Abstracts

A Novel Monolithic LNA Integrating a Common-Source HEMT with an HBT Darlington Amplifier

K.W. Kobayashi, D.K. Umemoto, T.R. Block, A.K. Oki and D.C. Streit. "A Novel Monolithic LNA Integrating a Common-Source HEMT with an HBT Darlington Amplifier." 1995 Microwave and Guided Wave Letters 5.12 (Dec. 1995 [MGWL]): 442-444.

Here we report on the results of a novel HEMT-HBT LNA MMIC fabricated using selective molecular beam epitaxy (MBE) techniques. This unique circuit monolithically integrates a low-noise common-source HEMT with an HBT Darlington feedback amplifier to achieve high gain, low noise figure, and wide bandwidth utilizing a compact direct-coupled topology. The miniature direct-coupled MMIC is 0.9 x 0.7 mm² in size and obtains 1-8 GHz bandwidth, greater than 17.5 dB gain, and a minimum noise figure of 2.5 dB. The maximum IP3 is 18 dBm with a saturated output power (P/sub sat/) > 12 dBm. The HEMT-HBT amplifier achieves comparable P/sat/ performance to the conventional HBT-only Darlington amplifier while achieving over 2-dB reduction in noise figure across the band, This work benchmarks the first HEMT-HBT MMIC that illustrates microwave performance advantages when compared to an HBT-only design.

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