Abstracts

High Efficiency Microwave Harmonic Reaction Amplifier

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The operation mechanism of the novel high efficiency Harmonic Reaction Amplifier (HRA) is clarified. The HRA is basically constructed with a pair of power FETs. The technical originality lies in a provision of an interconnecting circuit concerning a second-harmonic output component between FETs. This additional circuit realizes an efficient and stable switching-mode operation required for the attainment of highly efficient microwave power amplification. Theoretical analysis results indicate that a drain efficiency of 86% is available with an ideal HRA construction of purely class-B biased operation. Experiments on a miniaturized 2-GHz 5-W HRA module are conducted to verify analysis results. A power-added efficiency of over 70% is achieved confirming that the HRA can be practically applied to microwave power amplifiers. Moreover, an HRA capability of high efficiency as a linear amplifier under a class-AB biased condition is shown in the experiments as well.

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