

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H10 SEMICONDUCTOR DEVICES; ELECTRIC SOLID-STATE DEVICES NOT OTHERWISE PROVIDED FOR

H10W GENERIC PACKAGES, INTERCONNECTIONS, CONNECTORS OR OTHER CONSTRUCTIONAL DETAILS OF DEVICES COVERED BY CLASS [H10](#)

NOTES

1. This subclass covers:
 - a. packages of devices and parts of such packages;
 - b. interconnections of devices in chips, wafers, substrates or packages;
 - c. connectors of devices in packages;
 - d. other constructional details of devices in chips, wafers, substrates or packages, e.g. isolation regions between components of integrated devices;
 - e. detachable holders for supporting packaged chips in operation;
 - f. the manufacture or treatment of aspects (a)-(e);
 when aspects (a)-(e) are
 - (1) applicable to devices covered by subclass [H10B](#);
 - (2) applicable to devices covered by subclass [H10D](#), except for semiconductor bodies or electrodes thereof, which are covered by subgroups [H10D 62/00](#) or [H10D 64/00](#); or
 - (3) generically applicable to devices covered by subclasses [H10B](#), [H10D](#), [H10F](#), [H10H](#), [H10K](#) or [H10N](#).
2. {In this subclass, the periodic system used is the I to VIII group system indicated in the Periodic Table under Note (3) of section [C](#).}

Constructional details of integrated devices in chips, wafers or substrates

10/00 Isolation regions in semiconductor bodies between components of integrated devices

10/01 . {Manufacture or treatment}

10/011 . . {of isolation regions comprising dielectric materials}

10/012 . . . {using local oxidation of silicon [LOCOS]}

10/0121 {in regions recessed from the surface, e.g. in trenches or grooves}

10/0123 {using auxiliary pillars in the regions}

10/0124 {the regions having non-rectangular shapes, e.g. rounded ([H10W 10/0123](#) takes precedence)}

10/0125 {comprising introducing electrical impurities in local oxidation regions, e.g. to alter LOCOS oxide growth characteristics}

10/0126 {introducing electrical active impurities in local oxidation regions to create channel stoppers}

10/0127 {using both n-type and p-type impurities, e.g. for isolation of complementary doped regions}

10/0128 {comprising multiple local oxidation process steps}

10/014 . . . {using trench refilling with dielectric materials, e.g. shallow trench isolations}

10/0142 {the dielectric materials being chemical transformed from non-dielectric materials}

10/0143 {comprising concurrently refilling multiple trenches having different shapes or dimensions}

10/0145 {of trenches having shapes other than rectangular or V-shape ([H10W 10/0143](#) takes precedence)}

10/0147 {the shapes being altered by a local oxidation of silicon process, e.g. trench corner rounding by LOCOS}

10/0148 {comprising introducing impurities in side walls or bottom walls of trenches, e.g. for forming channel stoppers}

10/018 . . . {using selective deposition of crystalline silicon, e.g. using epitaxial growth of silicon}

10/019 . . . {using epitaxial passivated integrated circuit [EPIC] processes}

10/021 . . {of air gaps}

10/031 . . {of isolation regions comprising PN junctions}

10/041 . . {of isolation regions comprising polycrystalline semiconductor materials}

10/051 . . {of isolation region based on field-effect}

10/061 . . {using SOI processes together with lateral isolation, e.g. combinations of SOI and shallow trench isolations}

10/10 . Isolation regions comprising dielectric materials

10/13 . . formed using local oxidation of silicon [LOCOS], e.g. sealed interface localised oxidation [SILO] or side-wall mask isolation [SWAMI]

10/17 . . formed using trench refilling with dielectric materials, e.g. shallow trench isolations

10/181 . . {Semiconductor-on-insulator [SOI] isolation regions, e.g. buried oxide regions of SOI wafers}

10/20 . Air gaps

10/30 . Isolation regions comprising PN junctions

10/40 . Isolation regions comprising polycrystalline semiconductor materials

- 10/50 . Isolation regions based on field-effect
- 15/00 Highly-doped buried regions of integrated devices**
- 15/01 . {Manufacture or treatment}
- 20/00 Interconnections in chips, wafers or substrates**

NOTES

1. This group covers:
 - interconnections in chips;
 - interconnections in or on wafers;
 - interconnections in or on substrates.
2. This group does not cover interconnections in packages, such as in or on package substrates, which are covered by subgroups [H10W 70/00](#) or [H10W 72/00](#).

- 20/01 . {Manufacture or treatment}
- 20/021 . . {of interconnections within wafers or substrates}
- 20/023 . . . {the interconnections being through-semiconductor vias}

WARNING

Group [H10W 20/023](#) is impacted by reclassification into groups [H10W 20/0234](#), [H10W 20/0238](#), [H10W 20/0242](#), [H10W 20/0245](#), [H10W 20/0249](#), [H10W 20/0253](#), [H10W 20/0257](#), [H10W 20/0261](#) and [H10W 20/0265](#).

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

- 20/0234 {comprising etching via holes that stop on pads or on electrodes}

WARNING

Groups [H10W 20/0234](#) - [H10W 20/0265](#) are incomplete pending reclassification of documents from group [H10W 20/023](#).

Groups [H10W 20/023](#) and [H10W 20/0234](#) - [H10W 20/0265](#) should be considered in order to perform a complete search.

- 20/0238 {comprising etching via holes through pads or through electrodes}
- 20/0242 {comprising etching via holes from the back sides of the chips, wafers or substrates}
- 20/0245 {comprising use of blind vias during the manufacture}
- 20/0249 {wherein the through-semiconductor via protrudes from backsides of the chips, wafers or substrates during the manufacture}
- 20/0253 {comprising forming the through-semiconductor vias after stacking of the chips, wafers or substrates}
- 20/0257 {comprising using a sacrificial placeholder, e.g. using a sacrificial plug}
- 20/0261 {characterised by the filling method or the material of the conductive fill}
- 20/0265 {characterised by the sidewall insulation}
- 20/031 . . {of conductive parts of the interconnections}
- 20/032 . . . {of conductive barrier, adhesion or liner layers}
- 20/033 {in openings in dielectrics}
- 20/034 {bottomless barrier, adhesion or liner layers}

- 20/035 {combinations of barrier, adhesion or liner layers, e.g. multi-layered barrier layers}
- 20/036 {the barrier, adhesion or liner layers being within a main fill metal}
- 20/037 {the barrier, adhesion or liner layers being on top of a main fill metal}

WARNING

Group [H10W 20/037](#) is impacted by reclassification into group [H10W 20/0372](#).

Groups [H10W 20/037](#) and [H10W 20/0372](#) should be considered in order to perform a complete search.

- 20/0372 {comprising multiple barrier, adhesion or liner layers}

WARNING

Group [H10W 20/0372](#) is incomplete pending reclassification of documents from group [H10W 20/037](#).

Groups [H10W 20/037](#) and [H10W 20/0372](#) should be considered in order to perform a complete search.

- 20/0375 {comprising multiple stacked thin barrier, adhesion or liner layers not being formed in openings in dielectrics}
- 20/038 {covering conductive structures ([H10W 20/037](#) takes precedence)}
- 20/039 {also covering sidewalls of the conductive structures}
- 20/041 {the barrier, adhesion or liner layers being discontinuous}
- 20/042 {the barrier, adhesion or liner layers being seed or nucleation layers}
- 20/0425 {comprising multiple stacked seed or nucleation layers}
- 20/043 {for electroplating}
- 20/044 {for electroless plating}
- 20/045 {for deposition from the gaseous phase, e.g. for chemical vapour deposition [CVD]}
- 20/046 {the barrier, adhesion or liner layers being associated with interconnections of capacitors}
- 20/047 {by introducing additional elements therein}
- 20/048 {by using plasmas or gaseous environments, e.g. by nitriding}
- 20/049 {by diffusing alloying elements}
- 20/051 {by ion implantation}
- 20/052 {by treatments not introducing additional elements therein}
- 20/0523 {by irradiating with ultraviolet or particle radiation}
- 20/0526 {by thermal treatment thereof}
- 20/054 {by selectively removing parts thereof ([H10W 20/034](#) takes precedence)}
- 20/055 {by formation methods other than physical vapour deposition [PVD], chemical vapour deposition [CVD] or liquid deposition}

- 20/0552 {by diffusing metallic dopants to react with dielectrics}
- 20/0554 . . . {of nanotubes or nanowires}
- 20/056 . . . {by filling conductive material into holes, grooves or trenches}

WARNING

Group [H10W 20/056](#) is impacted by reclassification into group [H10W 20/0595](#). Groups [H10W 20/056](#) and [H10W 20/0595](#) should be considered in order to perform a complete search.

- 20/057 {by selectively depositing, e.g. by using selective CVD or plating}
- 20/058 {by depositing on sacrificial masks, e.g. using lift-off}
- 20/059 {by reflowing or applying pressure}
- 20/0595 {by using multiple deposition steps separated by etching steps}

WARNING

Group [H10W 20/0595](#) is incomplete pending reclassification of documents from group [H10W 20/056](#). Groups [H10W 20/056](#) and [H10W 20/0595](#) should be considered in order to perform a complete search.

- 20/062 . . . {by smoothing of conductive parts, e.g. by planarisation}
- 20/063 . . . {by forming conductive members before forming protective insulating material}

WARNING

Group [H10W 20/063](#) is impacted by reclassification into groups [H10W 20/0633](#) and [H10W 20/0636](#). Groups [H10W 20/063](#), [H10W 20/0633](#) and [H10W 20/0636](#) should be considered in order to perform a complete search.

- 20/0633 {using subtractive patterning of the conductive members}

WARNING

Groups [H10W 20/0633](#) - [H10W 20/0636](#) are incomplete pending reclassification of documents from group [H10W 20/063](#). Groups [H10W 20/063](#) and [H10W 20/0633](#) - [H10W 20/0636](#) should be considered in order to perform a complete search.

- 20/0636 {the conductive members being on sidewalls}
- 20/064 . . . {by modifying the conductivity of conductive parts, e.g. by alloying}
- 20/065 {by making at least a portion of the conductive part non-conductive, e.g. by oxidation}
- 20/066 {by forming silicides of refractory metals}
- 20/067 . . . {by modifying the pattern of conductive parts}
- 20/068 {by using a laser, e.g. laser cutting or laser direct writing}

- 20/069 . . . {by forming self-aligned vias or self-aligned contact plugs}

WARNING

Group [H10W 20/069](#) is impacted by reclassification into groups [H10W 20/0693](#) and [H10W 20/0696](#).

Groups [H10W 20/069](#), [H10W 20/0693](#) and [H10W 20/0696](#) should be considered in order to perform a complete search.

- 20/0693 {by forming self-aligned vias}

WARNING

Groups [H10W 20/0693](#) - [H10W 20/0696](#) are incomplete pending reclassification of documents from group [H10W 20/069](#).

Groups [H10W 20/069](#) and [H10W 20/0693](#) - [H10W 20/0696](#) should be considered in order to perform a complete search.

- 20/0696 {by using sacrificial placeholders, e.g. using sacrificial plugs}
- 20/0698 . . . {Local interconnections}
- 20/071 . . {of dielectric parts thereof}
- 20/072 . . . {of dielectric parts comprising air gaps}
- 20/074 . . . {of dielectric parts comprising thin functional dielectric layers, e.g. dielectric etch-stop, barrier, capping or liner layers}
- 20/075 {of multilayered thin functional dielectric layers}
- 20/076 {in via holes or trenches}
- 20/0765 {the thin functional dielectric layers being temporary, e.g. sacrificial layers}
- 20/077 {on sidewalls or on top surfaces of conductors ([H10W 20/076](#) takes precedence)}
- 20/081 . . . {by forming openings in the dielectric parts}
- 20/082 {the openings being tapered via holes}
- 20/083 {the openings being via holes penetrating underlying conductors}
- 20/084 {for dual-damascene structures}
- 20/085 {involving intermediate temporary filling with material}
- 20/086 {involving buried masks}
- 20/087 {involving multiple stacked pre-patterned masks}
- 20/088 {involving partial etching of via holes}
- 20/0882 {wherein the dual damascene structure is in a photoresist layer}
- 20/0884 {involving forming vias by burying sacrificial pillars in the dielectric parts and removing the pillars}
- 20/0886 {involving forming a via in a via-level dielectric prior to deposition of a trench-level dielectric}
- 20/0888 {wherein via-level dielectrics are compositionally different than trench-level dielectrics}
- 20/089 {using processes for implementing desired shapes or dispositions of the openings, e.g. double patterning}
- 20/091 {by printing or stamping}
- 20/092 . . . {by smoothing the dielectric parts}

- 20/093 . . . {by modifying materials of the dielectric parts}
- 20/094 {by transforming insulators into conductors}
- 20/095 {by irradiating with electromagnetic or particle radiation (plasma treatment [H10W 20/096](#))}
- 20/096 {by contacting with gases, liquids or plasmas}
- 20/097 {by thermally treating}
- 20/098 . . . {by filling between adjacent conductive parts}
- 20/20 . Interconnections within wafers or substrates, e.g. through-silicon vias [TSV]

WARNING

Group [H10W 20/20](#) is incomplete pending reclassification of documents from group [H10W 72/823](#). Group [H10W 20/20](#) is also impacted by reclassification into groups [H10W 20/211](#), [H10W 20/212](#), [H10W 20/2125](#), [H10W 20/2128](#), [H10W 20/213](#), [H10W 20/2134](#), [H10W 20/215](#), [H10W 20/216](#), [H10W 20/217](#), [H10W 20/218](#), [H10W 20/222](#) and [H10W 20/233](#).

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

- 20/211 . . {Through-semiconductor vias, e.g. TSVs}

WARNING

Groups [H10W 20/211](#) and [H10W 20/215](#) are incomplete pending reclassification of documents from groups [H10W 20/20](#) and [H10W 72/823](#).

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

- 20/212 . . . {Top-view shapes or dispositions, e.g. top-view layouts of the vias}

WARNING

Groups [H10W 20/212](#), [H10W 20/2125](#) and [H10W 20/2128](#) are incomplete pending reclassification of documents from group [H10W 20/20](#).

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

- 20/2125 {Top-view shapes}
- 20/2128 {Coaxial through-semiconductor vias}
- 20/213 . . . {Cross-sectional shapes or dispositions}

WARNING

Groups [H10W 20/213](#) and [H10W 20/2134](#) are incomplete pending reclassification of documents from group [H10W 20/20](#).

Groups [H10W 20/20](#), [H10W 20/213](#) and [H10W 20/2134](#) should be considered in order to perform a complete search.

- 20/2134 {TSVs extending from the semiconductor wafer into back-end-of-line layers}
- 20/215 . . . {characterised by thin functional layers between the through-semiconductor vias and sidewalls of the via holes, e.g. barrier layers or adhesion layers}

- 20/216 . . . {characterised by dielectric material at least partially filling the via holes, e.g. covering the through-semiconductor vias in the via holes}

WARNING

Groups [H10W 20/216](#) - [H10W 20/218](#) are incomplete pending reclassification of documents from group [H10W 20/20](#).

Groups [H10W 20/20](#) and [H10W 20/216](#) - [H10W 20/218](#) should be considered in order to perform a complete search.

- 20/217 . . . {comprising ring-shaped isolation structures outside of the via holes}
- 20/218 . . . {in silicon-on-insulator [SOI] wafers}
- 20/222 . . {Vias through non-semiconductor substrates, e.g. through-glass vias}

WARNING

Group [H10W 20/222](#) is incomplete pending reclassification of documents from groups [H10W 20/20](#) and [H10W 72/823](#).

