

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 April 2006 (13.04.2006)

PCT

(10) International Publication Number
WO 2006/039438 A3

(51) International Patent Classification:
H01L 21/02 (2006.01)

DOYLE CIRCLE, SANTA CLARA, California 95054 (US).

(21) International Application Number:
PCT/US2005/035089

(74) Agents: **MCCRACKIN, Ann, M.** et al.; SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A., P.O. Box 2938, Minneapolis, MN 55402 (US).

(22) International Filing Date:
29 September 2005 (29.09.2005)

(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, 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.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/954,644 29 September 2004 (29.09.2004) US

(71) Applicant (*for all designated States except US*): **INTEL CORPORATION** [US/US]; 2200 Mission College Boulevard, Santa Clara, California 95052 (US).

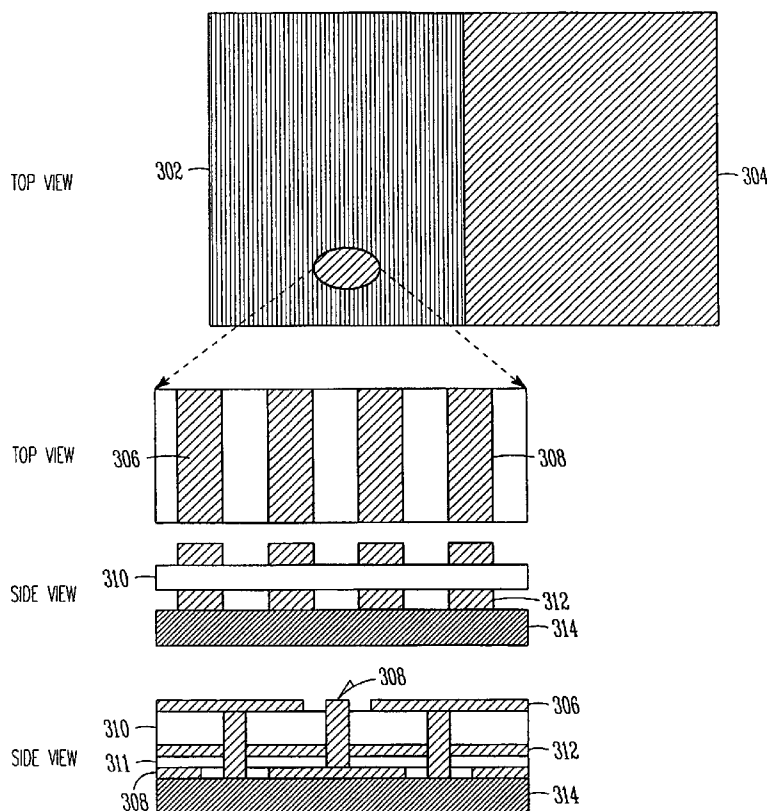
(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT,

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **PALANDUZ, Cengiz** [TR/US]; 281 W. ROADRUNNER DR, CHANDLER, Arizona 85248 (US). **MOSLEY, Larry** [US/US]; 1216

[Continued on next page]

(54) Title: SPLIT THIN FILM CAPACITOR FOR MULTIPLE VOLTAGES



(57) Abstract: An apparatus, and a method for forming, a split thin film capacitor for providing multiple power and reference supply voltage levels to electrical devices such as integrated circuits, may be useful in space restricted applications, and in applications that require very close electrical connections between the power consumer and the power supply. An example of both a space restricted application and a close coupling application may be an integrated circuit (IC) such as a microprocessor. The capacitor supplying and moderating power to the microprocessor needs to be closely coupled in order to respond to instantaneous power demands that may be found in high clock rate microprocessors, and the space inside a microprocessor package is very restricted. The microprocessor may use a lower voltage power supply level for minimum sized fast transistors in the fast core logic portions of the microprocessor, and a more normal voltage power supply voltage level for the cache memory and I/O transistor portions of the microprocessor. Thus a compact capacitor with multiple power and reference supply levels may be needed to provide the required power for a high frequency IC.



RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:
13 July 2006

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.