Abstracts

A novel 12-24 GHz broadband HBT distributed active balanced mixer

K.W. Kobayashi, L.T. Tran, M. Lammert, T.R. Block, A.K. Oki and D.C. Streit. "A novel 12-24 GHz broadband HBT distributed active balanced mixer." 1997 Radio Frequency Integrated Circuits (RFIC) Symposium 97. (1997 [RFIC]): 75-78.

Here we present a novel HBT distributed active balanced Schottky mixer design that demonstrates octave-band balanced frequency performance in a compact 3/spl times/3.9 mm/sup 2/ MMIC while operating with a reduced LO power of +9 dBm. The MMIC mixer features a unique HBT distributed active balun design which employs a novel HBT active IF center-tap combiner that provides gain and also functions as an active load termination for the distributed LO and RF baluns. High performance vertical Schottky diodes made from the existing HBT epitaxy comprise the active mixer device. The HBT active balanced Schottky mixer achieves 8-12 dB conversion loss over a simultaneously swept 12-24 GHz RF and LO octave input band. An LO-IF isolation /spl ges/20 dB, LO-RF isolation /spl ges/30 dB, and 2-2 spur suppression of 24-30 dBc were also achieved across the band and are attributed to the excellent bipolar threshold and beta matching properties of the high speed 1 /spl mu/m GaAs HBTs (f/sub T/'s=43 GHz). The new HBT distributed active balanced mixer design has potential use in wideband mixer applications such as direct-conversion receivers.

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