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- (71) **Applicant (for all designated States except US):** **MICRON TECHNOLOGY, INC.** [US/US]; 8000 S Federal Way, Boise, Idaho 83716-9632 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **BEIGEL, Kurt D.** [US/US]; 4262 S Pinerest Way, Boise, Idaho 83716 (US). **TANG, Sahn D.** [—/US]; 11587 W Verde Drive, Boise, Idaho 83709 (US).
- (74) **Agent:** **DETTLAFF, Daniel A.**; Brooks, Cameron & Huebsch PLLC, 1221 Nicollet Avenue, Suite 500, Minneapolis, Minnesota 55403 (US).
- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM,

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(54) **Title:** VERTICAL MEMORY CELL

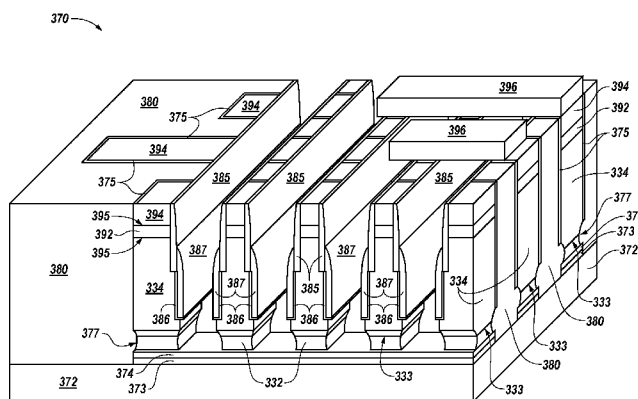


Fig. 3H

(57) **Abstract:** Methods of forming, devices, and apparatus associated with a vertical memory cell are provided. One example method of forming a vertical memory cell can include forming a semiconductor structure over a conductor line. The semiconductor structure can have a first region that includes a first junction between first and second doped materials. An etch-protective material is formed on a first pair of sidewalls of the semiconductor structure above the first region. A volume of the first region is reduced relative to a body region of the semiconductor structure in a first dimension.



INTERNATIONAL SEARCH REPORT

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PCT/US2012/047214**A. CLASSIFICATION OF SUBJECT MATTER****H01L 21/8247(2006.01)i, H01L 27/115(2006.01)i**

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)

H01L 21/8247; H01L 21/336; H01L 27/108; H01L 21/8242; H01L 29/78; H01L 31/072

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: vertical memory, cross-sectional area, junction

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 08-064777 A (TOSHIBA CORP) 08 March 1996 See paragraphs [0023]-[0025]; claim 1; and figure 1.	1-31
A	US 2004-0262635 A1 (SANG-YUN; LEE) 30 December 2004 See paragraphs [0139]-[0140]; claims 18-20; and figures 9B, 18A, 18C, 18D.	1-31
A	US 2008-0303083 A1 (OYU; KIYONORI) 11 December 2008 See paragraphs [0064]-[0067]; claims 1,5; and figure 4B.	1-31
A	US 6420228 B1 (ROESNER; WOLFGANG et al.) 16 July 2002 See column 6 line 59 - column 7 line 35; claims 1-2; and figure 7.	1-31

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

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189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan
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Authorized officer

Lee Seok Joo

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Information on patent family members

International application No.

PCT/US2012/047214

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