Groups [H10W 20/20](#), [H10W 72/823](#) and [H10W 20/222](#) should be considered in order to perform a complete search.

- 20/233 . . {parallel to the active surface, e.g. horizontal traces in trenches in the surface of the wafer}

WARNING

Group [H10W 20/233](#) is incomplete pending reclassification of documents from group [H10W 20/20](#).

Groups [H10W 20/20](#) and [H10W 20/233](#) should be considered in order to perform a complete search.

- 20/40 . Interconnections external to wafers or substrates, e.g. back-end-of-line [BEOL] metallisations or vias connecting to gate electrodes

WARNING

Group [H10W 20/40](#) is impacted by reclassification into groups [H10W 20/41](#), [H10W 20/42](#), [H10W 20/421](#), [H10W 20/422](#), [H10W 20/423](#), [H10W 20/425](#), [H10W 20/427](#), [H10W 20/43](#), [H10W 20/432](#), [H10W 20/435](#), [H10W 20/438](#), [H10W 20/44](#), [H10W 20/4403](#), [H10W 20/4405](#), [H10W 20/4407](#), [H10W 20/4421](#), [H10W 20/4424](#), [H10W 20/4432](#), [H10W 20/4435](#), [H10W 20/4441](#), [H10W 20/4446](#), [H10W 20/4451](#), [H10W 20/4462](#), [H10W 20/4473](#), [H10W 20/4484](#), [H10W 20/45](#), [H10W 20/455](#), [H10W 20/46](#), [H10W 20/47](#), [H10W 20/48](#), [H10W 20/481](#), [H10W 20/482](#), [H10W 70/60](#), [H10W 70/611](#), [H10W 70/614](#), [H10W 70/616](#), [H10W 70/62](#), [H10W 70/63](#), [H10W 70/635](#), [H10W 70/641](#), [H10W 70/644](#), [H10W 70/65](#), [H10W 70/652](#), [H10W 70/6523](#), [H10W 70/6525](#), [H10W 70/6528](#), [H10W 70/654](#), [H10W 70/655](#), [H10W 70/656](#), [H10W 70/657](#), [H10W 70/658](#), [H10W 70/66](#), [H10W 70/662](#), [H10W 70/664](#), [H10W 70/666](#), [H10W 70/668](#), [H10W 70/67](#), [H10W 70/68](#), [H10W 70/681](#), [H10W 70/682](#), [H10W 70/685](#), [H10W 70/688](#), [H10W 70/69](#), [H10W 70/692](#), [H10W 70/695](#), [H10W 70/698](#) and [H10W 72/00](#).

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

- 20/41 . . characterised by their conductive parts

WARNING

Groups [H10W 20/41](#), [H10W 20/423](#), [H10W 20/427](#), [H10W 20/43](#), [H10W 20/432](#), [H10W 20/435](#), [H10W 20/438](#), [H10W 20/44](#), [H10W 20/4405](#), [H10W 20/4407](#), [H10W 20/4421](#), [H10W 20/4424](#), [H10W 20/4432](#), [H10W 20/4435](#), [H10W 20/4441](#), [H10W 20/4446](#), [H10W 20/4451](#), [H10W 20/4462](#), [H10W 20/4473](#) and [H10W 20/4484](#) are incomplete pending reclassification of documents from group [H10W 20/40](#).

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

- 20/42 . . . Vias, e.g. via plugs

WARNING

Group [H10W 20/42](#) is incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 20/482](#). Group [H10W 20/42](#) is also impacted by reclassification into groups [H10W 20/421](#) and [H10W 20/422](#).

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

- 20/421 {Skip vias, i.e. vias that do not connect all metallization layers that they pass through}

WARNING

Group [H10W 20/421](#) is incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 20/42](#).

Groups [H10W 20/40](#), [H10W 20/42](#) and [H10W 20/421](#) should be considered in order to perform a complete search.

- 20/422 {Vias connecting to electrodes, e.g. contact plugs}

WARNING

Group [H10W 20/422](#) is incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 20/42](#).

Groups [H10W 20/40](#), [H10W 20/42](#) and [H10W 20/422](#) should be considered in order to perform a complete search.

- 20/423 . . . {Shielding layers}

- 20/425 . . . {Barrier, adhesion or liner layers}

WARNING

Group [H10W 20/425](#) is incomplete pending reclassification of documents from group [H10W 20/40](#). Group [H10W 20/425](#) is also impacted by reclassification into group [H10W 20/455](#).

Groups [H10W 20/40](#), [H10W 20/425](#) and [H10W 20/455](#) should be considered in order to perform a complete search.

- 20/427 . . . {Power or ground buses}

- 20/43 . . . Layouts of interconnections

- 20/432 {comprising crossing interconnections}

- 20/435 . . . {Cross-sectional shapes or dispositions of interconnections}

- 20/438 . . . {Interconnections with multiple fill metals, e.g. having different metals in wide and narrow interconnections, or having different metals in vias and in trenches}

- 20/44 . . . Conductive materials thereof

- 20/4403 {based on metals, e.g. alloys, metal silicides ([H10W 20/4484](#) takes precedence)}

WARNING

Group [H10W 20/4403](#) is incomplete pending reclassification of documents from group [H10W 20/40](#). Group [H10W 20/4403](#) is also impacted by reclassification into group [H10W 20/4437](#).

Groups [H10W 20/40](#), [H10W 20/4403](#) and [H10W 20/4437](#) should be considered in order to perform a complete search.

- 20/4405 {the principal metal being aluminium}

- 20/4407 {Aluminium alloys}

- 20/4421 {the principal metal being copper}

- 20/4424 {Copper alloys}

- 20/4432 {the principal metal being a noble metal, e.g. gold}
 20/4435 {Noble-metal alloys}
 20/4437 {the principal metal being a transition metal}

WARNING

Group [H10W 20/4437](#) is incomplete pending reclassification of documents from group [H10W 20/4403](#).

Groups [H10W 20/4403](#) and [H10W 20/4437](#) should be considered in order to perform a complete search.

- 20/4441 {the principal metal being a refractory metal}
 20/4446 {Refractory-metal alloys}
 20/4451 {Semiconductor materials, e.g. polysilicon}
 20/4462 {Carbon or carbon-containing materials, e.g. graphene}
 20/4473 {Conductive organic materials, e.g. conductive adhesives or conductive inks}
 20/4484 {Superconducting materials}
 20/45 . . characterised by their insulating parts

WARNING

Groups [H10W 20/45](#), [H10W 20/46](#), [H10W 20/47](#) and [H10W 20/48](#) are incomplete pending reclassification of documents from group [H10W 20/40](#).

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

- 20/455 . . . {Thin functional dielectric layers}

WARNING

Group [H10W 20/455](#) is incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 20/425](#).

Groups [H10W 20/40](#), [H10W 20/425](#) and [H10W 20/455](#) should be considered in order to perform a complete search.

- 20/46 . . . comprising air gaps
 20/47 . . . comprising two or more dielectric layers having different properties, e.g. different dielectric constants
 20/48 . . . Insulating materials thereof
 20/481 . . {on the rear surfaces of the wafers or substrates}

WARNING

Group [H10W 20/481](#) is incomplete pending reclassification of documents from group [H10W 20/40](#).

Groups [H10W 20/40](#) and [H10W 20/481](#) should be considered in order to perform a complete search.

- 20/482 . . {for individual devices provided for in groups [H10D 8/00](#) - [H10D 48/00](#), e.g. for power transistors}

WARNING

Group [H10W 20/482](#) is incomplete pending reclassification of documents from group [H10W 20/40](#).

Groups [H10W 20/40](#) and [H10W 20/482](#) should be considered in order to perform a complete search.

- 20/483 . . . {Interconnections over air gaps, e.g. air bridges}
 20/484 . . . {Interconnections having extended contours, e.g. pads having mesh shape or interconnections comprising connected parallel stripes}
 20/49 . . Adaptable interconnections, e.g. fuses or antifuses
 20/491 . . . {Antifuses, i.e. interconnections changeable from non-conductive to conductive}
 20/492 {changeable by the use of an external beam, e.g. laser beam or ion beam}
 20/493 . . . {Fuses, i.e. interconnections changeable from conductive to non-conductive}
 20/494 {changeable by the use of an external beam, e.g. laser beam or ion beam}
 20/495 . . {Capacitive arrangements or effects of, or between wiring layers}
 20/496 . . . {Capacitor integral with wiring layers}
 20/497 . . {Inductive arrangements or effects of, or between, wiring layers}
 20/498 . . {Resistive arrangements or effects of, or between, wiring layers}

29/00 Generic parts of integrated devices, not otherwise provided for

- 29/01 . {Manufacture or treatment}

Constructional details related to chips, wafers, substrates or packages**40/00 Arrangements for thermal protection or thermal control (integrated devices comprising arrangements for thermal protection [H10D 89/60](#))****WARNING**

Group [H10W 40/00](#) is incomplete pending reclassification of documents from group [H10W 99/00](#). Group [H10W 40/00](#) is also impacted by reclassification into groups [H10W 40/20](#) and [H10W 40/50](#).

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

- 40/01 . {Manufacture or treatment}

WARNING

Group [H10W 40/01](#) is incomplete pending reclassification of documents from group [H10W 99/00](#).

Groups [H10W 99/00](#) and [H10W 40/01](#) should be considered in order to perform a complete search.

- 40/03 . . {of arrangements for cooling}

WARNING

Group [H10W 40/03](#) is incomplete pending reclassification of documents from group [H10W 70/02](#).

Groups [H10W 70/02](#) and [H10W 40/03](#) should be considered in order to perform a complete search.

- 40/033 . . . {using mechanical treatments, e.g. deforming, punching or cutting}

WARNING

Group [H10W 40/033](#) is incomplete pending reclassification of documents from group [H10W 70/027](#).

Groups [H10W 70/027](#) and [H10W 40/033](#) should be considered in order to perform a complete search.

- 40/037 . . . {Assembling together parts thereof}

- 40/10 . Arrangements for heating

WARNING

Group [H10W 40/10](#) is impacted by reclassification into group [H10W 40/20](#).

Groups [H10W 40/10](#) and [H10W 40/20](#) should be considered in order to perform a complete search.

- 40/20 . Arrangements for cooling

WARNING

Group [H10W 40/20](#) is incomplete pending reclassification of documents from groups [H10W 40/00](#) and [H10W 40/10](#).

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

- 40/22 . . characterised by their shape, e.g. having conical or cylindrical projections

WARNING

Group [H10W 40/22](#) is impacted by reclassification into groups [H10W 40/226](#), [H10W 40/228](#), [H10W 40/231](#), [H10W 40/233](#), [H10W 40/235](#), [H10W 40/237](#) and [H10W 40/242](#).

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

- 40/226 . . . {characterised by projecting parts, e.g. fins to increase surface area (leadframes for cooling [H10W 70/461](#))}

WARNING

Groups [H10W 40/226](#) and [H10W 40/228](#) are incomplete pending reclassification of documents from group [H10W 40/22](#).

Groups [H10W 40/22](#), [H10W 40/226](#) and [H10W 40/228](#) should be considered in order to perform a complete search.

- 40/228 {the projecting parts being wire-shaped or pin-shaped}

- 40/231 . . {characterised by their places of attachment or cooling paths}

WARNING

Groups [H10W 40/231](#), [H10W 40/233](#), [H10W 40/235](#), [H10W 40/237](#) and [H10W 40/242](#) are incomplete pending reclassification of documents from group [H10W 40/22](#).

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

- 40/233 . . . {attached to chips}

- 40/235 . . . {attached to package parts}

- 40/237 . . . {attached to additional arrangements for cooling}

- 40/242 . . . {comprising thermal conductors between chips and the and the arrangements for cooling, e.g. compliant heat-spreaders}

- 40/25 . . characterised by their materials

- 40/251 . . . {Organics}

- 40/253 . . . {Semiconductors}

- 40/254 . . . {Diamond}

- 40/255 . . . {having a laminate or multilayered structure, e.g. direct bond copper [DBC] ceramic substrates}

- 40/257 . . . {having a heterogeneous or anisotropic structure, e.g. powder or fibres in a matrix, wire mesh or porous structures ([H10W 40/254](#), [H10W 40/251](#) take precedence)}

- 40/258 . . . {Metallic materials ([H10W 40/254](#), [H10W 40/257](#), [H10W 40/255](#), [H10W 40/251](#), [H10W 40/253](#) take precedence)}

- 40/259 . . . {Ceramics or glasses ([H10W 40/254](#), [H10W 40/257](#), [H10W 40/255](#), [H10W 40/251](#), [H10W 40/253](#) take precedence)}

- 40/28 . . comprising Peltier coolers

- 40/30 . wherein the packaged device is completely immersed in a fluid other than air, e.g. immersed in a cryogenic fluid

- 40/305 . . {the fluid being a liquefied gas, e.g. liquid nitrogen}

- 40/40 . involving heat exchange by flowing fluids

- 40/43 . . by flowing gases, e.g. forced air cooling

- 40/47 . . by flowing liquids, e.g. forced water cooling

- 40/475 . . . {using jet impingement ([H10W 40/776](#) takes precedence)}

- 40/50 . Arrangements for sensing temperature

WARNING

Group [H10W 40/50](#) is incomplete pending reclassification of documents from group [H10W 40/00](#).

Groups [H10W 40/00](#) and [H10W 40/50](#) should be considered in order to perform a complete search.

- 40/60 . Securing means for detachable heating or cooling arrangements, e.g. clamps

- 40/611 . . {Bolts or screws}

- 40/613 . . . {for stacked arrangements of a plurality of semiconductor devices}

- 40/625 . . {Clamping parts not primarily conducting heat}
- 40/641 . . {Snap-on arrangements, e.g. clips}
- 40/70 . Fillings or auxiliary members in containers or in encapsulations for thermal protection or control
- 40/73 . . for cooling by change of state
- 40/735 . . . {by melting or evaporation of solids}
- 40/77 . . Auxiliary members characterised by their shape
- 40/772 . . . {Bellows}
- 40/774 . . . {Pistons, e.g. spring-loaded members}
- 40/776 . . . {Arrangements for jet impingement, e.g. for spraying}
- 40/778 . . . {in encapsulations}
- 40/80 . Circuit arrangements for thermal protection or control of packages

WARNING

Group [H10W 40/80](#) is incomplete pending reclassification of documents from group [H10W 42/00](#).

Groups [H10W 42/00](#) and [H10W 40/80](#) should be considered in order to perform a complete search.

42/00 Arrangements for protection of devices
(arrangements for thermal protection [H10W 40/00](#))

WARNING

Group [H10W 42/00](#) is incomplete pending reclassification of documents from group [H10W 99/00](#). Group [H10W 42/00](#) is also impacted by reclassification into groups [H10W 42/101](#), [H10W 40/80](#) and [H10W 99/00](#).

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

- 42/101 . {protecting against moisture, e.g. getters (fillers in containers for absorbing or reacting with moisture or other undesired substances [H10W 76/48](#))}

WARNING

Group [H10W 42/101](#) is incomplete pending reclassification of documents from group [H10W 42/00](#).

Groups [H10W 42/00](#) and [H10W 42/101](#) should be considered in order to perform a complete search.

- 42/121 . {protecting against mechanical damage ([H10W 76/00](#), [H10W 74/00](#) take precedence)}
- 42/20 . protecting against electromagnetic or particle radiation, e.g. light, X-rays, gamma-rays or electrons

WARNING

Group [H10W 42/20](#) is impacted by reclassification into groups [H10W 42/40](#), [H10W 42/261](#), [H10W 42/263](#), [H10W 42/265](#), [H10W 42/267](#), [H10W 42/271](#), [H10W 42/273](#), [H10W 42/276](#), [H10W 42/281](#), [H10W 42/284](#) and [H10W 42/287](#).

