288.
Accession number:20112814134876
Title:Numerical study of a full-wavelength dipole antenna on a GaAs membrane structure at terahertz frequency
Authors:Nguyen, Truong Khang (1); Han, Haewook (2); Park, Ikmo (1)
Author affiliation:(1) School of Electrical and Computer Engineering, Ajou University, 5 Woncheon-dong, Youngtong-gu, Suwon 443-749, Korea, Republic of; (2) Department of Electrical and Computer Engineering, Pohang University of Science and Technology, San 31 Hoyja-dong, Nam-gu, Pohang 790-784, Korea, Republic of
Corresponding author:Park, I.(ipark@ajou.ac.kr)
Source title:Journal of Infrared, Millimeter, and Terahertz Waves
Abbreviated source title:J. Infrared. Millim. Terahertz Waves
Volume:32
Issue:6
Issue date:June 2011
Publication year:2011
Pages:763-777
Language:English
ISSN:18666892
E-ISSN:18666906
Document type:Journal article (JA)
Publisher:Springer New York, 233 Springer Street, New York, NY 10013-1578, United States
Abstract:In this paper, a full-wavelength dipole antenna, supported by a GaAs membrane structure, is examined. The antenna was designed with both high input resistance and high radiation efficiency to improve the overall efficiency of a terahertz photomixer design. The geometrical effects of the GaAs membrane structure on the overall antenna performance were investigated through an optimization process. To supply DC bias to the antenna, a bias line with a photonic bandgap (PBG) structure was designed and optimized. The resulting antenna had a 2742-Ω input resistance and a 65% radiation efficiency, corresponding to an approximately 44% total efficiency at the 1.05-THz resonance frequency. The proposed antenna is expected to efficiently generate THz waves and be applicable to many practical applications where large coverage (detection area), easy alignment, and high scanning speed, rather than high-resolution, are preferred.
Number of references:14