Abstracts

A D-Band Monolithic Fundamental Oscillator Using InP-Based HEMT's (Dec. 1993 [T-MTT])

Y. Kwon, D. Pavlidis, T.L. Brock and D.C. Streit. "A D-Band Monolithic Fundamental Oscillator Using InP-Based HEMT's (Dec. 1993 [T-MTT])." 1993 Transactions on Microwave Theory and Techniques 41.11 (Dec. 1993 [T-MTT] (1993 Symposium Issue)): 2336-2344.

The design, analysis, and experimental characteristics of the first fundamental D-band monolithic HEMT oscillator are reported. The circuit is based on a dual feedback topology and uses 0.1 µm pseudomorphic double heterojunction InAIAs/In/sub 0.7/Ga/sub 0.3/As HEMT's. It includes on-chip bias circuitry and an integrated E-field probe for direct radiation into the waveguide. The circuit was analyzed using both small-signal and large-signal methods, while carefully accounting for the high-frequency effects of the InP-based HEMT's. An oscillation frequency of 130.7 GHz was measured and the output power level was -7.9 dBm using HEMT's of small gate periphery (90 µm). The measured power characteristics were compared to the simulation and yielded good agreement. This represents the highest frequency of fundamental signal generation out of monolithic chips using three-terminal devices.

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