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

- 42/25 . . against alpha rays, e.g. for outer space applications

- 42/261 . . {characterised by their shapes or dispositions}

WARNING

Groups [H10W 42/261](#), [H10W 42/263](#), [H10W 42/265](#), [H10W 42/267](#), [H10W 42/271](#), [H10W 42/273](#) and [H10W 42/276](#) are incomplete pending reclassification of documents from group [H10W 42/20](#).

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

- 42/263 . . . {Shielding bumps}
- 42/265 . . . {Shielding wires, e.g. constant potential wires}
- 42/267 . . . {Patterned shielding planes}
- 42/271 . . . {the arrangements being between stacked chips}
- 42/273 . . . {the arrangements being between laterally adjacent chips, e.g. walls between chips}
- 42/276 . . . {the arrangements being on an external surface of the package, e.g. on the outer surface of an encapsulation}
- 42/281 . . {characterised by their materials}

WARNING

Groups [H10W 42/281](#), [H10W 42/284](#) and [H10W 42/287](#) are incomplete pending reclassification of documents from group [H10W 42/20](#).

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

- 42/284 . . . {shielding resins}
- 42/287 . . . {materials for magnetic shielding, e.g. ferromagnetic materials}
- 42/40 . protecting against tampering, e.g. unauthorised inspection or reverse engineering

WARNING

Group [H10W 42/40](#) is incomplete pending reclassification of documents from group [H10W 42/20](#).

Groups [H10W 42/20](#) and [H10W 42/40](#) should be considered in order to perform a complete search.

- 42/405 . . {using active circuits}
- 42/60 . protecting against electrostatic charges or discharges, e.g. Faraday shields (integrated devices comprising arrangements for electrical protection [H10D 89/60](#))
- 42/80 . protecting against overcurrent or overload, e.g. fuses or shunts (integrated devices comprising arrangements for electrical protection [H10D 89/60](#))

44/00 Electrical arrangements for controlling or matching impedance

- 44/20 . at high-frequency [HF] or radio frequency [RF]
- 44/203 . . {Electrical connections}
- 44/206 . . . {Wires}
- 44/209 . . . {Vertical interconnections, e.g. vias}
- 44/212 {Coaxial feed-throughs in substrates}
- 44/216 . . . {Waveguides, e.g. strip lines}
- 44/219 {characterised by transitions between different types of waveguides}

- 44/223 . . . {Differential pair signal lines}
- 44/226 . . {for HF amplifiers}
- 44/231 . . . {Arrangements for applying bias}
- 44/234 . . . {Arrangements for impedance matching}
- 44/241 . . {for passive devices or passive elements}
- 44/243 . . . {for decoupling, e.g. bypass capacitors}
- 44/248 . . . {for antennas}
- 44/251 . . {for monolithic microwave integrated circuits [MMIC]}
- 44/255 . . {for operation at multiple different frequencies}
- 44/259 . . {Optical signal interface}
- 44/401 . {Resistive arrangements ([H10W 44/20](#), [H10W 42/80](#) take precedence)}
- 44/501 . {Inductive arrangements ([H10W 44/20](#) takes precedence)}
- 44/601 . {Capacitive arrangements ([H10W 44/20](#) takes precedence)}

46/00 Marks applied to devices, e.g. for alignment or identification

NOTE

This group covers marks in or on chips, wafers, substrates or packages.

- 46/101 . {characterised by the type of information, e.g. logos or symbols}
- 46/103 . . {alphanumeric information, e.g. words, letters or serial numbers}
- 46/106 . . {digital information, e.g. bar codes}
- 46/201 . {located on the periphery of wafers, e.g. orientation notches or lot numbers}
- 46/301 . {for alignment}
- 46/401 . {for identification or tracking}
- 46/403 . . {for non-wireless electrical read out}
- 46/407 . . {for wireless electrical read out}
- 46/501 . {for use before dicing}
- 46/503 . . {Located in scribe lines}
- 46/507 . . {Located in dummy chips or in reference chips}
- 46/601 . {for use after dicing}
- 46/603 . . {Formed on wafers or substrates before dicing and remaining on chips after dicing}
- 46/607 . . {Located on parts of packages, e.g. on encapsulations or on package substrates}

Aspects of packages

70/00 Package substrates; Interposers; Redistribution layers [RDL]

WARNING

Groups [H10W 70/00](#), [H10W 70/01](#) and [H10W 70/04](#) are incomplete pending reclassification of documents from group [H10W 99/00](#).

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

- 70/01 . Manufacture or treatment

- 70/02 . . of conductive package substrates serving as an interconnection, e.g. of metal plates ([manufacture or treatment of leadframes H10W 70/04](#))

WARNING

Group [H10W 70/02](#) is incomplete pending reclassification of documents from group [H10W 99/00](#). Group [H10W 70/02](#) is also impacted by reclassification into group [H10W 40/03](#).

Groups [H10W 99/00](#), [H10W 70/02](#) and [H10W 40/03](#) should be considered in order to perform a complete search.

- 70/023 . . . {Connecting or disconnecting interconnections thereto or therefrom, e.g. connecting bond wires or bumps}

- 70/027 . . . {Mechanical treatments, e.g. deforming, punching or cutting}

WARNING

Group [H10W 70/027](#) is impacted by reclassification into group [H10W 40/033](#).

Groups [H10W 70/027](#) and [H10W 40/033](#) should be considered in order to perform a complete search.

- 70/04 . . of leadframes

- 70/041 . . . {Connecting or disconnecting interconnections to or from leadframes, e.g. connecting bond wires or bumps}

- 70/042 . . . {Etching}

- 70/045 . . . {Cleaning}

- 70/047 . . . {Attaching leadframes to insulating supports, e.g. for tape automated bonding [TAB]}

- 70/048 . . . {Mechanical treatments, e.g. punching, cutting, deforming or cold welding}

- 70/05 . . of insulating or insulated package substrates, or of interposers, or of redistribution layers ([manufacture or treatment of leadframes H10W 70/04](#))

WARNING

Group [H10W 70/05](#) is incomplete pending reclassification of documents from group [H10W 99/00](#). Group [H10W 70/05](#) is also impacted by reclassification into groups [H10W 70/06](#), [H10W 70/08](#), [H10W 70/09](#), [H10W 70/092](#), [H10W 70/093](#), [H10W 70/095](#), [H10W 70/096](#), [H10W 70/097](#) and [H10W 70/098](#).

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

- 70/06 . . . using temporary auxiliary supports

WARNING

Group [H10W 70/06](#) is incomplete pending reclassification of documents from groups [H10W 70/05](#) and [H10W 99/00](#).

Groups [H10W 70/05](#), [H10W 99/00](#) and [H10W 70/06](#) should be considered in order to perform a complete search.

- 70/08 . . . by depositing layers on the chip or wafer, e.g. "chip-first" RDLs

WARNING

Groups [H10W 70/08](#) and [H10W 70/09](#) are incomplete pending reclassification of documents from groups [H10W 70/05](#) and [H10W 99/00](#).

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

- 70/09 extending onto an encapsulation that laterally surrounds the chip or wafer, e.g. fan-out wafer level package [FOWLP] RDLs

- 70/092 . . . {Adapting interconnections, e.g. making engineering charges, repairing}

WARNING

Groups [H10W 70/092](#) - [H10W 70/098](#) are incomplete pending reclassification of documents from group [H10W 70/05](#).

Groups [H10W 70/05](#) and [H10W 70/092](#) - [H10W 70/098](#) should be considered in order to perform a complete search.

- 70/093 . . . {Connecting or disconnecting other interconnections thereto or therefrom, e.g. connecting bond wires or bumps}

- 70/095 . . . {of vias therein}

- 70/096 . . . {Cutting or separating}

- 70/097 . . . {Cleaning}

- 70/098 . . . {Applying pastes or inks, e.g. screen printing ([H10W 70/095](#) takes precedence)}

- 70/099 . {Connecting interconnections to insulating or insulated package substrates, interposers or redistribution layers}

- 70/20 . Conductive package substrates serving as an interconnection, e.g. metal plates ([leadframes H10W 70/40](#))

- 70/22 . . {having an heterogeneous or anisotropic structure}

- 70/24 . . {characterised by materials}

- 70/26 . . . {Semiconductor materials}

- 70/28 . . . {Carbon-containing materials}

- 70/40 . Leadframes

- 70/411 . . {Chip-supporting parts, e.g. die pads}

- 70/413 . . . {Insulating or insulated substrates serving as die pads ([H10W 70/468](#) takes precedence)}

- 70/415 . . . {Leadframe inner leads serving as die pads}

- 70/417 . . . {Bonding materials between chips and die pads}

- 70/421 . . {Shapes or dispositions}

- 70/424 . . . {Cross-sectional shapes ([H10W 70/481](#) takes precedence)}

- 70/427 {Bent parts}

- 70/429 {being the outer leads}

- 70/433 . . . {of deformation-absorbing parts, e.g. leads having meandering shapes ([H10W 70/481](#) takes precedence)}

- 70/435 . . . {of insulating layers on leadframes, e.g. bridging members}

- 70/438 . . . {of side rails, e.g. having holes}

- 70/442 . . . {of multiple leadframes in a single chip}

- 70/451 . . {Multilayered leadframes}

- 70/453 . . {comprising flexible metallic tapes}

- 70/456 . . {Materials}

- 70/457 . . . {of metallic layers on leadframes}

- 70/458 . . . {of insulating layers on leadframes}

- 70/461 . . {specially adapted for cooling}

- 70/464 . . {Additional interconnections in combination with leadframes}

- 70/465 . . . {Bumps or wires}

- 70/466 . . . {Tape carriers or flat leads}

- 70/467 . . . {Multilayered additional interconnections}

- 70/468 . . . {Circuit boards}

- 70/474 . . {Batteries in combination with leadframes}

- 70/475 . . {Capacitors in combination with leadframes}

- 70/476 . . {Oscillators in combination with leadframes}

- 70/479 . . {on or in insulating or insulated package substrates, interposers, or redistribution layers}

- 70/481 . . {for devices being provided for in groups [H10D 8/00](#) - [H10D 48/00](#)}

- 70/60 . Insulating or insulated package substrates; Interposers; Redistribution layers ([leadframes H10W 70/40](#))

WARNING

Group [H10W 70/60](#) is incomplete pending reclassification of documents from group [H10W 20/40](#). Group [H10W 70/60](#) is also impacted by reclassification into groups [H10W 70/611](#), [H10W 70/614](#), [H10W 70/616](#), [H10W 70/618](#), [H10W 70/62](#), [H10W 70/63](#), [H10W 70/635](#), [H10W 70/641](#), [H10W 70/644](#), [H10W 70/65](#), [H10W 70/652](#), [H10W 70/6523](#), [H10W 70/6525](#), [H10W 70/6528](#), [H10W 70/654](#), [H10W 70/655](#), [H10W 70/656](#), [H10W 70/6565](#), [H10W 70/657](#), [H10W 70/658](#), [H10W 70/66](#), [H10W 70/662](#), [H10W 70/664](#), [H10W 70/666](#), [H10W 70/668](#), [H10W 70/67](#), [H10W 70/68](#), [H10W 70/681](#), [H10W 70/682](#), [H10W 70/685](#), [H10W 70/686](#), [H10W 70/687](#), [H10W 70/69](#), [H10W 70/692](#), [H10W 70/695](#), [H10W 70/698](#) and [H10W 70/699](#).

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

- 70/611 . . {for connecting multiple chips together}

WARNING

Groups [H10W 70/611](#), [H10W 70/614](#) and [H10W 70/616](#) are incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 70/60](#).

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

- 70/614 . . . {the multiple chips being integrally enclosed}

- 70/616 . . . {package substrates, interposers or redistribution layers combined with bridge chips}

- 70/618 {the bridge chips being embedded in the package substrates, interposers or redistribution layers}

WARNING

Group [H10W 70/618](#) is incomplete pending reclassification of documents from group [H10W 70/60](#).

Groups [H10W 70/60](#) and [H10W 70/618](#) should be considered in order to perform a complete search.

- 70/62 . . characterised by their interconnections

WARNING

Groups [H10W 70/62](#), [H10W 70/63](#), [H10W 70/635](#), [H10W 70/641](#) and [H10W 70/644](#) are incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 70/60](#).

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

- 70/63 . . . Vias, e.g. via plugs
 70/635 {Through-vias}
 70/641 . . . {Adaptable interconnections, e.g. fuses or antifuses}
 70/644 . . . {Elastic or compliant interconnections, e.g. springs, cantilevers or elastic pads}
 70/65 . . . Shapes or dispositions of interconnections

WARNING

Group [H10W 70/65](#) is incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 70/60](#).

Group [H10W 70/65](#) is also impacted by reclassification into groups [H10W 70/652](#), [H10W 70/6523](#), [H10W 70/6525](#), [H10W 70/6528](#), [H10W 70/654](#), [H10W 70/655](#), [H10W 70/656](#), [H10W 70/6565](#), [H10W 70/657](#) and [H10W 70/658](#).

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

- 70/652 Cross-sectional shapes

WARNING

Groups [H10W 70/652](#), [H10W 70/6523](#), [H10W 70/6525](#) and [H10W 70/6528](#) are incomplete pending reclassification of documents from groups [H10W 20/40](#), [H10W 70/60](#) and [H10W 70/65](#).

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

- 70/6523 {for connecting to pads at different heights at the same side of the package substrate, interposer or RDL}
 70/6525 {for securing the interconnections to the substrate, e.g. to prevent peeling}
 70/6528 {of the portions that connect to chips, wafers or package parts}

- 70/654 Top-view layouts

WARNING

Groups [H10W 70/654](#), [H10W 70/655](#) and [H10W 70/656](#) are incomplete pending reclassification of documents from groups [H10W 20/40](#), [H10W 70/60](#) and [H10W 70/65](#).

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

- 70/655 Fan-out layouts

- 70/656 Fan-in layouts

- 70/6565 {recessed into the surface of the package substrates, interposers, or redistribution layers}

WARNING

Group [H10W 70/6565](#) is incomplete pending reclassification of documents from groups [H10W 70/60](#) and [H10W 70/65](#).

Groups [H10W 70/60](#), [H10W 70/65](#) and [H10W 70/6565](#) should be considered in order to perform a complete search.

- 70/657 {on sidewalls or bottom surfaces of the package substrates, interposers or redistribution layers}

WARNING

Groups [H10W 70/657](#) - [H10W 70/658](#) are incomplete pending reclassification of documents from groups [H10W 20/40](#), [H10W 70/60](#) and [H10W 70/65](#).

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

- 70/658 {for devices provided for in groups [H10D 8/00](#) - [H10D 48/00](#)}

- 70/66 . . . Conductive materials thereof

WARNING

Group [H10W 70/66](#) is incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 70/60](#).

Group [H10W 70/66](#) is also impacted by reclassification into groups [H10W 70/662](#), [H10W 70/664](#), [H10W 70/666](#) and [H10W 70/668](#).

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

- 70/662 {Semiconductor materials}

WARNING

Groups [H10W 70/662](#) - [H10W 70/668](#) are incomplete pending reclassification of documents from groups [H10W 20/40](#), [H10W 70/60](#) and [H10W 70/66](#).

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

- 70/664 {Carbon-based materials, e.g. fullerenes}
- 70/666 {Organic materials or pastes}
- 70/668 {Superconducting materials}
- 70/67 . . characterised by their insulating layers or insulating parts

WARNING

Groups [H10W 70/67](#), [H10W 70/68](#), [H10W 70/681](#) and [H10W 70/682](#) are incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 70/60](#).

