Abstracts

Temperature dependence of intermodulation and linearity in GaN based devices (2001 Vol. I [MWSYM])

A. Ahmed, S.S. Islam and A.F.M. Anwar. "Temperature dependence of intermodulation and linearity in GaN based devices (2001 Vol. I [MWSYM])." 2001 MTT-S International Microwave Symposium Digest 01.1 (2001 Vol. I [MWSYM]): 579-582 vol.1.

The gain and intermodulation distortion of an AlGaN-GaN device operating at RF, have been analyzed using a general Volterra series representation. The circuit model to represent the GaN FET is obtained from a physics based analysis. Theoretical current-voltage characteristics are In excellent agreement with the experimental data. For a 1 /spl mu/m/spl times/500 /spl mu/m Al/sub 0.15/Ga/sub 0.85/N-GaN FET, the calculated output power, power added efficiency and gain are 25 dBm, 13% and 10.1 dB, respectively at 15 dBm input power and are in excellent agreement with the experimental data. The output referred third order intercept point IP3 is 39.9 dBm at 350 K and 33 dBm at 650 K. These are in agreement with the simulated results from Cadence which are 39.34 dBm and 35.7 dBm, respectively. At 10 GHz, third order intermodulation distortion IM3 for 10 dBm output power is -88 dB at 350 K and -82 dB at 650 K. At 350 K IM3 is -97 dB at 5 GHz and -88 dB at 10 GHz. For the same frequencies IM3 increased to -90 dB and -82 dB, respectively, at 650 K.

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