Abstracts

Influence of collector design on InGaP/GaAs HBT linearity

M. Iwamoto, T.S. Low, C.P. Hutchinson, J.B. Scott, A. Cognata, Xiaohui Qin, L.H. Camnitz, P.M. Asbeck and D.C. D'Avanzo. "Influence of collector design on InGaP/GaAs HBT linearity." 2000 MTT-S International Microwave Symposium Digest 00.2 (2000 Vol. II [MWSYM]): 757-760.

Linearity characteristics of InGaP/GaAs heterojunction bipolar transistors with various collector profiles are examined. Output third-order intercept point is measured as a function of bias current and voltage at 5 GHz. The results from this study indicate that IP3 varies with current in a complex manner and is significantly dependent on the collector design. A dynamic trend in IP3 is observed where a peak occurs at a current just below Kirk effect and a trough occurs at the onset of Kirk effect. Although the Gummel-Poon model is not able to predict this behavior, a large signal HBT model, which accounts for collector space-charge effects such as electron velocity modulation and Kirk effect, can properly represent the measured data. For accurate linearity predictions, these effects should be included in a large signal HBT model.

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