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

- 70/68 . . . Shapes or dispositions thereof
- 70/681 {comprising holes not having chips therein, e.g. for outgassing, underfilling or bond wire passage}
- 70/682 {comprising holes having chips therein}
- 70/685 comprising multiple insulating layers

WARNING

Group [H10W 70/685](#) is incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 70/60](#). Group [H10W 70/685](#) is also impacted by reclassification into groups [H10W 70/686](#) and [H10W 70/687](#).

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

- 70/686 {the multiple insulating layers having different compositions, e.g. polymer layer on glass substrate}

WARNING

Group [H10W 70/686](#) is incomplete pending reclassification of documents from groups [H10W 70/60](#), [H10W 70/685](#) and [H10W 70/69](#).

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

- 70/687 {characterized by the outer layers being for protection, e.g. solder masks, or for protection against chemical or mechanical damage}

WARNING

Group [H10W 70/687](#) is incomplete pending reclassification of documents from groups [H10W 70/60](#) and [H10W 70/685](#).

Groups [H10W 70/60](#), [H10W 70/685](#) and [H10W 70/687](#) should be considered in order to perform a complete search.

- 70/6875 {being on a metallic substrate, e.g. insulated metal substrates [IMS]}

- 70/688 {Flexible insulating substrates}

WARNING

Group [H10W 70/688](#) is incomplete pending reclassification of documents from group [H10W 20/40](#).

Groups [H10W 20/40](#) and [H10W 70/688](#) should be considered in order to perform a complete search.

- 70/69 . . . Insulating materials thereof

WARNING

Group [H10W 70/69](#) is incomplete pending reclassification of documents from groups [H10W 20/40](#) and [H10W 70/60](#).

Group [H10W 70/69](#) is also impacted by reclassification into groups [H10W 70/692](#), [H10W 70/695](#), [H10W 70/698](#) and [H10W 70/686](#).

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

- 70/692 Ceramics or glasses

WARNING

Groups [H10W 70/692](#) - [H10W 70/698](#) are incomplete pending reclassification of documents from groups [H10W 20/40](#), [H10W 70/60](#) and [H10W 70/69](#).

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

- 70/695 Organic materials
- 70/698 Semiconductor materials that are electrically insulating, e.g. undoped silicon
- 70/699 . . {for flat cards, e.g. credit cards}

WARNING

Group [H10W 70/699](#) is incomplete pending reclassification of documents from group [H10W 70/60](#).

Groups [H10W 70/60](#) and [H10W 70/699](#) should be considered in order to perform a complete search.

72/00 Interconnections or connectors in packages**NOTE**

In this group, bond pads in general, i.e. where the nature of a related connector is unspecified or generic to multiple types of connectors, are classified in group [H10W 72/90](#). Bond pads specially adapted for a specific type of connector are classified in the group covering the connector type. For example, bond pads specially adapted for wire connectors are classified in group [H10W 72/59](#).

H10W 72/00

(continued)

WARNING

Group [H10W 72/00](#) is incomplete pending reclassification of documents from groups [H10W 20/40](#), [H10W 72/07232](#), [H10W 72/07233](#) and [H10W 72/07236](#). Group [H10W 72/00](#) is also impacted by reclassification into groups [H10W 72/20](#), [H10W 72/221](#), [H10W 72/222](#), [H10W 72/223](#), [H10W 72/224](#), [H10W 72/225](#), [H10W 72/227](#), [H10W 72/228](#), [H10W 72/231](#), [H10W 72/232](#), [H10W 72/234](#), [H10W 72/235](#), [H10W 72/237](#), [H10W 72/241](#), [H10W 72/242](#), [H10W 72/244](#), [H10W 72/245](#), [H10W 72/247](#), [H10W 72/248](#), [H10W 72/251](#), [H10W 72/252](#), [H10W 72/253](#), [H10W 72/255](#), [H10W 72/257](#), [H10W 72/2524](#), [H10W 72/2528](#), [H10W 72/261](#), [H10W 72/263](#), [H10W 72/265](#), [H10W 72/267](#), [H10W 72/281](#), [H10W 72/283](#), [H10W 72/285](#), [H10W 72/287](#), [H10W 72/30](#), [H10W 72/321](#), [H10W 72/322](#), [H10W 72/323](#), [H10W 72/324](#), [H10W 72/325](#), [H10W 72/327](#), [H10W 72/328](#), [H10W 72/331](#), [H10W 72/332](#), [H10W 72/334](#), [H10W 72/335](#), [H10W 72/337](#), [H10W 72/341](#), [H10W 72/342](#), [H10W 72/344](#), [H10W 72/345](#), [H10W 72/347](#), [H10W 72/348](#), [H10W 72/351](#), [H10W 72/352](#), [H10W 72/353](#), [H10W 72/354](#), [H10W 72/355](#), [H10W 72/357](#), [H10W 72/3524](#), [H10W 72/3528](#), [H10W 72/361](#), [H10W 72/365](#), [H10W 72/367](#), [H10W 72/381](#), [H10W 72/383](#), [H10W 72/385](#), [H10W 72/387](#), [H10W 72/40](#), [H10W 72/49](#), [H10W 72/50](#), [H10W 72/521](#), [H10W 72/522](#), [H10W 72/523](#), [H10W 72/524](#), [H10W 72/525](#), [H10W 72/527](#), [H10W 72/528](#), [H10W 72/531](#), [H10W 72/533](#), [H10W 72/534](#), [H10W 72/535](#), [H10W 72/537](#), [H10W 72/536](#), [H10W 72/5363](#), [H10W 72/5366](#), [H10W 72/5368](#), [H10W 72/541](#), [H10W 72/543](#), [H10W 72/547](#), [H10W 72/5434](#), [H10W 72/5438](#), [H10W 72/5473](#), [H10W 72/5475](#), [H10W 72/5445](#), [H10W 72/5449](#), [H10W 72/5453](#), [H10W 72/551](#), [H10W 72/552](#), [H10W 72/5522](#), [H10W 72/5524](#), [H10W 72/5525](#), [H10W 72/553](#), [H10W 72/555](#), [H10W 72/557](#), [H10W 72/5528](#), [H10W 72/581](#), [H10W 72/583](#), [H10W 72/585](#), [H10W 72/60](#), [H10W 72/621](#), [H10W 72/622](#), [H10W 72/623](#), [H10W 72/624](#), [H10W 72/625](#), [H10W 72/627](#), [H10W 72/631](#), [H10W 72/634](#), [H10W 72/635](#), [H10W 72/637](#), [H10W 72/641](#), [H10W 72/645](#), [H10W 72/647](#), [H10W 72/646](#), [H10W 72/642](#), [H10W 72/643](#), [H10W 72/6478](#), [H10W 72/651](#), [H10W 72/652](#), [H10W 72/653](#), [H10W 72/6528](#), [H10W 72/655](#), [H10W 72/657](#), [H10W 72/681](#), [H10W 72/683](#), [H10W 72/685](#) and [H10W 72/691](#).

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

72/01

. {Manufacture or treatment}

WARNING

Group [H10W 72/01](#) is impacted by reclassification into groups [H10W 72/011](#), [H10W 72/0112](#), [H10W 72/0113](#), [H10W 72/0115](#), [H10W 72/0116](#), [H10W 72/012](#), [H10W 72/01204](#), [H10W 72/01208](#), [H10W 72/01212](#), [H10W 72/01215](#), [H10W 72/01221](#), [H10W 72/01223](#), [H10W 72/01225](#), [H10W 72/01231](#), [H10W 72/01233](#), [H10W 72/01235](#), [H10W 72/01236](#), [H10W 72/01238](#), [H10W 72/01251](#), [H10W 72/01253](#), [H10W 72/01255](#), [H10W 72/01257](#), [H10W 72/01261](#), [H10W 72/01265](#), [H10W 72/01271](#), [H10W 72/013](#), [H10W 72/01304](#), [H10W 72/01308](#), [H10W 72/01315](#), [H10W 72/01321](#), [H10W 72/01323](#), [H10W 72/01325](#), [H10W 72/01331](#), [H10W 72/01333](#), [H10W 72/01335](#), [H10W 72/01336](#), [H10W 72/01338](#), [H10W 72/01351](#), [H10W 72/01353](#), [H10W 72/01355](#), [H10W 72/01357](#), [H10W 72/01359](#), [H10W 72/01361](#), [H10W 72/01365](#), [H10W 72/01371](#), [H10W 72/014](#), [H10W 72/015](#), [H10W 72/01504](#), [H10W 72/01515](#), [H10W 72/01551](#), [H10W 72/01553](#), [H10W 72/01561](#), [H10W 72/01565](#), [H10W 72/01571](#), [H10W 72/016](#), [H10W 72/01604](#), [H10W 72/01615](#), [H10W 72/01651](#), [H10W 72/01653](#), [H10W 72/01661](#), [H10W 72/01665](#), [H10W 72/01671](#), [H10W 72/019](#), [H10W 72/01904](#), [H10W 72/01908](#), [H10W 72/01921](#), [H10W 72/01923](#), [H10W 72/01925](#), [H10W 72/01931](#), [H10W 72/01933](#), [H10W 72/01935](#), [H10W 72/01936](#), [H10W 72/01938](#), [H10W 72/01951](#), [H10W 72/01953](#), [H10W 72/01955](#), [H10W 72/01961](#), [H10W 72/01971](#) and [H10W 72/0198](#).

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

72/011

. . {Apparatus thereof}

WARNING

Groups [H10W 72/011](#), [H10W 72/0112](#), [H10W 72/0113](#), [H10W 72/0115](#) and [H10W 72/0116](#) are incomplete pending reclassification of documents from group [H10W 72/01](#).

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

72/0112

. . . {Apparatus for manufacturing bump connectors}

72/0113

. . . {Apparatus for manufacturing die-attach connectors}

72/0115

. . . {Apparatus for manufacturing bond wires}

72/0116

. . . {Apparatus for manufacturing strap connectors}

- 72/012 . . . {of bump connectors, dummy bumps or thermal bumps}

WARNING

Group [H10W 72/012](#) is incomplete pending reclassification of documents from group [H10W 72/01](#). Group [H10W 72/012](#) is also impacted by reclassification into groups [H10W 72/01204](#), [H10W 72/01208](#), [H10W 72/01212](#), [H10W 72/01215](#), [H10W 72/01221](#), [H10W 72/01223](#), [H10W 72/01225](#), [H10W 72/01231](#), [H10W 72/01233](#), [H10W 72/01235](#), [H10W 72/01236](#), [H10W 72/01238](#), [H10W 72/01251](#), [H10W 72/01253](#), [H10W 72/01255](#), [H10W 72/01257](#), [H10W 72/01261](#), [H10W 72/01265](#) and [H10W 72/01271](#).

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

- 72/01204 . . . {using temporary auxiliary members, e.g. using sacrificial coatings or handle substrates}

WARNING

Groups [H10W 72/01204](#) - [H10W 72/01215](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/012](#).

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

- 72/01208 . . . {using permanent auxiliary members, e.g. using solder flow barriers, spacers or alignment marks}
- 72/01212 . . . {at a different location than on the final device, e.g. forming as prepeg}
- 72/01215 . . . {forming coatings}
- 72/01221 . . . {using local deposition}

WARNING

Groups [H10W 72/01221](#), [H10W 72/01223](#) and [H10W 72/01225](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/012](#).

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

- 72/01223 {in liquid form, e.g. by dispensing droplets or by screen printing}
- 72/01225 {in solid form, e.g. by using a powder or by stud bumping}
- 72/01231 . . . {using blanket deposition}

WARNING

Groups [H10W 72/01231](#), [H10W 72/01233](#), [H10W 72/01235](#), [H10W 72/01236](#) and [H10W 72/01238](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/012](#).

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

- 72/01233 {in liquid form, e.g. spin coating, spray coating or immersion coating}
- 72/01235 {by plating, e.g. electroless plating or electroplating}
- 72/01236 {in solid form, e.g. by using a powder or by laminating a foil}
- 72/01238 {in gaseous form, e.g. by CVD or PVD}
- 72/01251 . . . {Changing the shapes of bumps}

WARNING

Groups [H10W 72/01251](#), [H10W 72/01253](#), [H10W 72/01255](#) and [H10W 72/01257](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/012](#).

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

- 72/01253 {by etching}
- 72/01255 {by using masks}
- 72/01257 {by reflowing}
- 72/01261 . . . {Chemical or physical modification, e.g. by sintering or anodisation ([patterning H10W 72/01251](#))}

WARNING

Groups [H10W 72/01261](#) - [H10W 72/01271](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/012](#).

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

- 72/01265 . . . {Thermally treating ([reflowing H10W 72/01257](#))}
- 72/01271 . . . {Cleaning, e.g. oxide removal or de-smearing}
- 72/013 . . . {of die-attach connectors}

WARNING

Group [H10W 72/013](#) is incomplete pending reclassification of documents from group [H10W 72/01](#). Group [H10W 72/013](#) is also impacted by reclassification into groups [H10W 72/01304](#), [H10W 72/01308](#), [H10W 72/01315](#), [H10W 72/01321](#), [H10W 72/01323](#), [H10W 72/01325](#), [H10W 72/01331](#), [H10W 72/01333](#), [H10W 72/01335](#), [H10W 72/01336](#), [H10W 72/01338](#), [H10W 72/01351](#), [H10W 72/01353](#), [H10W 72/01355](#), [H10W 72/01357](#), [H10W 72/01359](#), [H10W 72/01361](#), [H10W 72/01365](#) and [H10W 72/01371](#).

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

- 72/01304 . . . {using temporary auxiliary members, e.g. using sacrificial coatings or handle substrates}

WARNING

Groups [H10W 72/01304](#) - [H10W 72/01315](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/013](#).

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

- 72/01308 . . . {using permanent auxiliary members, e.g. using alignment marks}
 72/01315 . . . {Forming coatings}
 72/01321 . . . {using local deposition}

WARNING

Groups [H10W 72/01321](#), [H10W 72/01323](#) and [H10W 72/01325](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/013](#).

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

- 72/01323 {in liquid form, e.g. by dispensing droplets or by screen printing}
 72/01325 {in solid form}
 72/01331 . . . {using blanket deposition}

WARNING

Groups [H10W 72/01331](#), [H10W 72/01333](#), [H10W 72/01335](#), [H10W 72/01336](#) and [H10W 72/01338](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/013](#).

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

- 72/01333 {in liquid form, e.g. spin coating, spray coating or immersion coating}
 72/01335 {by plating, e.g. electroless plating or electroplating}
 72/01336 {in solid form, e.g. by using a powder or by laminating a foil}
 72/01338 {in gaseous form, e.g. by CVD or PVD}
 72/01351 . . . {Changing the shapes of die-attach connectors}

WARNING

Groups [H10W 72/01351](#), [H10W 72/01353](#), [H10W 72/01355](#), [H10W 72/01357](#) and [H10W 72/01359](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/013](#).

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

- 72/01353 {by etching}
 72/01355 {by use of masks}
 72/01357 {by reflowing or heating}
 72/01359 {by planarisation, e.g. chemical-mechanical polishing [CMP]}

- 72/01361 . . . {Chemical or physical modification, e.g. by sintering or anodisation ([patterning H10W 72/01351](#))}

WARNING

Groups [H10W 72/01361](#) - [H10W 72/01371](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/013](#).

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

- 72/01365 . . . {Thermally treating ([reflowing H10W 72/01357](#))}
 72/01371 . . . {Cleaning, e.g. oxide removal or de-smearing}
 72/014 . . {of anisotropic conductive adhesives}

WARNING

Group [H10W 72/014](#) is incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/30](#).

