PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H01L 23/04 | A1

(11) International Publication Number: WO 98/53498

(43) International Publication Date: 26 November 1998 (26.11.98)

(21) International Application Number: PCT/US98/09214

(22) International Filing Date: 13 May 1998 (13.05.98)

(30) Priority Data:
08/862,687 23 May 1997 (23.05.97) US

(71) Applicant: AMKOR ELECTRONICS, INC. [US/US]; 1900 South Price Road, Chandler, AZ 85248 (US).

(72) Inventors: GLENN, Thomas, P.; 1001 S. Crown Key Court, Gilbert, AZ 85233 (US). HOLLAWAY, Roy, D.; KM 22 East Service Road, South Superhighway, Muntinlupa City 1702 (PH). PANCZAK, Anthony, E.; Apartment H206, 655 S. Fairoaks, Sunnyvale, CA 94086 (US).

(74) Agent: MacDONALD, Thomas, S.; Skjerven, Morrill, MacPherson, Franklin & Friel LLP, Suite 700, 25 Metro Drive, San Jose, CA 95110 (US).

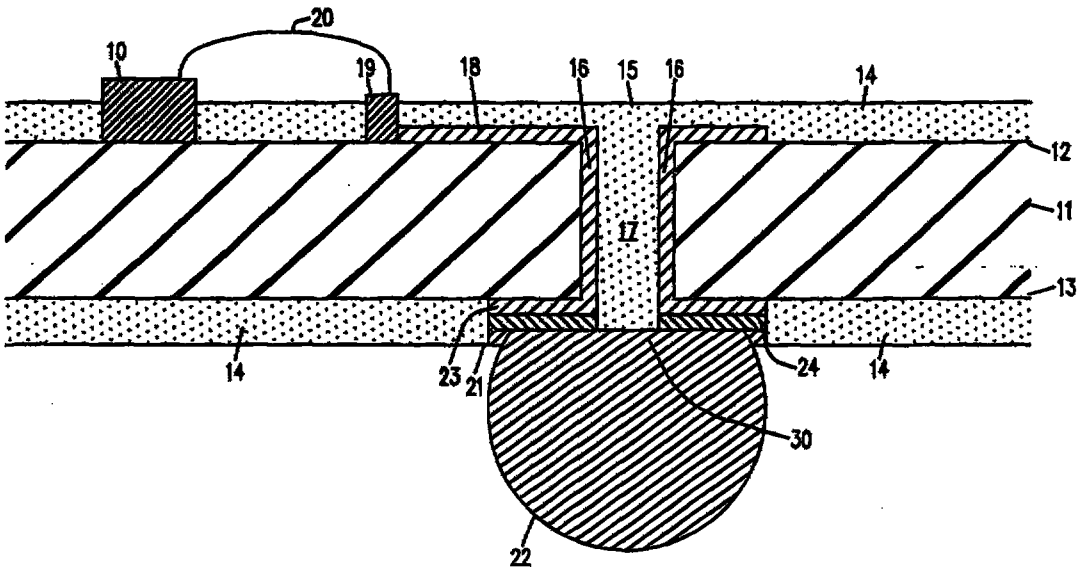
(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, 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).

Published

With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: IMPROVED SOLDER BALL JOINT



(57) Abstract

An improved interconnection ball joint for a ball grid array integrated circuit package includes a substrate base (11) having a first surface to which an integrated circuit die (10) is affixed, and an opposite second surface. A metallized via (15) extends through the substrate. The via (15) has a central hole which extends through the substrate. The hole is plugged with a flexible nonconductive material, such as epoxy solder mask material. A metallic interconnection ball land (21) is on the second surface of the substrate, integral with the metallized via and adjacent to the hole and the plug of nonconductive material. A solder interconnection ball (22) is formed on the land, opposite the via and the plug of nonconductive material. A metal-to-metal annular bond is formed at the joint between the interconnection ball (22) and the land (21) around the plug of nonconductive material in the center of the via.