Abstracts

Large Signal Device Characterization for Broadband Ka-Band IMPATT Amplifier Design

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A three-stage 0.5 watt avalanche diode amplifier has been developed with 23 dB of gain and 0.5 dB bandwidth of 2 GHz from 34 to 36 GHz. The voltage gain bandwidth product of the first stage exceeds 12 GHz - a state-of-the-art value for Ka-band IMPATT amplifiers. The amplifier uses GaAs modified Read profile devices which produce 0.5 watt at 8-9 percent efficiency. The flat broadband response of this waveguide amplifier is the result of applying lower frequency circuit design techniques such as network analysis and circuit synthesis to millimeter wave frequencies. Diode matching is controlled and predictable, no tuning screws are utilized. This paper describes the design approach, the circuit, and the results; including amplifier system performance tests such as input-output, noise figure and intermodulation products.

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