Abstracts

Frequency Modulation of Avalanche Transit Time Oscillators (Dec. 1967 [T-MTT])

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This paper presents experimental data taken to determine the frequency modulation characteristics of avalanche transit time oscillators. The active element is a diffused mesa diode with a shallow junction in epitaxiad n-n+ silicon; the details of the construction of the diode are presented and its typical characteristics are discussed. The basic oscillator consists of the diode mounted in the capacitive portion of a radial mode cavity machined of copper with the outlines of a DO-5 diode header. The frequency of oscillation is dependent upon the diode junction capacitance and is varied between 5 and 8 GHz for the diodes tested. Microwave power levels up to 100 mW have been observed with an efficiency exceeding 3 percent. The frequency drift over the temperature range from -70 to +100°C is 2.5x10/sup -5/ parts/°C. The frequency modulation characteristics of these oscillators indicate their potential applications in miniature solid-state low-power communications systems.

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