CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS

(NOTES omitted)

INSTRUMENTS

G11 INFORMATION STORAGE

G11C STATIC STORES (semiconductor memory devices H10B)

NOTES

1. This subclass covers devices or arrangements for storage of digital or analogue information:
   - in which no relative movement takes place between an information storage element and a transducer;
   - which incorporate a selecting-device for writing-in or reading-out the information into or from the store.
2. This subclass does not cover elements not adapted for storage and not provided with such means as referred to in Note (3) below, which elements are classified in the appropriate subclass, e.g. of H01, H03K.
3. In this subclass, the following terms are used with the meaning indicated:
   - "storage element" is an element which can hold at least one item of information and is provided with means for writing-in or reading-out this information;
   - "memory" is a device, including storage elements, which can hold information to be extracted when desired.

WARNINGS

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

G11C 8/02	covered by	G11C 8/00, H03K 17/00
G11C 11/4193	covered by	G11C 11/00
G11C 11/4195	covered by	G11C 11/00
G11C 11/4197	covered by	G11C 11/00

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

5/00 **Details of stores covered by group G11C 11/00**

5/005 . {Circuit means for protection against loss of information of semiconductor storage devices}

5/02 . Disposition of storage elements, e.g. in the form of a matrix array

5/025 . . {Geometric lay-out considerations of storage- and peripheral-blocks in a semiconductor storage device (geometrical lay-out of the components in integrated circuits, geometrical lay-out of the components in integrated circuits H10D 89/10)}

5/04 . . Supports for storage elements {, e.g. memory modules}; Mounting or fixing of storage elements on such supports

5/05 . . . Supporting of cores in matrix

5/06 . Arrangements for interconnecting storage elements electrically, e.g. by wiring

5/063 . . {Voltage and signal distribution in integrated semi-conductor memory access lines, e.g. word-line, bit-line, cross-over resistance, propagation delay}

5/066 . . {Means for reducing external access-lines for a semiconductor memory clip, e.g. by multiplexing at least address and data signals}

5/08 . . for interconnecting magnetic elements, e.g. toroidal cores

5/10 . . for interconnecting capacitors

5/12 . Apparatus or processes for interconnecting storage elements, e.g. for threading magnetic cores

5/14 . Power supply arrangements {, e.g. power down, chip selection or deselection, layout of wirings or power grids, or multiple supply levels}

5/141 . . {Battery and back-up supplies}

5/142 . . {Contactless power supplies, e.g. RF, induction, or IR}

5/143 . . {Detection of memory cassette insertion or removal; Continuity checks of supply or ground lines; Detection of supply variations, interruptions or levels (G11C 5/148 takes precedence); Switching between alternative supplies (G11C 5/141 takes precedence)}

5/144 . . . {Detection of predetermined disconnection or reduction of power supply, e.g. power down or power standby}

5/145 . . {Applications of charge pumps; Boosted voltage circuits; Clamp circuits therefor (G11C 5/141 takes precedence)}

5/146 . . . {Substrate bias generators (G11C 5/141 takes precedence)}

5/147 . . {Voltage reference generators, voltage or current regulators; Internally lowered supply levels; Compensation for voltage drops (G11C 5/141 takes precedence)}

5/148 . . {Details of power up or power down circuits, standby circuits or recovery circuits}

7/00 **Arrangements for writing information into, or reading information out from, a digital store** (G11C 5/00 takes precedence; auxiliary circuits for stores using semiconductor devices G11C 11/4063, G11C 11/413)

7/005 . {with combined beam-and individual cell access}
7/02 . with means for avoiding parasitic signals
7/04 . with means for avoiding disturbances due to temperature effects
7/06 . Sense amplifiers; Associated circuits {, e.g. timing or triggering circuits}
7/062 . . {Differential amplifiers of non-latching type, e.g. comparators, long-tailed pairs}
7/065 . . {Differential amplifiers of latching type}
7/067 . . {Single-ended amplifiers}
7/08 . . Control thereof
7/10 . Input/output [I/O] data interface arrangements, e.g. I/O data control circuits, I/O data buffers
7/1003 . . {Interface circuits for daisy chain or ring bus memory arrangements}
7/1006 . . {Data managing, e.g. manipulating data before writing or reading out, data bus switches or control circuits therefor}
7/1009 . . . {Data masking during input/output}
7/1012 . . . {Data reordering during input/output, e.g. crossbars, layers of multiplexers, shifting or rotating}
7/1015 . . {Read-write modes for single port memories, i.e. having either a random port or a serial port}
7/1018 . . . {Serial bit line access mode, e.g. using bit line address shift registers, bit line address counters, bit line burst counters}
7/1021 . . . . {Page serial bit line access mode, i.e. using an enabled row address stroke pulse with its associated word line address and a sequence of enabled column address stroke pulses each with its associated bit line address}
7/1024 . . . . . {Extended data output [EDO] mode, i.e. keeping output buffer enabled during an extended period of time}
7/1027 . . . . {Static column decode serial bit line access mode, i.e. using an enabled row address stroke pulse with its associated word line address and a sequence of enabled bit line addresses}
7/103 . . . {using serially addressed read-write data registers (G11C 7/1036 takes precedence)}
7/1033 . . . . {using data registers of which only one stage is addressed for sequentially outputting data from a predetermined number of stages, e.g. nibble read-write mode}
7/1036 . . . {using data shift registers}
7/1039 . . . {using pipelining techniques, i.e. using latches between functional memory parts, e.g. row/column decoders, I/O buffers, sense amplifiers}
7/1042 . . . {using interleaving techniques, i.e. read-write of one part of the memory while preparing another part}
7/1045 . . . {Read-write mode select circuits}
7/1048 . . {Data bus control circuits, e.g. precharging, presetting, equalising}
7/1051 . . {Data output circuits, e.g. read-out amplifiers, data output buffers, data output registers, data output level conversion circuits}
7/1054 . . . {Optical output buffers}
7/1057 . . . {Data output buffers, e.g. comprising level conversion circuits, circuits for adapting load}
7/106 . . . {Data output latches}
7/1063 . . . {Control signal output circuits, e.g. status or busy flags, feedback command signals}
7/1066 . . . {Output synchronization}
7/1069 . . . {I/O lines read out arrangements}
7/1072 . . {for memories with random access ports synchronised on clock signal pulse trains, e.g. synchronous memories, self timed memories}
7/1075 . . {for multiport memories each having random access ports and serial ports, e.g. video RAM}
7/1078 . . {Data input circuits, e.g. write amplifiers, data input buffers, data input registers, data input level conversion circuits}
7/1081 . . . {Optical input buffers}
7/1084 . . . {Data input buffers, e.g. comprising level conversion circuits, circuits for adapting load}
7/1087 . . . {Data input latches}
7/109 . . . {Control signal input circuits}
7/1093 . . . {Input synchronization}
7/1096 . . . {Write circuits, e.g. I/O line write drivers}
7/12 . Bit line control circuits, e.g. drivers, boosters, pull-up circuits, pull-down circuits, precharging circuits, equalising circuits, for bit lines
7/14 . Dummy cell management; Sense reference voltage generators
7/16 . Storage of analogue signals in digital stores using an arrangement comprising analogue/digital [A/D] converters, digital memories and digital/analogue [D/A] converters
7/18 . Bit line organisation; Bit line lay-out
7/20 . Memory cell initialisation circuits, e.g. when powering up or down, memory clear, latent image memory
7/22 . Read-write [R-W] timing or clocking circuits; Read-write [R-W] control signal generators or management
7/222 . . {Clock generating, synchronizing or distributing circuits within memory device}
7/225 . . {Clock input buffers}
7/227 . . {Timing of memory operations based on dummy memory elements or replica circuits}
7/24 . Memory cell safety or protection circuits, e.g. arrangements for preventing inadvertent reading or writing; Status cells; Test cells

