

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
24 April 2003 (24.04.2003)

PCT

(10) International Publication Number
WO 03/034437 A3

(51) International Patent Classification⁷: **G11C 11/16**

(21) International Application Number: PCT/US02/30437

(22) International Filing Date:
24 September 2002 (24.09.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/978,859 16 October 2001 (16.10.2001) US

(71) Applicant: **MOTOROLA, INC.** [US/US]; 1303 East Algonquin Road, Schaumburg, IL 60196 (US).

(72) Inventors: **SAVTCHENKO, Leonid** (deceased). **ENGEL, Bradley, N.**; 5651 West Gail Drive, Chandler, AZ 85226 (US). **RIZZO, Nicholas, D.**; 1238 North Palm-springs Drive, Gilbert, AZ 85234 (US). **DEHERRERA, Mark, F.**; 2301 East Laird Street, Tempe, AZ 85281 (US). **JANESKY, Jason, Allen**; 600 South Dobson, #196, Mesa, AZ 85202 (US).

(74) Agents: **KOCH, William, E.** et al.; Corporate Law Department, Intellectual Property Section, 3102 North 56th Street, MD: AZ11/56-238, Phoenix, AZ 85018 (US).

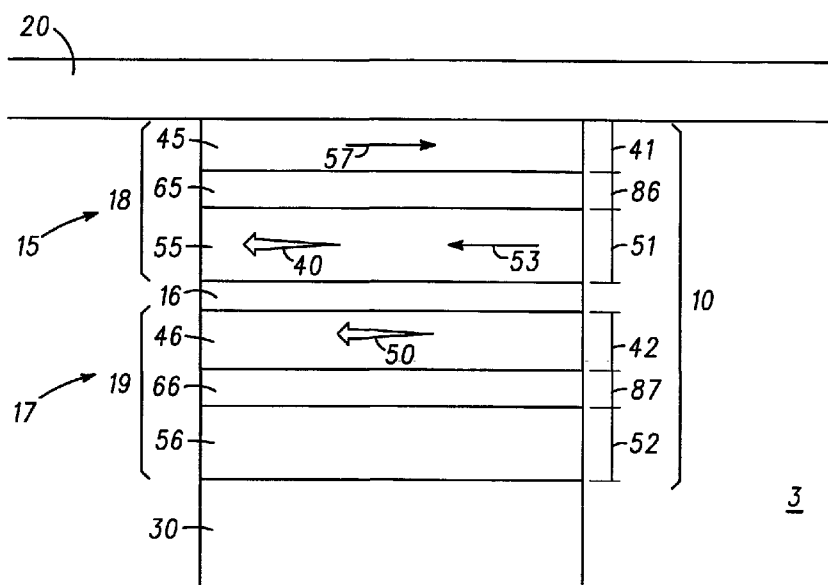
(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

[Continued on next page]

(54) Title: WRITING TO A MRAM ELEMENT COMPRISING A SYNTHETIC ANTIFERROMAGNETIC LAYER



(57) Abstract: A method to switch a scalable magnetoresistive memory cell (10) including the steps of providing a magnetoresistive memory device (3) sandwiched between a word line (20) and a digit line (30) so that current waveforms can be applied to the word and digit lines at various times to cause a magnetic field flux to rotate the effective magnetic moment vector of the device by approximately 180°. The magnetoresistive memory device includes N ferromagnetic layers that are anti-ferromagnetically coupled. N can be adjusted to change the magnetic switching volume of the device.



WO 03/034437 A3



(88) Date of publication of the international search report:
7 August 2003

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.