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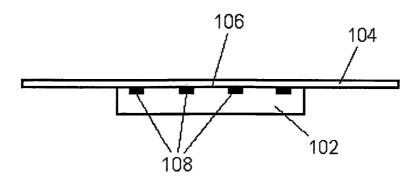
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(54) Title: DIRECT BUILD-UP LAYER ON AN ENCAPSULATED DIE PACKAGE



(57) Abstract: A microelectronic package including a microelectronic die having an active surface and at least one side. An encapsulation material is disposed adjacent the microelectronic die side(s), wherein the encapsulation material includes at least one surface substantially planar to the microelectronic die active surface. A first dielectric material layer may be disposed on at least a portion of the microelectronic die active surface and the encapsulation material surface. At least one conductive trace is then disposed on the first dielectric material layer. The conductive trace(s) is in electrical contact with the microelectronic die active surface. At least one conductive trace extends adjacent the microelectronic die active surface and adjacent the encapsulation material surface.



INTERNATIONAL SEARCH REPORT

Intern all Application No PCT/US 01/25060

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 H01L23/31

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

 $\begin{array}{ll} \mbox{Minimum documentation searched (classification system followed by classification symbols)} \\ \mbox{IPC 7} & \mbox{H01L} \end{array}$

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, PAJ

C. DOCOM	ENTS CONSIDERED TO BE RELEVANT		Delevent to alaim No
Category °	Citation of document, with indication, where appropriate, of the	relevant passages	Relevant to claim No.
(EP 0 611 129 A (GEN ELECTRIC) 17 August 1994 (1994-08-17)		1–19
A	abstract; figures 1A,1E,4A,5B,8 column 1, line 55 -column 2, li column 5, line 37 -column 7, li column 9, line 40 -column 12, l column 15, line 19 - line 46 claims 1,11-14,17	ne 51 ne 3	20-23
X	US 5 291 066 A (NEUGEBAUER CONS		1-3
A	ET AL) 1 March 1994 (1994-03-01 abstract; figure 1A column 1, line 45 -column 2, li column 2, line 66 -column 3, li	ne 26	5–8
X Fur	ther documents are listed in the continuation of box C.	X Patent family members are listed	i in annex.
° Special c	ategories of cited documents:	*T* later document published after the int	ernational filing date
	nent defining the general state of the art which is not dered to be of particular relevance	or priority date and not in conflict with cited to understand the principle or the invention	n the application but
"E" earlier filing	document but published on or after the international date	"X" document of particular relevance; the cannot be considered novel or cannot	ot be considered to
which	ent which may throw doubts on priority claim(s) or n Is cited to establish the publication date of another on or other special reason (as specified)	involve an inventive step when the d "Y" document of particular relevance; the cannot be considered to involve an in	claimed invention nventive step when the
other	nent referring to an oral disclosure, use, exhibition or r means nent published prior to the international filing date but	document is combined with one or ments, such combination being obvious in the art.	ous to a person skilled
later	than the priority date claimed e actual completion of the international search	"&" document member of the same paten Date of mailing of the international se	
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INTERNATIONAL SEARCH REPORT

Interi ial Application No PCT/US 01/25060

		PCT/US 01/25060
	ation) DOCUMENTS CONSIDERED TO BE RELEVANT	Relevant to claim No.
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Helevani to claim No.
Х	EP 0 707 340 A (MARTIN MARIETTA CORP) 17 April 1996 (1996-04-17) abstract; figure 10	1-3
A	column 2, line 3 -column 3, line 8 column 4, line 34 -column 7, line 3	5-8
		-

INTERNATIONAL SEARCH REPORT

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Intel	ai Application No	
PCT/	US 01/25060	

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0611129	A	17-08-1994	US DE DE EP JP US	5353498 A 69430765 D1 69430765 T2 0611129 A2 7007134 A 5497033 A	11-10-1994 18-07-2002 23-01-2003 17-08-1994 10-01-1995 05-03-1996
US 5291066	A	01-03-1994	NONE		ريو پيدا ۱۳۰۰ کار پيدار پيدا اين اين اين اين اين اين اين اين اين اي
EP 0707340	Α	17-04-1996	US EP JP	5527741 A 0707340 A2 8306737 A	18-06-1996 17-04-1996 22-11-1996