8/00 **Arrangements for selecting an address in a digital store** (for stores using transistors G11C 11/407, G11C 11/413)

8/005 . {with travelling wave access}
8/04 . using a sequential addressing device, e.g. shift register, counter
8/06 . Address interface arrangements, e.g. address buffers
8/08 . Word line control circuits, e.g. drivers, boosters, pull-up circuits, pull-down circuits, precharging circuits, for word lines
8/10 . Decoders
8/12 . Group selection circuits, e.g. for memory block selection, chip selection, array selection
8/14 . Word line organisation; Word line lay-out

8/16 . Multiple access memory array, e.g. addressing one storage element via at least two independent addressing line groups

8/18 . Address timing or clocking circuits; Address control signal generation or management, e.g. for row address strobe [RAS] or column address strobe [CAS] signals

8/20 . Address safety or protection circuits, i.e. arrangements for preventing unauthorized or accidental access

11/00 Digital stores characterised by the use of particular electric or magnetic storage elements; Storage elements therefor (G11C 14/00 - G11C 21/00 take precedence)

NOTE

Group G11C 11/56 takes precedence over groups G11C 11/02 - G11C 11/54.

{This Note corresponds to IPC Note (1) relating to G11C 11/02 - G11C 11/56.}

11/005 . {comprising combined but independently operative RAM-ROM, RAM-PROM, RAM-EPROM cells}

11/02 . using magnetic elements

11/04 . . using storage elements having cylindrical form, e.g. rod, wire (G11C 11/12, G11C 11/14 take precedence)

11/06 . . using single-aperture storage elements, e.g. ring core; using multi-aperture plates in which each individual aperture forms a storage element

11/06007 . . . {using a single aperture or single magnetic closed circuit}

NOTE

{Provisionally contains the following details; control write -, read -, address circuitry (pulse generators in general H03K 5/00, H03K 17/00); arrangements for temperature compensation; checking of the correct functioning and repair arrangements (checking methods in general G06F 11/00, G06F 11/28; testing magnetic elements per seG01R 33/00); magnetic properties, choice of materials or the like (materials per seH01F 1/00) }

11/06014 . . . . {using one such element per bit}

11/06021 . . . . . {with destructive read-out}

11/06028 . . . . . {Matrixes}

11/06035 . . . . . {Bit core selection for writing or reading, by at least two coincident partial currents, e.g. "bit"- organised, 2L/2D, or 3D}

11/06042 . . . . . {"word"-organised, e.g. 2D organisation or linear selection, i.e. full current selection through all the bit-cores of a word during reading}

11/0605 . . . . . {with non-destructive read-out}

11/06057 . . . . . {Matrixes}

11/06064 . . . . . {"bit"-organised (2 1/2D, 3D or similar organisation)}

11/06071 . . . . . {"word"-organised (2D organisation or linear selection)}

11/06078 . . . . {using two or more such elements per bit}

11/06085 . . . {Multi-aperture structures or multi-magnetic closed circuits, each aperture storing a "bit", realised by rods, plates, grids, waffle-irons,(i.e. grooved plates) or similar devices}

11/06092 . . . {Multi-aperture structures or multi-magnetic closed circuits using two or more apertures per bit}

11/061 . . . using elements with single aperture or magnetic loop for storage, one element per bit, and for destructive read-out {(contains no documents, see G11C 11/06007, G11C 11/06014, G11C 11/06021, G11C 11/06028)}

11/063 . . . . bit organised, such as 2 1/2D, 3D organisation, i.e. for selection of an element by means of at least two coincident partial currents both for reading and for writing {(contains no documents; see G11C 11/06035)}

11/065 . . . . word organised, such as 2D organisation, or linear selection, i.e. for selection of all the elements of a word by means of a single full current for reading {(contains no documents; see G11C 11/06042)}

11/067 . . . using elements with single aperture or magnetic loop for storage, one element per bit, and for non-destructive read-out {(contains no documents, see G11C 11/0605 - G11C 11/06071)}

11/08 . . using multi-aperture storage elements, e.g. using transfluxors; using plates incorporating several individual multi-aperture storage elements (G11C 11/10 takes precedence)

11/10 . . using multi-axial storage elements

11/12 . . using tensors; using twistors, i.e. elements in which one axis of magnetisation is twisted

11/14 . . using thin-film elements

11/15 . . . using multiple magnetic layers (G11C 11/155 takes precedence)

11/155 . . . with cylindrical configuration

11/16 . . using elements in which the storage effect is based on magnetic spin effect

11/161 . . . {details concerning the memory cell structure, e.g. the layers of the ferromagnetic memory cell}

