Abstracts

Terahertz-Bandwidth Characteristics of Coplanar Transmission Lines on Low Permittivity Substrates

H.-J. Cheng, J.F. Whitaker, T.M. Weller and L.P.B. Katehi. "Terahertz-Bandwidth Characteristics of Coplanar Transmission Lines on Low Permittivity Substrates." 1994 Transactions on Microwave Theory and Techniques 42.12 (Dec. 1994, Part II [T-MTT] (1994 Symposium Issue)): 2399-2406.

Coplanar striplines and waveguides capable of supporting ultra-high-frequency pulses over many millimeters of propagation length have been fabricated on Iow-permittivity substrates, including a durable 1.4-µm-thick membrane. These transmission lines were characterized using broadband pulses from a novel in situ optoelectronic test-signal generator together with an electro-optic probe tip and an optically-based sampling technique. Pulse-propagation characteristics for the coplanar lines on the low-permittivity substrates have been compared in both the time and frequency domains with the transmission behavior of Iines on GaAs substrates. A semi-empirical model has also been used to simulate the experimental results with good agreement, helping to indicate the origin of the distortion mechanisms involved. In addition, for the copIanar waveguide structures, waveforms corresponding to the even and odd modes have been individually resolved in the time domain for Iines fabricated on the GaAs and membrane substrates.

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