85783 . . . . . Rhenium (Re) as principal constituent
2224/85784 . . . . . Tungsten (W) as principal constituent
2224/85786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/85787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/85788)
2224/85788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8579 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85793 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2224/857 - H01L 2224/85791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85794 . . . . . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/857 - H01L 2224/85791
2224/85795 . . . . . with a principal constituent of the material being a gas not provided for in groups H01L 2224/857 - H01L 2224/85791
2224/85798 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/85799 . . . . . Shape or distribution of the fillers
2224/858 . . . Bonding techniques
2224/85801 . . . . Soldering or alloying
2224/85805 . . . . . involving forming a eutectic alloy at the bonding interface
2224/8581 . . . . . involving forming an intermetallic compound at the bonding interface
2224/85815 . . . . . Reflow soldering
2224/8582 . . . . . Diffusion bonding
2224/85825 . . . . . Solid-liquid interdiffusion
2224/8583 . . . . . Solid-solid interdiffusion, e.g. "direct bonding"
2224/8584 . . . . Sintering
2224/8585 . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/85855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
2224/85856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
2224/85859 . . . . . Localised curing of parts of the connector
2224/85862 . . . . . Heat curing
2224/85865 . . . . . Microwave curing
2224/85868 . . . . . Infrared [IR] curing
2224/85871 . . . . . Visible light curing
2224/85874 . . . . . Ultraviolet [UV] curing
2224/85877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/8588 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/85885 . . . . . Combinations of two or more hardening methods provided for in at least two different groups from H01L 2224/85855 - H01L 2224/8588, e.g. for hybrid thermoplastic-thermosetting adhesives
2224/8589 . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass

2224/85893 . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
2224/85895 . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/85897 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/85898 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
2224/85899 . . . . Combinations of bonding methods provided for in at least two different groups from H01L 2224/858 - H01L 2224/85898
2224/859 . . . involving monitoring, e.g. feedback loop
2224/85909 . . . Post-treatment of the connector or wire bonding area
2224/8591 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/85911 . . . . . Chemical cleaning, e.g. etching, flux
2224/85912 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
2224/85913 . . . . . Plasma cleaning
2224/85914 . . . . . Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
2224/85916 . . . . . using a laser
2224/85917 . . . . . Electron beam cleaning
2224/85919 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8591 - H01L 2224/85914
2224/8592 . . . . Applying permanent coating, e.g. protective coating
2224/8593 . . . . Reshaping, e.g. for severing the wire, modifying the wedge or ball or the loop shape
2224/85931 . . . . . by chemical means, e.g. etching
2224/85935 . . . . . by heating means, e.g. reflowing
2224/85937 . . . . . using a polychromatic heating lamp
2224/85939 . . . . . using a laser
2224/85941 . . . . . Induction heating, i.e. eddy currents
2224/85943 . . . . . using a flame torch, e.g. hydrogen torch
2224/85945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/85947 . . . . . by mechanical means, e.g. "pull-and-cut", pressing, stamping
2224/85948 . . . . Thermal treatments, e.g. annealing, controlled cooling
2224/85951 . . . . Forming additional members, e.g. for reinforcing
2224/85986 . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
2224/86 . . using tape automated bonding [TAB]
2224/86001 . . . involving a temporary auxiliary member not forming part of the bonding apparatus
2224/86002 . . . . being a removable or sacrificial coating
2224/86005 . . . . being a temporary or sacrificial substrate
2224/86007 . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the TAB connector during or after the bonding process
2224/86009 . . . Pre-treatment of the connector or the bonding area
2224/8601 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/8603 . . . . Reshaping
2224/86031 . . . . . by chemical means, e.g. etching, anodisation
2224/86035 . . . . . by heating
2224/86039 . . . . . using a laser
2224/86045 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/86047 . . . . . by mechanical means, e.g. severing, pressing, stamping
2224/86048 . . . . Thermal treatment, e.g. annealing, controlled pre-heating or pre-cooling
2224/86051 . . . . Forming additional members
2224/86053 . . . Bonding environment
2224/86054 . . . . Composition of the atmosphere
2224/86085 . . . . being a liquid, e.g. fluidic self-assembly
2224/8609 . . . . Vacuum
2224/86091 . . . . Under pressure
2224/86095 . . . . Temperature settings
2224/86096 . . . . . Transient conditions
2224/86097 . . . . . Heating
2224/86098 . . . . . Cooling
2224/86099 . . . . . Ambient temperature
2224/861 . . . the connector being supplied to the parts to be connected in the bonding apparatus
2224/8611 . . . involving protection against electrical discharge, e.g. removing electrostatic charge
2224/8612 . . . Aligning
2224/86121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
2224/86122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
2224/8613 . . . . . using marks formed on the semiconductor or solid-state body
2224/86132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
2224/86136 . . . . involving guiding structures, e.g. spacers or supporting members
2224/86138 . . . . . the guiding structures being at least partially left in the finished device
2224/86143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/86148 . . . . involving movement of a part of the bonding apparatus
2224/86149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
2224/8615 . . . . . Rotational movements
2224/8616 . . . . . Translational movements
2224/86169 . . . . . being the upper part of the bonding apparatus, e.g. nozzle
2224/8617 . . . . . Rotational movement
2224/8618 . . . . . Translational movements
2224/86181 . . . . . connecting first on the semiconductor or solid-state body, i.e. on-chip,

2224/86186 . . . . . connecting first outside the semiconductor or solid-state body, i.e. off-chip
2224/86191 . . . . . connecting first both on and outside the semiconductor or solid-state body
2224/862 . . . Applying energy for connecting
2224/86201 . . . . Compression bonding
2224/86203 . . . . . Thermo-compression bonding
2224/86205 . . . . . Ultrasonic bonding
2224/86207 . . . . . Thermosonic bonding
2224/8621 . . . . with energy being in the form of electromagnetic radiation
2224/86212 . . . . . Induction heating, i.e. eddy currents
2224/86214 . . . . . using a laser
2224/8623 . . . . . Polychromatic or infrared lamp heating
2224/86232 . . . . . using an autocatalytic reaction, e.g. exothermic brazing
2224/86234 . . . . . using means for applying energy being within the device, e.g. integrated heater
2224/86236 . . . . . using electro-static corona discharge
2224/86237 . . . . . using electron beam (electron beam in general B23K 15/00)
2224/86238 . . . . . using electric resistance welding, i.e. ohmic heating
2224/8634 . . . Bonding interfaces of the connector
2224/86345 . . . . Shape, e.g. interlocking features
2224/86355 . . . . having an external coating, e.g. protective bond-through coating
2224/86359 . . . . Material
2224/8636 . . . Bonding interfaces of the semiconductor or solid state body
2224/86365 . . . . Shape, e.g. interlocking features
2224/86375 . . . . having an external coating, e.g. protective bond-through coating
2224/86379 . . . . Material
2224/8638 . . . Bonding interfaces outside the semiconductor or solid-state body
2224/86385 . . . . Shape, e.g. interlocking features
2224/86395 . . . . having an external coating, e.g. protective bond-through coating
2224/86399 . . . . Material
2224/868 . . . Bonding techniques
2224/86801 . . . . Soldering or alloying
2224/86805 . . . . . involving forming a eutectic alloy at the bonding interface
2224/8681 . . . . . involving forming an intermetallic compound at the bonding interface
2224/86815 . . . . . Reflow soldering
2224/8682 . . . . . Diffusion bonding
2224/86825 . . . . . Solid-liquid interdiffusion
2224/8683 . . . . . Solid-solid interdiffusion
2224/8684 . . . . Sintering
2224/8685 . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/86855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
2224/86856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
2224/86859 . . . . . Localised curing of parts of the connector
2224/86862 . . . . . Heat curing
2224/86865 . . . . . Microwave curing
2224/86868 . . . . . Infrared [IR] curing
2224/86871 . . . . . Visible light curing
2224/86874 . . . . . Ultraviolet [UV] curing
2224/86877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/8688 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/86885 . . . . . Combinations of two or more hardening methods provided for in at least two different groups selected from H01L 2224/86855 - H01L 2224/8688, e.g. hybrid thermoplastic-thermosetting adhesives
2224/8689 . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
2224/86893 . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
2224/86895 . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/86896 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/86897 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
2224/86899 . . . . Combinations of bonding methods provided for in at least two different groups from H01L 2224/868 - H01L 2224/86897
2224/869 . . . involving monitoring, e.g. feedback loop
2224/86909 . . . Post-treatment of the connector or the bonding area
2224/8691 . . . . Cleaning, e.g. oxide removal step, desmearing
2224/8693 . . . . Reshaping
2224/86931 . . . . . by chemical means, e.g. etching, anodisation
2224/86935 . . . . . by heating means
2224/86939 . . . . . using a laser
2224/86945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
2224/86947 . . . . . by mechanical means, e.g. severing, pressing, stamping
2224/86948 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
2224/86951 . . . . Forming additional members
2224/86986 . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
2224/89 . . using at least one connector not provided for in any of the groups H01L 2224/81 - H01L 2224/86
2224/90 . Methods for connecting semiconductor or solid state bodies using means for bonding not being attached to, or not being formed on, the body surface to be connected, e.g. pressure contacts using springs or clips
2224/91 . Methods for connecting semiconductor or solid state bodies including different methods provided for in two or more of groups H01L 2224/80 - H01L 2224/90
2224/92 . . Specific sequence of method steps

