Abstracts

Analysis of the Frequency and Power Performances of Tunnel Diode Generators

H.J. Oguey. "Analysis of the Frequency and Power Performances of Tunnel Diode Generators." 1963 Transactions on Microwave Theory and Techniques 11.5 (Sep. 1963 [T-MTT]): 412-419.

This analysis shows the order of magnitude of the highest frequency and power to be expected from a single tunnel diode generator. An optimization on the circuit level indicates how to make the best use of a given device. The influence of the dimensions and the geometry is considered and relates the performances of the circuit with bulk and junction properties of the semiconductor. On the basis of empirical data, a correlation between bulk and junction properties is established and relates all of them to the doping level and the basic semiconductor used. Numerical data show the physical limitations to be expected with germanium and gallium-arsenide in with two idealized cavity geometries. As dimensions cannot be arbitrarily reduced, nor the impedance be arbitrarily low, they introduce other limitations which prevent in some cases the possibility of optimum performances and show comparable merits of the two geometries. It is concluded that a power output of 5 mw at 30 kMc for a GaAs tunnel diode generator is an optimistic figure close to the technical limit.

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