Abstracts

Small-signal and temperature noise model for MOSFETs

A. Pascht, M. Grozing, D. Wiegner and M. Berroth. "Small-signal and temperature noise model for MOSFETs." 2002 Transactions on Microwave Theory and Techniques 50.8 (Aug. 2002 [T-MTT]): 1927-1934.

The present CMOS technology provides n-channel MOSFETs with a transit frequency beyond 30 GHz, which are attractive for RF integrated circuits, e.g., low-noise amplifiers. This paper presents an improved deembedding procedure for extraction of parasitic elements of MOSFETs. The extraction determines the intrinsic elements of the small-signal equivalent circuit. As a result, a new method to determine the gate capacitance is presented. This deembedding procedure is based on an analytical solution of the equations and facilitates the determination of the elements at any specific frequency. Moreover, a temperature noise model is presented, which is based on the small-signal equivalent circuit with an analytical description of the channel noise. This enables a complete noise modeling of all four noise parameters and the determination of the dominant noise sources. Finally, the noise-figure measurements are compared with the simulation results.

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