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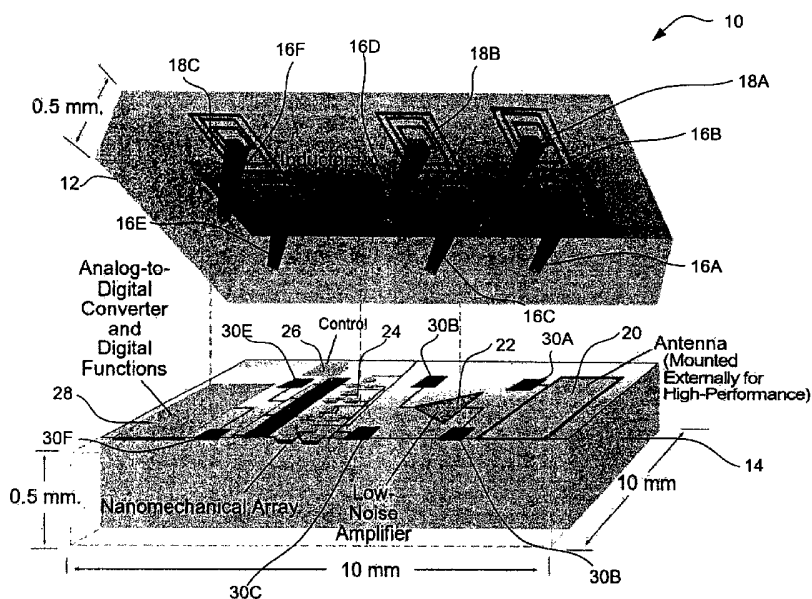
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(54) Title: PACKAGE WITH INTEGRATED INDUCTOR AND/OR CAPACITOR



(57) Abstract: Methods for attaching two wafers are presented along with devices resulting from such methods. In one illustrative embodiment, a first wafer is provided having pillars for conducting an electric signal. The wafer also includes an electronic device such as an inductor or capacitor that may in some instances consume relatively large amounts of space. The first wafer is bonded to a second wafer so that a circuit on the second wafer may be electrically connected to the electronic device of the first wafer.



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.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/27680

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L21/98 H01L23/64 H01L25/16 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 B81B

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 5 354 695 A (LEEDY GLENN J) 11 October 1994 (1994-10-11) abstract; figures 5,7,17A-17C,28A,28B,29E,29L column 5, line 23-61 column 11, line 67 -column 12, line 19 column 26, line 52 -column 28, line 55 column 37, line 23-36 column 40, line 41 -column 41, line 27 column 44, line 13 -column 45, line 46 ---	1-31, 41-44 32,33,36
X A	US 5 455 445 A (KURTZ ANTHONY D ET AL) 3 October 1995 (1995-10-03) the whole document --- -/--	1,2,7,9, 14-25, 27-31, 41-44 32,33,36

☒ 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

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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

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/27680

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 56921 A (RAYTHEON CO) 9 August 2001 (2001-08-09)	20-29, 31
A	abstract; figures 6,7,11-13 page 19, line 32 -page 24, line 3 ---	32, 33, 36
P,A	WO 01 65598 A (COMMISSARIAT ENERGIE ATOMIQUE ;VIEUX ROCHAZ LINE (FR); CUCHET ROBE) 7 September 2001 (2001-09-07) abstract; figure 10 ---	1, 20, 30, 31
A	WO 00 65689 A (CHUNG KEVIN KWONG TAI ;AMERASIA INTERNAT TECHNOLOGY I (US)) 2 November 2000 (2000-11-02) abstract; figure 7 ---	13
A	US 5 625 297 A (ARNAUDOV KONSTANTIN ET AL) 29 April 1997 (1997-04-29) column 9, line 38 -column 10, line 60; figures 2D,E ---	22, 32-40
A	US 6 133 065 A (AKRAM SALMAN) 17 October 2000 (2000-10-17) column 2, line 40 -column 3, line 30; figure 12 ---	32-40
A	US 5 326 428 A (GRIEF MALCOLM ET AL) 5 July 1994 (1994-07-05) abstract; figures 12,13 -----	32-40

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 02/27680

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-31,41-44

A method of attaching two wafers comprising:

- providing a first and second wafer wafer
- creating a pit to define a pillar in the second wafer
- adapting the pit to conduct and electric signal
- attaching the first wafer to the second wafer

2. Claims: 32-40

A method comprising:

- providing a first and second wafer wafer
- creating a pit to define a pillar in the second wafer
- adapting a first region of the pillar to be electrically conductive
- adapting a second region of the pillar to be electrically conductive, the second region separate from the first region

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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