Abstracts

A new empirical large-signal model of Si LDMOSFETs for high-power amplifier design

Youngoo Yang, Young Yun Woo, Jaehyok Yi and Bumman Kim. "A new empirical large-signal model of Si LDMOSFETs for high-power amplifier design." 2001 Transactions on Microwave Theory and Techniques 49.9 (Sep. 2001 [T-MTT] (Mini-Special Issue on the 2001 IEEE Radio Frequency Integrated Circuit (RFIC) Symposium)): 1626-1633.

We propose a new empirical large-signal model of silicon laterally diffused MOSFETs for the design of various modes of high-power amplifiers. The new channel current model has only nine parameters that represent the unique operation principles of a MOSFET. In the channel current model, we include the thermal phenomena of high-power devices. To accurately characterize high-power devices, we incorporate the channel heating and heat-sink heating effects by providing two thermal capacitances and two thermal resistances. Nonlinear capacitances, including deep subthreshold and triode regions, as well as normal saturation regions, are extracted and modeled. For validation of our model, a 1.4-GHz 5-W amplifier is implemented, and the measured and simulated results match very well.

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