Abstracts

K-band receiver front-ends in a GaAs metamorphic HEMT process

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In this paper, we present K-band receiver blocks fabricated in a state-of-the-art 0.18-/spl mu/m GaAs metamorphic high electron-mobility transistor (MHEMT) process using a 60% indium-content InGaAs channel. Several circuits are developed to demonstrate the superior noise performance and successful integration of K-band receiver components in such a process. We show a low-power three-stage low-noise amplifier (LNA) with a gain of 23 dB and a noise figure (NF) of less than 1.6 dB at 30 GHz. This LNA shows InP-like performance on a GaAs substrate with a high RF yield of 84%. This is the first report of a statistical yield analysis of an MHEMT integrated circuit. We also demonstrate on-chip integration of a single-stage amplifier with a diode subharmonic mixer for low-power and broad-band receiver performance. This down-converter exhibits a conversion loss of 3 dB, overall NF of 5 dB, and third-order input intercept point of -5 dBm from 26 to 30 GHz.

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