2224/9201 . . . Forming connectors during the connecting process, e.g. in-situ formation of bumps
2224/9202 . . . Forming additional connectors after the connecting process
2224/9205 . . . Intermediate bonding steps, i.e. partial connection of the semiconductor or solid-state body during the connecting process
2224/921 . . . Connecting a surface with connectors of different types
2224/9211 . . . . Parallel connecting processes
2224/9212 . . . . Sequential connecting processes
2224/92122 . . . . . the first connecting process involving a bump connector
2224/92124 . . . . . the second connecting process involving a build-up interconnect
2224/92125 . . . . . the second connecting process involving a layer connector
2224/92127 . . . . . the second connecting process involving a wire connector
2224/92132 . . . . . the first connecting process involving a build-up interconnect
2224/92133 . . . . . the second connecting process involving a bump connector
2224/92135 . . . . . the second connecting process involving a layer connector
2224/92136 . . . . . the second connecting process involving a strap connector
2224/92137 . . . . . the second connecting process involving a wire connector
2224/92138 . . . . . the second connecting process involving a TAB connector
2224/92142 . . . . . the first connecting process involving a layer connector
2224/92143 . . . . . the second connecting process involving a bump connector
2224/92144 . . . . . the second connecting process involving a build-up interconnect
2224/92147 . . . . . the second connecting process involving a wire connector
2224/92148 . . . . . the second connecting process involving a TAB connector
2224/92152 . . . . . the first connecting process involving a strap connector
2224/92153 . . . . . the second connecting process involving a bump connector
2224/92155 . . . . . the second connecting process involving a layer connector
2224/92157 . . . . . the second connecting process involving a wire connector
2224/92158 . . . . . the second connecting process involving a TAB connector
2224/92162 . . . . . the first connecting process involving a wire connector
2224/92163 . . . . . the second connecting process involving a bump connector
2224/92164 . . . . . the second connecting process involving a build-up interconnect
2224/92165 . . . . . the second connecting process involving a layer connector
2224/92166 . . . . . the second connecting process involving a strap connector
2224/92168 . . . . . the second connecting process involving a TAB connector
2224/92172 . . . . . the first connecting process involving a TAB connector
2224/92173 . . . . . the second connecting process involving a bump connector
2224/92174 . . . . . the second connecting process involving a build-up interconnect
2224/92175 . . . . . the second connecting process involving a layer connector
2224/92176 . . . . . the second connecting process involving a strap connector
2224/92177 . . . . . the second connecting process involving a wire connector
2224/922 . . . Connecting different surfaces of the semiconductor or solid-state body with connectors of different types
2224/9221 . . . . Parallel connecting processes
2224/9222 . . . . Sequential connecting processes
2224/92222 . . . . . the first connecting process involving a bump connector
2224/92224 . . . . . the second connecting process involving a build-up interconnect
2224/92225 . . . . . the second connecting process involving a layer connector
2224/92226 . . . . . the second connecting process involving a strap connector
2224/92227 . . . . . the second connecting process involving a wire connector
2224/92228 . . . . . the second connecting process involving a TAB connector
2224/92242 . . . . . the first connecting process involving a layer connector
2224/92244 . . . . . the second connecting process involving a build-up interconnect
2224/92246 . . . . . the second connecting process involving a strap connector
2224/92247 . . . . . the second connecting process involving a wire connector
2224/92248 . . . . . the second connecting process involving a TAB connector
2224/92252 . . . . . the first connecting process involving a strap connector
2224/92253 . . . . . the second connecting process involving a bump connector
2224/92255 . . . . . the second connecting process involving a layer connector
2224/93 . Batch processes
2224/94 . . at wafer-level, i.e. with connecting carried out on a wafer comprising a plurality of undiced individual devices
2224/95 . . at chip-level, i.e. with connecting carried out on a plurality of singulated devices, i.e. on diced chips
2224/95001 . . . involving a temporary auxiliary member not forming part of the bonding apparatus, e.g. removable or sacrificial coating, film or substrate
2224/95053 . . . Bonding environment
2224/95085 . . . . being a liquid, e.g. for fluidic self-assembly
2224/95091 . . . . Under pressure
2224/95092 . . . . . Atmospheric pressure, e.g. dry self-assembly
2224/95093 . . . . . Transient conditions, e.g. assisted by a gas flow or a liquid flow
2224/951 . . . Supplying the plurality of semiconductor or solid-state bodies

2224/95101 . . . . in a liquid medium
2224/95102 . . . . . being a colloidal droplet
2224/9511 . . . . using a rack or rail
2224/95115 . . . . using a roll-to-roll transfer technique
2224/9512 . . . Aligning the plurality of semiconductor or solid-state bodies
2224/95121 . . . . Active alignment, i.e. by apparatus steering
2224/95122 . . . . . by applying vibration
2224/95123 . . . . . by applying a pressurised fluid flow, e.g. liquid or gas flow
2224/95133 . . . . . by applying an electromagnetic field
2224/95134 . . . . . Electrowetting, i.e. by changing the surface energy of a droplet
2224/95136 . . . . involving guiding structures, e.g. shape matching, spacers or supporting members
2224/95143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
2224/95144 . . . . . Magnetic alignment, i.e. using permanent magnetic parts in the semiconductor or solid-state body
2224/95145 . . . . . Electrostatic alignment, i.e. polarity alignment with Coulomb charges
2224/95146 . . . . . by surface tension
2224/95147 . . . . . by molecular lock-key, e.g. by DNA
2224/95148 . . . . involving movement of a part of the bonding apparatus
2224/96 . . . the devices being encapsulated in a common layer, e.g. neo-wafer or pseudo-wafer, said common layer being separable into individual assemblies after connecting
2224/97 . . . the devices being connected to a common substrate, e.g. interposer, said common substrate being separable into individual assemblies after connecting
2224/98 . Methods for disconnecting semiconductor or solid-state bodies

2225/00 Details relating to assemblies covered by the group H01L 25/00 but not provided for in its subgroups

2225/03 . All the devices being of a type provided for in the same subgroup of groups H01L 27/00 - H01L 33/648 and H10K 99/00
2225/04 . . the devices not having separate containers
2225/065 . . . the devices being of a type provided for in group H01L 27/00
2225/06503 . . . . Stacked arrangements of devices
2225/06506 . . . . . Wire or wire-like electrical connections between devices
2225/0651 . . . . . Wire or wire-like electrical connections from device to substrate
2225/06513 . . . . . Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps
2225/06517 . . . . . Bump or bump-like direct electrical connections from device to substrate
2225/0652 . . . . . Bump or bump-like direct electrical connections from substrate to substrate
2225/06524 . . . . . Electrical connections formed on device or on substrate, e.g. a deposited or grown layer
2225/06527 . . . . . Special adaptation of electrical connections, e.g. rewiring, engineering changes, pressure contacts, layout
2225/06531 . . . . . Non-galvanic coupling, e.g. capacitive coupling
2225/06534 . . . . . Optical coupling
2225/06537 . . . . . Electromagnetic shielding
2225/06541 . . . . . Conductive via connections through the device, e.g. vertical interconnects, through silicon via [TSV] (manufacturing via connections per se H01L 21/76898)
2225/06544 . . . . . Design considerations for via connections, e.g. geometry or layout
2225/06548 . . . . . Conductive via connections through the substrate, container, or encapsulation
2225/06551 . . . . . Conductive connections on the side of the device
2225/06555 . . . . . Geometry of the stack, e.g. form of the devices, geometry to facilitate stacking
2225/06558 . . . . . the devices having passive surfaces facing each other, i.e. in a back-to-back arrangement
2225/06562 . . . . . at least one device in the stack being rotated or offset
2225/06565 . . . . . the devices having the same size and there being no auxiliary carrier between the devices
2225/06568 . . . . . the devices decreasing in size, e.g. pyramidical stack
2225/06572 . . . . . Auxiliary carrier between devices, the carrier having an electrical connection structure
2225/06575 . . . . . Auxiliary carrier between devices, the carrier having no electrical connection structure
2225/06579 . . . . . TAB carriers; beam leads
2225/06582 . . . . . Housing for the assembly, e.g. chip scale package [CSP]
2225/06586 . . . . . Housing with external bump or bump-like connectors
2225/06589 . . . . . Thermal management, e.g. cooling
2225/06593 . . . . . Mounting aids permanently on device; arrangements for alignment (use of temporary supports H01L 21/6835)
2225/06596 . . . . . Structural arrangements for testing (testing or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00)
2225/10 . . the devices having separate containers
2225/1005 . . . the devices being of a type provided for in group H01L 27/00
2225/1011 . . . . the containers being in a stacked arrangement
2225/1017 . . . . . the lowermost container comprising a device support
2225/1023 . . . . . the support being an insulating substrate
2225/1029 . . . . . the support being a lead frame
2225/1035 . . . . . the device being entirely enclosed by the support, e.g. high-density interconnect [HDI]
2225/1041 . . . . . Special adaptations for top connections of the lowermost container, e.g. redistribution layer, integral interposer
2225/1047 . . . . . Details of electrical connections between containers
2225/1052 . . . . . Wire or wire-like electrical connections