11/165 . . . {Auxiliary circuits}

11/1653 . . . . {Address circuits or decoders}

11/1655 . . . . . {Bit-line or column circuits}

11/1657 . . . . . {Word-line or row circuits}

11/1659 . . . . {Cell access}

11/1673 . . . . {Reading or sensing circuits or methods}

11/1675 . . . . {Writing or programming circuits or methods}

11/1677 . . . . {Verifying circuits or methods}

11/1693 . . . . {Timing circuits or methods}

11/1695 . . . . {Protection circuits or methods}

11/1697 . . . . {Power supply circuits}

11/18 . using Hall-effect devices

11/19 . using non-linear reactive devices in resonant circuits

11/20 . . using parametrons

11/21 . using electric elements

11/22 . . using ferroelectric elements

11/221 . . . {using ferroelectric capacitors}

11/223 . . . {using MOS with ferroelectric gate insulating film}

11/225 . . . {Auxiliary circuits}
11/2253 . . . . {Address circuits or decoders}
11/2255 . . . . . {Bit-line or column circuits}
11/2257 . . . . . {Word-line or row circuits}
11/2259 . . . . {Cell access}
11/2273 . . . . {Reading or sensing circuits or methods}
11/2275 . . . . {Writing or programming circuits or methods}
11/2277 . . . . {Verifying circuits or methods}
11/2293 . . . . {Timing circuits or methods}
11/2295 . . . . {Protection circuits or methods}
11/2297 . . . . {Power supply circuits}
11/23 . . using electrostatic storage on a common layer, e.g. Forrester-Haeff tubes {or William tubes}(G11C 11/22 takes precedence)
11/24 . . using capacitors (G11C 11/22 takes precedence; using a combination of semiconductor devices and capacitors G11C 11/34, e.g. G11C 11/40)
11/26 . . using discharge tubes
11/265 . . . {counting tubes, e.g. decatrons or trochotrons}
11/28 . . . using gas-filled tubes
11/30 . . . using vacuum tubes (G11C 11/23 takes precedence)
11/34 . . using semiconductor devices
11/35 . . . with charge storage in a depletion layer, e.g. charge coupled devices
11/36 . . . using diodes, e.g. as threshold elements {, i.e. diodes assuming a stable ON-stage when driven above their threshold (S- or N-characteristic)}
11/38 . . . . using tunnel diodes
11/39 . . . using thyristors {or the avalanche or negative resistance type, e.g. PNPN, SCR, SCS, UJT}
11/40 . . . using transistors
11/401 . . . . forming cells needing refreshing or charge regeneration, i.e. dynamic cells
11/402 . . . . . with charge regeneration individual to each memory cell, i.e. internal refresh
11/4023 . . . . . {using field effect transistors}
11/4026 . . . . . {using bipolar transistors}
11/403 . . . . . with charge regeneration common to a multiplicity of memory cells, i.e. external refresh
11/404 . . . . . with one charge-transfer gate, e.g. MOS transistor, per cell
11/4045 . . . . . {using a plurality of serially connected access transistors, each having a storage capacitor}
11/405 . . . . . with three charge-transfer gates, e.g. MOS transistors, per cell
11/406 . . . . . Management or control of the refreshing or charge-regeneration cycles
11/40603 . . . . . {Arbitration, priority and concurrent access to memory cells for read/write or refresh operations}
11/40607 . . . . . {Refresh operations in memory devices with an internal cache or data buffer}
11/40611 . . . . . {External triggering or timing of internal or partially internal refresh operations, e.g. auto-refresh or CAS-before-RAS triggered refresh}
11/40615 . . . . . {Internal triggering or timing of refresh, e.g. hidden refresh, self refresh, pseudo-SRAMs}
11/40618 . . . . . {Refresh operations over multiple banks or interleaving}
11/40622 . . . . . {Partial refresh of memory arrays}
11/40626 . . . . . {Temperature related aspects of refresh operations}
11/4063 . . . . . Auxiliary circuits, e.g. for addressing, decoding, driving, writing, sensing or timing
11/4067 . . . . . for memory cells of the bipolar type
11/407 . . . . . for memory cells of the field-effect type
11/4072 . . . . . Circuits for initialization, powering up or down, clearing memory or presetting
11/4074 . . . . . Power supply or voltage generation circuits, e.g. bias voltage generators, substrate voltage generators, back-up power, power control circuits
11/4076 . . . . . Timing circuits (for regeneration management G11C 11/406)
11/4078 . . . . . Safety or protection circuits, e.g. for preventing inadvertent or unauthorised reading or writing; Status cells; Test cells (protection of memory contents during checking or testing G11C 29/52)
11/408 . . . . . Address circuits
11/4082 . . . . . {Address Buffers; level conversion circuits}
11/4085 . . . . . {Word line control circuits, e.g. word line drivers, - boosters, - pull-up, - pull-down, - precharge}
11/4087 . . . . . {Address decoders, e.g. bit - or word line decoders; Multiple line decoders}
11/409 . . . . . Read-write [R-W] circuits
11/4091 . . . . . Sense or sense/refresh amplifiers, or associated sense circuitry, e.g. for coupled bit-line precharging, equalising or isolating
11/4093 . . . . . Input/output [I/O] data interface arrangements, e.g. data buffers
11/4094 . . . . . Bit-line management or control circuits
11/4096 . . . . . Input/output [I/O] data management or control circuits, e.g. reading or writing circuits, I/O drivers or bit-line switches
11/4097 . . . . . Bit-line organisation, e.g. bit-line layout, folded bit lines
11/4099 . . . . . Dummy cell treatment; Reference voltage generators
11/41 . . . . forming {static} cells with positive feedback, i.e. cells not needing refreshing or charge regeneration, e.g. bistable multivibrator or Schmitt trigger
11/411 . . . . . using bipolar transistors only
11/4113 . . . . . {with at least one cell access to base or collector of at least one of said transistors, e.g. via access diodes, access transistors}
11/4116 . . . . . {with at least one cell access via separately connected emittors of said transistors or via multiple emittors, e.g. T2L, ECL}
11/412 . . . . . using field-effect transistors only

11/4125 . . . . . {Cells incorporating circuit means for protecting against loss of information}
11/413 . . . . . Auxiliary circuits, e.g. for addressing, decoding, driving, writing, sensing, timing or power reduction
11/414 . . . . . for memory cells of the bipolar type
11/415 . . . . . Address circuits
11/416 . . . . . Read-write [R-W] circuits
11/417 . . . . . for memory cells of the field-effect type
11/418 . . . . . Address circuits
11/419 . . . . . Read-write [R-W] circuits
11/42 . . using opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically- coupled {or feedback-coupled}
11/44 . . using super-conductive elements, e.g. cryotron
11/46 . using thermoplastic elements
11/48 . using displaceable coupling elements, e.g. ferromagnetic cores, to produce change between different states of mutual or self-inductance {(contains no documents; see G11C 17/00 and subgroups)}
11/50 . using actuation of electric contacts to store the information
11/52 . . using electromagnetic relays
11/54 . using elements simulating biological cells, e.g. neuron
11/56 . using storage elements with more than two stable states represented by steps, e.g. of voltage, current, phase, frequency
11/5607 . . {using magnetic storage elements}
11/5614 . . {using conductive bridging RAM [CBRAM] or programming metallization cells [PMC]}
11/5621 . . {using charge storage in a floating gate}
11/5628 . . . {Programming or writing circuits; Data input circuits}
11/5635 . . . . {Erasing circuits}
11/5642 . . . {Sensing or reading circuits; Data output circuits}
11/565 . . {using capacitive charge storage elements}
11/5657 . . {using ferroelectric storage elements}
11/5664 . . {using organic memory material storage elements}
11/5671 . . {using charge trapping in an insulator}
11/5678 . . {using amorphous/crystalline phase transition storage elements}
11/5685 . . {using storage elements comprising metal oxide memory material, e.g. perovskites}
11/5692 . . {read-only digital stores using storage elements with more than two stable states}

