Abstracts

Large-Signal Model of Picosecond FET's and Measurement of the Step Response

A. Ouslimani, G. Vernet, P. Crozat and R. Adde. "Large-Signal Model of Picosecond FET's and Measurement of the Step Response." 1989 Transactions on Microwave Theory and Techniques 37.9 (Sep. 1989 [T-MTT] (Special Issue on FET Structures Modeling and Circuit Applications)): 1460-1465.

A FET large-signal model is developed for the time-domain CAD of ultrafast circuits. Numerical 2-D look-up tables describe the nonlinear parameters versus the device internal voltages. A dc and microwave FET characterization versus bias voltage followed by parameter extraction completely determines the tables of parameters. The model may be implemented in simulators handling 2-D tables and applied to commercial transistors without a detailed knowledge of the internal technology. The step response of a NEC710 MESFET is measured and compared with the model, demonstrating its accuracy in representing switching waveforms and transient phenomena in the range covering tens of picosecond. The 20 ps switching time of the NEC710 shows that the presented methodology of modeling, measurement, and simulation is adequate for studying picosecond transient phenomena in single transistors.

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