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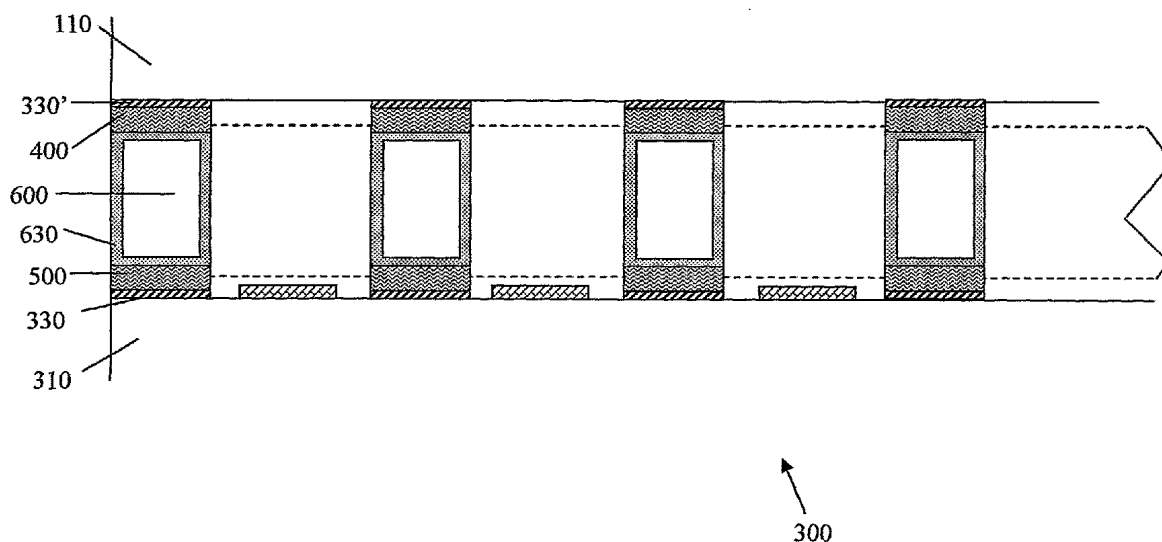
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(54) Title: WAFER LEVEL HERMETIC BOND USING METAL ALLOY



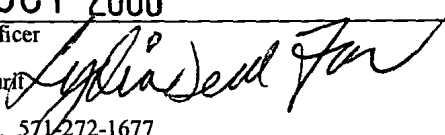
(57) Abstract: Systems and methods for forming an encapsulated MEMS device include a hermetic seal which seals an insulating gas between two substrates, one of which supports the MEMS device. The hermetic seal may be formed by heating at least two metal layers, in order to melt at least one of the metal layers. The first melted metal material flows into and forms an alloy with a second metal material, forming a hermetic seal which encapsulates the MEMS device.

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/32431

| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>IPC: <b>H01L 21/00( 2006.01);H01L 33/00( 2006.01)</b><br><br>USPC: <b>438/48-55;438/106-127: 438/455-464 257/678-884,700-704,710-711</b><br>According to International Patent Classification (IPC) or to both national classification and IPC |                                                                                                                                                                     |                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>B. FIELDS SEARCHED</b><br><br>Minimum documentation searched (classification system followed by classification symbols)<br>U.S. : 438/48-55;438/106-127: 438/455-464 257/678-884, 700-704, 710-711                                                                                       |                                                                                                                                                                     |                                                                                                                                                                                                                                                  |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched<br>NONE                                                                                                                                                       |                                                                                                                                                                     |                                                                                                                                                                                                                                                  |
| Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)<br>NONE                                                                                                                                                        |                                                                                                                                                                     |                                                                                                                                                                                                                                                  |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>                                                                                                                                                                                                                                               |                                                                                                                                                                     |                                                                                                                                                                                                                                                  |
| Category *                                                                                                                                                                                                                                                                                  | Citation of document, with indication, where appropriate, of the relevant passages                                                                                  | Relevant to claim No.                                                                                                                                                                                                                            |
| Y                                                                                                                                                                                                                                                                                           | US 2004/0126953A1 (CHEUNG) 01 JULY 2004 (01.07.2004), para 0038                                                                                                     | 7-8,11,13,18,22                                                                                                                                                                                                                                  |
| X                                                                                                                                                                                                                                                                                           | US 2005//0093134 A1 (TARN) 05 May 2005 (05.05.2005), Fig. 4a , Fig.5 , para 0027, para 0031, praa 0036                                                              | 1-6, 12, 14, 19-21                                                                                                                                                                                                                               |
| ---                                                                                                                                                                                                                                                                                         |                                                                                                                                                                     | -----                                                                                                                                                                                                                                            |
| Y                                                                                                                                                                                                                                                                                           |                                                                                                                                                                     | 7, 8, 11, 13,18,22                                                                                                                                                                                                                               |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.                                                                                                                                                       |                                                                                                                                                                     |                                                                                                                                                                                                                                                  |
| * Special categories of cited documents:                                                                                                                                                                                                                                                    |                                                                                                                                                                     |                                                                                                                                                                                                                                                  |
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| "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) | "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 |
| "O"                                                                                                                                                                                                                                                                                         | document referring to an oral disclosure, use, exhibition or other means                                                                                            | "&" document member of the same patent family                                                                                                                                                                                                    |
| "P"                                                                                                                                                                                                                                                                                         | document published prior to the international filing date but later than the priority date claimed                                                                  |                                                                                                                                                                                                                                                  |
| Date of the actual completion of the international search<br>22 June 2008 (22.06.2008)                                                                                                                                                                                                      |                                                                                                                                                                     | Date of mailing of the international search report<br><b>24 OCT 2008</b>                                                                                                                                                                         |
| Name and mailing address of the ISA/US<br>Mail Stop PCT, Attn: ISA/US<br>Commissioner for Patents<br>P.O. Box 1450<br>Alexandria, Virginia 22313-1450<br>Facsimile No. (571) 273-3201                                                                                                       |                                                                                                                                                                     | Authorized officer<br>Savitri Mulpuria <br>Telephone No. 571-272-1677                                                                                        |