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Accession number:20114514506406

Title:Characterization of near-terahertz complementary metal-oxide semiconductor circuits using a Fourier-transform interferometer

Authors:Arenas, D.J. (1); Shim, Dongha (2); Koukis, D.I. (3); Seok, Eunyoung (2); Tanner, D.B. (3); Kenneth K.o. (5)

Author affiliation:(1) Department of Physics, University of North Florida, Jacksonville, FL 32254, United States; (2) Department of Electrical and Computer Engineering, University of Florida, Gainesville, FL 32611, United States; (3) Department of Physics, University of Florida, Gainesville, FL 32611, United States; (4) Texas Instruments, Inc., Dallas, TX 75266, United States; (5) Texas Analog Center of Excellence, Department of Electrical Engineering, University of Texas, Dallas, TX 75080, United States

Corresponding author:Arenas, D.J.

Source title:Review of Scientific Instruments

Abbreviated source title:Rev. Sci. Instrum.

Volume:82

Issue:10

Issue date:October 2011

Publication year:2011

Article number:103106

Language:English

ISSN:00346748

CODEN:RSINAK

Document type:Journal article (JA)

Publisher:American Institute of Physics, 2 Huntington Quadrangle, Suite N101, Melville, NY 11747-4502, United States

Abstract:Optical methods for measuring of the emission spectra of oscillator circuits operating in the 400-600 GHz range are described. The emitted power from patch antennas included in the circuits is measured by placing the circuit in the source chamber of a Fourier-transform interferometric spectrometer. The results show that this optical technique is useful for measuring circuits pushing the frontier in operating frequency. The technique also allows the characterization of the circuit by measuring the power radiated in the fundamental and in the harmonics. This capability is useful for oscillator architectures designed to cancel the fundamental and use higher harmonics. The radiated power was measured using two techniques: direct measurement of the power by placing the device in front of a bolometer of known responsivity, and by comparison to the estimated power from blackbody sources. The latter technique showed that these circuits have higher emission than blackbody sources at the operating frequencies, and, therefore, offer potential spectroscopy applications.

Number of references:64