Abstracts

Series Impedance of GaAs Planar Schottky Diodes Operated to 500 GHz

K. Bhaumik, B. Gelmont, R.J. Mattauch and M. Shur. "Series Impedance of GaAs Planar Schottky Diodes Operated to 500 GHz." 1992 Transactions on Microwave Theory and Techniques 40.5 (May 1992 [T-MTT]): 880-885.

This paper discusses the impact of ohmic contacts on the series impedance of a GaAs cylindrical planar Schottky diode. The expression for the high-frequency impedance of an annular ohmic contact is developed using a novel transmission line model. This formulation is used to ascertain the contribution of the ohmic contact impedance to the overall device series impedance at both dc and 500 GHz, Diode impedance characterization indicates that the ohmic contact impedance makes a small contribution to the series impedance in comparison to that of the other components, both at dc and submillimeter wave-lengths. Hence, the dimensions of the contact pads can be scaled down significantly without any appreciable increase in series impedance but with a decrease in the parasitic pad-to-pad capacitance. Finally, this modeling establishes theoretical guide-lines regarding the allowable limits for specific contact resistance in small geometry diodes, so that device Z-V characteristics are not significantly altered as a result of the ohmic contact impedance.

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