Abstracts

Design of Stable, Very Low Noise, Cavity-Stabilized IMPATT Oscillators for C Band

B.F. van der Heyden. "Design of Stable, Very Low Noise, Cavity-Stabilized IMPATT Oscillators for C Band." 1977 Transactions on Microwave Theory and Techniques 25.4 (Apr. 1977 [T-MTT] (Special Issue on Low-Noise Technology)): 318-323.

Two types of C-band IMPATT oscillators, which easily meet the noise and stability requirements for use as local oscillators in microwave FM communications equipment, are described. Both types use a transmission cavity-stabilization circuit as proposed by Kurokawa. In one of them a TE/sub 103/ mode rectangular invar cavity is used for stabilization, while in the other the coupling is made via a high-Q cylindrical TE/sub 011/, mode cavity. Although the Si IMPATT diode is inherently noisy, it is shown that a proper choice of circuit parameters and diode characteristics leads to measured FM noise levels of less than 0.2 Hz in a 100-Hz band. With respect to frequency stability, special attention is paid to hysteresis-free compensation of temperature effects and to the influence of changes with time and ambient temperature of the diode and of the internal atmosphere of the cavity. By careful processing and sealing, an average temperature stability of better than -0.4 ppm//spl deg/C was realized with temperature cycling between 26 and 51/spl deg/C over a period of 450 h.

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