Abstracts

Power optimization of high-efficiency microwave MESFET oscillators

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Achieving high output power and efficiency in GaAs MESFET oscillators is mainly hampered by the device's parasitics, its static I-V characteristics, and the circuit embedding impedance. In this paper, the derivation of the relationship between oscillator output power and various circuit and device parameters is presented. From these analytical expressions, optimum operating conditions for maximum oscillator output power and efficiency are determined. The analysis method employed here is based upon a quasi-linear approach and an open-loop model of the oscillator. The design procedure is verified by measurements on an experimental circuit, which have demonstrated a dc/radio-frequency conversion efficiency of 54%.

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