2225/1058 . . . . . Bump or bump-like electrical connections, e.g. balls, pillars, posts
2225/1064 . . . . . Electrical connections provided on a side surface of one or more of the containers
2225/107 . . . . . Indirect electrical connections, e.g. via an interposer, a flexible substrate, using TAB (printed circuits H05K 1/00)
2225/1076 . . . . . Shape of the containers
2225/1082 . . . . . for improving alignment between containers, e.g. interlocking features
2225/1088 . . . . . Arrangements to limit the height of the assembly
2225/1094 . . . . . Thermal management, e.g. cooling

2229/00 Indexing scheme for semiconductor devices adapted for rectifying, amplifying, oscillating or switching, or capacitors or resistors with at least one potential-jump barrier or surface barrier, for details of semiconductor bodies or of electrodes thereof, or for multistep manufacturing processes therefor

2924/00 Indexing scheme for arrangements or methods for connecting or disconnecting semiconductor or solid-state bodies as covered by H01L 24/00
2924/0001 . Technical content checked by a classifier

NOTE

Codes H01L 2924/0001 - H01L 2924/0002 are used to describe the status of reclassification; they do not relate to technical features as such

2924/00011 . . Not relevant to the scope of the group, the symbol of which is combined with the symbol of this group
2924/00012 . . Relevant to the scope of the group, the symbol of which is combined with the symbol of this group
2924/00013 . . Fully indexed content
2924/00014 . . the subject-matter covered by the group, the symbol of which is combined with the symbol of this group, being disclosed without further technical details
2924/00015 . . the subject-matter covered by the group, the symbol of which is combined with the symbol of this group, being disclosed as prior art
2924/0002 . . Not covered by any one of groups H01L 24/00, H01L 24/00 and H01L 2224/00
2924/01 . Chemical elements
2924/01001 . . Hydrogen [H]
2924/01002 . . Helium [He]
2924/01003 . . Lithium [Li]
2924/01004 . . Beryllium [Be]
2924/01005 . . Boron [B]
2924/01006 . . Carbon [C]
2924/01007 . . Nitrogen [N]
2924/01008 . . Oxygen [O]
2924/01009 . . Fluorine [F]
2924/0101 . . Neon [Ne]
2924/01011 . . Sodium [Na]
2924/01012 . . Magnesium [Mg]
2924/01013 . . Aluminum [Al]
2924/01014 . . Silicon [Si]
2924/01015 . . Phosphorus [P]
2924/01016 . . Sulfur [S]
2924/01017 . . Chlorine [Cl]
2924/01018 . . Argon [Ar]
2924/01019 . . Potassium [K]
2924/0102 . . Calcium [Ca]
2924/01021 . . Scandium [Sc]
2924/01022 . . Titanium [Ti]
2924/01023 . . Vanadium [V]
2924/01024 . . Chromium [Cr]
2924/01025 . . Manganese [Mn]
2924/01026 . . Iron [Fe]
2924/01027 . . Cobalt [Co]
2924/01028 . . Nickel [Ni]
2924/01029 . . Copper [Cu]
2924/0103 . . Zinc [Zn]
2924/01031 . . Gallium [Ga]
2924/01032 . . Germanium [Ge]
2924/01033 . . Arsenic [As]
2924/01034 . . Selenium [Se]
2924/01035 . . Bromine [Br]
2924/01036 . . Krypton [Kr]
2924/01037 . . Rubidium [Rb]
2924/01038 . . Strontium [Sr]
2924/01039 . . Yttrium [Y]
2924/0104 . . Zirconium [Zr]
2924/01041 . . Niobium [Nb]
2924/01042 . . Molybdenum [Mo]
2924/01043 . . Technetium [Tc]
2924/01044 . . Ruthenium [Ru]
2924/01045 . . Rhodium [Rh]
2924/01046 . . Palladium [Pd]
2924/01047 . . Silver [Ag]
2924/01048 . . Cadmium [Cd]
2924/01049 . . Indium [In]
2924/0105 . . Tin [Sn]
2924/01051 . . Antimony [Sb]
2924/01052 . . Tellurium [Te]
2924/01053 . . Iodine [I]
2924/01054 . . Xenon [Xe]
2924/01055 . . Cesium [Cs]
2924/01056 . . Barium [Ba]
2924/01057 . . Lanthanum [La]
2924/01058 . . Cerium [Ce]
2924/01059 . . Praseodymium [Pr]
2924/0106 . . Neodymium [Nd]
2924/01061 . . Promethium [Pm]
2924/01062 . . Samarium [Sm]
2924/01063 . . Europium [Eu]
2924/01064 . . Gadolinium [Gd]
2924/01065 . . Terbium [Tb]
2924/01066 . . Dysprosium [Dy]
2924/01067 . . Holmium [Ho]
2924/01068 . . Erbium [Er]
2924/01069 . . Thulium [Tm]
2924/0107 . . Ytterbium [Yb]
2924/01071 . . Lutetium [Lu]
2924/01072 . . Hafnium [Hf]
2924/01073 . . Tantalum [Ta]
2924/01074 . . Tungsten [W]
2924/01075 . . Rhenium [Re]
2924/01076 . . Osmium [Os]
2924/01077 . . Iridium [Ir]

2924/01078 . . Platinum [Pt]
2924/01079 . . Gold [Au]
2924/0108 . . Mercury [Hg]
2924/01081 . . Thallium [Tl]
2924/01082 . . Lead [Pb]
2924/01083 . . Bismuth [Bi]
2924/01084 . . Polonium [Po]
2924/01085 . . Astatine [At]
2924/01086 . . Radon [Rn]
2924/01087 . . Francium [Fr]
2924/01088 . . Radium [Ra]
2924/01089 . . Actinium [Ac]
2924/0109 . . Thorium [Th]
2924/01091 . . Protactinium [Pa]
2924/01092 . . Uranium [U]
2924/01093 . . Neptunium [Np]
2924/01094 . . Plutonium [Pu]
2924/011 . Groups of the periodic table
2924/01101 . . Alkali metals
2924/01102 . . Alkali earth metals
2924/01103 . . Transition metals
2924/01104 . . Refractory metals
2924/01105 . . Rare earth metals
2924/01106 . . . Lanthanides, i.e. Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu
2924/01107 . . . Actinides, i.e. Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr
2924/01108 . . Noble metals
2924/01109 . . Metalloids or Semi-metals
2924/0111 . . Chalcogens
2924/01111 . . Halogens
2924/01112 . . Noble gases
2924/012 . Semiconductor purity grades
2924/01201 . . 1N purity grades, i.e. 90%
2924/01202 . . 2N purity grades, i.e. 99%
2924/01203 . . 3N purity grades, i.e. 99.9%
2924/01204 . . 4N purity grades, i.e. 99.99%
2924/01205 . . 5N purity grades, i.e. 99.999%
2924/01206 . . 6N purity grades, i.e. 99.9999%
2924/01207 . . 7N purity grades, i.e. 99.99999%
2924/01208 . . 8N purity grades, i.e. 99.999999%
2924/013 . Alloys
2924/0132 . . Binary Alloys
2924/01321 . . . Isomorphous Alloys
2924/01322 . . . Eutectic Alloys, i.e. obtained by a liquid transforming into two solid phases
2924/01323 . . . . Hypoeutectic alloys i.e. with compositions lying to the left of the eutectic point
2924/01324 . . . . Hypereutectic alloys i.e. with compositions lying to the right of the eutectic point
2924/01325 . . . Peritectic Alloys, i.e. obtained by a liquid and a solid transforming into a new and different solid phase
2924/01326 . . . Monotectics, i.e. obtained by a liquid transforming into a solid and a new and different liquid phase
2924/01327 . . . Intermediate phases, i.e. intermetallics compounds
2924/0133 . . Ternary Alloys
2924/0134 . . Quaternary Alloys
2924/0135 . . Quinary Alloys
2924/014 . . Solder alloys
2924/01402 . . Invar, i.e. single-phase alloy of around 36% nickel and 64% iron
2924/01403 . . Kovar, i.e. FeNiCo alloys
2924/01404 . . Alloy 42, i.e. FeNi42
2924/01405 . . Inovco, i.e. Fe-33Ni-4.5Co
2924/042 . Borides composed of metals from groups of the periodic table
2924/0421 . . 1st Group
2924/0422 . . 2nd Group
2924/0423 . . 3rd Group
2924/0424 . . 4th Group
2924/0425 . . 5th Group
2924/0426 . . 6th Group
2924/0427 . . 7th Group
2924/0428 . . 8th Group
2924/0429 . . 9th Group
2924/044 . . 10th Group
2924/0441 . . 11th Group
2924/0442 . . 12th Group
2924/0443 . . 13th Group
2924/0444 . . 14th Group
2924/0445 . . Lanthanides
2924/0446 . . Actinides
2924/0449 . . being a combination of two or more materials provided in the groups H01L 2924/0421 - H01L 2924/0446
2924/04491 . . having a monocrystalline microstructure
2924/04492 . . having a polycrystalline microstructure
2924/04494 . . having an amorphous microstructure, i.e. glass
2924/045 . Carbides composed of metals from groups of the periodic table
2924/0451 . . 1st Group
2924/0452 . . 2nd Group
2924/0453 . . 3rd Group
2924/0454 . . 4th Group
2924/04541 . . . TiC
2924/0455 . . 5th Group
2924/0456 . . 6th Group
2924/04563 . . . WC
2924/0457 . . 7th Group
2924/0458 . . 8th Group
2924/0459 . . 9th Group
2924/046 . . 10th Group
2924/0461 . . 11th Group
2924/0462 . . 12th Group
2924/0463 . . 13th Group
2924/0464 . . 14th Group
2924/04642 . . . SiC
2924/0465 . . Lanthanides
2924/0466 . . Actinides
2924/0469 . . being a combination of two or more materials provided in the groups H01L 2924/0451 - H01L 2924/0466
2924/04691 . . having a monocrystalline microstructure
2924/04692 . . having a polycrystalline microstructure
2924/04694 . . having an amorphous microstructure, i.e. glass
2924/047 . Silicides composed of metals from groups of the periodic table
2924/0471 . . 1st Group
2924/0472 . . 2nd Group
2924/0473 . . 3rd Group
2924/0474 . . 4th Group

