Abstracts

Harmonic Tuning of Power FETs at X-Band

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We report on a study of high-efficiency, harmonic-tuned, class-B operation of power MESFETs at X-band. Hybrid, single-stage 1200µm power FET amplifiers were fabricated with the output circuit designed to provide optimum load impedance at the fundamental frequency (10 GHz) and short at the second harmonic. Power-added efficiency of 61% at an output power level of 450mW and 7dB power gain were obtained at 10GHz. The corresponding drain efficiency was 75%. The second harmonic level in the output was suppressed to less than -40 dBc level over a 4% frequency bandwidth. The improvement in the efficiency was at the expense of lower operating voltage and power density (0.4W/mm) when compared with class-A or class-AB amplifiers made from similar devices, Theoretical harmonic-balance analysis of these tuned class-B amplifiers were also performed and the results agree fairly well with the measured data.

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