Abstracts

A W-Band Image-Rejection Downconverter

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This paper presents the design, fabrication, and evaluation of a W-band image-rejection downconverter based on pseudomorphic InGaAs/GaAs HEMT technology. The image-rejection downconverter consists of a monolithic three-stage low-noise amplifier, a monolithic image-rejection mixer, and a hybrid IF 90° coupler with an IF amplifier. The three-stage amplifier has a measured noise figure of 3.5 dB with an associated small signal gain of 21 dB at 94 GHz while the image-rejection mixer has a measured conversion loss of 11 dB with a +10 dBm LO drive at 94.15 GHz. Measured results of the complete image-rejection downconverter including the hybrid IF 90° coupler and a 10 dB gain IF amplifier show a conversion gain of more than 18 dB and a noise figure of 4.6 dB at around 94 GHz.

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