Abstracts

K-Band Double-Balanced Mixer Using GaAs HBT THz Schottky Diodes (1994 Vol. II [MWSYM])

K.W. Kobayashi, R. Kasody, A.K. Oki, S. Dow, B. Allen and D.C. Streit. "K-Band Double-Balanced Mixer Using GaAs HBT THz Schottky Diodes (1994 Vol. II [MWSYM])." 1994 MTT-S International Microwave Symposium Digest 94.2 (1994 Vol. II [MWSYM]): 1163-1166.

We report on a K-band double-balanced mixer using Schottky diodes made with our baseline (Foundry) GaAs HBT technology. The GaAs HBT MBE structure which yields a transistor f/sub max/ of 50 GHz, can also support Schottky diode structures with THz cut-off frequencies. A GaAs HBT Schottky diode double-balanced mixer achieves an upconversion loss of less than 6 dB over an RF output frequency band from 18-22 GHz, an LO frequency of 12 GHz @ +10 dBm, and an IF input frequency band from 6-10 GHz. An output IP3 of 9 dBm with an LO drive of 10 dBm was achieved. IF-RF and IF-LO isolations of > 20 dB, and an LO-RF isolation of > 30 dB were achieved over the broad band. In comparison to a HEMT Schottky diode implementation of the same identical design, the HBT Schottky implementation achieves lower conversion loss and higher IP3 for a given LO drive level and obtains similar isolation and intermodulation performance.

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