

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
18 June 2009 (18.06.2009)

PCT

(10) International Publication Number
WO 2009/076494 A3

- (51) International Patent Classification:
H01L 23/367 (2006.01)
- (21) International Application Number:
PCT/US2008/086338
- (22) International Filing Date:
11 December 2008 (11.12.2008)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
12/001,267 11 December 2007 (11.12.2007) US
- (71) Applicant (for all designated States except US): E. I. DU PONT DE NEMOURS AND COMPANY [US/US]; 1007 Market Street, Wilmington, Delaware 19898 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): NARITA, Hidefumi [JP/JP]; Rinkan 1-2-15-204, Yamato-shi, Kanagawa 242-0003 (JP). INABA, Akira [JP/JP]; 3-2-1 Sakado, Takatsu-Ku, Kawasaki-shi, Kanagawa 213-0012 (JP).
- (74) Agent: SIEGELL, Barbara, C.; E. I. du Pont de Nemours and Company, Legal Patent Records Center, 4417 Lancaster Pike, Wilmington, Delaware 19805 (US).

- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, 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, ST, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, 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:
30 July 2009

(54) Title: CERAMIC SUBSTRATE HAVING THERMAL VIA

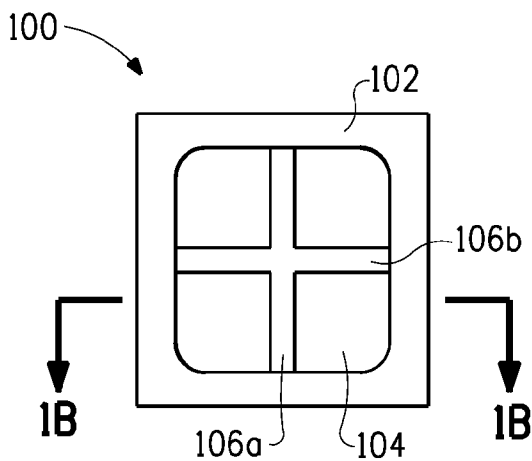


FIG. 1A

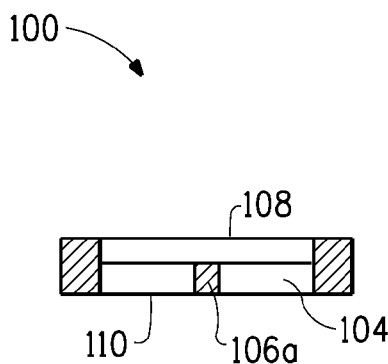


FIG. 1B

(57) Abstract: The present invention relates to a ceramic substrate having a thermal via passing through the substrate for purposes of radiating heat to the outside, wherein the ceramic substrate has a reinforcing structure that divides the opening of the thermal via into two or more parts, and the height of the reinforcing structure is less than the height of the thermal via.

WO 2009/076494 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/086338A. CLASSIFICATION OF SUBJECT MATTER
INV. H01L23/367

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

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 07 221218 A (TOKYO SHIBAURA ELECTRIC CO) 18 August 1995 (1995-08-18) the whole document	1-8
A	US 2007/108618 A1 (HASUNUMA MASAHIKO [JP] ET AL) 17 May 2007 (2007-05-17) paragraph [0009]	1-8
A	US 2006/097379 A1 (WANG CHUNG-CHENG [TW]) 11 May 2006 (2006-05-11) paragraph [0005]	1-8
A	EP 1 306 901 A (HEWLETT PACKARD CO [US]) 2 May 2003 (2003-05-02) the whole document	1-8

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

- *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.
- * & * document member of the same patent family

Date of the actual completion of the international search

15 June 2009

Date of mailing of the international search report

19/06/2009

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Kästner, Martin

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2008/086338

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 7221218	A	18-08-1995	NONE
US 2007108618	A1	17-05-2007	NONE
US 2006097379	A1	11-05-2006	NONE
EP 1306901	A	02-05-2003	JP 3955810 B2 08-08-2007
			JP 2003151978 A 23-05-2003
			US 2003077877 A1 24-04-2003
			US 2004192029 A1 30-09-2004