

Abstracts

Large-signal modeling of GaN FET and nonlinearity analysis using Volterra series (2002 Vol. I [MWSYM])

S.S. Islam and A.F.M. Anwar. "Large-signal modeling of GaN FET and nonlinearity analysis using Volterra series (2002 Vol. I [MWSYM])." 2002 MTT-S International Microwave Symposium Digest 02.1 (2002 Vol. I [MWSYM]): 267-270 vol.1.

A large-signal model is reported to investigate the nonlinearities of a GaN MESFET. The model developed accounts for the observed current collapse and frequency dispersion of output resistance and transconductance and uses Volterra series technique to determine the nonlinearities. Calculated $f_{\text{sub T}}$ and $f_{\text{sub max}}$ of a $0.8 \mu\text{m}/150 \mu\text{m}$ GaN MESFET are 6.5 GHz and 13 GHz, respectively, and are in close agreement with their measured values of 6 GHz and 14 GHz, respectively. For a $1.0 \mu\text{m}/150 \mu\text{m}$ FET operating at 1 GHz, 1-dB compression point and output referred third-order intercept point (OIP3) are 18 dBm and 25.3 dBm, respectively. The corresponding quantities are 19.6 dBm and 30.5 dBm for a $0.6 \mu\text{m}/150 \mu\text{m}$ FET at same frequency. Similar improvements in third-order intermodulation (IM3) for shorter gate length devices are reported.

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