2924/0475 . . 5th Group
2924/0476 . . 6th Group
2924/0477 . . 7th Group
2924/0478 . . 8th Group
2924/0479 . . 9th Group
2924/048 . . 10th Group
2924/0481 . . 11th Group
2924/0482 . . 12th Group
2924/0483 . . 13th Group
2924/0484 . . 14th Group
2924/0485 . . Lanthanides
2924/0486 . . Actinides
2924/0489 . . being a combination of two or more materials provided in the groups H01L 2924/0471 - H01L 2924/0486
2924/04891 . . having a monocrystalline microstructure
2924/04892 . . having a polycrystalline microstructure
2924/04894 . . having an amorphous microstructure, i.e. glass
2924/049 . Nitrides composed of metals from groups of the periodic table
2924/0491 . . 1st Group
2924/0492 . . 2nd Group
2924/0493 . . 3rd Group
2924/0494 . . 4th Group
2924/04941 . . . TiN
2924/0495 . . 5th Group
2924/04953 . . . TaN
2924/0496 . . 6th Group
2924/0497 . . 7th Group
2924/0498 . . 8th Group
2924/0499 . . 9th Group
2924/05 . . 10th Group
2924/0501 . . 11th Group
2924/0502 . . 12th Group
2924/0503 . . 13th Group
2924/05032 . . . AlN
2924/0504 . . 14th Group
2924/05042 . . . Si_3N_4
2924/0505 . . Lanthanides
2924/0506 . . Actinides
2924/0509 . . being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506
2924/05091 . . having a monocrystalline microstructure
2924/05092 . . having a polycrystalline microstructure
2924/05094 . . having an amorphous microstructure, i.e. glass
2924/051 . Phosphides composed of metals from groups of the periodic table
2924/0511 . . 1st Group
2924/0512 . . 2nd Group
2924/0513 . . 3rd Group
2924/0514 . . 4th Group
2924/0515 . . 5th Group
2924/0516 . . 6th Group
2924/0517 . . 7th Group
2924/0518 . . 8th Group
2924/0519 . . 9th Group
2924/052 . . 10th Group
2924/0521 . . 11th Group
2924/0522 . . 12th Group
2924/0523 . . 13th Group
2924/0524 . . 14th Group
2924/0525 . . Lanthanides
2924/0526 . . Actinides
2924/0529 . . being a combination of two or more materials provided in the groups H01L 2924/0511 - H01L 2924/0526
2924/05291 . . having a monocrystalline microstructure
2924/05292 . . having a polycrystalline microstructure
2924/05294 . . having an amorphous microstructure, i.e. glass
2924/053 . Oxides composed of metals from groups of the periodic table
2924/0531 . . 1st Group
2924/0532 . . 2nd Group
2924/0533 . . 3rd Group
2924/0534 . . 4th Group
2924/05341 . . . TiO_2
2924/05342 . . . ZrO_2
2924/0535 . . 5th Group
2924/0536 . . 6th Group
2924/0537 . . 7th Group
2924/0538 . . 8th Group
2924/05381 . . . FeOx
2924/0539 . . 9th Group
2924/054 . . 10th Group
2924/0541 . . 11th Group
2924/0542 . . 12th Group
2924/0543 . . 13th Group
2924/05432 . . . Al_2O_3
2924/0544 . . 14th Group
2924/05442 . . . SiO_2
2924/0545 . . Lanthanides
2924/0546 . . Actinides
2924/0549 . . being a combination of two or more materials provided in the groups H01L 2924/0531 - H01L 2924/0546
2924/05491 . . having a monocrystalline microstructure
2924/05492 . . having a polycrystalline microstructure
2924/05494 . . having an amorphous microstructure, i.e. glass
2924/055 . Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table
2924/0551 . . 1st Group
2924/0552 . . 2nd Group
2924/0553 . . 3rd Group
2924/0554 . . 4th Group
2924/0555 . . 5th Group
2924/0556 . . 6th Group
2924/0557 . . 7th Group
2924/0558 . . 8th Group
2924/0559 . . 9th Group
2924/056 . . 10th Group
2924/0561 . . 11th Group
2924/0562 . . 12th Group
2924/0563 . . 13th Group
2924/0564 . . 14th Group
2924/0565 . . Lanthanides
2924/0566 . . Actinides
2924/0569 . . being a combination of two or more materials provided in the groups H01L 2924/0551 - H01L 2924/0566
2924/05691 . . having a monocrystalline microstructure
2924/05692 . . having a polycrystalline microstructure
2924/05694 . . having an amorphous microstructure, i.e. glass

