

Title: New p-i-n Si : H imager configuration for spatial resolution improvement

Author(s): Vieira, M (Vieira, M); Fernandes, M (Fernandes, M); Martins, J (Martins, J); Antunes, PL (Antunes, PL); Macarico, A (Macarico, A); Schwarz, R (Schwarz, R); Schubert, MB (Schubert, MB)

Source: Sensors and Actuators A-Physical

Volume: 92 **Issue:** 1-3 **Pages:** 60-66

DOI: 10.1016/S0924-4247(01)00540-4 **Published:** AUG 1 2001

Abstract: Amorphous glass/ZnO-Al/p(a-Si:H)/i(a-Si:H)/n(a-Si_{1-x}C_x:H)/Al imagers with different n-layer resistivities were produced by plasma enhanced chemical vapour deposition technique (PE-CVD). An image is projected onto the sensing element and leads to spatially confined depletion regions that can be readout by scanning the photodiode with a low-power modulated laser beam. The essence of the scheme is the analog readout, and the absence of semiconductor arrays or electrode potential manipulations to transfer the information coming from the transducer. The influence of the intensity of the optical image projected onto the sensor surface is correlated with the sensor output characteristics (sensitivity, linearity blooming, resolution and signal-to-noise ratio) are analysed for different material compositions ($0.5 < x < 1$). The results show that the responsivity and the spatial resolution are limited by the conductivity of the doped layers. An enhancement of one order of magnitude in the image intensity signal and on the spatial resolution are achieved at 0.2 mW cm⁻² light flux by decreasing the n-layer conductivity by the same amount. A physical model supported by electrical simulation gives insight into the image-sensing technique used. (C) 2001 Elsevier Science B.V. All rights reserved.

Language: English

Document Type: Article; Proceedings Paper

Conference Title: EUROSENSORS XIV

Conference Date: AUG 27-30, 2000

Conference Location: COPENHAGEN, DENMARK

Author Keywords: Solid State Transducer; a-Si : H p-i-n Devices; Optical Sensors; Imager; Image Acquisition and Representation; Analog Readout

KeyWords Plus: Silicon

Reprint Address: Vieira, M (reprint author), ISEL, Elect & Commun Dept, R Conselheiro Emídio Navarro, P-1949014 Lisbon, Portugal

Publisher: Elsevier Science SA

Publisher Address: PO BOX 564, 1001 Lausanne, SWITZERLAND

ISSN: 0924-4247

ISO Source Abbrev.: Sens. Actuator A-Phys.