

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

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
20 February 2003 (20.02.2003)

PCT

(10) International Publication Number  
**WO 03/015164 A3**

(51) International Patent Classification<sup>7</sup>: **H01L 23/18**,  
23/22, 23/66

(21) International Application Number: PCT/US02/20235

(22) International Filing Date: 29 May 2002 (29.05.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
09/871,445 30 May 2001 (30.05.2001) US

(71) Applicant: **ERICSSON INC.** [US/US]; 6300 Legacy,  
Plano, TX 75024 (US).

(72) Inventor: **MOLLER, Thomas, W.**; 2100 Buena Vista  
Ave., Gilroy, CA 95020 (US).

(74) Agents: **BURLEIGH, Roger, S.** et al.; Ericsson Inc., 6300  
Legacy, MS EVW 2-C-2, Plano, TX 75024 (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, 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, CH, CY, DE, DK, ES, FI, FR,  
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent  
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,  
NE, SN, TD, TG).

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

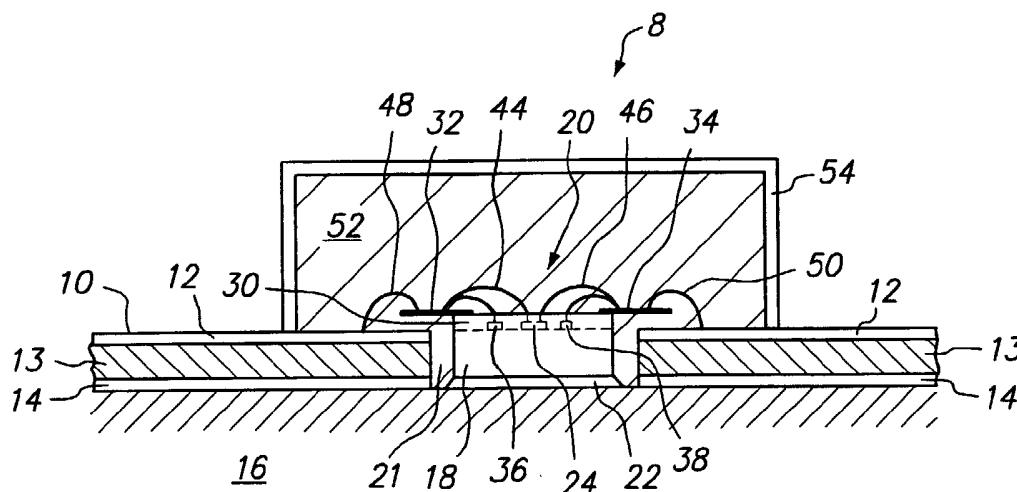
**Published:**

- with international search report

(88) Date of publication of the international search report:  
4 December 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.

(54) Title: DAMPING OF HIGH FREQUENCY BOND WIRE VIBRATION



(57) Abstract: A plurality of conductors and an electrical component are disposed on a substrate, wherein the electrical component has a plurality of leads that are connected to the conductors on the substrate by a plurality of bond wires (44, 46, 48, 50). A damping material (52) is then situated in contact with the plurality of bond wires (44, 46, 48, 50), the damping material (52) chosen so that the plurality of bond wires (44, 46, 48, 50) can move in relation to the damping material (52). The damping material (52) may be a viscous liquid kept in contact with the bond wires (44, 46, 48, 50) by a containing lid (54) attached to the substrate (10). Alternatively, the damping material (52) may be a colloidal mixture involving a liquid or an elastomer.



WO 03/015164 A3

## INTERNATIONAL SEARCH REPORT

PCT/US 02/20235

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L23/18 H01L23/22 H01L23/66

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, PAJ, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages                                                                                      | Relevant to claim No.   |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| X          | PATENT ABSTRACTS OF JAPAN<br>vol. 016, no. 521 (E-1285),<br>27 October 1992 (1992-10-27)<br>- & JP 04 196233 A (MITSUBISHI ELECTRIC<br>CORP), 16 July 1992 (1992-07-16) | 1, 4, 5,<br>10-12       |
| Y          | abstract                                                                                                                                                                | 2                       |
| X          | PATENT ABSTRACTS OF JAPAN<br>vol. 016, no. 162 (E-1192),<br>20 April 1992 (1992-04-20)<br>- & JP 04 012556 A (OKI ELECTRIC IND CO<br>LTD), 17 January 1992 (1992-01-17) | 1, 3, 4, 6,<br>9, 11-13 |
| Y          | abstract                                                                                                                                                                | 2                       |
| A          | WO 92 20096 A (SENSOROR AS)<br>12 November 1992 (1992-11-12)<br>page 20, line 5 - line 15<br>page 24, line 5 - page 25, line 27                                         | 3, 6, 9, 13             |
|            | ---<br>-/--                                                                                                                                                             |                         |

☒ 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.
- \*Z\* document member of the same patent family

Date of the actual completion of the international search

16 April 2003

Date of mailing of the international search report

25/04/2003

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

Ah1stedt, M

## INTERNATIONAL SEARCH REPORT

PCT/US' 02/20235

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                                                                                                                                                                                                                                                                            |                       |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Category °                                           | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                                                                                                         | Relevant to claim No. |
| A                                                    | <p>LEIDECKER H ET AL: "Vibration-induced fatigue failures in bonding wires used in stacked chip modules" , MULTICHIP MODULES AND HIGH DENSITY PACKAGING, 1998. PROCEEDINGS. 1998 INTERNATIONAL CONFERENCE ON DENVER, CO, USA 15-17 APRIL 1998, NEW YORK, NY, USA, IEEE, US, PAGE(S) 308-313 XP010277211<br/>ISBN: 0-7803-4850-8<br/>the whole document</p> | 1-10                  |

## INTERNATIONAL SEARCH REPORT

PCT/US 02/20235

| Patent document<br>cited in search report |   | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|---|---------------------|----------------------------|---------------------|
| JP 04196233                               | A | 16-07-1992          | NONE                       |                     |
| JP 04012556                               | A | 17-01-1992          | NONE                       |                     |
| WO 9220096                                | A | 12-11-1992          | AT 136686 T                | 15-04-1996          |
|                                           |   |                     | AU 649139 B2               | 12-05-1994          |
|                                           |   |                     | AU 1747492 A               | 21-12-1992          |
|                                           |   |                     | BR 9205261 A               | 20-07-1993          |
|                                           |   |                     | CA 2086825 A1              | 07-11-1992          |
|                                           |   |                     | DE 69209772 D1             | 15-05-1996          |
|                                           |   |                     | DE 69209772 T2             | 07-11-1996          |
|                                           |   |                     | EP 0539555 A1              | 05-05-1993          |
|                                           |   |                     | JP 6500205 T               | 06-01-1994          |
|                                           |   |                     | KR 134790 B1               | 20-04-1998          |
|                                           |   |                     | NO 930028 A                | 06-01-1993          |
|                                           |   |                     | WO 9220096 A1              | 12-11-1992          |