

Title: A two terminal optical signal and image processing p-i-n/p-i-n image and colour sensor

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Abstract: A two terminal optically addressed image processing device based on two stacked sensing/switching p-i-n a-SiC:H diodes is presented. The charge packets are injected optically into the p-i-n sensing photodiode and confined at the illuminated regions changing locally the electrical field profile across the p-i-n switching diode. A red scanner is used for charge readout. The various design parameters and addressing architecture trade-offs are discussed. The influence on the transfer functions of an a-SiC:H sensing absorber optimized for red transmittance and blue collection or of a floating anode in between is analysed. Results show that the thin a-SiC:H sensing absorber confines the readout to the switching diode and filters the light allowing full colour detection at two appropriated voltages. When the floating anode is used the spectral response broadens, allowing B&W image recognition with improved light-to-dark sensitivity. A physical model supports the image and colour recognition process. (C) 2005 Elsevier B.V. All rights reserved.

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