Abstracts

Design of Ultra-Broad-Band LiNbO/sub 3/ Optical Modulators with Ridge Structure

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This paper describes novel coplanar waveguide (CPW) electrode and asymmetric coplanar strip line (A-CPS) electrode structures, introducing ridged LiNbO/sub 3/ substrates and thicker electrodes, for ultra-broad-band LiNbO/sub 3/ optical modulators. The structures are designed here with quasistatic analysis using the finite-element method. Ridged-structures with CPW and A-CPS electrodes are shown to be able to reduce the driving-voltage below that of the conventional planar-type electrodes and are suitable for modulation of exceeding 100 GHz and driving voltage of far less than 4 V under an optical wavelength of 1.55 µm and 50 Omega characteristic-impedance system. The ridge-type CPW can provide a broader bandwidth characteristic with a relatively thinner buffer layer and thinner electrode than the ridge-type A-CPS and is easier to fabricate. The ridge-type LiNbO/sub 3/ modulators are consequently candidate devices for future ultra-high-speed optical fiber transmission systems.

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