

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
12 September 2003 (12.09.2003)

PCT

(10) International Publication Number
WO 2003/075348 A3

(51) International Patent Classification⁷: **H01L 25/065**

(21) International Application Number:
PCT/US2003/003761

(22) International Filing Date: 7 February 2003 (07.02.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/085,869 28 February 2002 (28.02.2002) US

(71) Applicant: **MOTOROLA, INC., A CORPORATION
OF THE STATE OF DELAWARE** [US/US]; 1303 East
Algonquin Road, Schaumburg, IL 60196 (US).

(72) Inventors: **LO, Wai, Yew**; No. 30 Jalan PJU 3/23, Petal-
ing Jaya, 47810 Selangor (MY). **ARIPIN, Azhar, Bin**; Lot
16403 Bt 5 Kg Johan, Setia Kelang, 41200 Selangor (MY).
TIU, Kong, Bee; 69, Jln Jagong, Pandamaran, 42000 Port
Klang, Selangor (MY).

(74) Agent: **KOCH, William, E.**; MOTOROLA, INC., In-
tellectual 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, SC, SD, SE,
SG, 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, HU, IE, IT, LU, MC, NL, PT, SE, SI,
SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

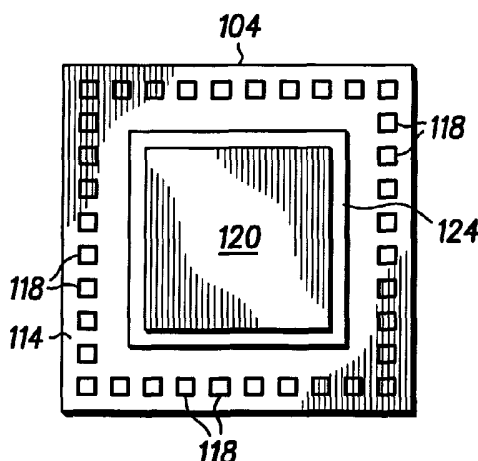
Published:

- with international search report
- 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:
22 April 2004

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

(54) Title: STACKED DIE SEMICONDUCTOR DEVICE



(57) Abstract: A stacked multichip package (100) has a base carrier (102) having a top side (108) and a bottom side (110), a bottom integrated circuit die (104) having a bottom surface (112) attached to the base carrier top side (108), and an opposing, top surface (114). The top surface (114) has a peripheral area including a plurality of first bonding pads and a central area (120). A bead (124) is formed on the top surface (114) of the bottom die (104) between the peripheral area and the central area (120). A top integrated circuit die (106) having a bottom surface is positioned over the bottom die (104) and the bottom surface of the top die (106) is attached to the top surface (114) of the bottom die (104) via the bead (124). The bead (124) maintains a predetermined spacing between the bottom die (104) and the top die (106) so that wirebonds of first wires (122) connecting the bottom die (104) to the base carrier (102) are not damaged when the top die (106) is attached to the bottom die (104).



WO 2003/075348 A3

INTERNATIONAL SEARCH REPORT

International application No

PCT/US 03/03761

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L25/065

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)

IPC 7 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, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE WPI Section EI, Week 200203 Derwent Publications Ltd., London, GB; Class U11, AN 2002-290694 XP002271519 & TW 445 610 B (SILICONWARE PREC IND CO LTD), 11 July 2001 (2001-07-11) abstract	1-4, 6, 9-15, 18-23, 25-27
A	& US 6 593 662 B1 (PU ET AL.) 15 July 2003 (2003-07-15) abstract; figures 3-5, 9 column 3, line 66 -column 4, line 53 claims 1, 14 --- -/--	5, 7, 8, 16, 17, 24, 28

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in 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

25 February 2004

Date of mailing of the international search report

09/03/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Favre, P

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/03761

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 333 562 B1 (LIN CHUN HUNG) 25 December 2001 (2001-12-25)	1-3, 6, 9-14, 18-20, 22, 25, 26
A	abstract; figures 1, 3-10 column 1, line 35 -column 2, line 3 column 2, line 36 -column 3, line 47 column 4, line 12 - line 51 claims 1-3, 8 -----	4, 8, 15, 17, 21

INTERNATIONAL SEARCH REPORT

International application No

PCT/US 03/03761

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
TW 445610	B	11-07-2001	US 6593662 B1	15-07-2003
US 6333562	B1	25-12-2001	NONE	