Abstracts

Highly Integrated Three-Dimensional MMIC Single-Chip Receiver and Transmitter (Dec. 1996, Part II [T-MTT])

I. Toyoda, T. Tokumitsu and M. Aikawa. "Highly Integrated Three-Dimensional MMIC Single-Chip Receiver and Transmitter (Dec. 1996, Part II [T-MTT])." 1996 Transactions on Microwave Theory and Techniques 44.12 (Dec. 1996, Part II [T-MTT] (1996 Symposium Issue)): 2340-2343.

The three-dimensional monolithic microwave/millimeter wave integrated circuits (MMIC) structure that places thin polyimide-film layers on wafers significantly increases the integration level of MMIC'S. We newly develop 9.2-12 GHz receiver and 9.5-14 GHz transmitter chips with 20 dB gain using the three-dimensional MMIC technology. The receiver chip includes a four-stage front-end amplifier, a local oscillator (LO) amplifier, and an image-rejecton mixer in a 2 x 2 mm chip. The transmitter chip also includes an IF amplifier with balanced outputs, an LO amplifier, an RF buffer amplifier, and a balanced upconverter in a 1.9 x 1.9 mm chip. The integration levels of these chips are nearly three times higher than those of conventional planar devices. The design method of each function block, such as the amplifier and mixer, is also described.

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