Abstracts

Large-signal modeling of GaN FET and nonlinearity analysis using Volterra series (2002 [RFIC])

S.S. Islam and A.F.M. Anwar. "Large-signal modeling of GaN FET and nonlinearity analysis using Volterra series (2002 [RFIC])." 2002 Radio Frequency Integrated Circuits (RFIC) Symposium 02. (2002 [RFIC]): 351-354.

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/sub T/ and f/sub max/ of a 0.8 /spl mu/m/spl times/150 /spl mu/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 /spl mu/m/spl times/150 /spl mu/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 /spl mu/m/spl times/150 /spl mu/m FET at same frequency. Similar Improvements in third-order intermodulation (IM3) for shorter gate length devices are reported.

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