

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
4 January 2007 (04.01.2007)

PCT

(10) International Publication Number
WO 2007/002948 A1

(51) International Patent Classification:
H01L 23/522 (2006.01) *H01L 23/64* (2006.01)

LUMPAR, Kuala [MY/MY]; 24, Jalan Lemak 3 Taman Segar Cheras, Kuala Lumpur, 65100 (MY).

(21) International Application Number:
PCT/US2006/026077

(74) Agents: **TROP, Timothy, N.** et al.; TROP, PRUNER & HU, P.C., 1616 S. Voss Rd., Ste. 750, Houston, Texas 77057-2631 (US).

(22) International Filing Date: 28 June 2006 (28.06.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/168,175 28 June 2005 (28.06.2005) 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, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, 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, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

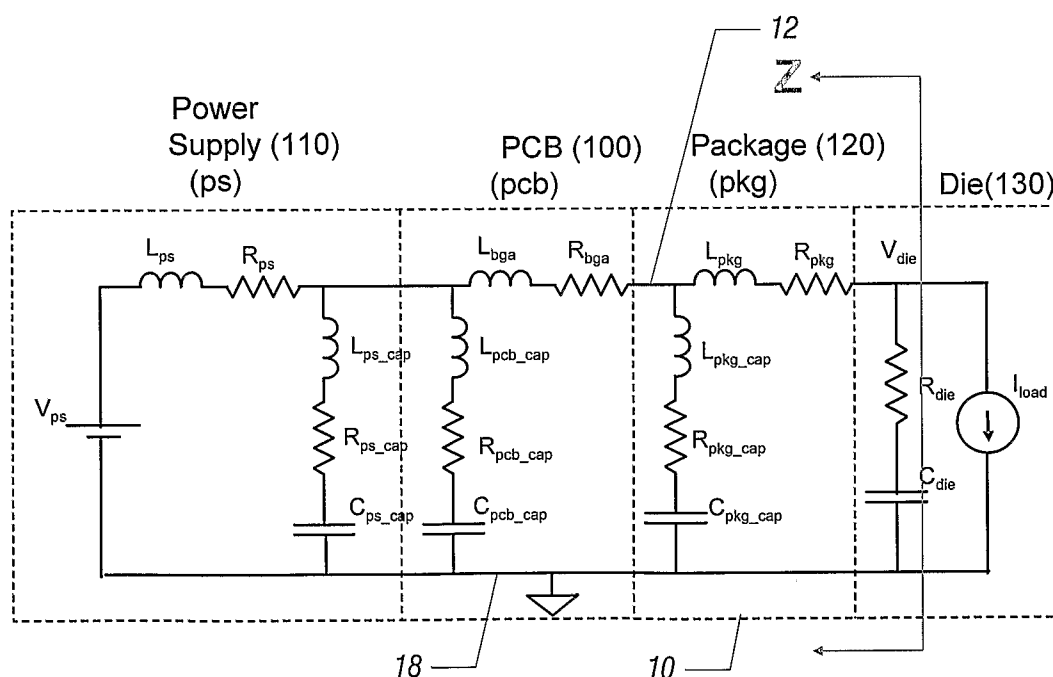
(72) Inventors; and

(75) Inventors/Applicants (for US only): **MYAT, Myitzu Soe** [MY/MY]; No. 27-16-6 (park View Tower), Tingkat Bukit Jambul 1, Penang, 11900 (MY). **CHANG, Mooi** [MY/MY]; No. 1095, Lrg Mas 2/1, Tmn. Delima, Sungai Petani, Kedah, 08000 (MY). **LEE, Eu Soon** [MY/MY]; 46-1, Jalan 2/116B, Kuchai Entereneurs Park, Kuala Lumpur, 58200 (MY). **MIN, Yongki** [KR/US]; 703 West Mountain Vista Drive, Pheonix, Arizona 85045 (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, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: EMBEDDING THIN FILM RESISTORS IN SUBSTRATES IN POWER DELIVERY NETWORKS



(57) Abstract: Using die side capacitors and embedded resistors, an advantageous power delivery network may be achieved. In some embodiments, the embedded resistors may be more precisely controllable. The number of die side capacitors may be reduced by combining embedded resistors with these capacitors to reduce costs. The embedded resistors may be provided within the metalization layers either at an upper or a lower level.

WO 2007/002948 A1

**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.