Abstracts

A Highly Stabilized Low-Noise GaAs FET Integrated Oscillator with a Dielectric Resonator in the C Band

H. Abe, Y. Takayama, A. Higashisaka and H. Takamizawa. "A Highly Stabilized Low-Noise GaAs FET Integrated Oscillator with a Dielectric Resonator in the C Band." 1978 Transactions on Microwave Theory and Techniques 26.3 (Mar. 1978 [T-MTT]): 156-162.

A GaAs FET integrated oscillator stabilized with a BaO--TiO/sub 2/ system ceramic dielectric resonator provides a high-frequency-stabilized low-noise compact microwave power source. The newly developed ceramic has an expansion coefficient and dielectric constant temperature coefficient that offset each other and result in a small resonant frequency temperature coefficient. A stabilized oscillator output of 100 mW with a 17-percent efficiency and a frequency temperature coefficient as low as 2.3 ppm/°C are obtained at 6 GHz. FM noise level is reduced more the 30 dB by the stabilization. The dynamic properties of the oscillator and resonator are precisely measured to determine equivalent circuit representations. A large-signal design theory based on these equivalent circuit representations is presented to realize the optimal coupling condition between the oscillator and stabilizing resonator. The stabilized oscillator performance is sufficient for application to microwave communications systems.

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