Abstracts

Negative TEO-Diode Conductance by Transient Measurement and Computer Simulation

H.L. Hartnagel and M. Kawashima. "Negative TEO-Diode Conductance by Transient Measurement and Computer Simulation." 1973 Transactions on Microwave Theory and Techniques 21.7 (Jul. 1973 [T-MTT]): 468-477.

A new method based on slow microwave transients due to steep bias-voltage steps gives a detailed negative-device-conductance function versus microwave-voltage amplitude V/sub ac/ for Gunn diodes. Measurements of GaAs and InP devices made by different fabrication processes as used by a variety of manufacturers show that basic differences in behavior exist. Some of these are representative of high switching speeds and others of good steady-state efficiencies. Computer simulation of Gunn devices with a range of mobility and ionized-donor density profiles oscillating in a suitable resonant structure leads to similar differences in negative-conductance functions. A first correlation between experimental and theoretical behavior is attempted, and it is possible to estimate the mobility and carrier-density profiles which could most likely be responsible for a certain device behavior. It is shown that an external locking signal affects the device's negative conductance only for small values of V/sub ac/, and experimental results confirm that this, in accordance with theoretical expectation, increases the switching speed only of certain types of diodes.

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