Abstracts

Study of self-heating effects, temperature-dependent modeling, and pulsed load-pull measurements on GaN HEMTs

S. Nuttinck, E. Gebara, J. Laskar and H.M. Harris. "Study of self-heating effects, temperature-dependent modeling, and pulsed load-pull measurements on GaN HEMTs." 2001 Transactions on Microwave Theory and Techniques 49.12 (Dec. 2001 [T-MTT] (Special Issue on 2001 International Microwave Symposium)): 2413-2420.

On-wafer RF and IV characterizations are performed for the first time on power GaN high electron-mobility transistors (HEMTs) under pulse and continuous conditions at different temperatures. These measurements give an in-depth understanding of self-heating effects and allow one to investigate the possibility of improving heat-dissipation mechanisms. A pulsed load-pull system that measures the power gain of the device-under-test (DUT) under pulsed RF and bias condition has been developed. To the best of our knowledge, this is the first time that the reflected power at the DUT is measured under the pulse mode of operation. Additionally, an improved small-signal model for power GaN HEMTs that incorporates the geometry of the device is developed at various temperatures. This is the basis for empirical large-signal modeling.

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