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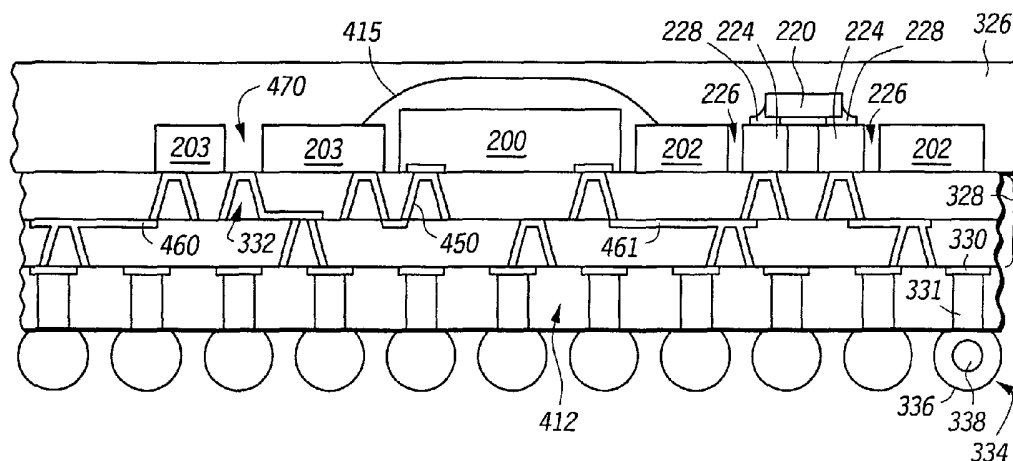
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[Continued on next page]

(54) Title: CIRCUIT DEVICE WITH AT LEAST PARTIAL PACKAGING AND METHOD FOR FORMING



(57) Abstract: In one embodiment, circuit device (15) is placed within an opening of a conductive layer (10) which is then partially encapsulated with an encapsulant (24) so that the active surface of the circuit device (15) is coplanar with the conductive layer (10). In this embodiment, at least a portion of the conductive layer (10) may be used as a reference voltage plane (e.g. a ground plane). In one embodiment, circuit device (115) is placed on a conductive layer (100) such that an active surface of circuit device (115) is between conductive layer (100) and an opposite surface of circuit device (115). In this embodiment, conductive layer (100) has at least one opening (128) to expose the active surface of circuit device (115). The encapsulant (24, 126, 326) may be electrically conductive for some embodiments, and electrically non-conductive for other embodiments.

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GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/11871

A. CLASSIFICATION OF SUBJECT MATTER		
IPC(7) : H01L 23/48		
US CL : 257/686,685,723,777,684,796,787,712,713,691,698		
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) U.S. : 257/686,685,723,777,684,796,787,712,713,691,698		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,159,767 A (Eichelberger) 12 December 2000 (12.12.2000), figures 1 to 9e, specifically figure 6.	1-37, 42-81
X	WO 02/21595 A2 (Henao) 14 March 2002 (14.03.2002), figures 1-18, specifically figure 18.	1-37, 42-81
<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:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent published on or after the international filing date	"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
"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	Date of mailing of the international search report	
02 February 2005 (02.02.2005)	22 JUN 2005	
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner of Patents P.O. Box 1450 Alexandria, Virginia 22313-1450	Authorized officer <i>for</i> Alexander O. Williams <i>James R. McArthur</i>	
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/11871

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

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

1. Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claim 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. Claim 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:
Please See Continuation 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.: 1-37 and 42-81

Remark on Protest The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

PCT/US04/11871

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-37 and 42-45, drawn to a device, classified in 257/ subclass 723.

Group II, claim(s) 38-41 and 82-84, drawn to a method, classified in class 438, subclass 15+.

The inventions listed as Groups II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Instead of removing the adhesive layer after forming the encapsulation layer, it can be removed before the encapsulation layer.

During a telephone call on 3/10/05 with Jim Clingan for Susan Hill, an election was made to process with the same election as in the U.S. Patent Application case., therefore, Group I will be examined.

However, a further lack of unity is required below:

This application contains claims directed to the following patentably distinct species of the claimed invention;

Species I, figures 1-5

Species II, figure 6

Species III, figures 7 and 8

During a telephone call on 3/10/05 with Jim Clingan for Susan Hill, an election was made to process with the same election as in the U.S. Patent Application case., therefore, Group I will be examined. Since Group I has been further restricted for lack of unity, according to the telephone instructions detailed above, Species I will be examined for Group I as examined in the U.S. Patent Application