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Sanders et al.

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(54) **MONOLITHIC NUCLEAR EVENT DETECTOR AND METHOD OF MANUFACTURE**

(76) Inventors: **Thomas J. Sanders**, 331 Seabreeze Dr., Indialantic, FL (US) 32901; **Nicolaas W. Van Vonno**, 3859 Riverside Dr., Melbourne, FL (US) 32935; **Clyde Combs**, 499 Cinnamon Dr., Satellite Beach, FL (US) 32937; **Glenn T. Hess**, 620 Grant Ct., Satellite Beach, FL (US) 32937

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H01L 21/782 (2006.01)

(52) **U.S. Cl.** **438/56**; 438/133; 257/E21.7; 257/E27.112

(58) **Field of Classification Search** 438/56, 438/133

See application file for complete search history.

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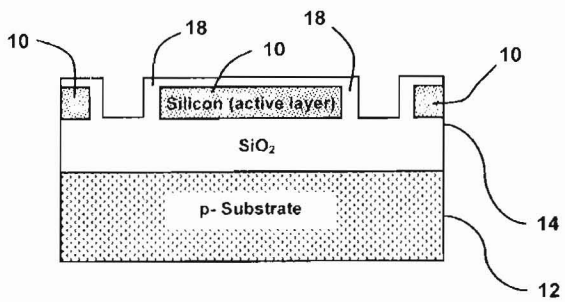
Primary Examiner—A. Sefer
(74) *Attorney, Agent, or Firm*—Hayworth, Chaney & Thom.; Stephen C. Thomas; Robert A. Lynch

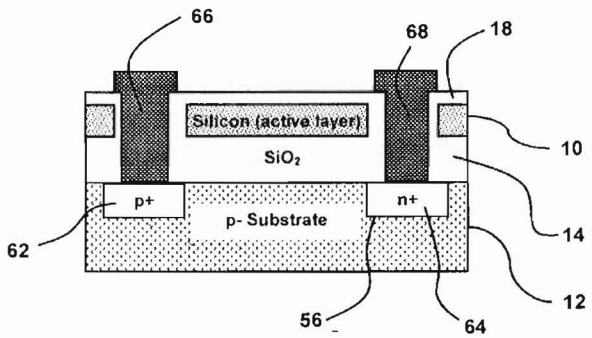
(57) **ABSTRACT**

A PIN diode-based monolithic Nuclear Event Detector and method of manufacturing same for use in detecting a desired level of gamma radiation, in which a PIN diode is integrated with signal processing circuitry, for example CMOS circuitry, in a single thin-film Silicon On Insulator (SOI) chip. The PIN diode is implemented in the p-substrate layer. The signal processing circuitry is located in a thin semiconductor layer and is in electrical communication with the PIN diode. The PIN diode may be integrated with the signal processing circuitry onto a single chip, or may be fabricated stand alone using SOI methods according to the method of the invention.

10 Claims, 11 Drawing Sheets



ISOLATED SILICON ACTIVE LAYERS



INTEGRATED PIN DIODE