Title: Stacked photo-sensing devices based on SiC alloys A non-pixelled architecture for imagers and demultiplexing devices

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Abstract: In this review paper different designs based on stacked p-i'-n-p-i-n heterojunctions are presented and compared with the single p-i-n sensing structures. The imagers utilise self-field induced depletion layers for light detection and a modulated laser beam for sequential readout. The effect of the sensing element structure, cell configurations (single or tandem), and light source properties (intensity and wavelength) are correlated with the sensor output characteristics (light-to-dark sensitivity, spatial resolution, linearity and S/N ratio). The readout frequency is optimized showing that scans speeds up to 104 lines per second can be achieved without degradation in the resolution. Multilayered p-i'-n-p-i-n heterostructures can also be used as wavelength-division multiplexing/demultiplexing devices in the visible range. Here the sensor element faces the modulated light from different input colour channels, each one with a specific wavelength and bit rate. By reading out the photocurrent at appropriated applied bias, the information is multiplexed or demultiplexed and can be transmitted or recovered again. Electrical models are present to support the sensing methodologies.

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