

Abstracts

Microwave Mixers Employing Multiple-Barrier Semiconductor Heterostructure Devices

G.B. Tait. "Microwave Mixers Employing Multiple-Barrier Semiconductor Heterostructure Devices." 1994 Transactions on Microwave Theory and Techniques 42.9 (Sep. 1994, Part I [T-MTT]): 1596-1601.

Experimental data on mixer performance of unipolar semiconductor heterostructure diodes containing bulk alloy-ramp barriers are presented. Prototype Al/sub x/Ga/sub 1-x/As/GaAs heterostructures containing one, two, and four barriers are fabricated by MBE and tested in a single-ended mixer circuit at 10 GHz. The devices with two and four barriers, which exhibit improved performance over the single-barrier device, achieve conversion losses between 4 and 6 dB and noise temperature ratios between 1.5 and 2 at 300 K. Several significant advantages over contending Schottky diodes are also discussed. The results indicate that multiple-barrier devices are good candidates for use in microwave and millimeter-wave mixer circuits.

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