2924/057 . Halides composed of metals from groups of the periodic table
2924/0571 . . 1st Group
2924/0572 . . 2nd Group
2924/0573 . . 3rd Group
2924/0574 . . 4th Group
2924/0575 . . 5th Group
2924/0576 . . 6th Group
2924/0577 . . 7th Group
2924/0578 . . 8th Group
2924/0579 . . 9th Group
2924/058 . . 10th Group
2924/0581 . . 11th Group
2924/0582 . . 12th Group
2924/0583 . . 13th Group
2924/0584 . . 14th Group
2924/0585 . . Lanthanides
2924/0586 . . Actinides
2924/0589 . . being a combination of two or more materials provided in the groups H01L 2924/0571 - H01L 2924/0586
2924/05891 . . having a monocrystalline microstructure
2924/05892 . . having a polycrystalline microstructure
2924/05894 . . having an amorphous microstructure, i.e. glass
2924/059 . Being combinations of any of the materials from the groups H01L 2924/042 - H01L 2924/0584, e.g. oxynitrides
2924/05991 . . having a monocrystalline microstructure
2924/05992 . . having a polycrystalline microstructure
2924/05994 . . having an amorphous microstructure, i.e. glass
2924/06 . Polymers (polymers per se C08; polymer adhesives C09J)
2924/061 . . Polyolefin polymer
2924/0615 . . Styrenic polymer
2924/062 . . Halogenated polymer
2924/0625 . . Polyvinyl alchohol
2924/063 . . Polyvinyl acetate
2924/0635 . . Acrylic polymer
2924/064 . . Graft polymer
2924/0645 . . Block copolymer
2924/065 . . ABS
2924/0655 . . Polyacetal
2924/066 . . Phenolic resin
2924/0665 . . Epoxy resin
2924/067 . . Polyphenylene
2924/0675 . . Polyester
2924/068 . . Polycarbonate
2924/0685 . . Polyether
2924/069 . . Polyurethane
2924/0695 . . Polyamide
2924/07 . . Polyamine or polyimide
2924/07001 . . . Polyamine
2924/07025 . . . Polyimide
2924/0705 . . Sulfur containing polymer
2924/0715 . . Polysiloxane
2924/078 . . Adhesive characteristics other than chemical
2924/07802 . . . not being an ohmic electrical conductor
2924/0781 . . . being an ohmic electrical conductor
2924/07811 . . . . Extrinsic, i.e. with electrical conductive fillers
2924/07812 . . . . Intrinsic, e.g. polyaniline [PANI]
2924/0782 . . . being pressure sensitive
2924/095 . with a principal constituent of the material being a combination of two or more materials provided in the groups H01L 2924/013 - H01L 2924/0715
2924/0951 . . Glass epoxy laminates
2924/09511 . . . FR-4
2924/09512 . . . FR-5
2924/09522 . . . G10
2924/09523 . . . G11
2924/096 . . Cermets, i.e. composite material composed of ceramic and metallic materials
2924/097 . . Glass-ceramics, e.g. devitrified glass
2924/09701 . . . Low temperature co-fired ceramic [LTCC]
2924/10 . Details of semiconductor or other solid state devices to be connected
2924/1011 . . Structure
2924/1015 . . Shape
2924/10155 . . . being other than a cuboid
2924/10156 . . . . at the periphery
2924/10157 . . . . at the active surface
2924/10158 . . . . at the passive surface
2924/1016 . . . being a cuboid
2924/10161 . . . . with a rectangular active surface
2924/10162 . . . . with a square active surface
2924/1017 . . . being a sphere
2924/102 . . Material of the semiconductor or solid state bodies
2924/1025 . . . Semiconducting materials
2924/10251 . . . . Elemental semiconductors, i.e. Group IV
2924/10252 . . . . . Germanium [Ge]
2924/10253 . . . . . Silicon [Si]
2924/10254 . . . . . Diamond [C]
2924/1026 . . . . Compound semiconductors
2924/1027 IV
2924/10271 . . . . . Silicon-germanium [SiGe]
2924/10272 . . . . . Silicon Carbide [SiC]
2924/1032 . . . . . III-V
2924/10321 . . . . . Aluminium antimonide [AlSb]
2924/10322 . . . . . Aluminium arsenide [AlAs]
2924/10323 . . . . . Aluminium nitride [AlN]
2924/10324 . . . . . Aluminium phosphide [AlP]
2924/10325 . . . . . Boron nitride [BN], e.g. cubic, hexagonal, nanotube
2924/10326 . . . . . Boron phosphide [BP]
2924/10327 . . . . . Boron arsenide [BAs, $B_{12}As_2$]
2924/10328 . . . . . Gallium antimonide [GaSb]
2924/10329 . . . . . Gallium arsenide [GaAs]
2924/1033 . . . . . Gallium nitride [GaN]
2924/10331 . . . . . Gallium phosphide [GaP]
2924/10332 . . . . . Indium antimonide [InSb]
2924/10333 . . . . . Indium arsenide [InAs]
2924/10334 . . . . . Indium nitride [InN]
2924/10335 . . . . . Indium phosphide [InP]
2924/10336 . . . . . Aluminium gallium arsenide [AlGaAs]
2924/10337 . . . . . Indium gallium arsenide [InGaAs]
2924/10338 . . . . . Indium gallium phosphide [InGaP]
2924/10339 . . . . . Aluminium indium arsenide [AlInAs]
2924/1034 . . . . . Aluminium indium antimonide [AlInSb]
2924/10341 . . . . . Gallium arsenide nitride [GaAsN]
2924/10342 . . . . . Gallium arsenide phosphide [GaAsP]
2924/10343 . . . . . Gallium arsenide antimonide [GaAsSb]
2924/10344 . . . . . Aluminium gallium nitride [AlGaN]
2924/10345 . . . . . Aluminium gallium phosphide [AlGaP]

2924/10346 . . . . . Indium gallium nitride [InGaN]
2924/10347 . . . . . Indium arsenide antimonide [InAsSb]
2924/10348 . . . . . Indium gallium antimonide [InGaSb]
2924/10349 . . . . . Aluminium gallium indium phosphide [AlGaInP]
2924/1035 . . . . . Aluminium gallium arsenide phosphide [AlGaInP]
2924/10351 . . . . . Indium gallium arsenide phosphide [InGaAsP]
2924/10352 . . . . . Indium gallium arsenide antimonide [InGaAsSb]
2924/10353 . . . . . Indium arsenide antimonide phosphide [InAsSbP]
2924/10354 . . . . . Aluminium indium arsenide phosphide [AlInAsP]
2924/10355 . . . . . Aluminium gallium arsenide nitride [AlGaAsN]
2924/10356 . . . . . Indium gallium arsenide nitride [InGaAsN]
2924/10357 . . . . . Indium aluminium arsenide nitride [InAlAsN]
2924/10358 . . . . . Gallium arsenide antimonide nitride [GaAsSbN]
2924/10359 . . . . . Gallium indium nitride arsenide antimonide [GaInNAsSb]
2924/1036 . . . . . Gallium indium arsenide antimonide phosphide [GaInAsSbP]
2924/1037 . . . . . II-VI
2924/10371 . . . . . Cadmium selenide [CdSe]
2924/10372 . . . . . Cadmium sulfide [CdS]
2924/10373 . . . . . Cadmium telluride [CdTe]
2924/10375 . . . . . Zinc selenide [ZnSe]
2924/10376 . . . . . Zinc sulfide [ZnS]
2924/10377 . . . . . Zinc telluride [ZnTe]
2924/10378 . . . . . Cadmium zinc telluride, i.e. CZT [CdZnTe]
2924/10379 . . . . . Mercury cadmium telluride [HgZnTe]
2924/1038 . . . . . Mercury zinc telluride [HgZnSe]
2924/10381 . . . . . Mercury zinc selenide [HgZnSe]
2924/1042 . . . . . I-VII
2924/10421 . . . . . Cuprous chloride [CuCl]
2924/1047 . . . . . I-VI
2924/10471 . . . . . Copper sulfide [CuS]
2924/1052 . . . . . IV-VI
2924/10521 . . . . . Lead selenide [PbSe]
2924/10522 . . . . . Lead(II)sulfide [PbS]
2924/10523 . . . . . Lead telluride [PbTe]
2924/10524 . . . . . Tin sulfide [SnS, SnS_2]
2924/10525 . . . . . Tin telluride [SnTe]
2924/10526 . . . . . Lead tin telluride [PbSnTe]
2924/10527 . . . . . Thallium tin telluride [Tl_2SnTe_5]
2924/10528 . . . . . Thallium germanium telluride [Tl_2GeTe_5]
2924/1057 . . . . . V-VI
2924/10571 . . . . . Bismuth telluride [Bi_2Te_3]
2924/1062 . . . . . II-V
2924/10621 . . . . . Cadmium phosphide [Cd_3P_2]
2924/10622 . . . . . Cadmium arsenide [Cd_3As_2]
2924/10623 . . . . . Cadmium antimonide [Cd_3Sb_2]
2924/10624 . . . . . Zinc phosphide [Zn_3P_2]
2924/10625 . . . . . Zinc arsenide [Zn_3As_2]
2924/10626 . . . . . Zinc antimonide [Zn_3Sb_2]
2924/1067 . . . . . Oxide
2924/10671 . . . . . Titanium dioxide, anatase, rutile, brookite [TiO_2]
2924/10672 . . . . . Copper(I)oxide [Cu_2O]
2924/10673 . . . . . Copper(II)oxide [CuO]
2924/10674 . . . . . Uranium dioxide [UO_2]
2924/10675 . . . . . Uranium trioxide [UO_3]
2924/10676 . . . . . Bismuth trioxide [Bi_2O_3]
2924/10677 . . . . . Tin dioxide [SnO_2]
2924/10678 . . . . . Barium titanate [$BaTiO_3$]
2924/10679 . . . . . Strontium titanate [$SrTiO_3$]
2924/1068 . . . . . Lithium niobate [$LiNbO_3$]
2924/10681 . . . . . Lanthanum copper oxide [La_2CuO_4]
2924/1072 . . . . . Layered
2924/10721 . . . . . Lead(II)iodide [PbI_2]
2924/10722 . . . . . Molybdenum disulfide [MoS_2]
2924/10723 . . . . . Gallium selenide [GaSe]
2924/10724 . . . . . Tin sulfide [SnS]
2924/10725 . . . . . Bismuth sulfide [Bi_2S_3]
2924/1077 . . . . . Magnetic diluted [DMS]
2924/10771 . . . . . Gallium manganese arsenide [GaMnAs]
2924/10772 . . . . . Indium manganese arsenide [InMnAs]
2924/10773 . . . . . Cadmium manganese telluride [CdMnTe]
2924/10774 . . . . . Lead manganese telluride [PbMnTe]
2924/10775 . . . . . Lanthanum calcium manganate [$La_{0.7}Ca_{0.3}MnO_3$]
2924/10776 . . . . . Iron(II)oxide [FeO]
2924/10777 . . . . . Nickel(II)oxide [NiO]
2924/10778 . . . . . Europium(II)oxide [EuO]
2924/10779 . . . . . Europium(II)sulfide [EuS]
2924/1078 . . . . . Chromium(III)bromide [$CrBr_3$]
2924/1082 . . . . . Other
2924/10821 . . . . . Copper indium gallium selenide, CIGS [$Cu[In,Ga]Se_2$]
2924/10822 . . . . . Copper zinc tin sulfide, CZTS [Cu_2ZnSnS_4]
2924/10823 . . . . . Copper indium selenide, CIS [$CuInSe_2$]
2924/10824 . . . . . Silver gallium sulfide [$AgGaS_2$]
2924/10825 . . . . . Zinc silicon phosphide [$ZnSiP_2$]
2924/10826 . . . . . Arsenic selenide [As_2S_3]
2924/10827 . . . . . Platinum silicide [PtSi]
2924/10828 . . . . . Bismuth(III)iodide [BiI_3]
2924/10829 . . . . . Mercury(II)iodide [HgI_2]
2924/1083 . . . . . Thallium(I)bromide [TlBr]
2924/10831 . . . . . Selenium [Se]
2924/10832 . . . . . Silver sulfide [Ag_2S]
2924/10833 . . . . . Iron disulfide [FeS_2]
2924/11 . . Device type
2924/12 . . . Passive devices, e.g. 2 terminal devices
2924/1203 . . . . Rectifying Diode
2924/12031 . . . . . PIN diode
2924/12032 . . . . . Schottky diode
2924/12033 . . . . . Gunn diode
2924/12034 . . . . . Varactor
2924/12035 . . . . . Zener diode
2924/12036 . . . . . PN diode
2924/12037 . . . . . Cat's whisker diode
2924/12038 . . . . . Point contact
2924/1204 . . . . Optical Diode
2924/12041 . . . . . LED
2924/12042 . . . . . LASER

