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(54) **Title:** METHOD AND DESIGN OF AN RF THRU-VIA INTERCONNECT

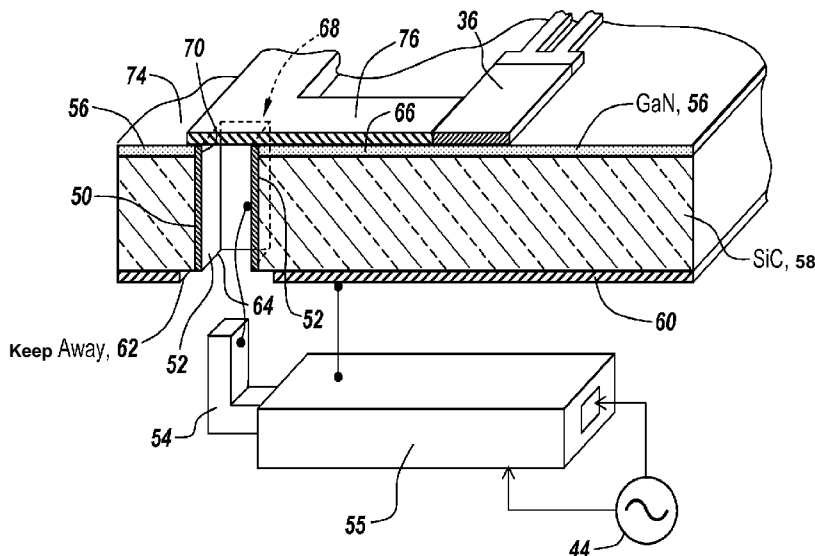


Fig. 4

(57) **Abstract:** In summary, a vertical metalized transition in the form of a via goes from the back side of a high thermal conductivity substrate and through any semiconductor layers thereon to a patterned metalized strip, with the substrate having a patterned metalized layer on the back side that is provided with a keep away zone dimensioned to provide impedance matching for RF energy coupled through the substrate to the semiconductor device while at the same time permitting the heat generated by the semiconductor device to flow through the high thermal conductivity substrate, through the back side of the substrate and to a heat sink.



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, ML, MR, NE, SN, TD, TG).

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USPC - 257/401
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
USPC: 257/401 ; 257/E21.409; 257/E27.06; 438/197 (keyword delimited-see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Patbase; Google Patents; Google Scholar
Search Terms Used: RF, radio, frequency, semiconductor, chip, vertical, via, stripped, metalization, backside, thermal, heat, sink, port, impedance, matching, transition, interconnect, GaN, back, connection, transmission, line, pin, chip

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y --- A	US 2002/0055265 A1 (RING) 09 May 2002 (09.05.2002), para [0010], [0031], [0032]	1-5 ----- 6-22
Y --- A	US 2005/0023656 A1 (LEEDY) 03 February 2005 (03.02.2005), para [0098], [0133], [0447], [0451]-[0453], [0455], [0486], [0507], [0637]-[0638], [0666]-[0667]	1-5 ----- 6-22
A	US 2009/0108437 A1 (RAYMOND) 30 April 2009 (30.04.2009), para [0010], [0036]	6-22
A	US 2006/0092079 A1 (DE ROCHEMONT) 04 May 2006 (04.05.2006), para [0078], [0080], [0090] [0093]-[0094], [0114]-[0115]	6-22
A	US 6,362,703 B1 (KEESEY et al.) 26 March 2002 (26.03.2002), col 2 ln 57- col 3, ln 17	6-22
A	US 2010/0225539 A1 (MARGOMENOS) 09 September 2010 (09.09.2010), entire document	6-22
A	US 5,057,798 A (MOYE et al.) 15 October 1991 (15.10.1991), entire document	6-22

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"A" document defining the general state of the art which is not considered to be of particular relevance	"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
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