

(43) International Publication Date
13 September 2012 (13.09.2012)(51) International Patent Classification:
H03K 3/027 (2006.01)(21) International Application Number:
PCT/US2012/028134(22) International Filing Date:
7 March 2012 (07.03.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/449,844 7 March 2011 (07.03.2011) US(71) Applicant (for all designated States except US): **UNIVERSITY OF CONNECTICUT** [US/US]; 263 Farmington Avenue, MC 6400, Farmington, CT 06030-6400 (US).

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(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, 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, 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.

[Continued on next page]

(54) Title: EMBEDDED RING OSCILLATOR NETWORK FOR INTEGRATED CIRCUIT SECURITY AND THREAT DETECTION

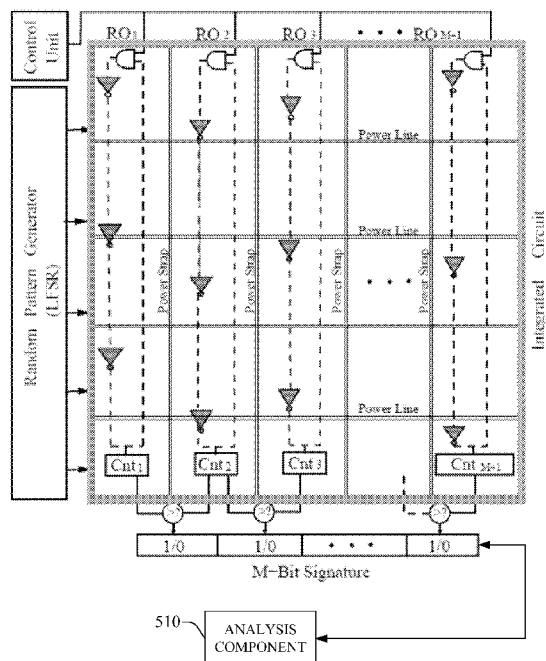


FIG. 5

(57) Abstract: Aspects of the disclosure relate to combining on-chip structure with external current measurements for threat detection in an integrated circuit. This method considers Trojans' impact on neighboring cells and on the entire IC's power consumption, and effectively localizes the measurement of dynamic power. An on-chip structure can permit threat detections. In one aspect, the on-chip structure can comprise a plurality of sensors distributed across the entirety of the IC, with each sensor of the plurality of sensors being placed in different rows of a standard-cell design. In another aspect, data analysis can permit separating effect of process variations on transient power usage of the IC from effects of a hardware threat such power usage. The on-chip structure also can be employed for implementation of a PE-PUF.



(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, MD, 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)*)
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (*Rule 48.2(h)*)

(88) Date of publication of the international search report:

27 December 2012

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (*Rule 4.17(ii)*)

A. CLASSIFICATION OF SUBJECT MATTER***H03K 3/027(2006.01)i***

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H03K 3/027; H04L 9/28; H04L 9/30; H03K 3/84; G06F 21/00; H03K 3/03

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: ring oscillator, random generator, security

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008-0279373 A1 (ERHART, RICHARD A. et al.) 13 November 2008 See abstract; claims 1, 8, 13, 30, 32; and figures 2A-2C.	1-33
A	US 7779273 B2 (DALE, JASON N. et al.) 17 August 2010 See abstract; claims 1, 6; and figure 2.	1-33
A	US 2011-0032041 A1 (DICHTL, MARKUS) 10 February 2011 See abstract; claims 1, 5-6, 10; and figure 2.	1-33
A	US 4810975 A (DIAS, DONALD R.) 07 March 1989 See abstract; claims 1, 5; and figure 1.	1-33



Further documents are listed in the continuation of Box C.



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Date of the actual completion of the international search

22 OCTOBER 2012 (22.10.2012)

Date of mailing of the international search report

23 OCTOBER 2012 (23.10.2012)

Name and mailing address of the ISA/KR

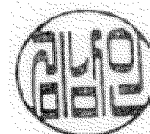
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Facsimile No. 82-42-472-7140

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Telephone No. 82-42-481-8583



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/028134

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