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(54) Title: RECTIFYING ELECTROMAGNETIC NANOSENSORS

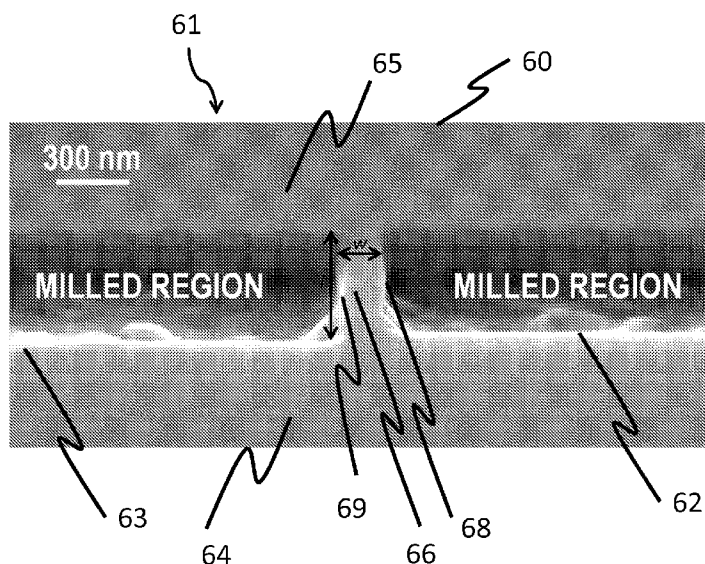


Fig. 6

(57) Abstract: The present invention may be embodied as a nanoscale semiconductor for broadband, room-temperature detection of electromagnetic radiation, including radiation in the microwave and terahertz regions of the spectrum. Radiation may be detected by utilizing intrinsic nonlinearities in the electrical characteristics of the nanosensor, such as drain conductance or transconductance. The nonlinearities generate either a measurable photo-current or photo-voltage by rectifying the incident electromagnetic radiation. The invention may involve utilizing the exchange of charge between surface states, formed at the etched walls of the nanosensor, and the interior of the nanosensor channel, as a way to generate the pronounced nonlinearities needed for efficient radiation detection.



— *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))*

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3 January 2013

A. CLASSIFICATION OF SUBJECT MATTER**G01R 29/08(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)

G01R 29/08; H01L 27/088; H01L 31/0328; H01L 29/06; H01L 37/00

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: terahertz, detector, channel, quantum

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7420225 B1 (MICHAEL C. WANKE et al.) 02 September 2008 See abstract, claims 1,5-7,15,24,32,38, column 6 and figures 3-4	1-19
A	D. COQUILLAT et al., Optics Express, Vol. 18, Issue 6, pp.6024-6032, 15 March 2010 See page 6026	1-19
A	D. SELIUTA et al., ELECTRONICS LETTERS, Vol. 40, No. 10, 13 May 2004 See page 631	1-19
A	US 7705415 B1 (BAHRAM NABET) 27 April 2010 See abstract, claims 1-2, column 9 and figure 5a	1-19
A	US 2010-0051812 A1 (YUKIO KAWANO et al.) 04 March 2010 See abstract, claims 1,5, paragraphs 50,54,74-76 and figures 2,3A-B	1-19



Further documents are listed in the continuation of Box C.



See patent family annex.

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"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

"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

"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

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 7420225 B1	02.09.2008	None	
US 7705415 B1	27.04.2010	None	
US 2010-0051812 A1	04.03.2010	JP 2010-060284 A US 8253104 B2	18.03.2010 28.08.2012