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Declarations under Rule 4.17:

[Continued on next page]

(54) Title: MEMS ELEMENT

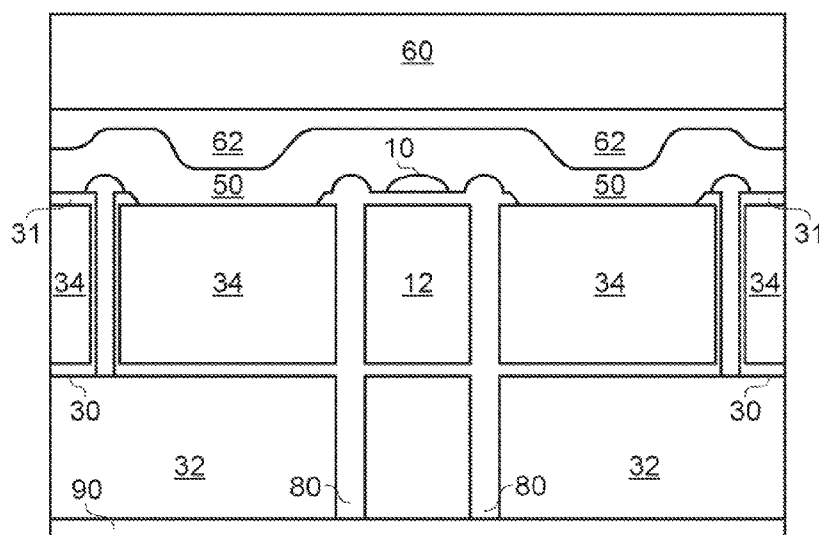


FIG. 9

(57) Abstract: A method of manufacturing an electronic device that comprises a microelectromechanical (MEMS) element, the method comprising the steps of: providing a material layer (34) on a first side of a substrate (32); providing a trench (40) in the material later (34); etching material from the trench (40) such as to also etch the substrate (32) from the first side of the substrate (32); grinding the substrate (32) from a second side of the substrate to expose the trench (40); and using the exposed trench (40) as an etch hole. The exposed trench (40) is used as an etch hole for releasing a portion of the material layer (34), for example a beam resonator (12), from the substrate (32). An input electrode (6), an output electrode (8), and a top electrode (10) are provided.



- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))* — *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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A. CLASSIFICATION OF SUBJECT MATTER
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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)

B81C B81B H03H

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 764 917 A (AVAGO TECHNOLOGIES GENERAL IP [SG]) 21 March 2007 (2007-03-21) page 5, paragraph 23 - page 7, paragraph 51 figures 1A-1R	1-10
A	US 2003/054645 A1 (SHELDON GARY S [US]) 20 March 2003 (2003-03-20) * abstract page 8, paragraph 103 - page 9, paragraph 113 figures 1-16 ----- -/--	1-10

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2005/218488 A1 (MATSUO MIE [JP]) 6 October 2005 (2005-10-06) * abstract page 3, paragraph 35 - page 4, paragraph 44 figures 2A-2F -----	1-10
A	EP 1 529 753 A (AKUSTICA INC [US]) 11 May 2005 (2005-05-11) column 9, paragraph 25 - column 10, paragraph 29 figure 22 -----	1-10
A	US 2008/290494 A1 (LUTZ MARKUS [US] ET AL) 27 November 2008 (2008-11-27) page 6, paragraph 82 page 8, paragraph 102 figure 3 figure 4K -----	1-10
A	WO 2007/057814 A (KONINKL PHILIPS ELECTRONICS NV [NL]; PHILIPS INTELLECTUAL PROPERTY [DE]) 24 May 2007 (2007-05-24) cited in the application page 10, paragraphs 3,4 figure 1 -----	1-10
A	US 2006/081056 A1 (SILVERBROOK KIA [AU] ET AL SILVERBROOK KIA [AU] ET AL) 20 April 2006 (2006-04-20) page 7, paragraph 131-142 figure 23 -----	1-10
A	WO 2007/078989 A (ANALOG DEVICES INC [US]; WEIGOLD JASON W [US]) 12 July 2007 (2007-07-12) page 7, paragraph 15 - page 10, paragraph 2 figure 1b -----	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2010/052348

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1764917	A	21-03-2007	CN 1917366 A	21-02-2007
			JP 2007006486 A	11-01-2007
			KR 20060133497 A	26-12-2006
			US 2006284707 A1	21-12-2006
US 2003054645	A1	20-03-2003	NONE	
US 2005218488	A1	06-10-2005	CN 1677705 A	05-10-2005
			JP 3875240 B2	31-01-2007
			JP 2005294462 A	20-10-2005
			TW 254343 B	01-05-2006
			US 2006157808 A1	20-07-2006
EP 1529753	A	11-05-2005	JP 2005161516 A	23-06-2005
US 2008290494	A1	27-11-2008	NONE	
WO 2007057814	A	24-05-2007	CN 101309854 A	19-11-2008
			EP 1951612 A2	06-08-2008
			JP 2009516346 T	16-04-2009
			KR 20080077958 A	26-08-2008
			US 2008283943 A1	20-11-2008
US 2006081056	A1	20-04-2006	US 2009025481 A1	29-01-2009
			US 2007062295 A1	22-03-2007
			US 2010043564 A1	25-02-2010
WO 2007078989	A	12-07-2007	NONE	