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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
17 December 2009 (17.12.2009)

PCT

(10) International Publication Number
WO 2009/151808 A1

(51) International Patent Classification:
H01L 31/04 (2006.01)

(21) International Application Number:
PCT/US2009/042130

(22) International Filing Date:
29 April 2009 (29.04.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/060,921 12 June 2008 (12.06.2008) US
12/431,684 28 April 2009 (28.04.2009) US

(71) Applicant *(for all designated States except US)*: **SUNPOWER CORPORATION** [US/US]; 3939 North First Street, San Jose, CA 95134 (US).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **SMITH, David, D.** [US/US]; 426 N. Milton Avenue, Campbell, CA 95008 (US).

(74) Agents: **BENEDICTO, Patrick, D.** et al.; Okamoto & Benedicto LLP, P.O. Box 641330, San Jose, CA 95164-1330 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, 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, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, 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 (Art. 21(3))*

(54) Title: TRENCH PROCESS AND STRUCTURE FOR BACKSIDE CONTACT SOLAR CELLS WITH POLYSILICON DOPED REGIONS

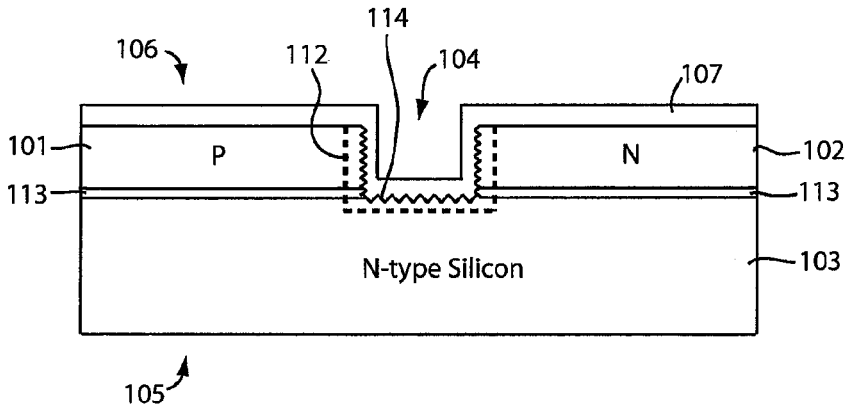


FIG. 1

(57) Abstract: A solar cell includes polysilicon P-type and N-type doped regions on a backside (106) of a substrate (103), such as a silicon wafer. A trench structure (104) separates the P-type doped region (101) from the N-type doped region (102). Each of the P-type and N-type doped regions may be formed over a thin dielectric layer (113). The trench structure (104) may include a textured surface (114) for increased solar radiation collection. Among other advantages, the resulting structure increases efficiency by providing isolation between adjacent P-type and N-type doped regions, thereby preventing recombination in a space charge region where the doped regions would have touched.

WO 2009/151808 A1