519.

Title: The Design of a 200-240-GHz Sub-Harmonic Mixer Based on RAL’s Planar Schottky Diodes

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Source title: Journal Terahertz & Technology

Volume:4

Publication year:2011

Pages:90-94

Document type:Journal Online

Abstract: This paper presents the design of a fixed-tuned 200-240-*GHz* wide-band sub-harmonic mixer. The mixer is based on an anti-parallel pair of GaAs Schottky diodes fabricated at Rutherford Appleton Laboratory (RAL). The circuits are fully integrated with the RF/IF filter and flip-chipped onto a suspended quartz-based substrate. A best conversion loss of 5.9*dB* was achieved with 5*mW* of LO power at 207*GHz*. Over an RF band of 200-240*GHz*, the conversion loss is below10*dB*. This state-of-the-art optimization is attributed to lower parasitic devices and a low-loss waveguide circuit.

Keywords: Sub-harmonic mixer, Planar Schottky diodes, Terahertz-wave, Wide-band