Abstracts

Nonuniform Layer Model of a Millimeter-Wave Phase Shifter

J.K. Butler, T.-F. Wu and M.W. Scott. "Nonuniform Layer Model of a Millimeter-Wave Phase Shifter." 1986 Transactions on Microwave Theory and Techniques 34.1 (Jan. 1986 [T-MTT]): 147-155.

The electromagnetic wave propagation of millimeter waves in dielectric waveguides with thin surface plasma layers is characterized. The phase and attenuation of a 94-GHz wave are computed for various surface plasma layer thicknesses as a function of earner density levels. The electron/hole pairs generated in the vicinity of the dielectric waveguide surface by photo excitation are assumed to have an exponential profile due to either carrier diffusion or the exponential absorption of the optical field. Field computations made for a uniform plasma layer are compared with those of the nonuniform plasma to illustrate the effects of the exponential tails of the carrier profiles on both the phase and attenuation of the millimeter wave. The thin plasma layers slightly affect the field profile of the transverse electric modes (fields polarized parallel to the plasma layer). The transverse magnetic fields are highly distorted at plasma densities greater than 10/sup 16/ cm/sup -3/.

❑ Return to main document.