

**Title:** Optical demultiplexer device operating in the visible spectrum

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**Abstract:** In this paper, we present results on the use of multilayered a-SiC:H heterostructures as a device for wavelength-division demultiplexing of optical signals. These devices are useful in optical communications applications that use the wavelength division multiplexing technique to encode multiple signals into the same transmission medium. The device is composed of two stacked p-i-n photodiodes, both optimized for the selective collection of photo generated carriers. Band gap engineering was used to adjust the photogeneration and recombination rate profiles of the intrinsic absorber regions of each photodiode to short and long wavelength absorption in the visible spectrum. The photocurrent signal using different input optical channels was analyzed at reverse and forward bias and under steady state illumination. A demux algorithm based on the voltage controlled sensitivity of the device was proposed and tested. An electrical model of the WDM device is presented and supported by the solution of the respective circuit equations. (C) 2011 Elsevier B.V. All rights reserved.

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