Groups [H10W 72/01](#), [H10W 72/30](#) and [H10W 72/014](#) should be considered in order to perform a complete search.

- 72/015 . . {of bond wires}

WARNING

Group [H10W 72/015](#) is incomplete pending reclassification of documents from group [H10W 72/01](#). Group [H10W 72/015](#) is also impacted by reclassification into groups [H10W 72/01504](#), [H10W 72/01515](#), [H10W 72/01551](#), [H10W 72/01553](#), [H10W 72/01561](#), [H10W 72/01565](#) and [H10W 72/01571](#).

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

- 72/01504 . . . {using temporary auxiliary members, e.g. using sacrificial coatings or handle substrates}

WARNING

Groups [H10W 72/01504](#) - [H10W 72/01571](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/015](#).

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

- 72/01515 . . . {Forming coatings}
 72/01551 . . . {Changing the shapes of bond wires}
 72/01553 {by etching}
 72/01561 . . . {Chemical or physical modification, e.g. by sintering or anodisation ([patterning H10W 72/01551](#))}
 72/01565 . . . {Thermally treating}
 72/01571 . . . {Cleaning, e.g. oxide removal or de-smearing}

72/016 . . . {of strap connectors}

WARNING

Group [H10W 72/016](#) is incomplete pending reclassification of documents from group [H10W 72/01](#). Group [H10W 72/016](#) is also impacted by reclassification into groups [H10W 72/01604](#), [H10W 72/01615](#), [H10W 72/01651](#), [H10W 72/01653](#), [H10W 72/01661](#), [H10W 72/01665](#) and [H10W 72/01671](#).

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

72/01604 . . . {using temporary auxiliary members, e.g. using sacrificial coatings or handle substrates}

WARNING

Groups [H10W 72/01604](#) - [H10W 72/01671](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/016](#).

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

72/01615 . . . {Forming coatings}

72/01651 . . . {Changing the shapes of strap connectors}

72/01653 . . . {by etching}

72/01661 . . . {Chemical or physical modification, e.g. by sintering or anodisation ([patterning H10W 72/01651](#))}

72/01665 . . . {Thermally treating}

72/01671 . . . {Cleaning, e.g. oxide removal or de-smearing}

72/019 . . . {of bond pads}

WARNING

Group [H10W 72/019](#) is incomplete pending reclassification of documents from group [H10W 72/01](#). Group [H10W 72/019](#) is also impacted by reclassification into groups [H10W 72/01904](#), [H10W 72/01908](#), [H10W 72/01921](#), [H10W 72/01923](#), [H10W 72/01925](#), [H10W 72/01931](#), [H10W 72/01933](#), [H10W 72/01935](#), [H10W 72/01936](#), [H10W 72/01938](#), [H10W 72/01951](#), [H10W 72/01953](#), [H10W 72/01955](#), [H10W 72/01961](#) and [H10W 72/01971](#).

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

72/01904 . . . {using temporary auxiliary members, e.g. using sacrificial coatings or handle substrates}

WARNING

Groups [H10W 72/01904](#) - [H10W 72/01908](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/019](#).

Groups [H10W 72/01](#), [H10W 72/019](#) and [H10W 72/01904](#) should be considered in order to perform a complete search.

72/01908 . . . {using permanent auxiliary members, e.g. using alignment marks}

72/01921 . . . {using local deposition}

WARNING

Groups [H10W 72/01921](#), [H10W 72/01923](#) and [H10W 72/01925](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/019](#).

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

72/01923 . . . {in liquid form, e.g. by dispensing droplets or by screen printing}

72/01925 . . . {in solid form}

72/01931 . . . {using blanket deposition}

WARNING

Groups [H10W 72/01931](#), [H10W 72/01933](#), [H10W 72/01935](#), [H10W 72/01936](#) and [H10W 72/01938](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/019](#).

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

72/01933 . . . {in liquid form, e.g. spin coating, spray coating or immersion coating}

72/01935 . . . {by plating, e.g. electroless plating or electroplating}

72/01936 . . . {in solid form, e.g. by using a powder or by laminating a foil}

72/01938 . . . {in gaseous form, e.g. by CVD or PVD}

72/01951 . . . {Changing the shapes of bond pads}

WARNING

Groups [H10W 72/01951](#), [H10W 72/01953](#) and [H10W 72/01955](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/019](#).

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

72/01953 . . . {by etching}

72/01955 . . . {by using masks}

72/01961 . . . {Chemical or physical modification, e.g. by sintering or anodisation ([patterning H10W 72/01951](#))}

WARNING

Groups [H10W 72/01961](#) - [H10W 72/01971](#) are incomplete pending reclassification of documents from groups [H10W 72/01](#) and [H10W 72/019](#).

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

72/01971 . . . {Cleaning, e.g. oxide removal}

72/0198 . . . {batch processes}

WARNING

Group [H10W 72/0198](#) is incomplete pending reclassification of documents from group [H10W 72/01](#).

Groups [H10W 72/01](#) and [H10W 72/0198](#) should be considered in order to perform a complete search.

72/071 . . {Connecting or disconnecting}
 72/0711 . . {Apparatus therefor}
 72/07113 . . . {Means for calibration}
 72/07118 . . . {Means for cleaning, e.g. brushes}
 72/07125 . . . {Means for controlling the bonding environment, e.g. valves or vacuum pumps}
 72/07131 . . . {Means for applying material, e.g. for deposition or forming coatings}
 72/07139 . . . {Means for protection against electrical discharge}
 72/07141 . . . {Means for applying energy, e.g. ovens or lasers}
 72/07152 . . . {Means for cooling}
 72/07163 . . . {Means for mechanical processing, e.g. for planarising, pressing, stamping or drilling}
 72/07168 . . . {Means for storing or moving the material for the connector}
 72/07173 . . . {Means for moving chips, wafers or other parts, e.g. conveyor belts}
 72/07178 . . . {Means for aligning}
 72/07183 . . . {Means for monitoring}
 72/07188 . . . {Apparatus chuck}
 72/072 . . {of bump connectors}
 72/07202 . . . {using auxiliary members}
 72/07204 {using temporary auxiliary members, e.g. sacrificial coatings}

WARNING

Group [H10W 72/07204](#) is impacted by reclassification into group [H10W 72/07207](#).

Groups [H10W 72/07204](#) and [H10W 72/07207](#) should be considered in order to perform a complete search.

72/07207 {Temporary substrates, e.g. removable substrates}

WARNING

Group [H10W 72/07207](#) is incomplete pending reclassification of documents from group [H10W 72/07204](#).

Groups [H10W 72/07204](#) and [H10W 72/07207](#) should be considered in order to perform a complete search.

72/07211 . . . {Treating the bond pad before connecting, e.g. by applying flux or cleaning}
 72/07221 . . . {Aligning}
 72/07223 {Active alignment, e.g. using optical alignment using marks or sensors}
 72/07227 {involving guiding structures, e.g. spacers or supporting members}
 72/07231 . . . {Techniques}

72/07232 {Compression bonding, e.g. thermocompression bonding}

WARNING

Group [H10W 72/07232](#) is impacted by reclassification into groups [H10W 72/00](#), [H10W 72/07332](#), [H10W 72/07532](#), [H10W 72/07632](#) and [H10W 95/00](#).

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

72/07233 {Ultrasonic bonding, e.g. thermosonic bonding}

WARNING

Group [H10W 72/07233](#) is impacted by reclassification into groups [H10W 72/00](#), [H10W 72/07333](#), [H10W 72/07533](#), [H10W 72/07633](#) and [H10W 95/00](#).

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

72/07234 {Using a reflow oven}

72/07235 {Applying EM radiation, e.g. induction heating or using a laser}

72/07236 {Soldering or alloying}

WARNING

Group [H10W 72/07236](#) is impacted by reclassification into groups [H10W 72/00](#), [H10W 72/07336](#), [H10W 72/07536](#), [H10W 72/07636](#) and [H10W 95/00](#).

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

72/07237 {using a polymer adhesive, e.g. an adhesive based on silicone or epoxy}

72/07241 . . . {Controlling the environment, e.g. atmosphere composition or temperature}

72/07251 . . . {characterised by changes in properties of the bump connectors during connecting}

72/07252 {changes in structures or sizes}

72/07253 {changes in shapes}

72/07254 {changes in dispositions}

72/07255 {changes in materials}

72/07261 . . . {with the bump connectors facing upwards, i.e. not in flip-chip orientation}

72/073 . . {of die-attach connectors}

72/07302 . . . {using an auxiliary member}

72/07304 {the auxiliary member being temporary, e.g. a sacrificial coating}

72/07307 {the auxiliary member being a temporary substrate, e.g. a removable substrate}

72/07311 . . . {Treating the bonding area before connecting, e.g. by applying flux or cleaning}

72/07321 . . . {Aligning}

72/07323 {Active alignment, e.g. using optical alignment using marks or sensors}

72/07327 {involving guiding structures, e.g. spacers or supporting members}

72/07331 . . . {Connecting techniques}

72/07332 {Compression bonding, e.g. thermocompression bonding}

WARNING

Group [H10W 72/07332](#) is incomplete pending reclassification of documents from group [H10W 72/07232](#).

Groups [H10W 72/07232](#) and [H10W 72/07332](#) should be considered in order to perform a complete search.

72/07333 {Ultrasonic bonding, e.g. thermosonic bonding}

WARNING

Group [H10W 72/07333](#) is incomplete pending reclassification of documents from group [H10W 72/07233](#).

Groups [H10W 72/07233](#) and [H10W 72/07333](#) should be considered in order to perform a complete search.

72/07334 {Using a reflow oven}

72/07335 {Applying EM radiation, e.g. induction heating or using a laser}

72/07336 {Soldering or alloying}

WARNING

Group [H10W 72/07336](#) is incomplete pending reclassification of documents from group [H10W 72/07236](#).

Groups [H10W 72/07236](#) and [H10W 72/07336](#) should be considered in order to perform a complete search.

72/07337 {using a polymer adhesive, e.g. an adhesive based on silicone or epoxy}

72/07338 {hardening the adhesive by curing, e.g. thermosetting}

72/07339 {hardening the adhesive by cooling, e.g. thermoplastics}

72/07341 . . . {Controlling the bonding environment, e.g. atmosphere composition or temperature}

72/07351 . . . {characterised by changes in properties of the die-attach connectors during connecting}

72/07352 {changes in structures or sizes}

72/07353 {changes in shapes}

72/07354 {changes in dispositions}

72/07355 {changes in materials}

72/074 . . {of anisotropic conductive adhesives}

WARNING

Group [H10W 72/074](#) is incomplete pending reclassification of documents from group [H10W 72/30](#).

Groups [H10W 72/30](#) and [H10W 72/074](#) should be considered in order to perform a complete search.

72/075 . . {of bond wires}

72/07502 . . . {using an auxiliary member}

72/07504 {the auxiliary member being temporary, e.g. a sacrificial coating}

72/07507 {the auxiliary member being a temporary substrate, e.g. a removable substrate}

72/07511 . . . {Treating the bonding area before connecting, e.g. by applying flux or cleaning}

72/07521 . . . {Aligning}

72/07523 {Active alignment, e.g. using optical alignment using marks or sensors}

72/07527 {involving guiding structures, e.g. spacers or supporting members}

72/07531 . . . {Techniques}

72/07532 {Compression bonding, e.g. thermocompression bonding}

WARNING

Group [H10W 72/07532](#) is incomplete pending reclassification of documents from group [H10W 72/07232](#).

Groups [H10W 72/07232](#) and [H10W 72/07532](#) should be considered in order to perform a complete search.

72/07533 {Ultrasonic bonding, e.g. thermosonic bonding}

WARNING

Group [H10W 72/07533](#) is incomplete pending reclassification of documents from group [H10W 72/07233](#).

Groups [H10W 72/07233](#) and [H10W 72/07533](#) should be considered in order to perform a complete search.

72/07535 {Applying EM radiation, e.g. induction heating or using a laser}

72/07536 {Soldering or alloying}

WARNING

Group [H10W 72/07536](#) is incomplete pending reclassification of documents from group [H10W 72/07236](#).

Groups [H10W 72/07236](#) and [H10W 72/07536](#) should be considered in order to perform a complete search.

72/07537 {using a polymer adhesive, e.g. an adhesive based on silicone or epoxy}

72/07541 . . . {Controlling the environment, e.g. atmosphere composition or temperature}

72/07551 . . . {characterised by changes in properties of the bond wires during the connecting}

72/07552 {changes in structures or sizes}

72/07553 {changes in shapes}

72/07554 {changes in dispositions}

72/07555 {changes in materials}

72/076 . . {of strap connectors}

72/07602 . . . {using an auxiliary member}

72/07604 {the auxiliary member being temporary, e.g. a sacrificial coating}

72/07607 {the auxiliary member being a temporary substrate, e.g. a removable substrate}

72/07611 . . . {Treating the bonding area before connecting, e.g. by applying flux or cleaning}

72/07621 . . . {Aligning}

72/07623 {Active alignment, e.g. using optical alignment using marks or sensors}

72/07627 {involving guiding structures, e.g. spacers or supporting members}

- 72/07631 . . . {Techniques}
 72/07632 . . . {Compression bonding, e.g. thermocompression bonding}

WARNING

Group [H10W 72/07632](#) is incomplete pending reclassification of documents from group [H10W 72/07232](#).

Groups [H10W 72/07232](#) and [H10W 72/07632](#) should be considered in order to perform a complete search.

- 72/07633 {Ultrasonic bonding, e.g. thermosonic bonding}

WARNING

Group [H10W 72/07633](#) is incomplete pending reclassification of documents from group [H10W 72/07233](#).

Groups [H10W 72/07233](#) and [H10W 72/07633](#) should be considered in order to perform a complete search.

- 72/07635 {Applying EM radiation, e.g. induction heating or using a laser}

- 72/07636 {Soldering or alloying}

WARNING

Group [H10W 72/07636](#) is incomplete pending reclassification of documents from group [H10W 72/07236](#).

Groups [H10W 72/07236](#) and [H10W 72/07636](#) should be considered in order to perform a complete search.

- 72/07637 {using a polymer adhesive, e.g. an adhesive based on silicone or epoxy}
 72/07641 . . . {Controlling the environment, e.g. atmosphere composition or temperature}
 72/07651 . . . {characterised by changes in properties of the strap connectors during connecting}
 72/07652 {changes in structures or sizes}
 72/07653 {changes in shapes}
 72/07654 {changes in dispositions}
 72/07655 {changes in materials}
 72/077 . . {Connecting of TAB connectors}

- 72/20 . Bump connectors, e.g. solder bumps or copper pillars; Dummy bumps; Thermal bumps

WARNING

Group [H10W 72/20](#) is incomplete pending reclassification of documents from group [H10W 72/00](#). Group [H10W 72/20](#) is also impacted by reclassification into groups [H10W 72/221](#), [H10W 72/222](#), [H10W 72/223](#), [H10W 72/224](#), [H10W 72/225](#), [H10W 72/227](#), [H10W 72/228](#), [H10W 72/231](#), [H10W 72/232](#), [H10W 72/234](#), [H10W 72/235](#), [H10W 72/237](#), [H10W 72/241](#), [H10W 72/242](#), [H10W 72/244](#), [H10W 72/245](#), [H10W 72/247](#), [H10W 72/248](#), [H10W 72/251](#), [H10W 72/252](#), [H10W 72/253](#), [H10W 72/255](#), [H10W 72/257](#), [H10W 72/2524](#), [H10W 72/2528](#), [H10W 72/261](#), [H10W 72/263](#), [H10W 72/265](#), [H10W 72/267](#), [H10W 72/281](#), [H10W 72/283](#), [H10W 72/285](#), [H10W 72/287](#), [H10W 72/60](#), [H10W 72/621](#), [H10W 72/622](#), [H10W 72/623](#), [H10W 72/624](#), [H10W 72/625](#), [H10W 72/627](#), [H10W 72/631](#), [H10W 72/634](#), [H10W 72/635](#), [H10W 72/637](#), [H10W 72/641](#), [H10W 72/645](#), [H10W 72/647](#), [H10W 72/642](#), [H10W 72/643](#), [H10W 72/646](#), [H10W 72/6478](#), [H10W 72/651](#), [H10W 72/652](#), [H10W 72/653](#), [H10W 72/6528](#), [H10W 72/655](#), [H10W 72/657](#), [H10W 72/681](#), [H10W 72/683](#), [H10W 72/685](#) and [H10W 72/691](#).

