

One-Chip GaAs Monolithic Frequency Converter Operable to 4 GHz

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A GaAs monolithic frequency converter integrated circuit that operates at frequencies up to 4 GHz has been developed. It combines a feedback amplifier, a differential amplifier, a double-balanced mixer, a voltage-controlled oscillator, and an IF amplifier on a 1-mm² GaAs chip. The FET circuits were matched by digital IC design rather than by the distributed element network technique, to use the substrate more effectively. Self-aligned WSi/Au gates 1.5 μm long were used, and the resistance in conventional WSi gates was reduced to enhance microwave characteristics. At 4 GHz, the conversion gain is 18 dB, the DSB noise is 11.8 dB, and the output power is 5.6 dBm.

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