2924/12043 . . . . . Photo diode
2924/12044 . . . . . OLED
2924/1205 . . . . Capacitor
2924/1206 . . . . Inductor
2924/1207 . . . . Resistor
2924/13 . . . Discrete devices, e.g. 3 terminal devices
2924/1301 . . . . Thyristor
2924/13011 . . . . . Anode Gate Thyristor [AGT]
2924/13013 . . . . . Bidirectional Control Thyristor [BCT]
2924/13014 . . . . . Breakover Diode [BOD]
2924/13015 . . . . . DIAC - Bidirectional trigger device
2924/13016 . . . . . Dynistor - Unidirectional switching device
2924/13017 . . . . . Shockley diode - Unidirectional trigger and switching device
2924/13018 . . . . . SIDAC - Bidirectional switching device
2924/13019 . . . . . Trisil, SIDACtor - Bidirectional protection devices
2924/1302 . . . . . GTO - Gate Turn-Off thyristor
2924/13021 . . . . . DB-GTO - Distributed Buffer Gate Turn-Off thyristor
2924/13022 . . . . . MA-GTO - Modified Anode Gate Turn-Off thyristor
2924/13023 . . . . . IGCT - Integrated Gate Commutated Thyristor
2924/13024 . . . . . LASCR - Light Activated SCR, or LTT - Light triggered thyristor
2924/13025 . . . . . Light Activated Semiconducting Switch [LASS]
2924/13026 . . . . . MCT - MOSFET Controlled Thyristor - It contains two additional FET structures for on/off control
2924/13027 . . . . . BRT - Base Resistance Controlled Thyristor
2924/13028 . . . . . RCT - Reverse Conducting Thyristor
2924/13029 . . . . . PUT or PUJT - Programmable Unijunction Transistor - A thyristor with gate on n-type layer near to the anode used as a functional replacement for unijunction transistor
2924/1303 . . . . . SCS - Silicon Controlled Switch or Thyristor Tetrode - A thyristor with both cathode and anode gates
2924/13032 . . . . . SITh - Static Induction Thyristor, or FCTh - Field Controlled Thyristor - containing a gate structure that can shut down anode current flow
2924/13033 . . . . . TRIAC - Triode for Alternating Current - A bidirectional switching device containing two thyristor structures with common gate contact
2924/13034 . . . . . Silicon Controlled Rectifier [SCR]
2924/13035 . . . . . Asymmetrical SCR [ASCR]
2924/1304 . . . . Transistor
2924/1305 . . . . . Bipolar Junction Transistor [BJT]
2924/13051 . . . . . Heterojunction bipolar transistor [HBT]
2924/13052 . . . . . Schottky transistor
2924/13053 . . . . . Avalanche transistor
2924/13054 . . . . . Darlington transistor
2924/13055 . . . . . Insulated gate bipolar transistor [IGBT]
2924/13056 . . . . . Photo transistor
2924/1306 . . . . . Field-effect transistor [FET]
2924/13061 . . . . . Carbon nanotube field-effect transistor [CNFET]
2924/13062 . . . . . Junction field-effect transistor [JFET]
2924/13063 . . . . . Metal-Semiconductor Field-Effect Transistor [MESFET]
2924/13064 . . . . . High Electron Mobility Transistor [HEMT, HFET [heterostructure FET], MODFET]
2924/13066 . . . . . Inverted-T field effect transistor [ITFET]
2924/13067 . . . . . FinFET, source/drain region shapes fins on the silicon surface
2924/13068 . . . . . Fast-reverse epitaxial diode field-effect transistor [FREDFET]
2924/13069 . . . . . Thin film transistor [TFT]
2924/1307 . . . . . Organic Field-Effect Transistor [OFET]
2924/13071 . . . . . Ballistic transistor
2924/13072 . . . . . Sensor FET
2924/13073 . . . . . ion-sensitive field-effect transistor [ISFET]
2924/13074 . . . . . Electrolyte-oxide-semiconductor field effect transistor [EOSFET], e.g. Neurochip
2924/13075 . . . . . Deoxyribonucleic acid field-effect transistor [DNAFET]
2924/13076 . . . . . DEPFET
2924/13078 . . . . . Unijunction transistors
2924/13079 . . . . . Single-electron transistors [SET]
2924/1308 . . . . . Nanofluidic transistor
2924/13081 . . . . . Multigate devices
2924/13082 . . . . . Tetrode transistor
2924/13083 . . . . . Pentode transistor
2924/13084 . . . . . Trigate transistor
2924/13085 . . . . . Dual gate FETs
2924/13086 . . . . . Junctionless Nanowire Transistor [JNT]
2924/13087 . . . . . Vertical-Slit Field-Effect Transistor [VeSFET]
2924/13088 . . . . . Graphene Nanoribbon Field-Effect Transistor [GNRFET]
2924/13089 . . . . . Nanoparticle Organic Memory Field-Effect Transistor [NOMFET]
2924/1309 . . . . . Modulation-Doped Field Effect Transistor [MODFET]
2924/13091 . . . . . Metal-Oxide-Semiconductor Field-Effect Transistor [MOSFET]
2924/13092 . . . . . Dual Gate Metal-Oxide-Semiconductor Field-Effect Transistor [DGMOSFET]
2924/14 . . . Integrated circuits
2924/141 . . . . Analog devices
2924/142 . . . . . HF devices
2924/1421 . . . . . RF devices
2924/14211 . . . . . Voltage-controlled oscillator [VCO]
2924/14215 . . . . . Low-noise amplifier [LNA]
2924/1422 . . . . . Mixer
2924/14221 . . . . . Electronic mixer
2924/14222 . . . . . Frequency mixer
2924/1423 . . . . . Monolithic Microwave Integrated Circuit [MMIC]
2924/1424 . . . . . Operational amplifier
2924/1425 . . . . . Converter
2924/14251 . . . . . Frequency converter
2924/14252 . . . . . Voltage converter
2924/14253 . . . . . Digital-to-analog converter [DAC]
2924/1426 . . . . . Driver
2924/1427 . . . . . Voltage regulator [VR]

