

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
28 February 2008 (28.02.2008)

PCT

(10) International Publication Number
WO 2008/024088 A3

(51) International Patent Classification:
G01T 1/24 (2006.01)

(21) International Application Number:
PCT/US2005/040332

(22) International Filing Date:
7 November 2005 (07.11.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/635,192 3 December 2004 (03.12.2004) US
11/258,464 25 October 2005 (25.10.2005) US

(71) Applicant (for all designated States except US): **THE GOVERNMENT OF THE UNITED STATES OF AMERICA**, as represented by **THE SECRETARY OF THE NAVY** [US/US]; One Liberty Center, 875 North Randolph Street, Suite 1425, Arlington, VA 22203 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **PHLIPS, Bernard** [BE/US]; 14411 Capt. John Smith Dr., Accokeek, MD 20607 (US). **KUB, Francis, J.** [US/US]; 1103 Spy Glass,

Arnold, MD 21012 (US). **HOBART, Karl, D.** [US/US]; 8610 Croom Rd., Upper Marlboro, MD 20772 (US). **KURFESS, James, D.** [US/US]; 1708 Justin Drive, Gambrills, MD 21054 (US).

(74) Agent: **KARASEK, John, J.**; US Naval Research Laboratory, 4555 Overlook Ave., SW, Washington, DC 20375 (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, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, 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, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT,

[Continued on next page]

(54) Title: WAFER BONDED SILICON RADIATION DETECTORS

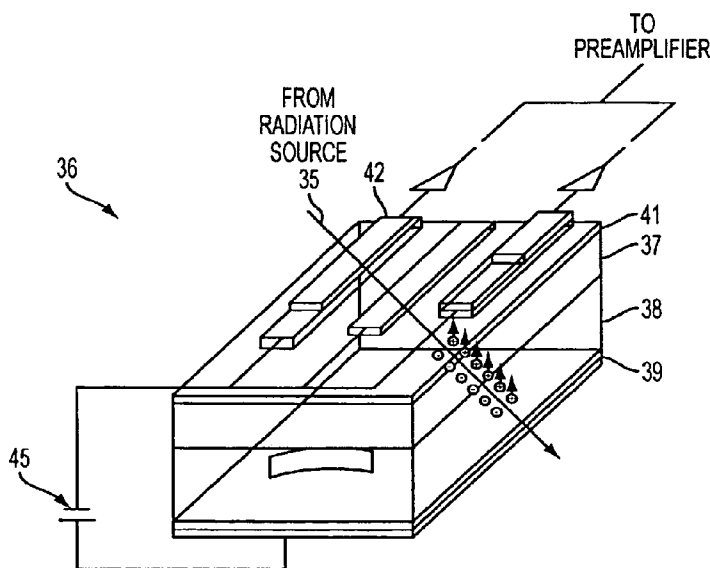


FIG. 2B

(57) Abstract: An apparatus and method for operating a direct wafer bonded semiconductor radiation detector includes bonding a plurality of wafers, receiving a radiation signal from a radiation source thereby producing electron and hole pairs via the radiation signal interacting with the detecting device. A voltage source produces a voltage across the direct bonded wafers, thereby drifting the electrons and holes through the plurality of bonded layers. The drifted electrons and/or holes include total drifted charge information of the detector and are collected and processed either at the detector or remote from the detector.

WO 2008/024088 A3



RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

Published:

— *with international search report*

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

24 July 2008

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/40332

A. CLASSIFICATION OF SUBJECT MATTER
 IPC: **G01T 1/24** (2006.01)

USPC: 250/370.11
 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)
 U.S. : 250/370.11

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EAST 2.01, GOOGLE, INSPEC, IEEE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 6,350,989 B1 (LEE) 26 February 2002 (26.02.2002), column 6, lines 45-51, abstract, figure 1, Column 1, lines 19-23, column 5, lines 53-59.	1-3, 13-15, 17 ----- 2, 15-20
X --- Y	US 5,391,882A (Rhiger) 21 February 1995 (21.02.1995), Figure 1, column 3, lin 64-65,	1, 3, 6-7, 13-14 ----- 2, 4-5, 8-12, 15-20
Y	US 6,734,431 B1 (Glasser), 11 May 2004, (11.05.2004), Figure 6	2, 15-20

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search: 12 May 2008 (12.05.2008) Date of mailing of the international search report: 21 MAY 2008

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer CHRISTINE SUNG <i>Christine Sung</i> Telephone No. 571-272-1550
---	--