

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
22 March 2018 (22.03.2018)

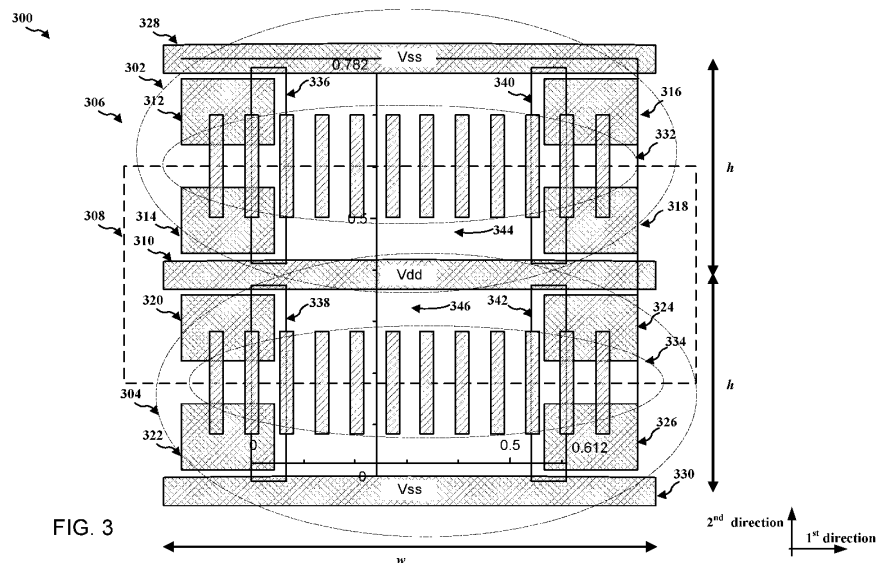


(10) International Publication Number
WO 2018/052664 A1

- (51) International Patent Classification:
H01L 23/544 (2006.01) *H01L 27/02* (2006.01)
- (21) International Application Number:
PCT/US2017/047847
- (22) International Filing Date:
21 August 2017 (21.08.2017)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
15/265,744 14 September 2016 (14.09.2016) US
- (71) Applicant: QUALCOMM INCORPORATED [US/US];
ATTEN: International IP Administration, 5775 Morehouse
Drive, San Diego, California, US 92121-1714 (US).
- (72) Inventors: SALEM, Rami; c/o QUALCOMM INCORPORATED, 5775 Morehouse Drive, San Diego, Califor-

- nia 92121-1714 (US). ENDRINAL, Lesly Zaren V.; c/o QUALCOMM INCORPORATED, 5775 Morehouse Drive, San Diego, California 92121-1714 (US). LIM, Hyeokjin; c/o QUALCOMM INCORPORATED, 5775 Morehouse Drive, San Diego, California 92121-1714 (US). BUNNALIM, Hadi; c/o QUALCOMM INCORPORATED, 5775 Morehouse Drive, San Diego, California 92121-1714 (US). KIM, Robert; 1025 Via Vera Cruz, San Marcos, California 92078 (US). RANGANATHAN, Lavakumar; c/o QUALCOMM INCORPORATED, 5775 Morehouse Drive, San Diego, California 92121-1714 (US). MALABRY, Michael; c/o QUALCOMM INCORPORATED, 5775 Morehouse Drive, San Diego, California 92121-1714 (US).
- (74) Agent: HODGES, Jonas J. et al.; c/o ARENT FOX LLP, 1717 K Street NW, Washington, District of Columbia 20006-5344 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

(54) Title: VISIBLE ALIGNMENT MARKERS/LANDMARKS FOR CAD-TO-SILICON BACKSIDE IMAGE ALIGNMENT



(57) Abstract: A MOS IC includes a first standard cell including first and second power rails, first and second active regions, and a plurality of metal interconnects. The first power rail extends in a first direction and provides a first voltage to the first standard cell. The second power rail extends in the first direction and provides a second voltage to the first standard cell. The first active region is between the first and second power rails on a first side of the first standard cell. The second active region is between the first and second power rails on a second side of the first standard cell. The second active region is separated from the first active region. The plurality of metal interconnects extend in a second direction between the first and second active regions and between the first and second power rails. The second direction is orthogonal to the first direction.

[Continued on next page]

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*