Abstracts

Multifunction Silicon MMIC's for Frequency Conversion Applications

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Recent advances in silicon bipolar IC technology have produced devices with 10-20 GHz f/sub T/ and f/sub max/ and excellent yields at MSI levels (/spl ap/ 100 devices). Thus cost-effective multifunction silicon MMIC's can now be developed for many commercial RF/microwave systems. In this work, the modeling, design, and testing of two silicon MMIC's for frequency conversion applications are illustrated in detail. The first product is a wide-band frequency doubler with conversion gain, 20 dBc rejection of harmonics, and a 2 GHz bandwidth. The second product is a wide-band vector demodulator (or image reject mixer) that utilizes an on-chip digital frequency divider to generate 0° and 90° LO phases from 0.05-1.5 GHz. Both products operate from a single 5 V supply, are load-insensitive, require no external baluns, and are packaged in tiny 180 mil hermetic packages. These frequency conversion MMIC's and others currently under development have been prototype on the analog silicon transistor array starCHIP™-1, which is also described.

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