Abstracts

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

G. Ghione, M. Goano, G.L. Madonna, G. 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 electrooptical applications." 1999 Transactions on Microwave Theory and Techniques 47.12 (Dec. 1999 [T-MTT] (Special Issue on 1999 International Microwave Symposium)): 2287-2293.

A set of thick coplanar waveguides on lithium niobate substrates with and without a thin SiO/sub 2/ buffer layer, has been experimentally characterized through on-wafer measurements. The effective refractive index and attenuation were extracted from raw (uncalibrated) measurements up to 40 GHz through the thru-reflection-line approach. The characteristic impedance was then obtained from the propagation constant, using an accurate estimate of the in-vacuo capacitance from a new conformal mapping approach able to account for large electrode thickness. We observed that the attenuation of lines with or without the oxide buffer layer consistently exhibits a different frequency behavior, thus suggesting that dielectric losses can play a significant role in the upper microwave range. This is confirmed by the results from a full quasi-TEM analytical model, including losses and frequency dispersion. The measured and simulated data show good agreement both for the propagation characteristics (attenuation and effective permittivity) and for the line impedance.

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