13/00 Digital stores characterised by the use of storage elements not covered by groups G11C 11/00, G11C 23/00, or G11C 25/00

13/0002 . {using resistive RAM [RRAM] elements}
13/0004 . . {comprising amorphous/crystalline phase transition cells}
13/0007 . . {comprising metal oxide memory material, e.g. perovskites}
13/0009 . . {RRAM elements whose operation depends upon chemical change}
13/0011 . . . {comprising conductive bridging RAM [CBRAM] or programming metallization cells [PMCs]}
13/0014 . . . {comprising cells based on organic memory material}
13/0016 . . . . {comprising polymers}
13/0019 . . . . {comprising bio-molecules}
13/0021 . . {Auxiliary circuits}
13/0023 . . . {Address circuits or decoders}
13/0026 . . . . {Bit-line or column circuits}
13/0028 . . . . {Word-line or row circuits}
13/003 . . . {Cell access}
13/0033 . . . {Disturbance prevention or evaluation; Refreshing of disturbed memory data}
13/0035 . . . {Evaluating degradation, retention or wearout, e.g. by counting writing cycles}
13/0038 . . . {Power supply circuits}
13/004 . . . {Reading or sensing circuits or methods}
2013/0042 . . . . {Read using differential sensing, e.g. bit line [BL] and bit line bar [BLB]}
2013/0045 . . . . {Read using current through the cell}
2013/0047 . . . . {Read destroying or disturbing the data}
2013/005 . . . . {Read using potential difference applied between cell electrodes}
2013/0052 . . . . {Read process characterized by the shape, e.g. form, length, amplitude of the read pulse}
2013/0054 . . . . {Read is performed on a reference element, e.g. cell, and the reference sensed value is used to compare the sensed value of the selected cell}
2013/0057 . . . . {Read done in two steps, e.g. wherein the cell is read twice and one of the two read values serving as a reference value}
13/0059 . . . {Security or protection circuits or methods}
13/0061 . . . {Timing circuits or methods}
13/0064 . . . {Verifying circuits or methods}
2013/0066 . . . . {Verify correct writing whilst writing is in progress, e.g. by detecting onset or cessation of current flow in cell and using the detector output to terminate writing}
13/0069 . . . {Writing or programming circuits or methods}
2013/0071 . . . . {Write using write potential applied to access device gate}
2013/0073 . . . . {Write using bi-directional cell biasing}
2013/0076 . . . . {Write operation performed depending on read result}
2013/0078 . . . . {Write using current through the cell}
2013/008 . . . . {Write by generating heat in the surroundings of the memory material, e.g. thermowrite}
2013/0083 . . . . {Write to perform initialising, forming process, electro forming or conditioning}
2013/0085 . . . . {Write a page or sector of information simultaneously, e.g. a complete row or word line}
2013/0088 . . . . {Write with the simultaneous writing of a plurality of cells}
2013/009 . . . . {Write using potential difference applied between cell electrodes}
2013/0092 . . . . {Write characterized by the shape, e.g. form, length, amplitude of the write pulse}
2013/0095 . . . . {Write using strain induced by, e.g. piezoelectric, thermal effects}
13/0097 . . . {Erasing, e.g. resetting, circuits or methods}

13/02 . using elements whose operation depends upon chemical change {(G11C 13/0009 takes precedence)}
13/025 . . {using fullerenes, e.g. C60, or nanotubes, e.g. carbon or silicon nanotubes}
13/04 . using optical elements {; using other beam accessed elements, e.g. electron or ion beam}
13/041 . . {using photochromic storage elements (G11C 13/042 takes precedence)}
13/042 . . {using information stored in the form of interference pattern}
13/043 . . . {using magnetic-optical storage elements}
13/044 . . . {using electro-optical elements}
13/045 . . . {using photochromic storage elements}
13/046 . . . {using other storage elements storing information in the form of an interference pattern}
13/047 . . {using electro-optical elements (G11C 13/042 takes precedence)}
13/048 . . {using other optical storage elements}
13/06 . . using magneto-optical elements {(G11C 13/042 takes precedence)}

14/00 Digital stores characterised by arrangements of cells having volatile and non-volatile storage properties for back-up when the power is down

14/0009 . {in which the volatile element is a DRAM cell}
14/0018 . . {whereby the nonvolatile element is an EEPROM element, e.g. a floating gate or metal-nitride-oxide-silicon [MNOS] transistor}
14/0027 . . {and the nonvolatile element is a ferroelectric element}
14/0036 . . {and the nonvolatile element is a magnetic RAM [MRAM] element or ferromagnetic cell}
14/0045 . . {and the nonvolatile element is a resistive RAM element, i.e. programmable resistors, e.g. formed of phase change or chalcogenide material}
14/0054 . {in which the volatile element is a SRAM cell}
14/0063 . . {and the nonvolatile element is an EEPROM element, e.g. a floating gate or MNOS transistor}
14/0072 . . {and the nonvolatile element is a ferroelectric element}
14/0081 . . {and the nonvolatile element is a magnetic RAM [MRAM] element or ferromagnetic cell}
14/009 . . {and the nonvolatile element is a resistive RAM element, i.e. programmable resistors, e.g. formed of phase change or chalcogenide material}

15/00 Digital stores in which information comprising one or more characteristic parts is written into the store and in which information is read-out by searching for one or more of these characteristic parts, i.e. associative or content-addressed stores

15/02 . using magnetic elements
15/04 . using semiconductor elements
15/043 . . {using capacitive charge storage elements}
15/046 . . {using non-volatile storage elements}
15/06 . using cryogenic elements

16/00 Erasable programmable read-only memories (G11C 14/00 takes precedence)

