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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
30 October 2014 (30.10.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/172835 A1

(51) International Patent Classification:
H01L 21/768 (2006.01) *H01L 23/52* (2006.01)

(21) International Application Number:
PCT/CN2013/074524

(22) International Filing Date:
22 April 2013 (22.04.2013)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant: **ACM RESEARCH (SHANGHAI) INC** [—/CN]; Bld. 4, No. 1690 Cailun Road, Zhangjiang High-tech Park, Shanghai 201203 (CN).

(72) Inventors: **WANG, Hui**; Bld. 4, No. 1690 Cailun Road, Zhangjiang High-tech Park, Shanghai 201203 (CN). **CHEN, Fuping**; Bld. 4, No. 1690 Cailun Road, Zhangjiang High-tech Park, Shanghai 201203 (CN). **ZHANG, Xiaoyan**; Bld. 4, No. 1690 Cailun Road, Zhangjiang High-tech Park, Shanghai 201203 (CN).

(74) Agent: **SHANGHAI PATENT & TRADEMARK LAW OFFICE, LLC**; 435 Guiping Road, Shanghai 200233 (CN).

(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, BN, BR, BW, BY, BZ, CA, CH, CL, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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, 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, ML, MR, NE, SN, TD, TG).

Published:

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

(54) **Title**: METHOD AND APPARATUS FOR THROUGH-SILICON VIAS REVEAL

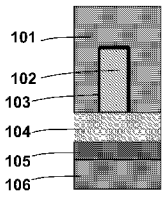


FIG 1a

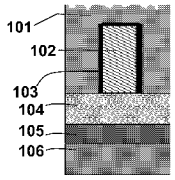


FIG 1b

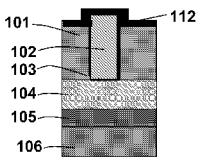


FIG 1e

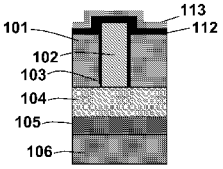


FIG 1f

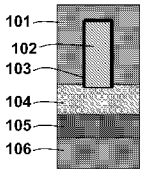


FIG 1c

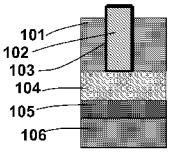


FIG 1d

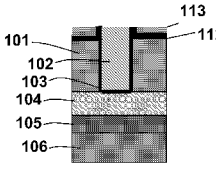


FIG 1g

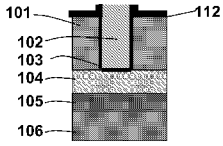


FIG 1h

(57) **Abstract**: A method and an apparatus for TSVs reveal are provided. The method includes the following steps: providing a Si substrate (101) having a plurality of TSVs (102) formed inside the Si substrate (101); rotating the Si substrate (101) and spraying a first etchant onto th backside of the Si substrate (101) to etch the backside of the Si substrate (101), and stopping etching before the TSVs (102) being exposed to the backside of the Si substrate (101); and rotating the Si substrate (101) and spraying a second etchant onto the backside o the Si substrate (101) to etch the backside of the Si substrate (101) until the TSVs (102) being exposed to the backside of the Si substrate (101), wherein reversing the rotation direction of the Si substrate (101) at fixed intervals during spraying the second etchant onto th backside of the Si substrate (101).

WO 2014/172835 A1