Abstracts

Efficiency of chip-level versus external power combining [microwave power amplifiers]

E.W. Bryerton, M.D. Weiss and Z. Popovic. "Efficiency of chip-level versus external power combining [microwave power amplifiers]." 1999 Transactions on Microwave Theory and Techniques 47.8 (Aug. 1999 [T-MTT] (Mini-Special Issue on Low-Power/Low-Noise Technologies for Mobile Wireless Communications)): 1482-1485.

In this paper, we compare two X-band high-efficiency switched-mode amplifiers designed around two commercially available packaged MESFET's, one having a four times larger gate periphery than the other. The amplifiers using the larger and smaller devices are designed to operate in classes E and F, respectively. The smaller device gives 685 mW output power with 7.4 dB gain and 64% overall efficiency. The larger device gives 1.70 W output power with 5.3 dB gain and 57% overall efficiency. This gives an internal (or chip-level) power-combining efficiency for the larger device of 89% in terms of overall efficiency. This is compared to the combining efficiency of circuit and spatial power combining using high-efficiency amplifiers, with the goal of assessing which architecture is the most efficient in terms of total dissipated power (DC and RF).

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