# Abstracts

## Computer-Aided Small-Signal Characterization of IMPATT Diodes (Sep. 1969 [T-MTT])

*C.N. Dunn and J.E. Dalley. "Computer-Aided Small-Signal Characterization of IMPATT Diodes (Sep. 1969 [T-MTT])." 1969 Transactions on Microwave Theory and Techniques 17.9 (Sep. 1969 [T-MTT]): 691-695.*

This paper is a discussion of IMPATT wafer small-signal characteristics in the frequency range of 2.0-8.0 GHz. These characteristics have been obtained by computer conversion of reflection phase-gain data. The data handling technique which allows establishment of the desired reference plane and the reduction of the admittance data into the desired equivalent circuit is presented. A calibration procedure using reference impedances consistent with the diode geometry is discussed. The validity of the microwave measurement technique and the data handling process is demonstrated by comparison of the values of junction capacitance determined at microwave frequencies with junction capacitance measurements at 30 MHz. Representative plots are given for wafer conductance and susceptance as a function of frequency with current density as a parameter. In addition, typical values obtained for the circuit elements are presented. These data illustrate the capability of determining package inductance, series resistance as a function of bias voltage, and, with the diode in avalanche, the parallel G, L, and C of the wafer admittance. The diode equivalent circuit was studied as a function of current density to compare results with the existing analytical small-signal theories. This procedure permits the separation of the wafer elements from the parasitic elements of the package. Data obtained from these measurements are extremely useful for ascertaining wafer design parameters and assisting in circuit design.

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