Abstracts

A 15 watt PFP GaAs PHEMT MMIC power amplifier for 3G wireless transmitter applications

J. Staudinger, R. Sherman, T. Quach, M. Miller and L. Frye. "A 15 watt PFP GaAs PHEMT MMIC power amplifier for 3G wireless transmitter applications." 2002 MTT-S International Microwave Symposium Digest 02.2 (2002 Vol. II [MWSYM]): 617-620 vol.2.

This work describes a wide-bandwidth highly integrated MMIC linear power amplifier implemented with high voltage GaAs PHEMT device technology targeting 3G wireless infrastructure applications. The MMIC amplifier exhibits 34 dB small signal gain, less than 0.5 dB gain variation across the UMTS frequency band centered at 2.14 GHz, and a peak-envelope power in excess of 15 W when biased with a 12 volt supply. Under a 64 traffic channel single carrier W-CDMA signal (test model 1, with a 11 dB peak-to-average signal ratio), the amplifier achieves 2W average output power and 17% power added efficiency at an ACPR of -40 dBc. Under a 9-channel single carrier IS-95 forward-link signal, the amplifier achieves 4 W average power at an efficiency of 25% at an ACPR of -38 dBc. The MMIC amplifier is highly integrated consisting of 3-gain stages, input and interstage matching circuits, and output pre-matching - all contained on the GaAs IC. The use of on-chip pre-matching for the output load line greatly simplifies and reduces off chip component matching elements and their tolerances. To the author's best knowledge, this amplifier represents the highest power and efficiency reported to date for a GaAs PHEMT amplifier realized at this level of integration.

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