Abstracts

Characteristics of Waveguides with a Semiconductor Side Wall

R.D. Larrabee. "Characteristics of Waveguides with a Semiconductor Side Wall." 1966 Transactions on Microwave Theory and Techniques 14.7 (Jul. 1966 [T-MTT]): 306-310.

The attenuation, guide wavelength, and characteristic impedance of rectangular waveguides with one high conductivity semiconductor side wall have been derived for the case of propagating TE/sub NO/ modes. These properties can be interpreted in terms of the penetration of the microwave electric field into the semiconductor material by an amount of the same order as, but generally unequal to, the classical skin depth. These theoretical results are evaluated for the special case of an indium antimonide side wall in RG 138/U waveguide operating at 110 Gc/s. The calculated attenuation lengths and guide wavelengths for this case are of such magnitude that they can be measured with reasonable accuracy, thus illustrating the value of this technique for the measurement of the electrical properties of semiconductor materials at the higher microwave frequencies.

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