2924/143 . . . . Digital devices
2924/1431 . . . . . Logic devices
2924/1432 . . . . . Central processing unit [CPU]
2924/1433 . . . . . Application-specific integrated circuit [ASIC]
2924/14335 . . . . . Digital signal processor [DSP]
2924/1434 . . . . . Memory
2924/1435 . . . . . Random access memory [RAM]
2924/1436 . . . . . Dynamic random-access memory [DRAM]
2924/14361 . . . . . Synchronous dynamic random access memory [SDRAM]
2924/14362 . . . . . RAS Only Refresh [ROR]
2924/14363 . . . . . CAS before RAS refresh [CBR]
2924/14364 . . . . . Multibank DRAM [MDRAM]
2924/14365 . . . . . Video DRAM [VRAM]
2924/14366 . . . . . Window DRAM [WRAM]
2924/14367 . . . . . Fast page mode DRAM [FPM DRAM]
2924/14368 . . . . . Extended data out DRAM [EDO DRAM]
2924/14369 . . . . . Burst EDO DRAM [BEDO DRAM]
2924/1437 . . . . . Static random-access memory [SRAM]
2924/1438 . . . . . Flash memory
2924/1441 . . . . . Ferroelectric RAM [FeRAM or FRAM]
2924/1442 . . . . . Synchronous graphics RAM [SGRAM]
2924/1443 . . . . . Non-volatile random-access memory [NVRAM]
2924/1444 . . . . . PBRAM
2924/145 . . . . . Read-only memory [ROM]
2924/1451 . . . . . EPROM
2924/14511 . . . . . EEPROM
2924/1453 . . . . . PROM
2924/146 . . Mixed devices
2924/1461 . . . MEMS
2924/15 . Details of package parts other than the semiconductor or other solid state devices to be connected
2924/151 . . Die mounting substrate
2924/1511 . . . Structure
2924/1515 . . . Shape
2924/15151 . . . . the die mounting substrate comprising an aperture, e.g. for underfilling, outgassing, window type wire connections
2924/15153 . . . . the die mounting substrate comprising a recess for hosting the device
2924/15155 . . . . . the shape of the recess being other than a cuboid
2924/15156 . . . . . Side view
2924/15157 . . . . . Top view
2924/15158 . . . . the die mounting substrate being other than a cuboid
2924/15159 . . . . . Side view
2924/15162 . . . . . Top view
2924/15165 . . . Monolayer substrate
2924/1517 . . . Multilayer substrate
2924/15172 . . . . Fan-out arrangement of the internal vias
2924/15173 . . . . . in a single layer of the multilayer substrate
2924/15174 . . . . . in different layers of the multilayer substrate
2924/15182 . . . . Fan-in arrangement of the internal vias
2924/15183 . . . . . in a single layer of the multilayer substrate
2924/15184 . . . . . in different layers of the multilayer substrate
2924/15192 . . . . Resurf arrangement of the internal vias
2924/152 . . . Disposition
2924/153 . . . Connection portion
2924/1531 . . . . the connection portion being formed only on the surface of the substrate opposite to the die mounting surface
2924/15311 . . . . . being a ball array, e.g. BGA
2924/15312 . . . . . being a pin array, e.g. PGA
2924/15313 . . . . . being a land array, e.g. LGA
2924/1532 . . . . the connection portion being formed on the die mounting surface of the substrate
2924/15321 . . . . . being a ball array, e.g. BGA
2924/15322 . . . . . being a pin array, e.g. PGA
2924/15323 . . . . . being a land array, e.g. LGA
2924/1533 . . . . . the connection portion being formed both on the die mounting surface of the substrate and outside the die mounting surface of the substrate
2924/15331 . . . . . being a ball array, e.g. BGA
2924/15332 . . . . . being a pin array, e.g. PGA
2924/15333 . . . . . being a land array, e.g. LGA
2924/156 . . . Material
2924/157 . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2924/15701 . . . . . the principal constituent melting at a temperature of less than 400 C
2924/15717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400 C and less than 950 C
2924/15724 . . . . . Aluminium [Al] as principal constituent
2924/15738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950 C and less than 1550 C
2924/15747 . . . . . Copper [Cu] as principal constituent
2924/1576 . . . . . Iron [Fe] as principal constituent
2924/15763 . . . . . the principal constituent melting at a temperature of greater than 1550 C
2924/15786 . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2924/15787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
2924/15788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2924/1579 . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2924/15791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2924/15793 . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2924/157 - H01L 2924/15791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

2924/15798 . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2924/161 . . Cap
2924/1611 . . . Structure
2924/1615 . . . Shape
2924/16151 . . . . Cap comprising an aperture, e.g. for pressure control, encapsulation
2924/16152 . . . . Cap comprising a cavity for hosting the device, e.g. U-shaped cap
2924/16153 . . . . . Cap enclosing a plurality of side-by-side cavities [e.g. E-shaped cap]
2924/1616 . . . . . Cavity shape
2924/1617 . . . . . Cavity coating
2924/16171 . . . . . Material
2924/16172 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2924/16173 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2924/16174 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/16175)
2924/16175 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2924/16176 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2924/16177 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2924/16178 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2924/157 - H01L 2924/15791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2924/16179 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2924/1619 . . . . . Cavity coating shape
2924/16195 . . . . Flat cap [not enclosing an internal cavity]
2924/16196 . . . . Cap forming a cavity, e.g. being a curved metal foil
2924/162 . . . Disposition
2924/16235 . . . . Connecting to a semiconductor or solid-state bodies, i.e. cap-to-chip
2924/16251 . . . . Connecting to an item not being a semiconductor or solid-state body, e.g. cap-to-substrate
2924/1626 . . . . Cap-in-cap assemblies
2924/1627 . . . . stacked type assemblies, e.g. stacked multi-cavities
2924/163 . . . Connection portion, e.g. seal
2924/1631 . . . . Structure
2924/16315 . . . . Shape
2924/1632 . . . . Disposition
2924/164 . . . . Material
2924/165 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2924/16586 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2924/16587 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
2924/16588 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2924/1659 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2924/16593 . . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2924/157 - H01L 2924/15791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2924/16598 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2924/166 . . . Material
2924/167 . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2924/16701 . . . . . the principal constituent melting at a temperature of less than 400 C
2924/16717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400 C and less than 950 C
2924/16724 . . . . . Aluminium [Al] as principal constituent
2924/16738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950 C and less than 1550 C
2924/16747 . . . . . Copper [Cu] as principal constituent
2924/1676 . . . . . Iron [Fe] as principal constituent
2924/16763 . . . . . the principal constituent melting at a temperature of greater than 1550 C
2924/16786 . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2924/16787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
2924/16788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2924/1679 . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2924/16791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

2924/16793 . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2924/167 - H01L 2924/16791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2924/16798 . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2924/171 . . Frame
2924/1711 . . . Structure
2924/1715 . . . Shape
2924/17151 . . . . Frame comprising an aperture, e.g. for pressure control, encapsulation
2924/172 . . . Disposition
2924/173 . . . Connection portion, e.g. seal
2924/176 . . . Material
2924/177 . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2924/17701 . . . . . the principal constituent melting at a temperature of less than 400 C
2924/17717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400 C and less than 950 C
2924/17724 . . . . . Aluminium [Al] as principal constituent
2924/17738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950 C and less than 1550 C
2924/17747 . . . . . Copper [Cu] as principal constituent
2924/1776 . . . . . Iron [Fe] as principal constituent
2924/17763 . . . . . the principal constituent melting at a temperature of greater than 1550 C
2924/17786 . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2924/17787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
2924/17788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2924/1779 . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2924/17791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2924/17793 . . . . with a principal constituent of the material being a solid not provided for in groups H01L 2924/177 - H01L 2924/17791, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2924/17798 . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2924/181 . . Encapsulation
2924/1811 . . . Structure
2924/1815 . . . Shape
2924/1816 . . . . Exposing the passive side of the semiconductor or solid-state body
2924/18161 . . . . . of a flip chip
2924/18162 . . . . . of a chip with build-up interconnect
2924/18165 . . . . . of a wire bonded chip
2924/182 . . . Disposition
2924/183 . . . Connection portion, e.g. seal
2924/18301 . . . . being an anchoring portion, i.e. mechanical interlocking between the encapsulation resin and another package part
2924/186 . . . Material
2924/19 . Details of hybrid assemblies other than the semiconductor or other solid state devices to be connected
2924/1901 . . Structure
2924/19011 . . . including integrated passive components
2924/19015 . . . including thin film passive components
2924/1902 . . . including thick film passive components
2924/1903 . . . including wave guides
2924/19031 . . . . being a strip line type
2924/19032 . . . . being a microstrip line type
2924/19033 . . . . being a coplanar line type
2924/19038 . . . . being a hybrid line type
2924/19039 . . . . . impedance transition between different types of wave guides
2924/1904 . . . Component type
2924/19041 . . . . being a capacitor
2924/19042 . . . . being an inductor
2924/19043 . . . . being a resistor
2924/1905 . . Shape
2924/19051 . . . Impedance matching structure [e.g. balun]
2924/191 . . Disposition
2924/19101 . . . of discrete passive components
2924/19102 . . . . in a stacked assembly with the semiconductor or solid state device
2924/19103 . . . . . interposed between the semiconductor or solid-state device and the die mounting substrate, i.e. chip-on-passive
2924/19104 . . . . . on the semiconductor or solid-state device, i.e. passive-on-chip
2924/19105 . . . . in a side-by-side arrangement on a common die mounting substrate
2924/19106 . . . . in a mirrored arrangement on two different side of a common die mounting substrate
2924/19107 . . . . off-chip wires
2924/20 . Parameters
2924/201 . . Temperature ranges
2924/20101 . . . Temperature range T<0 C, T<273.15 K
2924/20102 . . . Temperature range 0 C=<T<60 C, 273.15 K =<T< 333.15K
2924/20103 . . . Temperature range 60 C=<T<100 C, 333.15 K =< T< 373.15K
2924/20104 . . . Temperature range 100 C=<T<150 C, 373.15 K =< T < 423.15K
2924/20105 . . . Temperature range 150 C=<T<200 C, 423.15 K =< T < 473.15K
2924/20106 . . . Temperature range 200 C=<T<250 C, 473.15 K =<T < 523.15K
2924/20107 . . . Temperature range 250 C=<T<300 C, 523.15K =<T< 573.15K
2924/20108 . . . Temperature range 300 C=<T<350 C, 573.15K =<T< 623.15K
2924/20109 . . . Temperature range 350 C=<T<400 C, 623.15K =<T< 673.15K

