(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 July 2006 (20.07.2006)

PCT

(10) International Publication Number
WO 2006/076182 A1

(51) International Patent Classification:
H01G 5/16 (2006.01) *H01P 1/203* (2006.01)
H01P 1/18 (2006.01)

(21) International Application Number:
PCT/US2006/000069

(22) International Filing Date: 3 January 2006 (03.01.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/031,950 10 January 2005 (10.01.2005) US

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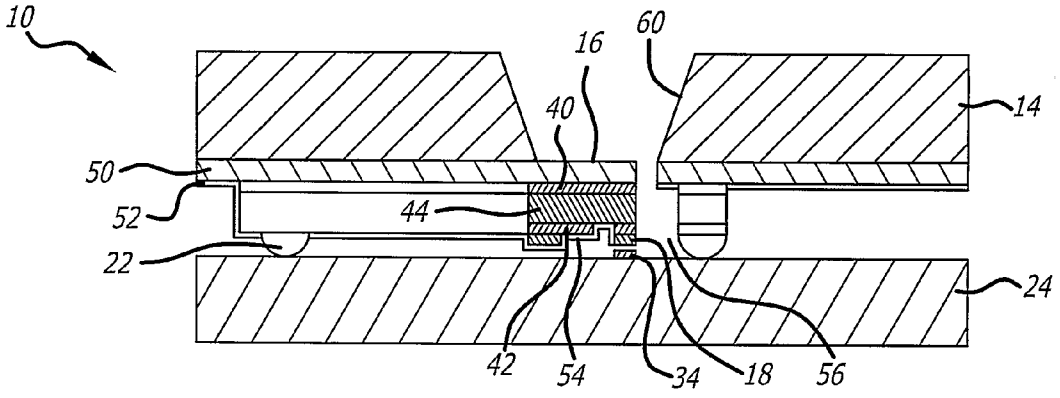
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, 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, NA, 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, IS, IT, LT, LU, LV, MC, NL, PL, 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*

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: IMPROVED MICRO-ELECTRICAL-MECHANICAL VARIABLE CAPACITOR DEVICE AND METHOD OF MAKING SAME



(57) Abstract: A micro-electro-mechanical variable capacitor device including a first substrate (24) ; a first contact (34) disposed on a first surface of the substrate; a piezoelectric actuator (16) disposed over the first surface of the substrate; a second contact (18) coupled to the actuator and disposed in proximity to the first contact; a gap control mechanism disposed between the substrate and the actuator for limiting movement of the first contact relative to the second contact. In the exemplary embodiment, the gap control mechanism is a gap control stop (37) constructed of dielectric material. In practice, plural stops are used. In the exemplary embodiment, plural thermosonic bonds (25) are used to connect the actuator to the first substrate. A second substrate (14) is disposed over the piezo-electric actuator. The second substrate has wells (15, 17) over the bonds to facilitate application of a bonding tool (19) to the bonds. The gap control mechanism provides consistent height control between a flipped chip and its base substrate without exposing the assembly to high temperatures.

WO 2006/076182 A1