## (19) World Intellectual Property Organization

International Bureau



## 

# (43) International Publication Date 21 December 2007 (21.12.2007)

(10) International Publication Number WO 2007/146310 A3

(51) International Patent Classification:

**H01L 23/48** (2006.01) **H01L 29/40** (2006.01) **H01L 23/52** (2006.01)

(21) International Application Number:

PCT/US2007/013825

(22) International Filing Date: 12 June 2007 (12.06.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

11/452,805 14 June 2006 (14.06.2006) US

(71) Applicant (for all designated States except US): KINGSTON TECHNOLOGY CORPORATION [US/US]; 17600 Newhope Street, Fountain Valley, CA 92708 (US).

(72) Inventors; and

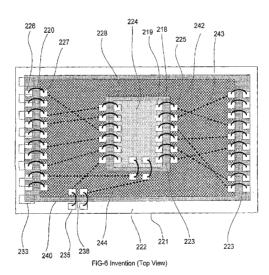
- (75) Inventors/Applicants (for US only): CHEN, Ben, Wei [US/US]; 1400 Tolteca Court, Fremont, CA 94539 (US). CHEN, David, Hong-Dien [US/US]; 68 Capecod, Irvine, CA 92620 (US). CHEN, Jason, Jajen [US/US]; 626 Broken Bow Lane, Walnut, CA 91789 (US).
- (74) Agents: SAWYER, Jr., Joseph A. et al.; Sawyer Law Group, Llp, P.o. Box 51418, Palo Alto, CA 94303 (US).

- (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: 16 October 2008

(54) Title: FLASH MEMORY CARD



(57) Abstract: A Flash memory card (10) is disclosed comprising a substrate, a Flash memory die on top of the substrate (222), a controller die (224) on top of the Flash memory die (223), and an interposer coupled to with the controller die (224) and on top the Flash memory die (223) wherein the interposer (242) results in substantial reduced wire bonding to the substrate. The interposer (242) can surround or be placed side by side with the controller die (224). A system and method in accordance with the present invention achieves the following objectives: takes advantage of as large of a Flash memory die (223) as possible, to increase the density of the Flash card by reducing the number of wire bond pads (326, 327) the substrate and enabling insertion of the largest die possible that can fit inside given card interior boundary; more efficiently stacks Flash memory dies to increase density of the Flash card (10); and has a substantially less number of bonding wires (151, 152) to the substrate as possible, to improve production yield





### INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/13825

A. CLASSIFICATION OF SUBJECT MATTER IPC: H01L 23/48( 2006.01),23/52( 2006.01),29/40( 2006.01)							
USPC: 257/724,777 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) U.S.: 257/724, 723, 777, 686, 696, 786, 784, 666							
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)							
C. DOCI	JMENTS CONSIDERED TO BE RELEVANT						
Category *	Citation of document, with indication, where ap		Relevant to claim No.				
Α	US 7, 151, 010 A (NGUYEN et al) 19 December 200	6, see entire document.	1-17				
Α	US 5, 790, 384 A (AHMAD et al.) 04 August 1998, see entire document.		1-17				
Α	US 7, 358, 444 A (NICKERSON et al) 15 April 2008, see entire document.		1-17				
X	US 7, 176, 506 A (BEROZ et al ) 13 February 2007, see entire document.		1-17				
Further	documents are listed in the continuation of Box C.	See patent family annex.					
* Special categories of cited documents:  "A" document defining the general state of the art which is not considered to be of particular relevance  "E" earlier application or patent published on or after the international filing date  "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  "O" document referring to an oral disclosure, use, exhibition or other means		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  "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  "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art					
				"P" document published prior to the international filing date but later than the priority date claimed		"&" document member of the same patent family	
				Date of the a	ctual completion of the international search	Date of mailing of the international searc	h report
19 July 2008	(19.07.2008)	14 AUG 2009					
	ailing address of the ISA/US	Authorized officer					
Mail Stop PCT, Attn: ISA/US Commissioner for Patents		/Sheila Clark / WWW Dlu Yu					
DO D 1450		Telephone No. 571 272 1725	V				
Facsimile No. (571) 273-3201							

Form PCT/ISA/210 (second sheet) (April 2007)