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

- 72/221 . . {Structures or relative sizes}

WARNING

Groups [H10W 72/221](#), [H10W 72/222](#), [H10W 72/223](#), [H10W 72/224](#), [H10W 72/225](#), [H10W 72/227](#) and [H10W 72/228](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/20](#).

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

- 72/222 . . . {Multilayered bumps, e.g. a coating on top and side surfaces of a bump core}
 72/223 {characterised by the structure of the outermost layers, e.g. multilayered coatings}
 72/224 . . . {Bumps having multiple side-by-side cores}
 72/225 . . . {Bumps having a filler embedded in a matrix}
 72/227 . . . {Multiple bumps having different sizes}
 72/228 . . . {Multiple bumps having different structures}
 72/231 . . {Shapes}

WARNING

Groups [H10W 72/231](#), [H10W 72/232](#), [H10W 72/234](#), [H10W 72/235](#) and [H10W 72/237](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/20](#).

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

- 72/232 . . . {Plan-view shape, i.e. in top view}

- 72/234 . . . {Cross-sectional shape, i.e. in side view}
- 72/235 . . . {of outermost layers of multilayered bumps, e.g. bump coating not being conformal on a bump core}
- 72/237 . . . {Multiple bump connectors having different shapes}
- 72/241 . . {Dispositions, e.g. layouts}

WARNING

Groups [H10W 72/241](#), [H10W 72/242](#), [H10W 72/244](#), [H10W 72/245](#), [H10W 72/247](#) and [H10W 72/248](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/20](#).

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

- 72/242 . . . {relative to the surface, e.g. recessed, protruding}
- 72/244 . . . {relative to underlying supporting features, e.g. bond pads, RDLs or vias}
- 72/245 . . . {of outermost layers of multilayered bumps, e.g. bump coating being only on a part of a bump core}
- 72/247 . . . {Dispositions of multiple bumps}
- 72/248 . . . {Top-view layouts, e.g. mirror arrays}
- 72/251 . . {Materials}

WARNING

Groups [H10W 72/251](#), [H10W 72/252](#), [H10W 72/2524](#), [H10W 72/2528](#), [H10W 72/253](#), [H10W 72/255](#) and [H10W 72/257](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/20](#).

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

- 72/252 . . . {comprising solid metals or solid metalloids, e.g. PbSn, Ag or Cu}
- 72/2524 . . . {Eutectic alloys}
- 72/2528 . . . {Intermetallic compounds}
- 72/253 . . . {not comprising solid metals or solid metalloids, e.g. polymers or ceramics}
- 72/255 . . . {of outermost layers of multilayered bumps, e.g. material of a coating}
- 72/257 . . . {Multiple bump connectors having different materials}
- 72/261 . . {Functions other than electrical connecting}

WARNING

Groups [H10W 72/261](#), [H10W 72/263](#), [H10W 72/265](#) and [H10W 72/267](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/20](#).

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

- 72/263 . . . {Providing mechanical bonding or support, e.g. dummy bumps}
- 72/265 . . . {Providing thermal transfer, e.g. thermal bumps}

- 72/267 . . . {Multiple bump connectors having different functions}
- 72/281 . . {Auxiliary members}

WARNING

Groups [H10W 72/281](#), [H10W 72/283](#), [H10W 72/285](#) and [H10W 72/287](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/20](#).

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

- 72/283 . . . {Reinforcing structures, e.g. bump collars}
- 72/285 . . . {Alignment aids, e.g. alignment marks}
- 72/287 . . . {Flow barriers}
- 72/29 . . Bond pads specially adapted therefor
- 72/30 . Die-attach connectors

WARNING

Group [H10W 72/30](#) is incomplete pending reclassification of documents from group [H10W 72/00](#). Group [H10W 72/30](#) is also impacted by reclassification into groups [H10W 72/014](#), [H10W 72/074](#), [H10W 72/321](#), [H10W 72/322](#), [H10W 72/323](#), [H10W 72/324](#), [H10W 72/325](#), [H10W 72/327](#), [H10W 72/328](#), [H10W 72/331](#), [H10W 72/332](#), [H10W 72/334](#), [H10W 72/335](#), [H10W 72/337](#), [H10W 72/341](#), [H10W 72/342](#), [H10W 72/344](#), [H10W 72/345](#), [H10W 72/347](#), [H10W 72/348](#), [H10W 72/351](#), [H10W 72/352](#), [H10W 72/353](#), [H10W 72/354](#), [H10W 72/355](#), [H10W 72/357](#), [H10W 72/3524](#), [H10W 72/3528](#), [H10W 72/361](#), [H10W 72/365](#), [H10W 72/367](#), [H10W 72/381](#), [H10W 72/383](#), [H10W 72/385](#), [H10W 72/387](#), [H10W 72/40](#) and [H10W 72/49](#).

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

- 72/321 . . {Structures or relative sizes of die-attach connectors}

WARNING

Groups [H10W 72/321](#), [H10W 72/322](#), [H10W 72/323](#), [H10W 72/324](#), [H10W 72/325](#), [H10W 72/327](#) and [H10W 72/328](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/30](#).

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

- 72/322 . . . {Multilayered die-attach connectors, e.g. a coating on a top surface of a core}
- 72/323 . . . {characterised by the structures of the outermost layers, e.g. multilayered coatings}
- 72/324 . . . {Die-attach connectors having multiple side-by-side cores}
- 72/325 . . . {Die-attach connectors having a filler embedded in a matrix}
- 72/327 . . . {Multiple die-attach connectors having different sizes}

- 72/328 . . . {Multiple die-attach connectors having different structures}
- 72/331 . . {Shapes of die-attach connectors}

WARNING

Groups [H10W 72/331](#), [H10W 72/332](#), [H10W 72/334](#), [H10W 72/335](#) and [H10W 72/337](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/30](#).

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

- 72/332 . . . {Plan-view shape, i.e. in top view}
- 72/334 . . . {Cross-sectional shape, i.e. in side view}
- 72/335 . . . {of outermost layers of multilayered die-attach connectors, e.g. coating not being conformal on a core}
- 72/337 . . . {Multiple die-attach connectors having different shapes}
- 72/341 . . {Dispositions of die-attach connectors, e.g. layouts}

WARNING

Groups [H10W 72/341](#), [H10W 72/342](#), [H10W 72/344](#), [H10W 72/345](#), [H10W 72/347](#) and [H10W 72/348](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/30](#).

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

- 72/342 . . . {relative to the surface, e.g. recessed, protruding}
- 72/344 . . . {relative to underlying supporting features, e.g. bond pads, RDLs or vias}
- 72/345 . . . {of outermost layers of multilayered die-attach connectors, e.g. coating being only on a part of a core}
- 72/347 . . . {Dispositions of multiple die-attach connectors}
- 72/348 {Top-view layouts, e.g. mirror arrays}
- 72/351 . . {Materials of die-attach connectors}

WARNING

Groups [H10W 72/351](#), [H10W 72/352](#), [H10W 72/3524](#), [H10W 72/3528](#), [H10W 72/353](#), [H10W 72/354](#), [H10W 72/355](#) and [H10W 72/357](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/30](#).

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

- 72/352 . . . {comprising metals or metalloids, e.g. solders}
- 72/3524 {Eutectic alloys}
- 72/3528 {Intermetallic compounds}
- 72/353 . . . {not comprising solid metals or solid metalloids, e.g. ceramics}
- 72/354 {comprising polymers}
- 72/355 . . . {of outermost layers of multilayered die-attach connectors, e.g. material of a coating}

- 72/357 . . . {Multiple die-attach connectors having different materials}
- 72/361 . . {Functions of die-attach connectors, other than mechanically connecting}

WARNING

Groups [H10W 72/361](#), [H10W 72/365](#) and [H10W 72/367](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/30](#).

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

- 72/365 . . . {Providing thermal transfer}
- 72/367 . . . {Multiple die-attach connectors having different functions}
- 72/381 . . {Auxiliary members}

WARNING

Groups [H10W 72/381](#), [H10W 72/383](#), [H10W 72/385](#) and [H10W 72/387](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/30](#).

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

- 72/383 . . . {Reinforcing structures, e.g. collars}
- 72/385 . . . {Alignment aids, e.g. alignment marks}
- 72/387 . . . {Flow barriers}
- 72/40 . . Anisotropic conductive adhesives

WARNING

Groups [H10W 72/40](#) and [H10W 72/49](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/30](#).

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

- 72/49 . . Bond pads specially adapted therefor

72/50 . Bond wires

WARNING

Group [H10W 72/50](#) is incomplete pending reclassification of documents from group [H10W 72/00](#). Group [H10W 72/50](#) is also impacted by reclassification into groups [H10W 72/521](#), [H10W 72/522](#), [H10W 72/523](#), [H10W 72/524](#), [H10W 72/525](#), [H10W 72/527](#), [H10W 72/528](#), [H10W 72/531](#), [H10W 72/533](#), [H10W 72/534](#), [H10W 72/535](#), [H10W 72/537](#), [H10W 72/536](#), [H10W 72/5363](#), [H10W 72/5366](#), [H10W 72/5368](#), [H10W 72/541](#), [H10W 72/543](#), [H10W 72/547](#), [H10W 72/5434](#), [H10W 72/5438](#), [H10W 72/5473](#), [H10W 72/5475](#), [H10W 72/5445](#), [H10W 72/5449](#), [H10W 72/5453](#), [H10W 72/551](#), [H10W 72/552](#), [H10W 72/5522](#), [H10W 72/5524](#), [H10W 72/5525](#), [H10W 72/553](#), [H10W 72/555](#), [H10W 72/557](#), [H10W 72/5528](#), [H10W 72/581](#), [H10W 72/583](#) and [H10W 72/585](#).

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

72/521 . . {Structures or relative sizes of bond wires}

WARNING

Groups [H10W 72/521](#), [H10W 72/522](#), [H10W 72/523](#), [H10W 72/524](#), [H10W 72/525](#), [H10W 72/527](#) and [H10W 72/528](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/50](#).

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

72/522 . . . {Multilayered bond wires, e.g. having a coating concentric around a core}

72/523 {characterised by the structures of the outermost layers, e.g. multilayered coatings}

72/524 . . . {Bond wires having multiple distinct cores}

72/525 . . . {Bond wires having a filler embedded in a matrix}

72/527 . . . {Multiple bond wires having different sizes}

72/528 . . . {Multiple bond wires having different structures}

72/531 . . {Shapes of wire connectors}

WARNING

Groups [H10W 72/531](#), [H10W 72/533](#), [H10W 72/534](#), [H10W 72/535](#), [H10W 72/536](#), [H10W 72/5363](#), [H10W 72/5366](#), [H10W 72/5368](#) and [H10W 72/537](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/50](#).

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

72/533 . . . {Cross-sectional shape}

72/534 {being rectangular}

72/535 . . . {Shapes of outermost layers of multilayered bond wires, e.g. coating not being conformal on a core}

- 72/536 . . . {the connected ends being ball-shaped}
- 72/5363 . . . {the connected ends being wedge-shaped}
- 72/5366 . . . {the bond wires having kinks}
- 72/5368 . . . {the bond wires having helical loops}
- 72/537 . . . {Multiple bond wires having different shapes}
- 72/541 . . {Dispositions of bond wires}

WARNING

Groups [H10W 72/541](#), [H10W 72/543](#), [H10W 72/5434](#), [H10W 72/5438](#), [H10W 72/5445](#), [H10W 72/5449](#), [H10W 72/5453](#), [H10W 72/547](#), [H10W 72/5473](#) and [H10W 72/5475](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/50](#).

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

72/543 . . . {of outermost layers of multilayered bond wires, e.g. coating being only on a part of a core}

72/5434 . . . {the connected ends being on auxiliary connecting means on bond pads, e.g. on other bond wires}

72/5438 . . . {the bond wires having multiple connections on the same bond pad}

72/5445 . . . {being orthogonal to a side surface of the chip, e.g. parallel arrangements}

72/5449 . . . {not being orthogonal to a side surface of the chip, e.g. fan-out arrangements}

72/5453 . . . {connecting between multiple bond pads on a chip, e.g. daisy chain}

72/547 . . . {Dispositions of multiple bond wires}

72/5473 {multiple bond wires connected to a common bond pad}

72/5475 {multiple bond wires connected to common bond pads at both ends of the wires}

72/551 . . {Materials of bond wires}

WARNING

Groups [H10W 72/551](#), [H10W 72/552](#), [H10W 72/5522](#), [H10W 72/5524](#), [H10W 72/5525](#), [H10W 72/5528](#), [H10W 72/553](#), [H10W 72/555](#) and [H10W 72/557](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/50](#).

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

72/552 . . . {comprising metals or metalloids, e.g. silver}

72/5522 {comprising gold [Au]}

72/5524 {comprising aluminium [Al]}

72/5525 {comprising copper [Cu]}

72/5527 {Eutectic alloys}

72/5528 {Intermetallic compounds}

72/553 . . . {not comprising solid metals or solid metalloids, e.g. polymers, ceramics or liquids}

72/555 . . . {of outermost layers of multilayered bond wires, e.g. material of a coating}

72/557 . . . {Multiple bond wires having different materials}

72/581 . . {Auxiliary members, e.g. flow barriers}

WARNING

Groups [H10W 72/581](#), [H10W 72/583](#) and [H10W 72/585](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/50](#).

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

72/583 . . . {Reinforcing structures}

72/585 . . . {Alignment aids, e.g. alignment marks}

72/59 . . Bond pads specially adapted therefor

72/60 . . Strap connectors, e.g. thick copper clips for grounding of power devices

WARNING

Group [H10W 72/60](#) is incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/20](#). Group [H10W 72/60](#) is also impacted by reclassification into groups [H10W 72/621](#), [H10W 72/622](#), [H10W 72/623](#), [H10W 72/624](#), [H10W 72/625](#), [H10W 72/627](#), [H10W 72/631](#), [H10W 72/634](#), [H10W 72/635](#), [H10W 72/637](#), [H10W 72/641](#), [H10W 72/645](#), [H10W 72/647](#), [H10W 72/646](#), [H10W 72/642](#), [H10W 72/643](#), [H10W 72/6478](#), [H10W 72/651](#), [H10W 72/652](#), [H10W 72/653](#), [H10W 72/6528](#), [H10W 72/655](#), [H10W 72/657](#), [H10W 72/681](#), [H10W 72/683](#), [H10W 72/685](#) and [H10W 72/701](#).

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

72/621 . . {Structures or relative sizes of strap connectors}

WARNING

Groups [H10W 72/621](#), [H10W 72/622](#), [H10W 72/623](#), [H10W 72/624](#), [H10W 72/625](#) and [H10W 72/627](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#), [H10W 72/20](#) and [H10W 72/60](#).