16/02 . electrically programmable
16/04 . . using variable threshold transistors, e.g. FAMOS
16/0408 . . . {comprising cells containing floating gate transistors (G11C 16/0483, G11C 16/0491 take precedence)}
16/0416 . . . . {comprising cells containing a single floating gate transistor and no select transistor, e.g. UV EPROM}
16/0425 . . . . {comprising cells containing a merged floating gate and select transistor}
16/0433 . . . . {comprising cells containing a single floating gate transistor and one or more separate select transistors}
16/0441 . . . . {comprising cells containing multiple floating gate devices, e.g. separate read-and-write FAMOS transistors with connected floating gates}
16/045 . . . . . {Floating gate memory cells with both P and N channel memory transistors, usually sharing a common floating gate}
16/0458 . . . . . {comprising two or more independent floating gates which store independent data}
16/0466 . . . {comprising cells with charge storage in an insulating layer, e.g. metal-nitride-oxide-silicon [MNOS], silicon-oxide-nitride-oxide-silicon [SONOS] (G11C 16/0483, G11C 16/0491 take precedence)}
16/0475 . . . . {comprising two or more independent storage sites which store independent data}
16/0483 . . . {comprising cells having several storage transistors connected in series}
16/0491 . . . {Virtual ground arrays}
16/06 . . Auxiliary circuits, e.g. for writing into memory
16/08 . . . Address circuits; Decoders; Word-line control circuits
16/10 . . . Programming or data input circuits
16/102 . . . . {External programming circuits, e.g. EPROM programmers; In-circuit programming or reprogramming; EPROM emulators}
16/105 . . . . . {Circuits or methods for updating contents of nonvolatile memory, especially with 'security' features to ensure reliable replacement, i.e. preventing that old data is lost before new data is reliably written}
16/107 . . . . {Programming all cells in an array, sector or block to the same state prior to flash erasing}
16/12 . . . . Programming voltage switching circuits
16/14 . . . . Circuits for erasing electrically, e.g. erase voltage switching circuits
16/16 . . . . . for erasing blocks, e.g. arrays, words, groups
16/18 . . . . Circuits for erasing optically
16/20 . . . . Initialising; Data preset; Chip identification
16/22 . . . Safety or protection circuits preventing unauthorised or accidental access to memory cells
16/225 . . . . {Preventing erasure, programming or reading when power supply voltages are outside the required ranges}
16/24 . . . Bit-line control circuits
16/26 . . . Sensing or reading circuits; Data output circuits
16/28 . . . . using differential sensing or reference cells, e.g. dummy cells
16/30 . . . Power supply circuits

16/32 . . . Timing circuits
16/34 . . . Determination of programming status, e.g. threshold voltage, overprogramming or underprogramming, retention
16/3404 . . . . {Convergence or correction of memory cell threshold voltages; Repair or recovery of overerased or overprogrammed cells}
16/3409 . . . . . {Circuits or methods to recover overerased nonvolatile memory cells detected during erase verification, usually by means of a "soft" programming step}
16/3413 . . . . . {Circuits or methods to recover overprogrammed nonvolatile memory cells detected during program verification, usually by means of a "soft" erasing step}
16/3418 . . . . {Disturbance prevention or evaluation; Refreshing of disturbed memory data}
16/3422 . . . . . {Circuits or methods to evaluate read or write disturbance in nonvolatile memory, without steps to mitigate the problem}
16/3427 . . . . . {Circuits or methods to prevent or reduce disturbance of the state of a memory cell when neighbouring cells are read or written}
16/3431 . . . . . {Circuits or methods to detect disturbed nonvolatile memory cells, e.g. which still read as programmed but with threshold less than the program verify threshold or read as erased but with threshold greater than the erase verify threshold, and to reverse the disturbance via a refreshing programming or erasing step}
16/3436 . . . . {Arrangements for verifying correct programming or erasure}
16/344 . . . . . {Arrangements for verifying correct erasure or for detecting overerased cells}
16/3445 . . . . . {Circuits or methods to verify correct erasure of nonvolatile memory cells}
16/345 . . . . . {Circuits or methods to detect overerased nonvolatile memory cells, usually during erasure verification}
16/3454 . . . . . {Arrangements for verifying correct programming or for detecting overprogrammed cells}
16/3459 . . . . . {Circuits or methods to verify correct programming of nonvolatile memory cells}
16/3463 . . . . . {Circuits or methods to detect overprogrammed nonvolatile memory cells, usually during program verification}
16/3468 . . . . . {Prevention of overerasure or overprogramming, e.g. by verifying whilst erasing or writing}
16/3472 . . . . . {Circuits or methods to verify correct erasure of nonvolatile memory cells whilst erasing is in progress, e.g. by detecting onset or cessation of current flow in cells and using the detector output to terminate erasure}
16/3477 . . . . . {Circuits or methods to prevent overerasing of nonvolatile memory cells, e.g. by detecting onset or cessation of current flow in cells and using the detector output to terminate erasing}
16/3481 . . . . . {Circuits or methods to verify correct programming of nonvolatile memory cells whilst programming is in progress, e.g. by detecting onset or cessation of current flow in cells and using the detector output to terminate programming}
16/3486 . . . . . {Circuits or methods to prevent overprogramming of nonvolatile memory cells, e.g. by detecting onset or cessation of current flow in cells and using the detector output to terminate programming}
16/349 . . . . {Arrangements for evaluating degradation, retention or wearout, e.g. by counting erase cycles}
16/3495 . . . . . {Circuits or methods to detect or delay wearout of nonvolatile EPROM or EEPROM memory devices, e.g. by counting numbers of erase or reprogram cycles, by using multiple memory areas serially or cyclically}

17/00 Read-only memories programmable only once; Semi-permanent stores, e.g. manually-replaceable information cards

17/005 . {with a storage element common to a large number of data, e.g. perforated card (G11C 17/02, G11C 17/04 take precedence)}
17/02 . using magnetic or inductive elements (G11C 17/14 takes precedence)
17/04 . using capacitive elements (G11C 17/06, G11C 17/14 take precedence)
17/06 . using diode elements (G11C 17/14 takes precedence)
17/08 . using semiconductor devices, e.g. bipolar elements (G11C 17/06, G11C 17/14 take precedence)
17/10 . . in which contents are determined during manufacturing by a predetermined arrangement of coupling elements, e.g. mask-programmable ROM
17/12 . . . using field-effect devices
17/123 . . . . {comprising cells having several storage transistors connected in series}
17/126 . . . . {Virtual ground arrays}
17/14 . in which contents are determined by selectively establishing, breaking or modifying connecting links by permanently altering the state of coupling elements, e.g. PROM
17/143 . . {using laser-fusible links}
17/146 . . {Write once memory, i.e. allowing changing of memory content by writing additional bits}
17/16 . . using electrically-fusible links
17/165 . . . {Memory cells which are electrically programmed to cause a change in resistance, e.g. to permit multiple resistance steps to be programmed rather than conduct to or from non-conduct change of fuses and antifuses (digital stores using resistance random access memory elements G11C 13/0002)}
17/18 . . Auxiliary circuits, e.g. for writing into memory

19/00 Digital stores in which the information is moved stepwise, e.g. shift registers

