Abstracts

A compact V-band 3-D MMIC single-chip down-converter using photosensitive BCB dielectric film

K. Nishikawa, S. Sugitani, K. Kamogawa, T. Tokumitsu, I. Toyoda and M. Tanaka. "A compact V-band 3-D MMIC single-chip down-converter using photosensitive BCB dielectric film." 1999 Transactions on Microwave Theory and Techniques 47.12 (Dec. 1999 [T-MTT] (Special Issue on 1999 International Microwave Symposium)): 2512-2518.

A high-density monolithic-microwave integrated-circuit (MMIC) V-band down-converter, which employs the masterslice three-dimensional (3-D) MMIC technology and photosensitive benzocyclobutene (BCB) dielectric film, is presented. The 3-D MMIC process reduces the turn-around time by 66% compared to the polyimide-based fabrication process. The BCB-based process offers flexible metal configurations and high yields. The down-converter is structured on an 8/spl times/2 master array in a 1.84 mm/spl times/0.87 mm chip. A newly developed down-converter MMIC with a heterostructure MESFET with f/sub max/ of 130 GHz consists of a two-stage radio-frequency amplifier and an image rejection mixer with an intermodulation frequency amplifier. This MMIC demonstrates a gain of 19.3 dB and an image rejection ratio of above 18 dB in the frequency range of 56.5-59.5 GHz; its associated gain density is five times higher than that of conventional MMIC's. This paper clarifies the design criteria for 3-D MMIC packaging using the flip-chip bonding technique. The BCB-based 3-D MMIC technology with flip-chip bonding will realize much cheaper millimeter-wave wireless equipment.

❑ Return to main document.