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

72/622 . . . {Multilayered strap connectors, e.g. having a coating on a lowermost surface of a core}

72/623 . . . {characterised by the structures of the outermost layers, e.g. multilayered coatings}

72/624 . . . {Strap connectors having multiple distinct cores}

72/625 . . . {Strap connectors having a filler embedded in a matrix}

72/627 . . . {Multiple strap connectors having different structures or shapes}

72/631 . . {Shapes of strap connectors}

WARNING

Groups [H10W 72/631](#), [H10W 72/634](#), [H10W 72/635](#) and [H10W 72/637](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#), [H10W 72/20](#) and [H10W 72/60](#).

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

72/634 . . . {Cross-sectional shape}

72/635 . . . {of outermost layers of multilayered strap connectors, e.g. coating not being conformal on a core}

72/637 . . . {Multiple strap connectors having different shapes}

72/641 . . {Dispositions of strap connectors}

WARNING

Groups [H10W 72/641](#), [H10W 72/642](#), [H10W 72/643](#), [H10W 72/645](#), [H10W 72/646](#), [H10W 72/647](#) and [H10W 72/6478](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#), [H10W 72/20](#) and [H10W 72/60](#).

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

72/642 . . . {being orthogonal to a side surface of the chip, e.g. in parallel arrangements}

72/643 . . . {not being orthogonal to a side surface of the chip, e.g. in fan-out arrangements}

72/644 . . . {connecting directly between multiple pads on a chip}

72/645 . . . {of outermost layers of multilayered strap connectors, e.g. coating being only on a part of a core}

72/646 . . . {the connected ends being on auxiliary connecting means on bond pads, e.g. on a bump connector}

72/647 . . . {Dispositions of multiple strap connectors}

72/6478 . . . {multiple strap connectors connecting to a common bond pad}

72/651 . . {Materials of strap connectors}

WARNING

Groups [H10W 72/651](#), [H10W 72/652](#), [H10W 72/6528](#), [H10W 72/653](#), [H10W 72/655](#) and [H10W 72/657](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#), [H10W 72/20](#) and [H10W 72/60](#).

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

72/652 . . . {comprising metals or metalloids, e.g. silver}

72/6524 . . . {Eutectic alloys}

72/6528 . . . {Intermetallic compounds}

72/653 . . . {not comprising solid metals or solid metalloids, e.g. polymers, ceramics or liquids}

72/655 . . . {of outermost layers of multilayered strap connectors, e.g. material of a coating}

- 72/657 . . . {Multiple strap connectors having different materials}
- 72/681 . . {Auxiliary members, e.g. flow barriers}

WARNING

Groups [H10W 72/681](#), [H10W 72/683](#) and [H10W 72/685](#) are incomplete pending reclassification of documents from groups [H10W 72/00](#), [H10W 72/20](#) and [H10W 72/60](#).

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

- 72/683 . . . {Reinforcing structures, e.g. bump collars}
- 72/685 . . . {Alignment aids, e.g. alignment marks}
- 72/691 . . {Bond pads specially adapted therefor}

WARNING

Group [H10W 72/691](#) is incomplete pending reclassification of documents from groups [H10W 72/00](#) and [H10W 72/20](#).

Groups [H10W 72/00](#), [H10W 72/20](#) and [H10W 72/691](#) should be considered in order to perform a complete search.

- 72/701 . {Tape-automated bond [TAB] connectors}

WARNING

Group [H10W 72/701](#) is incomplete pending reclassification of documents from group [H10W 72/60](#).

Groups [H10W 72/60](#) and [H10W 72/701](#) should be considered in order to perform a complete search.

- 72/709 . . {Bond pads specially adapted therefor}
- 72/801 . {Interconnections on sidewalls of containers}

WARNING

Group [H10W 72/801](#) is impacted by reclassification into group [H10W 72/812](#).

Groups [H10W 72/801](#) and [H10W 72/812](#) should be considered in order to perform a complete search.

- 72/812 . {Interconnections on sidewalls of encapsulations, e.g. conductive traces on molded resins}

WARNING

Group [H10W 72/812](#) is incomplete pending reclassification of documents from group [H10W 72/801](#).

Groups [H10W 72/801](#) and [H10W 72/812](#) should be considered in order to perform a complete search.

- 72/823 . {Interconnections through encapsulations, e.g. pillars through molded resin on a lateral side a chip}

WARNING

Group [H10W 72/823](#) is impacted by reclassification into groups [H10W 20/20](#), [H10W 20/211](#), [H10W 20/215](#), [H10W 20/222](#), [H10W 76/132](#), [H10W 76/134](#), [H10W 76/153](#), [H10W 76/157](#) and [H10W 76/165](#).

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

- 72/834 . {Interconnections on sidewalls of chips}
- 72/851 . {Dispositions of multiple connectors or interconnections}
- 72/853 . . {On the same surface}
- 72/856 . . . {Bump connectors and die-attach connectors (bumps embedded in underfills [H10W 74/15](#))}
- 72/859 . . . {Bump connectors and bond wires}
- 72/862 . . . {Bump connectors and strap connectors}
- 72/865 . . . {Die-attach connectors and bond wires}
- 72/868 . . . {Die-attach connectors and strap connectors}
- 72/871 . . . {Bond wires and strap connectors}
- 72/874 . . {On different surfaces}
- 72/877 . . . {Bump connectors and die-attach connectors}
- 72/879 . . . {Bump connectors and bond wires}
- 72/881 . . . {Bump connectors and strap connectors}
- 72/884 . . . {Die-attach connectors and bond wires}
- 72/886 . . . {Die-attach connectors and strap connectors}
- 72/889 . . . {Bond wires and strap connectors}
- 72/90 . Bond pads, in general

WARNING

Group [H10W 72/90](#) is impacted by reclassification into groups [H10W 72/921](#), [H10W 72/922](#), [H10W 72/9223](#), [H10W 72/9226](#), [H10W 72/923](#), [H10W 72/9232](#), [H10W 72/924](#), [H10W 72/925](#), [H10W 72/926](#), [H10W 72/927](#), [H10W 72/931](#), [H10W 72/932](#), [H10W 72/934](#), [H10W 72/936](#), [H10W 72/941](#), [H10W 72/9413](#), [H10W 72/9415](#), [H10W 72/942](#), [H10W 72/944](#), [H10W 72/9445](#), [H10W 72/951](#), [H10W 72/952](#), [H10W 72/953](#), [H10W 72/957](#), [H10W 72/9524](#), [H10W 72/9528](#), [H10W 72/961](#), [H10W 72/963](#), [H10W 72/965](#), [H10W 72/967](#), [H10W 72/981](#), [H10W 72/983](#), [H10W 72/985](#) and [H10W 72/987](#).

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

- 72/921 . . {Structures or relative sizes of bond pads}

WARNING

Groups [H10W 72/921](#), [H10W 72/922](#), [H10W 72/9223](#), [H10W 72/9226](#), [H10W 72/923](#), [H10W 72/9232](#), [H10W 72/924](#), [H10W 72/925](#), [H10W 72/926](#) and [H10W 72/927](#) are incomplete pending reclassification of documents from group [H10W 72/90](#).

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

- 72/922 . . . {Bond pads being integral with underlying chip-level interconnections}
- 72/9223 {with redistribution layers [RDL]}
- 72/9226 {with via interconnections}
- 72/923 . . . {Bond pads having multiple stacked layers}
- 72/9232 {with additional elements interposed between layers}
- 72/924 . . . {Bond pads having multiple side-by-side cores}
- 72/925 . . . {Bond pads having a filler embedded in a matrix}
- 72/926 . . . {Multiple bond pads having different sizes}
- 72/927 . . . {Multiple bond pads having different structures}
- 72/931 . . {Shapes of bond pads}

WARNING

Groups [H10W 72/931](#), [H10W 72/932](#), [H10W 72/934](#) and [H10W 72/936](#) are incomplete pending reclassification of documents from group [H10W 72/90](#).

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

- 72/932 . . . {Plan-view shape, i.e. in top view}
- 72/934 . . . {Cross-sectional shape, i.e. in side view}
- 72/936 . . . {Multiple bond pads having different shapes}
- 72/941 . . {Dispositions of bond pads}

WARNING

Groups [H10W 72/941](#), [H10W 72/9413](#), [H10W 72/9415](#), [H10W 72/942](#), [H10W 72/944](#) and [H10W 72/9445](#) are incomplete pending reclassification of documents from group [H10W 72/90](#).

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

- 72/9413 . . . {on encapsulations}
- 72/9415 . . . {relative to the surface, e.g. recessed, protruding}
- 72/942 . . . {relative to underlying supporting features, e.g. bond pads, RDLs or vias}
- 72/944 . . . {Dispositions of multiple bond pads}
- 72/9445 {Top-view layouts, e.g. mirror arrays}
- 72/951 . . {Materials of bond pads}

WARNING

Groups [H10W 72/951](#), [H10W 72/952](#), [H10W 72/9524](#), [H10W 72/9528](#), [H10W 72/953](#) and [H10W 72/957](#) are incomplete pending reclassification of documents from group [H10W 72/90](#).

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

- 72/952 . . . {comprising metals or metalloids, e.g. PbSn, Ag or Cu}
- 72/9524 {Eutectic alloys}
- 72/9528 {Intermetallic compounds}
- 72/953 . . . {not comprising solid metals or solid metalloids, e.g. polymers, ceramics or liquids}

- 72/957 . . . {Multiple bond pads having different materials}
- 72/961 . . {Functions of bonds pads}

WARNING

Groups [H10W 72/961](#), [H10W 72/963](#), [H10W 72/965](#) and [H10W 72/967](#) are incomplete pending reclassification of documents from group [H10W 72/90](#).

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

- 72/963 . . . {Providing mechanical bonding or support, e.g. dummy bond pads}
- 72/965 . . . {Providing thermal transfer}
- 72/967 . . . {Multiple bond pads having different functions}
- 72/981 . . {Auxiliary members, e.g. spacers}

WARNING

Groups [H10W 72/981](#), [H10W 72/983](#), [H10W 72/985](#) and [H10W 72/987](#) are incomplete pending reclassification of documents from group [H10W 72/90](#).

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

- 72/983 . . . {Reinforcing structures, e.g. collars}
- 72/985 . . . {Alignment aids, e.g. alignment marks}
- 72/987 . . . {Flow barriers}

74/00**Encapsulations, e.g. protective coatings**

- 74/01 . . Manufacture or treatment

WARNING

Group [H10W 74/01](#) is incomplete pending reclassification of documents from group [H10W 99/00](#).

Groups [H10W 99/00](#) and [H10W 74/01](#) should be considered in order to perform a complete search.

- 74/012 . . {of encapsulations on active surfaces of flip-chip devices, e.g. forming underfills}
- 74/014 . . {using batch processing}
- 74/016 . . {using moulds}
- 74/017 . . . {Auxiliary layers for moulds, e.g. release layers or layers preventing residue}
- 74/019 . . {using temporary auxiliary substrates ([H10W 74/017](#) takes precedence)}
- 74/10 . . characterised by their shape or disposition

WARNING

Group [H10W 74/10](#) is impacted by reclassification into group [H10W 74/15](#).

Groups [H10W 74/10](#) and [H10W 74/15](#) should be considered in order to perform a complete search.

- 74/111 . . {the semiconductor body being completely enclosed}
- 74/114 . . . {by a substrate and the encapsulations}
- 74/117 {the substrate having spherical bumps for external connection}

- 74/121 . . . {by multiple encapsulations, e.g. by a thin protective coating and a thick encapsulation}
- 74/124 . . . {the encapsulations having cavities other than that occupied by chips}
- 74/127 . . . {characterised by arrangements for sealing or adhesion}
- 74/129 . . . {forming a chip-scale package [CSP]}
- 74/131 . . {the semiconductor body being only partially enclosed}
- 74/134 . . . {the encapsulations being in grooves in the semiconductor body}
- 74/137 . . . {the encapsulations being directly on the semiconductor body ([H10W 74/134 takes precedence](#))}
- 74/141 . . . {the encapsulations being on at least the sidewalls of the semiconductor body}
- 74/142 . . . {the encapsulations exposing the passive side of the semiconductor body}
- 74/144 . . . {the encapsulations comprising foils}
- 74/147 . . . {the encapsulations being multilayered}
- 74/15 . . on active surfaces of flip-chip devices, e.g. underfills

WARNING

Group [H10W 74/15](#) is incomplete pending reclassification of documents from group [H10W 74/10](#).

Groups [H10W 74/10](#) and [H10W 74/15](#) should be considered in order to perform a complete search.

- 74/40 . . characterised by their materials
- 74/43 . . comprising oxides, nitrides or carbides, e.g. ceramics or glasses
- 74/47 . . comprising organic materials, e.g. plastics or resins
- 74/473 . . . {containing a filler}
- 74/476 . . . {Organic materials comprising silicon}
- 74/481 . . {comprising semiconductor materials}

76/00 Containers; Fillings or auxiliary members therefor; Seals

- 76/01 . . Manufacture or treatment

WARNING

Group [H10W 76/01](#) is incomplete pending reclassification of documents from group [H10W 99/00](#).

Groups [H10W 99/00](#) and [H10W 76/01](#) should be considered in order to perform a complete search.

- 76/05 . . Providing fillings in containers, e.g. gas filling
- 76/10 . . Containers or parts thereof
- 76/12 . . characterised by their shape
- 76/13 . . . Containers comprising a conductive base serving as an interconnection

- 76/132 having other interconnections through an insulated passage in the conductive base

WARNING

Groups [H10W 76/132](#) - [H10W 76/165](#) are incomplete pending reclassification of documents from group [H10W 72/823](#).

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

- 76/134 having other interconnections parallel to the conductive base
- 76/136 having other interconnections perpendicular to the conductive base
- 76/138 having another interconnection being formed by a cover plate parallel to the conductive base, e.g. sandwich type
- 76/15 . . . Containers comprising an insulating or insulated base
- 76/153 having interconnections in passages through the insulating or insulated base
- 76/157 having interconnections parallel to the insulating or insulated base
- 76/161 . . . {Containers comprising no base}
- 76/165 . . . {characterised by interconnections through the top surface of the containers, e.g. in a metal cap}
- 76/167 . . . {the container walls comprising an aperture, e.g. for pressure control}
- 76/17 . . characterised by their materials
- 76/18 . . . Insulating materials, e.g. resins, glasses or ceramics
- 76/40 . . Fillings or auxiliary members in containers, e.g. centering rings ([fillings or auxiliary members for thermal protection or control in containers or encapsulations H10W 40/70](#))
- 76/42 . . Fillings

NOTE

In this group, the phase of the fillings is determined at the operating temperature of the device.

- 76/43 . . . Gaseous fillings
- 76/45 . . . Liquid fillings
- 76/47 . . . Solid or gel fillings
- 76/48 . . . Fillings including materials for absorbing or reacting with moisture or other undesired substances
- 76/60 . . Seals

WARNING

Group [H10W 76/60](#) is impacted by reclassification into groups [H10W 76/63](#) and [H10W 76/67](#).

Groups [H10W 76/60](#), [H10W 76/63](#) and [H10W 76/67](#) should be considered in order to perform a complete search.

- 76/63 . . characterised by their shape or disposition, e.g. between cap and walls of a container

WARNING

Groups [H10W 76/63](#) - [H10W 76/67](#) are incomplete pending reclassification of documents from group [H10W 76/60](#).

