

**Title:** Optoelectronic Logic Functions Based on Reconfigurable SiC Multilayer Devices

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**Abstract:** WDM multilayered SiC/Si devices based on a-Si:H and a-SiC:H filter design are approached from a reconfigurable point of view. Results show that the devices, under appropriated optical bias, act as reconfigurable active filters that allow optical switching and optoelectronic logic functions development. Under front violet irradiation the magnitude of the red and green channels are amplified and the blue and violet reduced. Violet back irradiation cuts the red channel, slightly influences the magnitude of the green and blue ones and strongly amplifies de violet channel. This nonlinearity provides the possibility for selective removal of useless wavelengths. Particular attention is given to the amplification coefficient weights, which allow taking into account the wavelength background effects when a band needs to be filtered from a wider range of mixed signals, or when optical active filter gates are used to select and filter input signals to specific output ports in WDM communication systems. A truth table of an encoder that performs 8-to-1 multiplexer (MUX) function is presented.

**Author Keywords:** Optoelectronic logic functions; Reconfigurable devices; Numerical simulation; Transfer characteristics; Coder-encoder devices; Encoder truth tables

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