Abstracts

An improved deep submicrometer MOSFET RF nonlinear model with new breakdown current model and drain-to-substrate nonlinear coupling

Deukhyoun Heo, E. Gebara, Yi-Jan Emery Chen, Seung-Yup Yoo, M. Hamai, Youngsuk Suh and J. Laskar. "An improved deep submicrometer MOSFET RF nonlinear model with new breakdown current model and drain-to-substrate nonlinear coupling." 2000 Transactions on Microwave Theory and Techniques 48.12 (Dec. 2000 [T-MTT] (Special Issue on 2000 International Microwave Symposium)): 2361-2369.

An improved deep submicrometer (0.25 /spl mu/m) MOSFET radio-frequency (RF) large signal model that incorporates a new breakdown current model and drain-to-substrate nonlinear coupling was developed and investigated using various experiments. An accurate breakdown model is required for deep submicrometer MOSFETs due to their relatively low breakdown voltage. For the first time, this RF nonlinear model incorporates the breakdown voltage turnover trend into a continuously differentiable channel current model and a new nonlinear coupling circuit between the drain and the lossy substrate. The robustness of the model is verified with measured pulsed I-V, S-parameters, power characteristics, harmonic distortion, and intermodulation distortion levels at different input and output termination conditions, operating biases, and frequencies.

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