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

- 76/67 . . characterised by their materials

78/00 Detachable holders for supporting packaged chips in operation**80/00 Direct bonding of chips, wafers or substrates****NOTE**

This group covers direct bonding of:

- chips, e.g. chip-to-chip;
- wafers having devices and interconnections therein or thereon, e.g. wafer-to-wafer;
- substrates having devices and interconnections therein or thereon;
- combinations thereof, e.g. chip-to-wafer.

- 80/011 . {Manufacture or treatment of pads or other interconnections to be direct bonded}
- 80/016 . . {Cleaning}
- 80/023 . . {Applying a coating on the bonding area}
- 80/031 . . {Changing or setting shapes of the pads}
- 80/033 . . . {by chemical means, e.g. etching}
- 80/035 . . . {by heating, e.g. melting or causing diffusion}
- 80/037 . . . {by mechanical treatment, e.g. by cutting, pressing or stamping}
- 80/041 . . {Thermally treating}
- 80/102 . {Controlling the environment during the bonding, e.g. the temperature or pressure}
- 80/161 . {Aligning}
- 80/163 . . {using active alignment, e.g. detecting marks and correcting position}
- 80/165 . . {using passive alignment, e.g. using self-alignment}
- 80/168 . . {using guiding structures}
- 80/211 . {using auxiliary members, e.g. aids for protecting the bonding area}
- 80/301 . {Bonding techniques, e.g. hybrid bonding}
- 80/312 . . {characterised by the direct bonding of electrically conductive pads}
- 80/314 . . {characterized by direct bonding of pads or other interconnections}
- 80/327 . . {characterised by the direct bonding of insulating parts, e.g. of silicon oxide layers}
- 80/331 . . {characterised by the application of energy for connecting}
- 80/333 . . . {Compression bonding}
- 80/334 {Thermocompression bonding}
- 80/335 {Ultrasonic bonding}
- 80/337 . . . {causing reflow}
- 80/338 . . . {using EM radiation or electron beams, e.g. using lasers}
- 80/339 . . . {using integrated means for heating, e.g. embedded heater}
- 80/341 . . {Anodic bonding}
- 80/701 . {characterised by the pads after the direct bonding}

- 80/721 . . {having structure or size changed during the connecting}
- 80/732 . . {having shape changed during the connecting}
- 80/743 . . {having disposition changed during the connecting}
- 80/754 . . {having material changed during the connecting}

90/00 Package configurations**NOTE**

This group covers:

- the relative positions of multiple chips within a single package, e.g. adjacent chips in a single encapsulation;
- the relative positions of multiple chips within multiple packages, e.g. one encapsulated chip on another encapsulated chip in a "package-on-package" configuration.

WARNING

Group [H10W 90/00](#) is impacted by reclassification into groups [H10B 80/00](#), [H10D 80/00](#), [H10D 80/20](#), [H10D 80/211](#), [H10D 80/213](#), [H10D 80/215](#), [H10D 80/231](#), [H10D 80/251](#), [H10D 80/30](#), [H10F 39/90](#), [H10F 39/95](#), [H10H 29/20](#), [H10H 29/24](#), [H10H 29/30](#), [H10H 29/32](#), [H10H 29/34](#), [H10H 29/345](#), [H10H 29/352](#), [H10H 29/362](#), [H10H 29/37](#), [H10H 29/39](#), [H10H 29/41](#), [H10H 29/45](#), [H10H 29/49](#), [H10K 19/901](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10K 65/00](#), [H10N 19/00](#), [H10N 19/101](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#), [H10N 89/00](#), [H10N 89/02](#), [H10W 90/10](#), [H10W 90/15](#), [H10W 90/155](#), [H10W 90/20](#), [H10W 90/22](#), [H10W 90/231](#), [H10W 90/24](#), [H10W 90/26](#), [H10W 90/271](#), [H10W 90/275](#), [H10W 90/28](#), [H10W 90/284](#), [H10W 90/288](#), [H10W 90/291](#), [H10W 90/293](#), [H10W 90/295](#), [H10W 90/701](#), [H10W 90/721](#), [H10W 90/722](#), [H10W 90/723](#), [H10W 90/724](#), [H10W 90/725](#), [H10W 90/726](#), [H10W 90/727](#), [H10W 90/728](#), [H10W 90/729](#), [H10W 90/731](#), [H10W 90/732](#), [H10W 90/733](#), [H10W 90/734](#), [H10W 90/735](#), [H10W 90/736](#), [H10W 90/737](#), [H10W 90/738](#), [H10W 90/739](#), [H10W 90/751](#), [H10W 90/752](#), [H10W 90/753](#), [H10W 90/754](#), [H10W 90/755](#), [H10W 90/756](#), [H10W 90/757](#), [H10W 90/758](#), [H10W 90/759](#), [H10W 90/761](#), [H10W 90/762](#), [H10W 90/763](#), [H10W 90/764](#), [H10W 90/765](#), [H10W 90/766](#), [H10W 90/767](#), [H10W 90/768](#), [H10W 90/769](#), [H10W 90/791](#), [H10W 90/792](#), [H10W 90/794](#), [H10W 90/796](#), [H10W 90/798](#) and [H10W 90/811](#).

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

- 90/10 . Configurations of laterally-adjacent chips

WARNING

Groups [H10W 90/10](#), [H10W 90/15](#) and [H10W 90/155](#) are incomplete pending reclassification of documents from group [H10W 90/00](#).

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

- 90/15 . . the laterally-adjacent chips having different thicknesses than each other
- 90/155 . . {the laterally-adjacent chips comprising dummy chips}
- 90/20 . Configurations of stacked chips

WARNING

Groups [H10W 90/20](#), [H10W 90/22](#), [H10W 90/231](#), [H10W 90/24](#), [H10W 90/26](#), [H10W 90/271](#), [H10W 90/275](#), [H10W 90/28](#), [H10W 90/284](#), [H10W 90/288](#), [H10W 90/291](#), [H10W 90/293](#) and [H10W 90/295](#) are incomplete pending reclassification of documents from group [H10W 90/00](#).

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

- 90/22 . . the stacked chips being on both top and bottom sides of a package substrate, interposer or RDL
- 90/231 . . {the stacked chips being on both top and bottom sides of an auxiliary carrier having no electrical connection structure}
- 90/24 . . at least one of the stacked chips being laterally offset from a neighbouring stacked chip, e.g. chip stacks having a staircase shape
- 90/26 . . the stacked chips being of the same size without any chips being laterally offset, e.g. chip stacks having a rectangular shape
- 90/271 . . {the chips having passive surfaces facing each other, i.e. in a back-to-back arrangement}
- 90/275 . . {the stacked chips comprising dummy chips}
- 90/28 . . the stacked chips having different sizes, e.g. chip stacks having a pyramidal shape
- 90/284 . . {characterised by structural arrangements for measuring or testing}
- 90/288 . . {characterised by arrangements for thermal management of the stacked chips}
- 90/291 . . {characterised by containers, encapsulations, or other housings for the stacked chips}
- 90/293 . . {characterised by non-galvanic coupling between the chips, e.g. capacitive coupling}
- 90/295 . . . {optical coupling}
- 90/297 . . {characterised by the through-semiconductor vias [TSVs] in the stacked chips}
- 90/401 . {characterised by multiple insulating or insulated package substrates, interposers or RDLs}

- 90/701 . {characterised by the relative positions of pads or connectors relative to package parts}

WARNING

Group [H10W 90/701](#) is incomplete pending reclassification of documents from group [H10W 90/00](#). Group [H10W 90/701](#) is also impacted by reclassification into groups [H10W 90/724](#), [H10W 90/725](#), [H10W 90/7295](#), [H10W 90/754](#), [H10W 90/755](#), [H10W 90/764](#) and [H10W 90/765](#).

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

- 90/721 . . {of bump connectors}

WARNING

Groups [H10W 90/721](#), [H10W 90/722](#), [H10W 90/723](#), [H10W 90/727](#), [H10W 90/728](#) and [H10W 90/729](#) are incomplete pending reclassification of documents from group [H10W 90/00](#).

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

- 90/722 . . . {between stacked chips}
- 90/723 . . . {between laterally-adjacent chips}
- 90/724 . . . {between a chip and a stacked insulating package substrate, interposer or RDL}

WARNING

Group [H10W 90/724](#) is incomplete pending reclassification of documents from groups [H10W 90/00](#) and [H10W 90/701](#). Group [H10W 90/724](#) is also impacted by reclassification into group [H10W 90/726](#).

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

- 90/725 . . . {between a chip and a laterally-adjacent insulating package substrate, interposer or RDL}

WARNING

Group [H10W 90/725](#) is incomplete pending reclassification of documents from groups [H10W 90/00](#) and [H10W 90/701](#).

Groups [H10W 90/00](#), [H10W 90/701](#) and [H10W 90/725](#) should be considered in order to perform a complete search.

- 90/726 . . . {between a chip and a stacked lead frame, conducting package substrate or heat sink}

WARNING

Group [H10W 90/726](#) is incomplete pending reclassification of documents from groups [H10W 90/00](#) and [H10W 90/724](#).

Groups [H10W 90/00](#), [H10W 90/724](#) and [H10W 90/726](#) should be considered in order to perform a complete search.

- 90/727 . . . {between a chip and a laterally-adjacent lead frame, conducting package substrate or heat sink}
- 90/728 . . . {between a chip and a stacked discrete passive device, e.g. resistors, capacitors or inductors}
- 90/729 . . . {between a chip and a laterally-adjacent discrete passive device}
- 90/7295 . . . {on the rear surface of insulating package substrates, interposers or RDLs, for connection outside of the package, e.g. ball grid array [BGA] bumps}

WARNING

Group [H10W 90/7295](#) is incomplete pending reclassification of documents from group [H10W 90/701](#).

Groups [H10W 90/701](#) and [H10W 90/7295](#) should be considered in order to perform a complete search.

- 90/731 . . {of die-attach connectors}

WARNING

Groups [H10W 90/731](#), [H10W 90/732](#), [H10W 90/733](#), [H10W 90/734](#), [H10W 90/735](#), [H10W 90/736](#), [H10W 90/737](#), [H10W 90/738](#) and [H10W 90/739](#) are incomplete pending reclassification of documents from group [H10W 90/00](#).

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

- 90/732 . . . {between stacked chips}
- 90/733 . . . {between laterally-adjacent chips}
- 90/734 . . . {between a chip and a stacked insulating package substrate, interposer or RDL}
- 90/735 . . . {between a chip and a laterally-adjacent insulating package substrate, interposer or RDL}
- 90/736 . . . {between a chip and a stacked lead frame, conducting package substrate or heat sink}
- 90/737 . . . {between a chip and a laterally-adjacent lead frame, conducting package substrate or heat sink}
- 90/738 . . . {between a chip and a stacked discrete passive device}
- 90/739 . . . {between a chip and a laterally-adjacent discrete passive devices}
- 90/751 . . {of bond wires}

WARNING

Groups [H10W 90/751](#), [H10W 90/752](#), [H10W 90/753](#), [H10W 90/757](#), [H10W 90/758](#) and [H10W 90/759](#) are incomplete pending reclassification of documents from group [H10W 90/00](#).

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

- 90/752 . . . {between stacked chips}
- 90/753 . . . {between laterally-adjacent chips}

- 90/754 . . . {between a chip and a stacked insulating package substrate, interposer or RDL}

WARNING

Group [H10W 90/754](#) is incomplete pending reclassification of documents from groups [H10W 90/00](#) and [H10W 90/701](#).

Group [H10W 90/754](#) is also impacted by reclassification into group [H10W 90/756](#).

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

- 90/755 . . . {between a chip and a laterally-adjacent insulating package substrate, interpose or RDL}

WARNING

Group [H10W 90/755](#) is incomplete pending reclassification of documents from groups [H10W 90/00](#) and [H10W 90/701](#).

Groups [H10W 90/00](#), [H10W 90/701](#) and [H10W 90/755](#) should be considered in order to perform a complete search.

- 90/756 . . . {between a chip and a stacked lead frame, conducting package substrate or heat sink}

WARNING

Group [H10W 90/756](#) is incomplete pending reclassification of documents from groups [H10W 90/00](#) and [H10W 90/754](#).

Groups [H10W 90/00](#), [H10W 90/754](#) and [H10W 90/756](#) should be considered in order to perform a complete search.

- 90/757 . . . {between a chip and a laterally-adjacent lead frame, conducting package substrate or heat sink}
- 90/758 . . . {between a chip and a stacked discrete passive device}
- 90/759 . . . {between a chip and a laterally-adjacent discrete passive device}
- 90/761 . . {of strap connectors}

WARNING

Groups [H10W 90/761](#), [H10W 90/762](#), [H10W 90/763](#), [H10W 90/766](#), [H10W 90/767](#), [H10W 90/768](#) and [H10W 90/769](#) are incomplete pending reclassification of documents from group [H10W 90/00](#).

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

- 90/762 . . . {between stacked chips}
- 90/763 . . . {between laterally-adjacent chips}

- 90/764 . . . {between a chip and a stacked insulating package substrate, interposer or RDL}
- WARNING**
- Group [H10W 90/764](#) is incomplete pending reclassification of documents from groups [H10W 90/00](#) and [H10W 90/701](#).
- Groups [H10W 90/00](#), [H10W 90/701](#) and [H10W 90/764](#) should be considered in order to perform a complete search.
- 90/765 . . . {between a chip and a laterally-adjacent insulating package substrate, interposer or RDL}
- WARNING**
- Group [H10W 90/765](#) is incomplete pending reclassification of documents from groups [H10W 90/00](#) and [H10W 90/701](#).
- Groups [H10W 90/00](#), [H10W 90/701](#) and [H10W 90/765](#) should be considered in order to perform a complete search.
- 90/766 . . . {between a chip and a stacked lead frame, conducting package substrate or heat sink}
- 90/767 . . . {between a chip and a laterally-adjacent lead frame, conducting package substrate or heat sink}
- 90/768 . . . {between a chip and a stacked discrete passive device}
- 90/769 . . . {between a chip and a laterally-adjacent discrete passive device}
- 90/791 . . {of direct-bonded pads}
- WARNING**
- Groups [H10W 90/791](#), [H10W 90/792](#), [H10W 90/794](#), [H10W 90/796](#) and [H10W 90/798](#) are incomplete pending reclassification of documents from group [H10W 90/00](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 90/792 . . . {between multiple chips}
- 90/794 . . . {between a chip and a stacked insulating package substrate, interposer or RDL}
- 90/796 . . . {between a chip and a stacked lead frame, conducting package substrate or heat sink}
- 90/798 . . . {between a chip and a stacked discrete passive device}
- 90/811 . {Multiple chips on leadframes}
- WARNING**
- Group [H10W 90/811](#) is incomplete pending reclassification of documents from group [H10W 90/00](#).
- Groups [H10W 90/00](#) and [H10W 90/811](#) should be considered in order to perform a complete search.

95/00 Packaging processes not covered by the other groups of this subclass

WARNING

Group [H10W 95/00](#) is incomplete pending reclassification of documents from groups [H10W 72/07232](#), [H10W 72/07233](#), [H10W 72/07236](#) and [H10W 99/00](#).

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

99/00 Subject matter not provided for in other groups of this subclass

WARNING

Group [H10W 99/00](#) is incomplete pending reclassification of documents from group [H10W 42/00](#). Group [H10W 99/00](#) is also impacted by reclassification into groups [H10W 40/00](#), [H10W 40/01](#), [H10W 42/00](#), [H10W 70/00](#), [H10W 70/01](#), [H10W 70/02](#), [H10W 70/04](#), [H10W 70/05](#), [H10W 70/06](#), [H10W 70/08](#), [H10W 70/09](#), [H10W 74/01](#), [H10W 76/01](#) and [H10W 95/00](#).

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