Abstracts

RF circuit performance degradation due to soft breakdown and hot-carrier effect in deep-submicrometer CMOS technology

Qiang Li, Jinlong Zhang, Wei Li, J.S. Yuan, Yuan Chen and A.S. Oates. "RF circuit performance degradation due to soft breakdown and hot-carrier effect in deep-submicrometer CMOS technology." 2001 Transactions on Microwave Theory and Techniques 49.9 (Sep. 2001 [T-MTT] (Mini-Special Issue on the 2001 IEEE Radio Frequency Integrated Circuit (RFIC) Symposium)): 1546-1551.

A systematic study of RF circuit performance degradation subject to oxide soft breakdown (SBD), and hot-carrier (HC) stress is presented in this paper. DC and RF characteristics before and after stress are extracted from the experimental data. The effects of SBD and HC stress on s-parameters, cutoff frequency, third-order interception point, and noise parameters are examined. The performance drifts of gain, noise figure, linearity, and input matching of the RF low-noise amplifier are demonstrated by SpectreRF simulation results based on measured device data.

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