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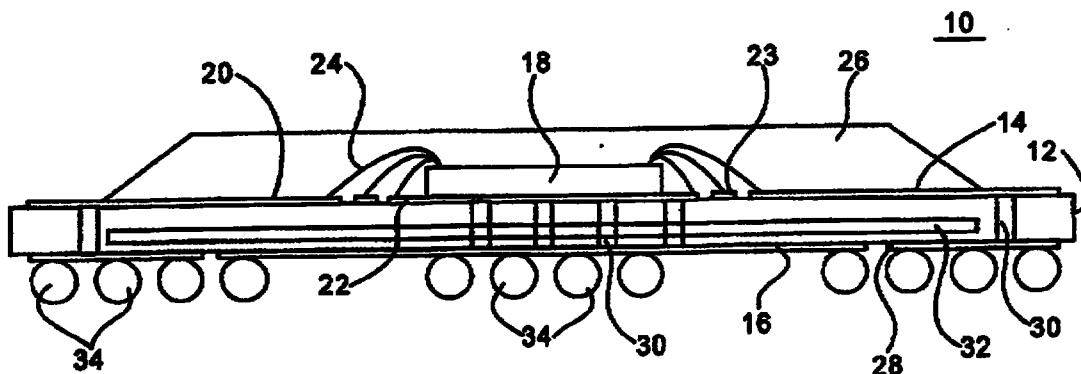
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H05K 7/06, 7/02, H01L 23/48		A1	(11) International Publication Number: WO 97/36466
			(43) International Publication Date: 2 October 1997 (02.10.97)
(21) International Application Number: PCT/US97/03511		(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG , SI, SK, SK (Utility model), TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 7 March 1997 (07.03.97)			
(30) Priority Data: ① 08/623,355 ✓ 28 March 1996 (28.03.96) ✓ US ✓			
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(54) Title: PERIMETER MATRIX BALL GRID ARRAY CIRCUIT PACKAGE WITH A POPULATED CENTER ✓



(57) Abstract

A ball grid array (BGA) integrated circuit package (10) which has an outer two-dimensional array of solder balls and a center two-dimensional array of solder balls (34) located on a bottom surface (16) of a package substrate (12). The solder balls are typically reflowed to mount the package to a printed circuit board. Mounted to an opposite surface of the substrate is an integrated circuit (18) that is electrically coupled to the solder balls by internal routing within the package. The outer array of solder balls are located outside of the dimensional profile of the integrated circuit to reduce solder stresses induced by the differential thermal expansion between the integrated circuit and the substrate. The center solder balls are typically routed directly to ground and power pads of the package to provide a direct thermal and electrical path from the integrated circuit to the printed circuit board.