Abstracts

Periodic-Structure Photoexcitation of a Silicon Coplanar Waveguide for Selective Optoelectronic Microwave Control

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A detailed analysis of the microwave Bragg reflection characteristics of a periodically CW-photoexcited coplanar waveguide on silicon substrate, with special regard to the inherent carrier diffusion mechanisms, is presented. In particular, the carrier diffusion in the direction of wave propagation can strongly affect the stopband reflection spectra of the configuration with respect to magnitude and bandwidth, or efficiency and selectivity, respectively. The dominant effects are studied quantitatively and are outlined in the form of practical performance diagrams. From this, future application of periodically photoexcited transmission line sections for light-induced tunable filters or Bragg reflectors may be inferred. Initial experimental results from a three-section periodic structure of 17 GHz center frequency under 840 nm LED CW excitation are reported.

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