Abstracts

A New SPICE-Type Heterojunction Bipolar Transistor Model for DC, Microwave Small-Signal and Large-Signal Circuit Simulation

K. Lu, P. Perry and T.J. Brazil. "A New SPICE-Type Heterojunction Bipolar Transistor Model for DC, Microwave Small-Signal and Large-Signal Circuit Simulation." 1994 MTT-S International Microwave Symposium Digest 94.3 (1994 Vol. III [MWSYM]): 1579-1582.

Accurate modelling of the microwave large-signal characteristics of Heterojunction Bipolar Transistors (HBTs) is extremely useful for microwave power applications of this device. This paper presents a new type of HBT large-signal model which is valid for DC, small-signal and large-signal AC modes of operation. The model may be used over a wide range of operating conditions and includes allowance for self-heating effects which are very important for HBTs. Through the use of several novel features, the model is differentiated from traditional Ebers-Moll or Gummel-Poon BJT representations. The new model is accompanied by a very simple parameter extraction process requiring only a series of conventional DC measurement and multi-bias point small-signal S-parameter measurements. The model is validated by independent power sweep measurements on HBTs from two different manufacturers.

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