(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 January 2008 (24.01.2008)

PCT

(10) International Publication Number
WO 2008/011439 A3

(51) International Patent Classification:
*G11C 11/56* (2006.01)

(21) International Application Number:
PCT/US2007/073737

(22) International Filing Date: 18 July 2007 (18.07.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/458,997 20 July 2006 (20.07.2006) US
11/459,000 20 July 2006 (20.07.2006) US

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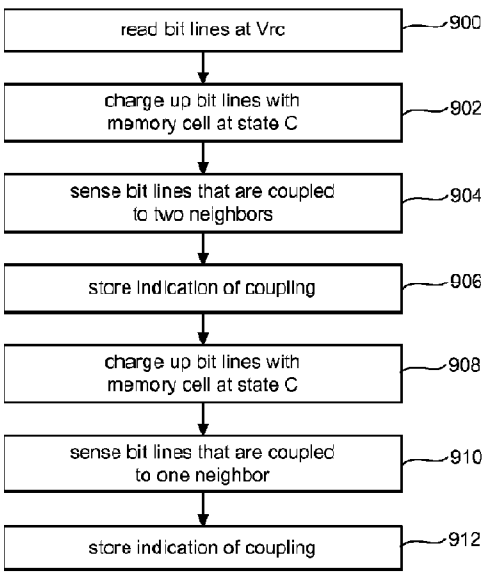
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
24 July 2008

(54) Title: COMPENSATING FOR COUPLING BETWEEN ADJACENT STORAGE ELEMENTS IN A NONVOLATILE MEMORY, BASED ON SENSING A NEIGHBOUR USING COUPLING




(57) Abstract: Shifts in the apparent charge stored on a floating gate (or other charge storing element) of a non-volatile memory cell can occur because of the coupling of an electric field based on the charge stored in adjacent floating gates (or other adjacent charge storing elements). To compensate for this coupling, the read or programming process for a given memory cell can take into account the programmed state of an adjacent memory cell. To determine whether compensation is needed, a process can be performed that includes sensing information about the programmed state of an adjacent memory cell (e.g., on an adjacent bit line or other location).

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# INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/073737

A. CLASSIFICATION OF SUBJECT MATTER
INV. G11C11/56

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)
G11C

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 practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | US 2004/109357 A1 (CERNEA RAUL-ADRIAN [US] ET AL) 10 June 2004 (2004-06-10) cited in the application paragraph [0126] - paragraph [0197]; figures 12-15 paragraph [0219] - paragraph [0231]; figures 18-20 | 1-26 |
| A | US 5 867 429 A (CHEN JIAN [US] ET AL) 2 February 1999 (1999-02-02) cited in the application column 7, line 10 - column 8, line 28; figures 5,6,8a,9,10 | 1-26 |

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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

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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 25 April 2008 | 23/05/2008 |

| Name and mailing address of the ISA/ | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL – 2280 HV Rijswijk<br>Tel. (+31–70) 340–2040, Tx. 31 651 epo nl,<br>Fax: (+31–70) 340–3016 | Cummings, Anthony |

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2007/073737

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 2004109357 A1 | 10-06-2004 | CN 101084556 A | 05-12-2007 |
| | | US 2004057287 A1 | 25-03-2004 |
| | | US 2007109889 A1 | 17-05-2007 |
| | | US 2007109847 A1 | 17-05-2007 |
| US 5867429 A | 02-02-1999 | NONE | |