Abstracts

Microwave Noise Characterization of GaAs MESFET's: Evaluation by On-Wafer Low-Frequency Output Noise Current Measurement

M.S. Gupta, O. Pitzalis, Jr., S.E. Rosenbaum and P.T. Greiling. "Microwave Noise Characterization of GaAs MESFET's: Evaluation by On-Wafer Low-Frequency Output Noise Current Measurement." 1987 Transactions on Microwave Theory and Techniques 35.12 (Dec. 1987 [T-MTT] (1987 Symposium Issue)): 1208-1218.

A simplified noise equivalent circuit is presented for submicron-gate-length MESFET's in the common-source configuration, consisting of five linear circuit elements: the gate-to source capacitance C/sub gs/, the total input resistance R/sub T/, the transconductance g/sub m/, the output resistance R/sub 0/, and a noise current source of spectral density S/sub io/ at the output port. All of these elements can be determined by on-wafer measurements, and the noise current can be measured at a low frequency. The minimum noise figure of the device calculated from this model, as well as the bias and frequency dependence of the noise figure, is shown to be in agreement with microwave noise figure measurements. Thus a technique has been established for determination of the minimum noise figure of a device solely by on-wafer measurements rather than by the usual microwave measurements. The proposed technique can be employed rapidly, conveniently, without the need for tuning, and at the wafer stage of device fabrication.

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