2924/2011 . . . Temperature range 400 C=<T<450 C, 673.15K =<T< 723.15K
2924/20111 . . . Temperature range 450 C=<T<500 C, 723.15K =<T< 773.15K
2924/202 . . Electromagnetic wavelength ranges [W]
2924/20201 . . . Gamma radiation, i.e. wavelength less than 0.01 nm
2924/20202 . . . X-ray radiation, i.e. wavelength 0.01 to 10 nm
2924/2021 . . . Ultraviolet radiation
2924/20211 . . . . UV-C 100=<W<280 nm
2924/20212 . . . . UV-B 280=<W<315 nm
2924/20213 . . . . UV-A 315=<W<400 nm
2924/2024 . . . Visible spectrum wavelength 390=<W<700 nm, i.e. 400-790 THz
2924/2026 . . . Infrared radiation 700=<W<3000 nm
2924/20261 . . . . IR-A 700=<W<1400 nm, i.e. 215 THz-430 THz
2924/20262 . . . . IR-B 1400=<W<3000 nm, i.e. 100THz-215 THz
2924/20263 . . . . IR-C 3000 nm =<W<1 mm, i.e. 300 GHz-100THz
2924/2027 . . . Radio 1 mm - km 300 GHz - 3 Hz
2924/20271 . . . . Microwave radiation 1 mm - 1 meter, i..e 300 GHz - 300 MHz
2924/203 . . Ultrasonic frequency ranges, i.e. KHz
2924/20301 . . . Ultrasonic frequency [f] f<25 kHz
2924/20302 . . . Ultrasonic frequency [f] 25 Khz=<f< 50 KHz
2924/20303 . . . Ultrasonic frequency [f] 50 Khz=<f< 75 KHz
2924/20304 . . . Ultrasonic frequency [f] 75 Khz=<f< 100 KHz
2924/20305 . . . Ultrasonic frequency [f] 100 Khz=<f< 125 KHz
2924/20306 . . . Ultrasonic frequency [f] 125 Khz=<f< 150 KHz
2924/20307 . . . Ultrasonic frequency [f] 150 Khz=<f< 175 KHz
2924/20308 . . . Ultrasonic frequency [f] 175 Khz=<f< 200 KHz
2924/20309 . . . Ultrasonic frequency [f] f>=200 KHz
2924/206 . . Length ranges
2924/2064 . . . larger or equal to 1 micron less than 100 microns
2924/20641 . . . larger or equal to 100 microns less than 200 microns
2924/20642 . . . larger or equal to 200 microns less than 300 microns
2924/20643 . . . larger or equal to 300 microns less than 400 microns
2924/20644 . . . larger or equal to 400 microns less than 500 microns
2924/20645 . . . larger or equal to 500 microns less than 600 microns
2924/20646 . . . larger or equal to 600 microns less than 700 microns
2924/20647 . . . larger or equal to 700 microns less than 800 microns
2924/20648 . . . larger or equal to 800 microns less than 900 microns
2924/20649 . . . larger or equal to 900 microns less than 1000 microns
2924/2065 . . . larger or equal to 1000 microns less than 1500 microns
2924/20651 . . . larger or equal to 1500 microns less than 2000 microns
2924/20652 . . . larger or equal to 2000 microns less than 2500 microns
2924/20653 . . . larger or equal to 2500 microns less than 3000 microns
2924/20654 . . . larger or equal to 3000 microns less than 4000 microns
2924/20655 . . . larger or equal to 4000 microns less than 5000 microns
2924/20656 . . . larger or equal to 5000 microns less than 6000 microns
2924/20657 . . . larger or equal to 6000 microns less than 7000 microns
2924/20658 . . . larger or equal to 7000 microns less than 8000 microns
2924/207 . . Diameter ranges
2924/2075 . . . larger or equal to 1 micron less than 10 microns
2924/20751 . . . larger or equal to 10 microns less than 20 microns
2924/20752 . . . larger or equal to 20 microns less than 30 microns
2924/20753 . . . larger or equal to 30 microns less than 40 microns
2924/20754 . . . larger or equal to 40 microns less than 50 microns
2924/20755 . . . larger or equal to 50 microns less than 60 microns
2924/20756 . . . larger or equal to 60 microns less than 70 microns
2924/20757 . . . larger or equal to 70 microns less than 80 microns
2924/20758 . . . larger or equal to 80 microns less than 90 microns
2924/20759 . . . larger or equal to 90 microns less than 100 microns
2924/2076 . . . equal to or larger than 100 microns
2924/30 . Technical effects
2924/301 . . Electrical effects
2924/30101 . . . Resistance
2924/30105 . . . Capacitance
2924/30107 . . . Inductance
2924/3011 . . . Impedance
2924/30111 . . . . matching
2924/302 . . . Electrostatic
2924/30201 . . . . Charge
2924/30205 . . . . Discharge
2924/3025 . . . Electromagnetic shielding
2924/35 . . Mechanical effects
2924/351 . . . Thermal stress
2924/3511 . . . . Warping
2924/3512 . . . . Cracking
2924/35121 . . . . . Peeling or delaminating
2924/36 . . Material effects
2924/364 . . . Polymers
2924/3641 . . . . Outgassing
2924/365 . . . Metallurgical effects
2924/3651 . . . . Formation of intermetallics
2924/36511 . . . . . Purple plague
2924/3656 . . . . Formation of Kirkendall voids
2924/37 . . Effects of the manufacturing process
2924/37001 . . . Yield
2924/37002 . . . Shelf life
2924/3701 . . . increased through put

2924/38 . . Effects and problems related to the device integration
2924/381 . . . Pitch distance
2924/384 . . . Bump effects
2924/3841 . . . . Solder bridging
2924/386 . . . Wire effects
2924/3861 . . . . Sag
2924/3862 . . . . Sweep
2924/40 . Details of apparatuses used for either manufacturing connectors or connecting the semiconductor or solid-state body
2924/401 . . LASER
2924/40101 . . . Mode
2924/40102 . . . . being pulsed
2924/40103 . . . . being continous
2924/40105 . . . Beam details
2924/4015 . . . . Shape
2924/402 . . . Type
2924/40201 . . . . being a chemical
2924/40202 . . . . . Deuterium Flouride [DF] LASER
2924/40203 . . . . . Hydrogen Flouride [HF] LASER
2924/40207 . . . . . Dye laser
2924/4025 . . . . being a gas
2924/40251 . . . . . argon-ion LASER
2924/40252 . . . . . CO_2 LASER
2924/40253 . . . . . HeAg LASER
2924/40254 . . . . . HeNe LASER
2924/40255 . . . . . NeCu LASER
2924/403 . . . . being an Excimer
2924/40301 . . . . . ArF LASER
2924/40302 . . . . . F2 LASER
2924/40303 . . . . . KrCl LASER
2924/40304 . . . . . KrF LASER
2924/40305 . . . . . XeCl LASER
2924/40306 . . . . . XeF LASER
2924/4035 . . . . being a fiber hosted LASER
2924/404 . . . . being a solid state
2924/40401 . . . . . Free electron LASER
2924/40402 . . . . . Photonic crystal LASER
2924/40403 . . . . . Fiber solid state LASER
2924/40404 . . . . . Yttrium Aluminium Garnet Nd:YAG LASER
2924/40405 . . . . . Yttrium Lithium Flouride Nd:YLF LASER
2924/40406 . . . . . Ruby LASER
2924/40407 . . . . . Yb:YAG LASER
2924/405 . . . Wavelength
2924/40501 . . . . UV spectrum
2924/40502 . . . . Visible spectrum
2924/40503 . . . . IR spectrum

2933/00 Details relating to devices covered by the group H01L 33/00 but not provided for in its subgroups

2933/0008 . Processes
2933/0016 . . relating to electrodes
2933/0025 . . relating to coatings
2933/0033 . . relating to semiconductor body packages
2933/0041 . . . relating to wavelength conversion elements
2933/005 . . . relating to encapsulations
2933/0058 . . . relating to optical field-shaping elements
2933/0066 . . . relating to arrangements for conducting electric current to or from the semiconductor body
2933/0075 . . . relating to heat extraction or cooling elements
2933/0083 . Periodic patterns for optical field-shaping in or on the semiconductor body or semiconductor body package, e.g. photonic bandgap structures
2933/0091 . Scattering means in or on the semiconductor body or semiconductor body package (H01L 33/22 takes precedence)