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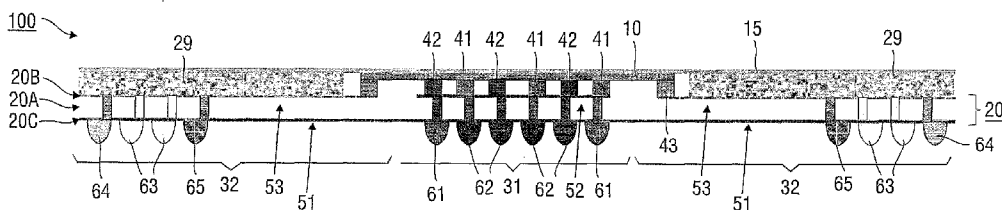
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(54) Title: ELECTRONIC DEVICE AND CARRIER SUBSTRATE



(57) Abstract: The electronic device comprises a semiconductor device (10), particularly an integrated circuit, and a carrier substrate (20) with conductive layers on the first side (21) and the second side (22), and voltage supply (29) and ground connections (61) mutually arranged according to a chessboard pattern. These connections (61,62) extend in a direct path through vertical interconnects and bumps (41,42) to bond pads at the integrated circuit, which bond pads are arranged in a corresponding chessboard pattern. As a result, an array of direct paths is provided, wherein the voltage supply connections (62) form as much as possible the coaxial center conductors of a coaxial structure.



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

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category ^o	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 175 158 B1 (DEGANI YINON ET AL) 16 January 2001 (2001-01-16) column 3, line 5 - line 9; claim 1; figure 1	1-11
Y	US 2002/017399 A1 (CHANG HUEY-RU ET AL) 14 February 2002 (2002-02-14) paragraph [0064]	1-11
A	US 6 330 164 B1 (KHANDROS IGOR Y ET AL) 11 December 2001 (2001-12-11) column 3, line 64 - column 4, line 10	2
A	US 2002/057558 A1 (BARROW MICHAEL) 16 May 2002 (2002-05-16) the whole document	1-11
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Patent family members are listed in 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 6 448 639 B1 (MA SHU JUNG) 10 September 2002 (2002-09-10) the whole document -----	1-11
A	EP 1 026 742 A (TRW INC) 9 August 2000 (2000-08-09) the whole document -----	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB2004/051946

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 6175158	B1	16-01-2001	KR 2000022978 A	25-04-2000
			SG 92651 A1	19-11-2002
			TW 423134 B	21-02-2001
US 2002017399	A1	14-02-2002	TW 525417 B	21-03-2003
			US 2004149490 A1	05-08-2004
US 6330164	B1	11-12-2001	US 5917707 A	29-06-1999
			US 5829128 A	03-11-1998
			US 6043563 A	28-03-2000
			US 6049976 A	18-04-2000
			US 5476211 A	19-12-1995
			US 6669489 B1	30-12-2003
			US 2002074653 A1	20-06-2002
			AU 4159896 A	06-06-1996
			AU 4159996 A	17-06-1996
			AU 4160096 A	06-06-1996
			AU 4237696 A	06-06-1996
			AU 4283996 A	19-06-1996
			CN 1135268 A ,C	06-11-1996
			CN 1171167 A ,C	21-01-1998
			DE 69431565 D1	21-11-2002
			DE 69431565 T2	12-06-2003
			DE 69530103 D1	30-04-2003
			DE 69530103 T2	11-12-2003
			DE 69531996 D1	27-11-2003
			DE 69531996 T2	22-07-2004
			DE 69533041 D1	17-06-2004
			DE 69533041 T2	16-09-2004
			DE 69533336 D1	09-09-2004
			DE 69533336 T2	13-01-2005
			EP 1198001 A2	17-04-2002
			EP 1241481 A2	18-09-2002
			EP 1262782 A2	04-12-2002
			EP 1408338 A2	14-04-2004
			EP 1408337 A2	14-04-2004
			EP 1441232 A2	28-07-2004
			EP 1439397 A2	21-07-2004
			EP 1447846 A2	18-08-2004
			EP 0729652 A1	04-09-1996
			EP 0795200 A1	17-09-1997
			EP 0792519 A1	03-09-1997
			EP 0792462 A1	03-09-1997
			EP 0792463 A1	03-09-1997
			EP 0792517 A1	03-09-1997
			JP 2000124397 A	28-04-2000
			JP 2000067953 A	03-03-2000
			JP 3157134 B2	16-04-2001
			JP 11126800 A	11-05-1999
			JP 3006885 B2	07-02-2000
			JP 9505439 T	27-05-1997
			JP 2892505 B2	17-05-1999
			JP 9508241 T	19-08-1997
			JP 3386077 B2	10-03-2003
			JP 10506197 T	16-06-1998
			JP 9512139 T	02-12-1997
			JP 3387930 B2	17-03-2003

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB2004/051946

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2002057558	A1	16-05-2002	US 5894410 A	13-04-1999
			US 2004262038 A1	30-12-2004
			AU 2070197 A	17-10-1997
			CN 1185892 A ,C	24-06-1998
			DE 69732166 D1	10-02-2005
			EP 1482773 A1	01-12-2004
			EP 0835600 A1	15-04-1998
			IL 122107 A	31-10-2003
			JP 11506274 T	02-06-1999
			WO 9736466 A1	02-10-1997

US 6448639	B1	10-09-2002	NONE	

EP 1026742	A	09-08-2000	US 6194669 B1	27-02-2001
			EP 1026742 A2	09-08-2000
			JP 3292719 B2	17-06-2002
			JP 2000232197 A	22-08-2000
