Abstracts

Microwave modeling and characterization of thick coplanar waveguides on oxide-coated lithium niobate substrates for electro-optical applications

G. Ghione, M. Goano, G. Madonna, C. Omegna, M. Pirola, S. Bosso, D. Frassati and A. Perasso. "Microwave modeling and characterization of thick coplanar waveguides on oxide-coated lithium niobate substrates for electro-optical applications." 1999 MTT-S International Microwave Symposium Digest 99.3 (1999 Vol. III [MWSYM]): 1007-1010 vol.3.

We have experimentally characterized a set of thick coplanar waveguides on Lithium Niobate substrates with and without a SiO/sub 2/-coating layer, having line widths and ground plane spacings in the range 10-80 /spl mu/m. The effective refractive index and attenuation were extracted from raw (uncalibrated) measurements up to 26 GHz through the TRL approach. The characteristic impedance was then obtained from the propagation constant, using an accurate estimate of the in-vacuo capacitance derived from a new conformal mapping approach able to exactly account for large electrode thickness. We observed that the attenuation of lines with or without the oxide buffer layer consistently exhibits a different frequency behaviour, thus suggesting that dielectric losses or metal surface roughness effects can play a significant role in the upper microwave range. Finally, a full analytical model, including losses and frequency dispersion, was derived by extending the quasi-TEM model and shown to yield results in good agreement with measured data.

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