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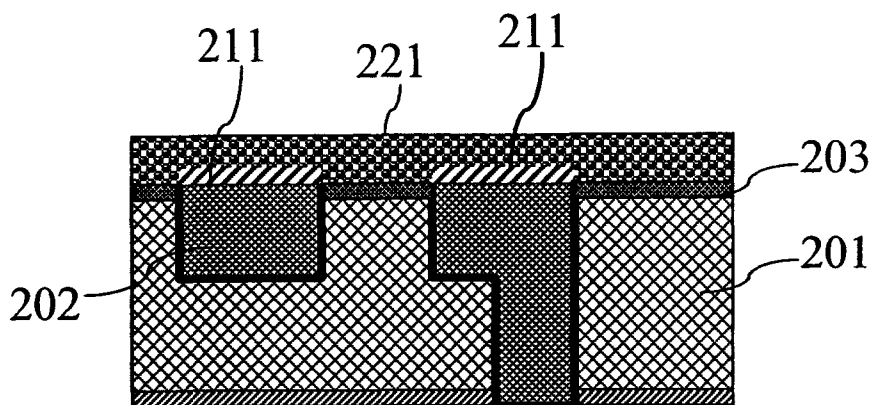
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C

(57) Abstract: An interconnect structure with improved performance and capacitance by providing air gaps inside the dielectric layer by use of a multi-phase photoresist material. The interconnect features are embedded in a dielectric layer having a columnar air gap structure in a portion of the dielectric layer surrounding the interconnect features. The interconnect features may also be embedded in a dielectric layer having two or more phases with a different dielectric constant created. The interconnect structure is compatible with current back end of line processing.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/73128

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H01L 21/469, 23/52 (2007.10)

USPC - 438/619; 257/774

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - H01L 21/469, 23/52 (2007.10)

USPC - 438/619; 257/774

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PubWEST, Google Patents Database, Google Scholar Database

(interconnect, dielectric, layer, substrate, pattern, expose, cap, multi-phase, photoresist, separate, column, air gap, reactive ion etching, hydrophilic, hydrophobic, insulate, semiconductor, Cu, Al, W, Sn, P, Co, Pd, Ru, silica, organosilane, amide, amine, aldehyde)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,461,003 A (Havemann, et al.) 24 Oct 1995 (24.10.1995) column 2, line 37-41, column 4, line 46-56, line 61-67, column 5, line 11-16, line 26-27, line 35-41, line 48-51, line 54-58, line 61, column 6, line 13-17, line 29-32	1-3, 6-10, 16, 18-23 ----- 4-5, 11-15, 17
Y	US 6,780,753 B2 (Latchford, et al.) 24 Aug 2004 (24.08.2004) column 4, line 60-63, column 5, line 14-17, line 56-63, column 7, line 17-20	4-5, 11, 15, 17
Y	US 2004/0023253 A1 (Kunwar, et al.) 5 Feb 2004 (05.02.2004) paragraphs [0166], [0303]	12-14

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"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

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