Abstracts

An Analysis of the Large-Signal Characteristics of AlGaAs/GaAs Heterojunction Bipolar Transistors

M.Y. Frankel and D. Pavlidis. "An Analysis of the Large-Signal Characteristics of AlGaAs/GaAs Heterojunction Bipolar Transistors." 1992 Transactions on Microwave Theory and Techniques 40.3 (Mar. 1992 [T-MTT]): 465-474.

The large-signal characteristics of AIGaAs/GaAs hetetrojunction bipolar transistors are reported. A harmonic balance analysis technique is used for their analysis. This is based on equivalent circuit extractions using approximate physical equations for constraining the fitted solutions and for describing certain circuit element value bias trends. Class A and Class AB large signal behavior was measured and modeled satisfactorily. Power saturation is shown to occur due to the input signal entering the cutoff or the saturation region of the HBT operation. This is illustrated by time-dependent currentlvoltage waveforms and the power dependence of large-signal equivalent circuit elements. Depending on device bias and matching conditions the main sources of nonlinearities in device output may be caused by the nonlinearities in transconductance, input conductance, and base-collector capacitance.

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