CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

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

H10B ELECTRONIC MEMORY DEVICES

NOTE

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.

Volatile memory devices

10/00 **Static random access memory [SRAM] devices**

10/10 . SRAM devices comprising bipolar components

WARNING

Group H10B 10/10 is incomplete pending reclassification of documents from groups H01L 27/1027, H01L 27/1028 and H10B 99/00.

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

10/12 . {comprising a MOSFET load element}

10/125 . . {the MOSFET being a thin film transistor [TFT]}

10/15 . {comprising a resistor load element}

10/18 . {Peripheral circuit regions}

12/00 **Dynamic random access memory [DRAM] devices**

12/01 . {Manufacture or treatment}

12/02 . . {for one transistor one-capacitor [1T-1C] memory cells}

12/03 . . . {Making the capacitor or connections thereto}

12/033 . . . . {the capacitor extending over the transistor}

12/0335 . . . . . {Making a connection between the transistor and the capacitor, e.g. plug}

12/036 . . . . {the capacitor extending under the transistor}

12/038 . . . . {the capacitor being in a trench in the substrate}

12/0383 . . . . . {wherein the transistor is vertical}

12/0385 . . . . . {Making a connection between the transistor and the capacitor, e.g. buried strap}

12/0387 . . . . . {Making the trench}

12/05 . . . {Making the transistor}

12/053 . . . . {the transistor being at least partially in a trench in the substrate (vertical transistor in combination with a capacitor formed in a substrate trench H10B 12/0383)}

12/056 . . . . {the transistor being a FinFET}

12/09 . . {with simultaneous manufacture of the peripheral circuit region and memory cells}

12/10 . DRAM devices comprising bipolar components

WARNING

Group H10B 12/10 is incomplete pending reclassification of documents from groups H01L 27/1027, H01L 27/1028 and H10B 99/00.

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

12/20 . {DRAM devices comprising floating-body transistors, e.g. floating-body cells}

12/30 . {DRAM devices comprising one-transistor - one-capacitor [1T-1C] memory cells}

12/31 . . {having a storage electrode stacked over the transistor}

12/312 . . . {with a bit line higher than the capacitor}

12/315 . . . {with the capacitor higher than a bit line}

12/318 . . . {the storage electrode having multiple segments}

12/33 . . {the capacitor extending under the transistor}

12/34 . . {the transistor being at least partially in a trench in the substrate}

12/36 . . {the transistor being a FinFET}

12/37 . . {the capacitor being at least partially in a trench in the substrate}

12/373 . . . {the capacitor extending under or around the transistor}

12/377 . . . {having a storage electrode extension located over the transistor}

12/39 . . {the capacitor and the transistor being in a same trench}

12/395 . . . {the transistor being vertical}

12/48 . . {Data lines or contacts therefor}

12/482 . . . {Bit lines}

12/485 . . . {Bit line contacts}

12/488 . . . {Word lines}

12/50 . {Peripheral circuit region structures}

Non-volatile memory devices

20/00 **Read-only memory [ROM] devices**

20/10 . ROM devices comprising bipolar components

WARNING

Group H10B 20/10 is incomplete pending reclassification of documents from groups H01L 27/1027, H01L 27/1028 and H10B 99/00.

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

20/20 . Programmable ROM [PROM] devices comprising field-effect components (H10B 20/10 takes precedence)

WARNING

Group H10B 20/20 is impacted by reclassification into group H10B 20/25.

Groups H10B 20/20 and H10B 20/25 should be considered in order to perform a complete search.

20/25 . . One-time programmable ROM [OTPROM] devices, e.g. using electrically-fusible links

WARNING

Group H10B 20/25 is incomplete pending reclassification of documents from group H10B 20/20.

Groups H10B 20/20 and H10B 20/25 should be considered in order to perform a complete search.

20/27 . {ROM only}

20/30 . . {having the source region and the drain region on the same level, e.g. lateral transistors}

20/34 . . . {Source electrode or drain electrode programmed}

20/36 . . . {Gate programmed, e.g. different gate material or no gate}

20/363 . . . . {Gate conductor programmed}

20/367 . . . . {Gate dielectric programmed, e.g. different thickness}

20/38 . . . {Doping programmed, e.g. mask ROM}

20/383 . . . . {Channel doping programmed}

20/387 . . . . {Source region or drain region doping programmed}

20/40 . . {having the source region and drain region on different levels, e.g. vertical channel}

20/50 . . {having transistors on different levels, e.g. 3D ROM}

20/60 . {Peripheral circuit regions}

20/65 . . {of memory structures of the ROM only type}

41/00 Electrically erasable-and-programmable ROM [EEPROM] devices comprising floating gates

41/10 . characterised by the top-view layout

41/20 . characterised by three-dimensional arrangements, e.g. with cells on different height levels

41/23 . . with source and drain on different levels, e.g. with sloping channels

41/27 . . . the channels comprising vertical portions, e.g. U-shaped channels

41/30 . characterised by the memory core region

41/35 . . with a cell select transistor, e.g. NAND

41/40 . characterised by the peripheral circuit region

41/41 . . of a memory region comprising a cell select transistor, e.g. NAND

41/42 . . Simultaneous manufacture of periphery and memory cells

41/43 . . . comprising only one type of peripheral transistor

41/44 . . . . with a control gate layer also being used as part of the peripheral transistor

41/46 . . . . with an inter-gate dielectric layer also being used as part of the peripheral transistor

