Abstracts

Broadband Single- and Double-Balanced Resistive HEMT Monolithic Mixers

T.H. Chen, K.W. Chang, S.B.T. Bui, L.C.T. Liu, G.S. Dow and S. Pak. "Broadband Single- and Double-Balanced Resistive HEMT Monolithic Mixers." 1995 Transactions on Microwave Theory and Techniques 43.3 (Mar. 1995 [T-MTT]): 477-484.

A double-balanced (DB) 3-18 GHz and a single-balanced (SB) 2-16 GHz resistive HEMT monolithic mixer have been successfully developed. The DB mixer consists of a AlGaAs/InGaAs HEMT quad, an active LO balun, and two passive baluns for RF and IF. At 16 dBm LO power, this mixer achieves the conversion losses of 7.5-9 dB for 4-13 GHz RF and 7.5-11 dB for 3-18 GHz RF. The SB mixer consists of a pair of AlGaAs/InGaAs HEMT's, an active LO balun, a passive IF balun and a passive RF power divider. At 16 dBm LO power, this mixer achieves the conversion losses of 8-10 dB for 4-15 GHz RF and 8-11 dB for 2-16 GHz RF. The simulated conversion losses of both mixers are very much in agreement with the measured results. Also, the DB mixer achieves a third-order input intercept (IP/sub 3/) of +19.5 to +27.5 dBm for a 7-18 GHz RF and 1 GHz IF at a LO drive of 16 dBm while the SB mixer achieves an input IP/sub 3/ of +20 to +28.5 dBm for 2 to 16 GHz RF and 1 GHz IF at a 16 dBm LO power. The bandwidth of the RF and LO frequencies are approximately 6:1 for the DB mixer and 8:1 for the SB mixer. The DB mixer of this work is believed to be the first reported DB resistive HEMT MMIC mixer covering such a broad bandwidth.

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