

Abstracts

A Compact Ka-Band MIMIC Voltage Controlled Oscillator Comparison of MESFET and HEMT Implementations

D. Bosch, M. Gawronski, S. Swirhun, J. Geddes, J. Beyer and R. Cravens. "A Compact Ka-Band MIMIC Voltage Controlled Oscillator Comparison of MESFET and HEMT Implementations." 1991 MTT-S International Microwave Symposium Digest 91.2 (1991 Vol. II [MWSYM]): 827-830.

A novel, compact Ka-band MMIC voltage controlled oscillator (VCO) has been designed, fabricated, and tested. The VCO design is a "ring" configuration using two FETs with two isolated control terminals which provides increased tuning bandwidth. This design uses an active feedback topology resulting in greater device size for higher output power and circuit Q. This VCO was fabricated with both 0.25 μ m gate length MESFET and HEMT processes designed to have similar RF equivalent circuits by engineering the device doping. To our knowledge, this is the first report of a monolithic millimeter-wave HEMT VCO. The measured MESFET VCO demonstrated a tuning bandwidth of 740MHz centered at 35GHz and output power of 8.3 dBm. Chip size is 30 x 34 mils. The measured HEMT VCO tuning bandwidth is greater, but phase noise is worse than the MESFET implementation. This limits HEMTs in the application of low phase noise millimeter wave oscillators.

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