Abstracts

Hot-carrier and soft-breakdown effects on VCO performance (Nov. 2002 [T-MTT])

Enjun Xiao, J.S. Yuan and Hong Yang. "Hot-carrier and soft-breakdown effects on VCO performance (Nov. 2002 [T-MTT])." 2002 Transactions on Microwave Theory and Techniques 50.11 (Nov. 2002 [T-MTT] (Mini-Special Issue on the 2002 IEEE Radio Frequency Integrated Circuit (RFIC) Symposium)): 2453-2458.

This paper systematically investigates the hot-carrier- and soft-breakdown-induced performance degradation in a CMOS voltage-controlled oscillator (VCO) used in phase-locked-loop frequency synthesizers. After deriving the closed-form equations to predict phase noise and VCO gain, we relate VCO RF performance such as phase noise, tuning range, and gain of VCO subject to electrical stress. The circuit degradations predicted by analytical model equations are verified by SpectraRF simulation using parameters extracted from the experimental data of 0.16 /spl mu/m CMOS technology. BERT simulation results give VCO performance degradations versus operation time.

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