Abstracts

Small-Signal Characterization of Microwave and Millimeter-Wave HEMT's Based on a Physical Model

R. Singh and C.M. Snowden. "Small-Signal Characterization of Microwave and Millimeter-Wave HEMT's Based on a Physical Model." 1996 Transactions on Microwave Theory and Techniques 44.1 (Jan. 1996 [T-MTT]): 114-121.

A highly efficient generalized physics-based approach for small-signal characterization of FET devices is presented. A novel method is developed for extracting the frequency dependent two-port parameters from a single time-domain physical simulation based on a multi-signal excitation scheme. The technique is applied to simulating the frequency- and bias-dependent scattering parameters of HEMT's using a quasi-two-dimensional physical model that incorporates the main physical phenomena which govern the device behavior. A new carrier energy distribution model is presented which improves the accuracy of the physical model. An equivalent circuit is also generated from the physical dynamic simulation which can be used for predicting S-parameters and for indirect linking of the physical model to existing CAD tools. The unique formulation and efficiency of the present technique make it suitable for computer aided design of FET subsystems. The accuracy and flexibility of this approach is demonstrated by comparison of simulated results with measured data for a pulse doped pHEMT and uniformly doped GaAs channel HEMT.

❑ Return to main document.