41/47 . . . . with a floating-gate layer also being used as part of the peripheral transistor

41/48 . . . . with a tunnel dielectric layer also being used as part of the peripheral transistor

41/49 . . . comprising different types of peripheral transistor

41/50 . characterised by the boundary region between the core region and the peripheral circuit region

41/60 . the control gate being a doped region, e.g. single-poly memory cell

41/70 . the floating gate being an electrode shared by two or more components

43/00 EEPROM devices comprising charge-trapping gate insulators

43/10 . characterised by the top-view layout

43/20 . characterised by three-dimensional arrangements, e.g. with cells on different height levels

43/23 . . with source and drain on different levels, e.g. with sloping channels

43/27 . . . the channels comprising vertical portions, e.g. U-shaped channels

43/30 . characterised by the memory core region

43/35 . . with cell select transistors, e.g. NAND

43/40 . characterised by the peripheral circuit region

43/50 . characterised by the boundary region between the core and peripheral circuit regions

51/00 Ferroelectric RAM [FeRAM] devices comprising ferroelectric memory transistors

51/10 . characterised by the top-view layout

51/20 . characterised by the three-dimensional arrangements, e.g. with cells on different height levels

51/30 . characterised by the memory core region

51/40 . characterised by the peripheral circuit region

51/50 . characterised by the boundary region between the core and peripheral circuit regions

53/00 Ferroelectric RAM [FeRAM] devices comprising ferroelectric memory capacitors

53/10 . characterised by the top-view layout

53/20 . characterised by the three-dimensional arrangements, e.g. with cells on different height levels

53/30 . characterised by the memory core region

53/40 . characterised by the peripheral circuit region

53/50 . characterised by the boundary region between the core and peripheral circuit regions

61/00 **Magnetic memory devices, e.g. magnetoresistive RAM [MRAM] devices**

WARNING

Group H10B 61/00 is incomplete pending reclassification of documents from group H10N 59/00.

Groups H10N 59/00 and H10B 61/00 should be considered in order to perform a complete search.

61/10 . {comprising components having two electrodes, e.g. diodes or MIM elements}

61/20 . {comprising components having three or more electrodes, e.g. transistors}

61/22 . . {of the field-effect transistor [FET] type}

63/00 **Resistance change memory devices, e.g. resistive RAM [ReRAM] devices**

WARNING

Group H10B 63/00 is impacted by reclassification into groups H10B 63/10 and H10N 79/00.

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

63/10 . Phase change RAM [PCRAM, PRAM] devices

WARNING

Group H10B 63/10 is incomplete pending reclassification of documents from group H10B 63/00.

Groups H10B 63/00 and H10B 63/10 should be considered in order to perform a complete search.

63/20 . {comprising selection components having two electrodes, e.g. diodes}

63/22 . . {of the metal-insulator-metal type}

63/24 . . {of the Ovonic threshold switching type}

63/30 . {comprising selection components having three or more electrodes, e.g. transistors}

63/32 . . {of the bipolar type}

63/34 . . {of the vertical channel field-effect transistor type}

63/80 . {Arrangements comprising multiple bistable or multi-stable switching components of the same type on a plane parallel to the substrate, e.g. cross-point arrays}

63/82 . . {the switching components having a common active material layer}

63/84 . . {arranged in a direction perpendicular to the substrate, e.g. 3D cell arrays}

63/845 . . . {the switching components being connected to a common vertical conductor}

69/00 **Erasable-and-programmable ROM [EPROM] devices not provided for in groups H10B 41/00 - H10B 63/00, e.g. ultraviolet erasable-and-programmable ROM [UVEPROM] devices**

WARNING

Group H10B 69/00 is incomplete pending reclassification of documents from groups H01L 27/1027 and H01L 27/1028.

Groups H01L 27/1027, H01L 27/1028 and H10B 69/00 should be considered in order to perform a complete search.

80/00 **Assemblies of multiple devices comprising at least one memory device covered by this subclass**

WARNING

Group H10B 80/00 is incomplete pending reclassification of documents from groups H01L 25/065, H01L 25/0652, H01L 25/0655, H01L 25/0657, H01L 25/16, H01L 25/162, H01L 25/165, H01L 25/167 and H01L 25/18.

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 H10B 99/00 is incomplete pending reclassification of documents from groups H01L 27/102 and H01L 27/1022.

Group H10B 99/00 is also impacted by reclassification into groups H10B 10/10, H10B 12/10 and H10B 20/10.

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

99/10 . {Memory cells having a cross-point geometry}

WARNING

Group H10B 99/10 is incomplete pending reclassification of documents from group H01L 27/10.

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

99/14 . {comprising memory cells that only have passive resistors or passive capacitors}

WARNING

Group H10B 99/14 is incomplete pending reclassification of documents from group H01L 27/101.

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

99/16 . {comprising memory cells having diodes}

WARNING

Group H10B 99/16 is incomplete pending reclassification of documents from group H01L 27/1021.

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

99/20 . {comprising memory cells having thyristors}

WARNING

Group H10B 99/20 is incomplete pending reclassification of documents from groups H01L 27/1027 and H01L 27/1028.

Groups H01L 27/1027, H01L 27/1028 and H10B 99/20 should be considered in order to perform a complete search.

99/22 . {including field-effect components}

WARNING

Group H10B 99/22 is incomplete pending reclassification of documents from group H01L 27/105.

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