Abstracts

Cross-coupled differential oscillator MMICs with low phase-noise performance

Sang-Woong Yoon, Eun-Chul Park, Chang-Ho Lee, Sanghoon Sim, Sang-Goog Lee, Euisik Yoon, J. Laskar and Songcheol Hong. "Cross-coupled differential oscillator MMICs with low phase-noise performance." 2001 Microwave and Wireless Components Letters 11.12 (Dec. 2001 [MWCL]): 495-497.

LC-tank oscillators in the 5/spl sim/6 GHz frequency range have been designed and implemented in a commercial 0.6 /spl mu/m GaAs MESFET technology. One is a voltage-controlled oscillator (VCO), and the other is an oscillator without a controlling element. The output frequency range of the VCO is from 5.44 to 6.14 GHz, and the measured phase-noise is -101.67 dBc/Hz at an offset frequency of 600 KHz from the 5.44 GHz carrier. The phase-noise of the 6.44 GHz oscillator is -108 dBc/Hz at an offset frequency of 600 KHz, and the phase-noise curve, in the offset frequency range between 100 KHz and 1 MHz, shows a -20 dB/decade slope. These phase-noise characteristics are comparable to, or better than, those of the reported 5/spl sim/6 GHz-band CMOS oscillators. To our knowledge, this is the first GaAs MESFET-based oscillator which has a cross-coupled differential topology and a capacitive coupling feedback to suppress the up-conversion of 1/f noise. Also, it is first reported that the GaAs MESFET-based oscillator shows 1/f/sup 2/ phase-noise behavior across the offset frequency range from 100 KHz to 1 MHz.

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