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标题: Millimeter-Wave Optoelectronic Mixers Based on Uni-Traveling Carrier Photodiodes

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来源出版物: IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES 卷: 60 期: 3 特刊: SI 页: 686-691 DOI: 10.1109/TMTT.2011.2178257 子辑: Part 2 出版年: MAR 2012

在 Web of Science 中的被引频次: 0

被引频次合计: 0

引用的参考文献数: 18

摘要: We present a novel technique for optoelectronic frequency down-conversion of millimeter-wave signals generated from photomixers. The mixing element proposed here is a uni-traveling carrier (UTC) photodiode employing a traveling wave design, originally fabricated for the generation of millimeter-wave signals. For fundamental mixing at a frequency of 100 GHz, a conversion gain of -32 dB was measured, representing a significant improvement on previously published results. When the device was operated as a subharmonic mixer, an additional loss of 20, 27, and 39 dB was measured for second-, third- and fourth-harmonic mixing, respectively, for the same level of RF input power (0 dBm). A nonlinear dependence of the IF signal on the optically generated signal was measured. From subharmonic mixing measurements, a flat intermediate frequency (IF) response was found over a wide range of frequencies, limited mainly by the IF electronic components.

入藏号: WOS:000302503800008

语种: English

文献类型: Article

作者关键词: InP device; microwave photonics; millimeter-wave mixers; optoelectronics; uni-traveling carrier (UTC) photodiode

KeyWords Plus: TERAHERTZ SOURCES; INP

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出版商: IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC

出版商地址: 445 HOES LANE, PISCATAWAY, NJ 08855-4141 USA

Web of Science 分类: Engineering, Electrical & Electronic

学科类别: Engineering

IDS 号: 921UQ

ISSN: 0018-9480

29 字符的来源出版物名称缩写: IEEE T MICROW THEORY

ISO 来源出版物缩写: IEEE Trans. Microw. Theory Tech.

来源出版物页码计数: 6