Abstracts

Full wave analysis of FET fingers using various semiconductor physical models

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We present a full wave simulation of FET fingers based on a global modeling approach. The electromagnetic fields inside the device are computed by a standard FDTD scheme and coupled to the semiconductor equations through the current density. Four different semiconductor models are used to characterize the active device. They are derived from the hydrodynamic model obtained by integration of Boltzmann's equations. The I-V characteristics of the FET are obtained for the different models. The RF voltage gain and the S parameters can be compared. This is the first time that such an analysis is performed. The wave device interactions occurring in the FET can be modeled using various physical models. This allows us to determine which semiconductor model to use for a given gate length and a given frequency range when the electromagnetic interactions are simulated.

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