19/005 . {with ferro-electric elements (condensers)}

19/02 . using magnetic elements (G11C 19/14 takes precedence)
19/04 . . using cores with one aperture or magnetic loop
19/06 . . using structures with a number of apertures or magnetic loops, e.g. transfluxors {laddic}
19/08 . . using thin films in plane structure
19/0808 . . . {using magnetic domain propagation}
19/0816 . . . . {using a rotating or alternating coplanar magnetic field}
19/0825 . . . . {using a variable perpendicular magnetic field}
19/0833 . . . . {using magnetic domain interaction}
19/0841 . . . . {using electric current}
19/085 . . . {Generating magnetic fields therefor, e.g. uniform magnetic field for magnetic domain stabilisation}
19/0858 . . . {Generating, replicating or annihilating magnetic domains (also comprising different types of magnetic domains, e.g. "Hard Bubbles") (G11C 19/0866 takes precedence)}
19/0866 . . . {Detecting magnetic domains}
19/0875 . . . {Organisation of a plurality of magnetic shift registers}
19/0883 . . . . {Means for switching magnetic domains from one path into another path, i.e. transfer switches, swap gates or decoders}
19/0891 . . . . . {using hybrid structure, e.g. ion doped layers}
19/10 . . using thin films on rods; with twistors
19/12 . using non-linear reactive devices in resonant circuits {, e.g. parametrons; magnetic amplifiers with overcritical feedback}
19/14 . using magnetic elements in combination with active elements, e.g. discharge tubes, semiconductor elements {(contains no documents, see provisionally G11C 19/02 - G11C 19/10)}
19/18 . using capacitors as main elements of the stages {(if capacitors are used as auxiliary stage in between main stages with other elements, the latter take precedence; G11C 19/005 takes precedence)}
19/182 . . {in combination with semiconductor elements, e.g. bipolar transistors, diodes}
19/184 . . . {with field-effect transistors, e.g. MOS-FET}
19/186 . . . . {using only one transistor per capacitor, e.g. bucket brigade shift register}
19/188 . . . {Organisation of a multiplicity of shift registers, e.g. regeneration, timing or input-output circuits}
19/20 . using discharge tubes (G11C 19/14 takes precedence)
19/202 . . {with vacuum tubes (G11C 19/207 takes precedence)}
19/205 . . {with gas-filled tubes (G11C 19/207 takes precedence)}
19/207 . . {with counting tubes}
19/28 . using semiconductor elements (G11C 19/14, G11C 19/36 take precedence)
19/282 . . {with charge storage in a depletion layer, i.e. charge coupled devices [CCD]}
19/285 . . . {Peripheral circuits, e.g. for writing into the first stage; for reading-out of the last stage}
19/287 . . {Organisation of a multiplicity of shift registers}
19/30 . using opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically-coupled
19/32 . using super-conductive elements
19/34 . using storage elements with more than two stable states represented by steps, e.g. of voltage, current, phase, frequency
19/36 . . using {multistable} semiconductor elements
19/38 . two-dimensional, e.g. horizontal and vertical shift registers

21/00 Digital stores in which the information circulates {continuously}(stepwise G11C 19/00)
21/005 . {using electrical delay lines}
21/02 . using electromechanical delay lines, e.g. using a mercury tank
21/023 . . {using piezoelectric transducers, e.g. mercury tank}
21/026 . . {using magnetostriction transducers, e.g. nickel delay line}

23/00 Digital stores characterised by movement of mechanical parts to effect storage, e.g. using balls; Storage elements therefor

25/00 Digital stores characterised by the use of flowing media; Storage elements therefor

27/00 Electric analogue stores, e.g. for storing instantaneous values
27/005 . {with non-volatile charge storage, e.g. on floating gate or MNOS}
27/02 . Sample-and-hold arrangements (G11C 27/04 takes precedence)
27/022 . . {using a magnetic memory element}
27/024 . . {using a capacitive memory element (G11C 27/04 takes precedence)}
27/026 . . . {associated with an amplifier (G11C 27/028 takes precedence)}
27/028 . . . {Current mode circuits, e.g. switched current memories}
27/04 . Shift registers

29/00 Checking stores for correct operation {; Subsequent repair}; Testing stores during standby or offline operation
29/003 . {in serial memories}
29/006 . {at wafer scale level, i.e. wafer scale integration [WSI]}
29/02 . Detection or location of defective auxiliary circuits, e.g. defective refresh counters
29/021 . . {in voltage or current generators}
29/022 . . {in I/O circuitry}
29/023 . . {in clock generator or timing circuitry}
29/024 . . {in decoders}
29/025 . . {in signal lines}
29/026 . . {in sense amplifiers}
29/027 . . {in fuses}
29/028 . . {with adaption or trimming of parameters}
29/04 . Detection or location of defective memory elements {, e.g. cell constructio details, timing of test signals}
2029/0401 . . {in embedded memories}
2029/0403 . . {during or with feedback to manufacture}
2029/0405 . . {comprising complete test loop}
2029/0407 . . {on power on}
2029/0409 . . {Online test}

