Abstracts

A New Large Signal HBT Model

Q.M. Zhang, H. Hu, J. Sitch, R.K. Surridge and J.M. Xu. "A New Large Signal HBT Model." 1996 Transactions on Microwave Theory and Techniques 44.11 (Nov. 1996 [T-MTT]): 2001-2009.

Several effects important for large signal operations of heterojunction bipolar transistor (HBT's) were not included in the previous HBT models used in most commercial circuit simulators. Exclusion of these effects resulted in large discrepancies between modeled and measured device characteristics. This paper presents a new large signal HBT model which takes into account those important effects for the device operation. The effects have been identified from measured device characteristics and can be justified from first principles. To make it easy to use, the model is made up of the elements available from SPICE. During the course of the model development, an extraction procedure for the model parameters has been established to minimize the uncertainty of the extracted parameter values. The new model has been applied to HBT's with various emitter sizes and excellent agreement has been achieved between modeled and measured data over a wide range of bias conditions and signal frequencies.

❑ Return to main document.