Abstracts

A nonlinear microwave MOSFET model for SPICE simulators

As the gate lengths of silicon MOSFET's become smaller and smaller, these devices are usable to frequencies in the gigahertz range. The nonlinear MOSFET model presented in this paper is based on S-parameter measurements over a large bias range, and has been implemented in a SPICE simulator. The improvements consist of new equations for the nonlinear capacitances and output conductance of the MOS transistor. This new large-signal model shows very good agreement between measured and simulated S-parameters of single transistors at various bias points up to 10 GHz. Intermodulation (IM) and circuit performance are also well predicted. Simulated S-parameters of a simple amplifier showed excellent agreement with measured results, confirming the performance of this model.

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