Abstracts

Direct Extraction of Equivalent Circuit Parameters for Heterojunction Bipolar Transistors

C.-J. Wei and J.C.M. Hwang. "Direct Extraction of Equivalent Circuit Parameters for Heterojunction Bipolar Transistors." 1995 Transactions on Microwave Theory and Techniques 43.9 (Sep. 1995, Part I [T-MTT]): 2035-2040.

A new method is presented for the direct extraction of hybrid-T equivalent circuits for heterojunction bipolar transistors. The method differs from previous ones by extracting the equivalent circuit without using test structures or numerical optimization techniques. Instead, all equivalent circuit parameters are calculated analytically from small-signal S-parameters measured under different bias conditions. The analysis includes the distributed nature of the HBT base. The calculated parameters are essentially frequency-independent and they exhibit systematic bias dependence over the typical operating range of the transistor. Thus, the present method ensures unique and physically meaningful parameters for transistor design improvement and large-signal circuit simulation. In addition, the present method is much faster than the numerical optimization method.

❑ Return to main document.