# Abstracts

## Conditions of Oscillation for Waveguide Mounted Tunnel Diodes

*C.C. Hoffins and K. Ishii. "Conditions of Oscillation for Waveguide Mounted Tunnel Diodes." 1964 Transactions on Microwave Theory and Techniques 12.2 (Mar. 1964 [T-MTT]): 176-183.*

Double frequency oscillation was observed in a waveguide mounted tunnel diode circuit, due to the frequency dependency of the waveguide's distributed parameters. A general analysis of the frequency dependent diode load is made and conditions of oscillation are formulated. The analysis is extended to a 1N3219A diode mounted in a tapered RG-52/U waveguide used as an oscillator. The load impedance to the tunnel diode is derived with the diode mounted at the center of the waveguide. A numerical example involving the RG-52/U waveguide mount is presented verifying the existence of double frequency oscillation and exemplifying the oscillation conditions stated. Off center diode mounting is examined. It is concluded that the waveguide mount's distributed parameters are highly frequency dependent at the center of the guide and thus double frequency oscillation can exist when a tunnel diode is mounted at that point. With the diode mounted at any other point, only one oscillation frequency can be observed. The frequencies of oscillation of a waveguide mounted tunnel diode oscillator are determined only by the real roots of the resistive component of the total tunnel diode load impedance.

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