

**Title:** Reconfigurable SiC Embedded Photonic Structures with Self Optical Bias Control

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**Abstract:** Multilayered heterostructures based on embedded a-Si:H and a-SiC:H p-i-n filters are analyzed from differential voltage design perspective using short- and long-pass filters. The transfer functions characteristics are presented. A numerical simulation is presented to explain the filtering properties of the photonic devices. Several monochromatic pulsed lights, separately (input channels) or in a polychromatic mixture (multiplexed signal) at different bit rates, illuminated the device. Steady-state optical bias is superimposed from the front and the back side. Results show that depending on the wavelength of the external background and impinging side, the device acts either as a short- or a long-pass band filter or as a band-stop filter. Particular attention is given to the amplification coefficient weights, which allow to take into account the wavelength background effects when a band or frequency needs to be filtered or the gate switch, in which optical active filter gates are used to select and filter input signals to specific output ports in wavelength division multiplexing (WDM) communication systems. This nonlinearity provides the possibility for selective removal or addition of wavelengths. A truth table of an encoder that performs 8-to-1 MUX function exemplifies the optoelectronic conversion.

**Author Keywords:** Photonic active filters; Reconfigurable devices; Numerical simulation; Transfer function characteristics; Encoder-decoder devices

**Keywords Plus:** Devices

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