

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
26 August 2004 (26.08.2004)

PCT

(10) International Publication Number
WO 2004/071700 A3

(51) International Patent Classification⁷: **H01L 21/44**,
21/48, 21/50, 21/44

(21) International Application Number:
PCT/US2004/002006

(22) International Filing Date: 6 February 2004 (06.02.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/359,608 7 February 2003 (07.02.2003) US

(71) Applicant (for all designated States except US): **ZIP-TRONIX, INC.** [US/US]; 800 Perimeter Park Drive, Suite 800, Morrisville, NC 27560 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **TONG, Qin-Yi** [CN/US]; 3511 Meadowrun Drive, Durham, NC 27707 (US). **ENQUIST, Paul, M.** [US/US]; 308 Frenchman's Bluff, Cary, NC 27513 (US). **ROSE, Anthony, Scot** [US/US]; 6632 Lewey Drive, Cary, NC 27519 (US).

(74) Agents: **KUESTERS, Eckhard, H.** et al.; Oblon, Spivak, McClelland, Maier & Neustadt, P.C., 1940 Duke Street, Alexandria, VA 22314 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

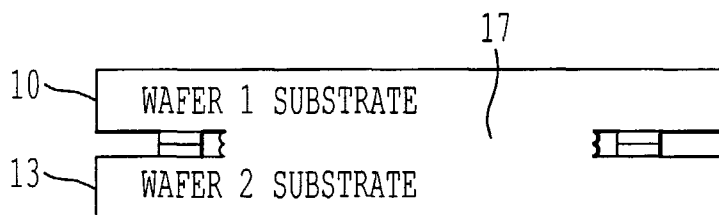
Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
21 April 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ROOM TEMPERATURE METAL DIRECT BONDING



(57) Abstract: A bonded device structure including a first substrate having a first set of metallic bonding pads, preferably connected to a device or circuit, and having a first non-metallic region adjacent to the metallic bonding pads on the first substrate, a second substrate having a second set of metallic bonding pads aligned with the first set of metallic bonding pads, preferably connected to a device or circuit, and having

a second non-metallic region adjacent to the metallic bonding pads on the second substrate, and a contact-bonded interface between the first and second set of metallic bonding pads formed by contact bonding of the first non-metallic region to the second non-metallic region. At least one of the first and second substrates may be elastically deformed.



WO 2004/071700 A3