



- (51) International Patent Classification:
H05K 5/00 (2006.01) *H01L 23/31* (2006.01)
H01L 25/16 (2006.01) *H01L 23/60* (2006.01)
- (21) International Application Number:
PCT/US2017/016361
- (22) International Filing Date:
03 February 2017 (03.02.2017)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
16290025.2 04 February 2016 (04.02.2016) EP
- (71) Applicant (for US only): **SCHLUMBERGER TECHNOLOGY CORPORATION** [US/US]; 300 Schlumberger Drive, Sugar Land, Texas 77478 (US).
- (71) Applicant (for CA only): **SCHLUMBERGER CANADA LIMITED** [CA/CA]; 125 - 9 Avenue SE, Calgary, Alberta T2G 0P6 (CA).
- (71) Applicant (for FR only): **SERVICES PETROLIERS SCHLUMBERGER** [FR/FR]; 42 rue Saint Dominique, 75007 Paris (FR).
- (71) Applicant (for all designated States except CA, FR, US): **SCHLUMBERGER TECHNOLOGY B.V.** [NL/NL]; Parkstraat 83-89m, NL-2514 JG The Hague (NL).
- (72) Inventors: **CHAVES, Cleverson Souza**; 1 Henri Becquerel, 92143 Clamart (FR). **BARBARA, Francois**; SCHLUMBERGER Riboud Product Center, 1, rue Henri Becquerel, 92142 Clamart (FR).
- (74) Agent: **BECKNER, Joan** et al.; 10001 Richmond Avenue, IP Administration Center of Excellence, Room 4720, Houston, Texas 77042 (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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

(54) Title: DOUBLE-SIDED HERMETIC MULTICHIP MODULE

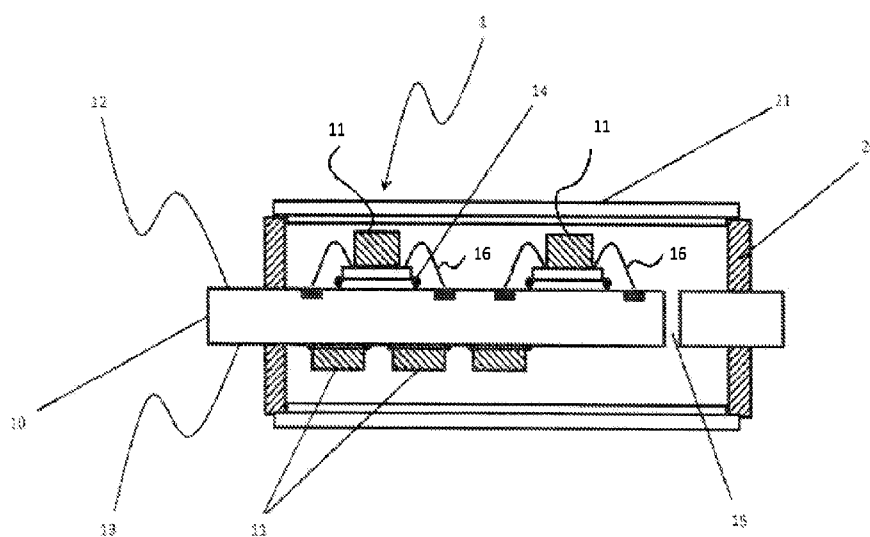


FIG. 2

(57) Abstract: A packaged electronic module for downhole applications, for example in a petrochemical well or similar environment. The electronic module includes one or more electronic components located on each side of a substrate, where the one or more electronic components are attached to the substrate by means of an adhesive.



Published:

— *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:

26 July 2018 (26.07.2018)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/016361**A. CLASSIFICATION OF SUBJECT MATTER****H05K 5/00(2006.01)i, H01L 25/16(2006.01)i, H01L 23/31(2006.01)i, H01L 23/60(2006.01)i**

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)

H05K 5/00; H01L 21/56; E21B 43/24; H01L 23/48; H01L 21/66; H01L 25/07; H01L 23/488; H01L 25/16; H01L 23/31; H01L 23/60

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: packaged electronic module, downhole, borehole, electronic component, multi-chip module

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2015-0130040 A1 (HARMEL JEAN DEFRETIN et al.) 14 May 2015 See paragraphs [0046], [0067]-[0071], claims 1, 15 and figures 2A, 12A, 13.	1-3, 15-17, 19
Y		18
Y	US 2013-0087903 A1 (SCHLUMBERGER TECHNOLOGY CORPORATION) 11 April 2013 See paragraph [0033] and figure 3.	18
A	US 2005-0098318 A1 (PAUL F. RODNEY et al.) 12 May 2005 See paragraphs [0027], [0031] and figures 3, 5.	1-3, 15-19
A	US 2007-0158834 A1 (ROGER L. SCHULTZ et al.) 12 July 2007 See paragraphs [0026]-[0030] and figures 2-3.	1-3, 15-19
A	US 2008-0112143 A1 (HUGH PATTON HANLEY) 15 May 2008 See paragraphs [0028]-[0034] and figures 1, 7.	1-3, 15-19

 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 application or patent 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

20 March 2017 (20.03.2017)

Date of mailing of the international search report

21 March 2017 (21.03.2017)

Name and mailing address of the ISA/KR

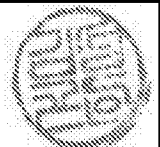
International Application Division
Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea

Facsimile No. +82-42-481-8578

Authorized officer

KIM, Sung Gon

Telephone No. +82-42-481-8746



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2017/016361

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2015-0130040 A1	14/05/2015	CA 2831916 A1 EP 2695188 A2 MX 2013011403 A MX 338271 B US 9431375 B2 WO 2012-135406 A2 WO 2012-135406 A3	04/10/2012 12/02/2014 31/01/2014 11/04/2016 30/08/2016 04/10/2012 25/04/2013
US 2013-0087903 A1	11/04/2013	WO 2013-050948 A1	11/04/2013
US 2005-0098318 A1	12/05/2005	EP 1700003 A2 EP 1700003 B1 US 7363971 B2 WO 2005-048664 A2 WO 2005-048664 B1	13/09/2006 14/08/2013 29/04/2008 26/05/2005 03/11/2005
US 2007-0158834 A1	12/07/2007	US 7804172 B2 WO 2007-082205 A2 WO 2007-082205 A3	28/09/2010 19/07/2007 02/05/2008
US 2008-0112143 A1	15/05/2008	US 7615712 B2	10/11/2009