Abstracts

A high-performance W-band uniplanar subharmonic mixer

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A uniplanar subharmonic mixer has been implemented in coplanar waveguide (CPW) technology. The circuit is designed to operate at RF frequencies of 92-96 GHz, IF frequencies of 2-4 GHz, and LO frequencies of 45-46 GHz. Total circuit size excluding probe pads and transitions is less than 0.8 mm /spl times/1.5 mm. The measured minimum single-sideband (SSB) conversion loss is 7.0 dB at an RF of 94 GHz, and represents state-of-the-art performance for a planar W-band subharmonic mixer. The mixer is broad-band with a SSB conversion loss of less than 10 dB over the 83-97-GHz measurement band. The measured LO-RF isolation is better than -40 dB for LO frequencies of 45-46 GHz. The double-sideband (DSB) noise temperature measured using the Y-factor method is 725 K at an LO frequency of 45.5 GHz and an IF frequency of 1.4 GHz. The measured data agrees well with the predicted performance using harmonic-balance analysis (HBA). Potential applications are millimeter-wave receivers for smart munition seekers and automotive-collision-avoidance radars.

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