2029/0411 . . {Online error correction}
29/06 . . Acceleration testing
29/08 . . Functional testing, e.g. testing during refresh, power-on self testing [POST] or distributed testing
29/10 . . . Test algorithms, e.g. memory scan [MScan] algorithms; Test patterns, e.g. checkerboard patterns
29/12 . . . Built-in arrangements for testing, e.g. built-in self testing [BIST] {or interconnection details}
29/12005 . . . . {comprising voltage or current generators}
29/1201 . . . . {comprising I/O circuitry}
29/12015 . . . . {comprising clock generation or timing circuitry}
2029/1202 . . . . {Word line control}
2029/1204 . . . . {Bit line control}
2029/1206 . . . . {Location of test circuitry on chip or wafer}
2029/1208 . . . . {Error catch memory}
29/14 . . . . Implementation of control logic, e.g. test mode decoders
29/16 . . . . . using microprogrammed units, e.g. state machines
29/18 . . . . Address generation devices; Devices for accessing memories, e.g. details of addressing circuits
2029/1802 . . . . . {Address decoder}
2029/1804 . . . . . {Manipulation of word size}
2029/1806 . . . . . {Address conversion or mapping, i.e. logical to physical address}
29/20 . . . . . using counters or linear-feedback shift registers [LFSR]
29/22 . . . . . Accessing serial memories
29/24 . . . . . Accessing extra cells, e.g. dummy cells or redundant cells
29/26 . . . . . Accessing multiple arrays (G11C 29/24 takes precedence)
2029/2602 . . . . . {Concurrent test}
29/28 . . . . . Dependent multiple arrays, e.g. multi-bit arrays
29/30 . . . . . Accessing single arrays
29/32 . . . . . Serial access; Scan testing
2029/3202 . . . . . {Scan chain}
29/34 . . . . . Accessing multiple bits simultaneously
29/36 . . . . Data generation devices, e.g. data inverters
2029/3602 . . . . . {Pattern generator}
29/38 . . . . Response verification devices
29/40 . . . . . using compression techniques
2029/4002 . . . . . {Comparison of products, i.e. test results of chips or with golden chip}
29/42 . . . . . using error correcting codes [ECC] or parity check
29/44 . . . . Indication or identification of errors, e.g. for repair
29/4401 . . . . . {for self repair}
2029/4402 . . . . {Internal storage of test result, quality data, chip identification, repair information}
29/46 . . . . Test trigger logic
29/48 . . . Arrangements in static stores specially adapted for testing by means external to the store, e.g. using direct memory access [DMA] or using auxiliary access paths
29/50 . . Marginal testing, e.g. race, voltage or current testing
29/50004 . . . {of threshold voltage}
29/50008 . . . {of impedance}
29/50012 . . . {of timing}
29/50016 . . . {of retention}
2029/5002 . . . {Characteristic}
2029/5004 . . . {Voltage}
2029/5006 . . . {Current}
29/52 . Protection of memory contents; Detection of errors in memory contents
29/54 . Arrangements for designing test circuits, e.g. design for test [DFT] tools
29/56 . External testing equipment for static stores, e.g. automatic test equipment [ATE]; Interfaces therefor
29/56004 . . {Pattern generation}
29/56008 . . {Error analysis, representation of errors}
29/56012 . . {Timing aspects, clock generation, synchronisation}
29/56016 . . {Apparatus features}
2029/5602 . . {Interface to device under test}
2029/5604 . . {Display of error information}
2029/5606 . . {Error catch memory}
29/70 . {Masking faults in memories by using spares or by reconfiguring}
29/702 . . {by replacing auxiliary circuits, e.g. spare voltage generators, decoders or sense amplifiers, to be used instead of defective ones}
29/72 . . {with optimized replacement algorithms}
29/74 . . {using duplex memories, i.e. using dual copies}
29/76 . . {using address translation or modifications}
29/765 . . . {in solid state disks}
29/78 . . {using programmable devices}
29/781 . . . {combined in a redundant decoder}
29/783 . . . {with refresh of replacement cells, e.g. in DRAMs}
29/785 . . . {with redundancy programming schemes}
29/787 . . . . {using a fuse hierarchy}
29/789 . . . . {using non-volatile cells or latches}
29/80 . . . {with improved layout}
29/802 . . . . {by encoding redundancy signals}
29/804 . . . . {to prevent clustered faults}
29/806 . . . . {by reducing size of decoders}
29/808 . . . . {using a flexible replacement scheme}
29/81 . . . . {using a hierarchical redundancy scheme}
29/812 . . . . {using a reduced amount of fuses}
29/814 . . . . {for optimized yield}
29/816 . . . . {for an application-specific layout}
29/818 . . . . . {for dual-port memories}
29/82 . . . . . {for EEPROMs}
29/822 . . . . . {for read only memories}
29/824 . . . . . {for synchronous memories}
29/83 . . . {with reduced power consumption}
29/832 . . . . {with disconnection of faulty elements}
29/835 . . . {with roll call arrangements for redundant substitutions}
29/838 . . . {with substitution of defective spares}
29/84 . . . {with improved access time or stability}
29/842 . . . . {by introducing a delay in a signal path}
29/844 . . . . {by splitting the decoders in stages}
29/846 . . . . {by choosing redundant lines at an output stage}
29/848 . . . . {by adjacent switching}

29/86 . . {in serial access memories, e.g. shift registers, CCDs, bubble memories}
29/88 . . {with partially good memories}
29/883 . . . {using a single defective memory device with reduced capacity, e.g. half capacity}
29/886 . . . {combining plural defective memory devices to provide a contiguous address range, e.g. one device supplies working blocks to replace defective blocks in another device}

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

2207/00 Indexing scheme relating to arrangements for writing information into, or reading information out from, a digital store

2207/002 . Isolation gates, i.e. gates coupling bit lines to the sense amplifier
2207/005 . Transfer gates, i.e. gates coupling the sense amplifier output to data lines, I/O lines or global bit lines
2207/007 . Register arrays
2207/06 . Sense amplifier related aspects
2207/061 . . Sense amplifier enabled by a address transition detection related control signal
2207/063 . . Current sense amplifiers
2207/065 . . Sense amplifier drivers
2207/066 . . Frequency reading type sense amplifier
2207/068 . . Integrator type sense amplifier
2207/10 . Aspects relating to interfaces of memory device to external buses
2207/101 . . Analog or multilevel bus
2207/102 . . Compression or decompression of data before storage
2207/104 . . Embedded memory devices, e.g. memories with a processing device on the same die or ASIC memory designs
2207/105 . . Aspects related to pads, pins or terminals
2207/107 . . Serial-parallel conversion of data or prefetch
2207/108 . . Wide data ports
2207/12 . Equalization of bit lines
2207/16 . Solid state audio
2207/22 . Control and timing of internal memory operations
2207/2209 . . Concurrent read and write
2207/2218 . . Late write
2207/2227 . . Standby or low power modes
2207/2236 . . Copy
2207/2245 . . Memory devices with an internal cache buffer
2207/2254 . . Calibration
2207/2263 . . Write conditionally, e.g. only if new data and old data differ
2207/2272 . . Latency related aspects
2207/2281 . . Timing of a read operation
2207/229 . . Timing of a write operation

2211/00 Indexing scheme relating to digital stores characterized by the use of particular electric or magnetic storage elements; Storage elements therefor

2211/401 . Indexing scheme relating to cells needing refreshing or charge regeneration, i.e. dynamic cells
2211/4013 . . Memory devices with multiple cells per bit, e.g. twin-cells
2211/4016 . . Memory devices with silicon-on-insulator cells
2211/406 . . Refreshing of dynamic cells
2211/4061 . . . Calibration or ate or cycle tuning
2211/4062 . . . Parity or ECC in refresh operations
2211/4063 . . . Interleaved refresh operations
2211/4065 . . . Low level details of refresh operations
2211/4066 . . . Pseudo-SRAMs
2211/4067 . . . Refresh in standby or low power modes
2211/4068 . . . Voltage or leakage in refresh operations
2211/56 . Indexing scheme relating to G11C 11/56 and sub-groups for features not covered by these groups
2211/561 . . Multilevel memory cell aspects
2211/5611 . . . Multilevel memory cell with more than one control gate
2211/5612 . . . Multilevel memory cell with more than one floating gate
2211/5613 . . . Multilevel memory cell with additional gates, not being floating or control gates
2211/5614 . . . Multilevel memory cell comprising negative resistance, quantum tunneling or resonance tunneling elements
2211/5615 . . . Multilevel magnetic memory cell using non-magnetic non-conducting interlayer, e.g. MTJ
2211/5616 . . . Multilevel magnetic memory cell using non-magnetic conducting interlayer, e.g. GMR, SV, PSV
2211/5617 . . . Multilevel ROM cell programmed by source, drain or gate contacting
2211/562 . . Multilevel memory programming aspects
2211/5621 . . . Multilevel programming verification
2211/5622 . . . Concurrent multilevel programming of more than one cell
2211/5623 . . . Concurrent multilevel programming and reading
2211/5624 . . . Concurrent multilevel programming and programming verification
2211/5625 . . . Self-converging multilevel programming
2211/563 . . Multilevel memory reading aspects
2211/5631 . . . Concurrent multilevel reading of more than one cell
2211/5632 . . . Multilevel reading using successive approximation
2211/5633 . . . Mixed concurrent serial multilevel reading
2211/5634 . . . Reference cells
2211/564 . . Miscellaneous aspects
2211/5641 . . . Multilevel memory having cells with different number of storage levels
2211/5642 . . . Multilevel memory with buffers, latches, registers at input or output
2211/5643 . . . Multilevel memory comprising cache storage devices
2211/5644 . . . Multilevel memory comprising counting devices
2211/5645 . . . Multilevel memory with current-mirror arrangements
2211/5646 . . . Multilevel memory with flag bits, e.g. for showing that a "first page" of a word line is programmed but not a "second page"
2211/5647 . . . Multilevel memory with bit inversion arrangement
2211/5648 . . . Multilevel memory programming, reading or erasing operations wherein the order or sequence of the operations is relevant

