

**Title:** Optical demultiplexer based on an a-SiC:H voltage controlled device

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**Abstract:** In this paper we present results on the use of a semiconductor heterostructure based on a-SiC:H as a wavelength-division demultiplexer for the visible light spectrum. The proposed device is composed of two stacked p-i-n photodiodes with intrinsic absorber regions adjusted to short and long wavelength absorption and carrier collection. An optoelectronic characterisation of the device was performed in the visible spectrum. Demonstration of the device functionality for WDM applications was done with three different input channels covering the long, the medium and the short wavelengths in the visible range. The recovery of the input channels is explained using the photocurrent spectral dependence on the applied voltage. An electrical model of the WDM device is proposed and supported by the solution of the respective circuit equations. Short range optical communications constitute the major application field however other applications are foreseen. (C) 2010 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

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