Abstracts

High-Performance GaAs Heterojunction Bipolar Transistor Logarithmic IF Amplifier

A.K. Oki, M.E. Kim, G.M. Gorman and J.B. Camou. "High-Performance GaAs Heterojunction Bipolar Transistor Logarithmic IF Amplifier." 1988 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 88.1 (1988 [MCS]): 41-46.

The GaAs/AIGaAs heterojunction bipolar transistor (HBT) has been used to demonstrate a high performance logarithmic amplifier, also believed to be the first using the HBT technology. A "true" logarithmic intermediate frequency (IF) amplifier is implemented, based on a silicon bipolar transistor dual-gain log stage design. The HBT true log IF amplifier monolithically integrates four log stages to achieve a piecewise-linear approximated log function for compression of wide dynamic range signals. An HBT IC fabrication process based on metal-organic chemical vapor deposition (MOCVD) epitaxy and a 3 µm emitter self-aligned base ohmic transistor is used to advance the state-of-the-art log IF amplifier technology in terms of IF frequency and bandwidth, pulse resolution, and monolithic dynamic range and accuracy. The true log IF amp performance includes DC-3 GHz lF/video bandwidth, 400 pS rise time, and <±1 dB log error over/spl ap/ 40 dB dynamic range at 3 GHz.

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