Abstracts

High-performance AlGaAs/InGaAs/GaAs PHEMTs for K and Ka-band applications

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We report AlGaAs/InGaAs/GaAs PHEMTs with high efficiency and power output, suitable for use in K and Ka-band applications. On-wafer active load-pull measurements were performed at 20 GHz on double-recessed devices with a gatelength (L/sub g/) of 0.14 /spl mu/m. P/sub out/=26.7 dBm was obtained from a 640 /spl mu/m part with power added efficiency (PAE) of 52% and associated power gain (G/sub A/) of 9.7 dB. This implies a power density of 727 mW/mm for this technology. When tuned for a maximum PAE of 54.9%, another 640 /spl mu/m device yielded P/sub out/=25.2 dBm and G/sub A/=10.4 dB. A maximum P/sub out/ of 27.4 dBm was also obtained from an 800 /spl mu/m part. This same transistor consistently yielded a PAE greater than 50% for an entire drain-source bias (V/sub DS/) range of 2-8 V. We believe these devices present the best combination of P/sub out/, PAE and G/sub A/ reported thus far in the literature for PHEMTs at 20 GHz.

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