Abstracts

A 94 GHz high performance quadruple subharmonic mixer MMIC

K. Kanaya, K. Kawakami, T. Hisaka, T. Ishikawa and S. Sakamoto. "A 94 GHz high performance quadruple subharmonic mixer MMIC." 2002 MTT-S International Microwave Symposium Digest 02.2 (2002 Vol. II [MWSYM]): 1249-1252 vol.2.

A 94 GHz high performance quadruple subharmonic mixer (4/spl times/SHM) MMIC has been designed and fabricated for a down converter. The required LO frequency is only a quarter of RF frequency which is a half LO frequency of conventional double subharmonic mixers (2/spl times/SHM). The conversion gain and noise power were experimentally compared with that of a conventional subharmonic mixer. The quadruple subharmonic mixer showed the maximum conversion gain of -11.4 dB at an RF frequency of 94 GHz and a LO frequency of 23.5 GHz. The maximum noise power of -159 dBm/Hz was obtained at an IF frequency of 100 kHz. This noise measurement also suggests noise performance at low IF frequency depends not on the LO mixing frequency but on the 1/f noise of the Schottky barrier diode. The fabricated MMIC chip size is as small as 0.9 mm/spl times/1.4 mm. To our knowledge, these results are the best performances demonstrated from a quadruple subharmonic mixer MMIC in the W-band millimeter-wave range.

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