2211/5649 . . . Multilevel memory with plate line or layer, e.g. in order to lower programming voltages

2211/565 . . . Multilevel memory comprising elements in triple well structure

2213/00 Indexing scheme relating to G11C 13/00 for features not covered by this group

2213/10 . Resistive cells; Technology aspects

2213/11 . . Metal ion trapping, i.e. using memory material including cavities, pores or spaces in form of tunnels or channels wherein metal ions can be trapped but do not react and form an electro-deposit creating filaments or dendrites

2213/12 . . Non-metal ion trapping, i.e. using memory material trapping non-metal ions given by the electrode or another layer during a write operation, e.g. trapping, doping

2213/13 . . Dissociation, i.e. using memory material including molecules which, during a write operation, are dissociated in ions which migrate further in the memory material

2213/14 . . Use of different molecule structures as storage states, e.g. part of molecule being rotated

2213/15 . . Current-voltage curve

2213/16 . . Memory cell being a nanotube, e.g. suspended nanotube

2213/17 . . Memory cell being a nanowire transistor

2213/18 . . Memory cell being a nanowire having RADIAL composition

2213/19 . . Memory cell comprising at least a nanowire and only two terminals

2213/30 . Resistive cell, memory material aspects

2213/31 . . Material having complex metal oxide, e.g. perovskite structure

2213/32 . . Material having simple binary metal oxide structure

2213/33 . . Material including silicon

2213/34 . . Material includes an oxide or a nitride

2213/35 . . Material including carbon, e.g. graphite, grapheme

2213/50 . Resistive cell structure aspects

2213/51 . . Structure including a barrier layer preventing or limiting migration, diffusion of ions or charges or formation of electrolytes near an electrode

2213/52 . . Structure characterized by the electrode material, shape, etc.

2213/53 . . Structure wherein the resistive material being in a transistor, e.g. gate

2213/54 . . Structure including a tunneling barrier layer, the memory effect implying the modification of tunnel barrier conductivity

2213/55 . . Structure including two electrodes, a memory active layer and at least two other layers which can be a passive or source or reservoir layer or a less doped memory active layer

2213/56 . . Structure including two electrodes, a memory active layer and a so called passive or source or reservoir layer which is NOT an electrode, wherein the passive or source or reservoir layer is a source of ions which migrate afterwards in the memory active layer to be only trapped there, to form conductive filaments there or to react with the material of the memory active layer in redox way

2213/70 . Resistive array aspects

2213/71 . . Three dimensional array

2213/72 . . Array wherein the access device being a diode

2213/73 . . Array where access device function, e.g. diode function, being merged with memorizing function of memory element

2213/74 . . Array wherein each memory cell has more than one access device

2213/75 . . Array having a NAND structure comprising, for example, memory cells in series or memory elements in series, a memory element being a memory cell in parallel with an access transistor

2213/76 . . Array using an access device for each cell which being not a transistor and not a diode

2213/77 . . Array wherein the memory element being directly connected to the bit lines and word lines without any access device being used

2213/78 . . Array wherein the memory cells of a group share an access device, all the memory cells of the group having a common electrode and the access device being not part of a word line or a bit line driver

2213/79 . . Array wherein the access device being a transistor

2213/80 . . Array wherein the substrate, the cell, the conductors and the access device are all made up of organic materials

2213/81 . . Array wherein the array conductors, e.g. word lines, bit lines, are made of nanowires

2213/82 . . Array having, for accessing a cell, a word line, a bit line and a plate or source line receiving different potentials

2216/00 Indexing scheme relating to G11C 16/00 and subgroups, for features not directly covered by these groups

2216/02 . Structural aspects of erasable programmable read-only memories

2216/04 . . Nonvolatile memory cell provided with a separate control gate for erasing the cells, i.e. erase gate, independent of the normal read control gate

2216/06 . . Floating gate cells in which the floating gate consists of multiple isolated silicon islands, e.g. nanocrystals

2216/08 . . Nonvolatile memory wherein data storage is accomplished by storing relatively few electrons in the storage layer, i.e. single electron memory

2216/10 . . Floating gate memory cells with a single polysilicon layer

2216/12 . Reading and writing aspects of erasable programmable read-only memories

2216/14 . . Circuits or methods to write a page or sector of information simultaneously into a nonvolatile memory, typically a complete row or word line in flash memory

2216/16 . . Flash programming of all the cells in an array, sector or block simultaneously

2216/18 . . Flash erasure of all the cells in an array, sector or block simultaneously

2216/20 . . Suspension of programming or erasing cells in an array in order to read other cells in it

2216/22 . . Nonvolatile memory in which reading can be carried out from one memory bank or array whilst a word or sector in another bank or array is being erased or programmed simultaneously

2216/24 . . Nonvolatile memory in which programming can be carried out in one memory bank or array whilst a word or sector in another bank or array is being erased simultaneously

2216/26 . . Floating gate memory which is adapted to be one-time programmable [OTP], e.g. containing multiple OTP blocks permitting limited update ability

2216/28 . . Floating gate memory programmed by reverse programming, e.g. programmed with negative gate voltage and erased with positive gate voltage or programmed with high source or drain voltage and erased with high gate voltage

2216/30 . . Reduction of number of input/output pins by using a serial interface to transmit or receive addresses or data, i.e. serial access memory

2229/00 Indexing scheme relating to checking stores for correct operation, subsequent repair or testing stores during standby or offline operation

2229/70 . Indexing scheme relating to G11C 29/70, for implementation aspects of redundancy repair

2229/72 . . Location of redundancy information

2229/723 . . . Redundancy information stored in a part of the memory core to be repaired

2229/726 . . . Redundancy information loaded from the outside into the memory

2229/74 . . Time at which the repair is done

2229/743 . . . After packaging

2229/746 . . . Before packaging

2229/76 . . Storage technology used for the repair

2229/763 . . . E-fuses, e.g. electric fuses or antifuses, floating gate transistors

2229/766 . . . Laser fuses