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标题: Sub-THz radiation room temperature sensitivity of long-channel silicon field effect transistors
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来源出版物: OPTO-ELECTRONICS REVIEW 卷: 20 期: 2 页: 194-199 DOI: 10.2478/s11772-012-0024-z 出版年: JUN 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: Room temperature operating n-MOSFETs (n-type metal-oxide silicon field effect transistors) used for registration of sub-THz (sub-terahertz) radiation in the frequency range nu = 53-145 GHz are considered. n-MOSFETs were manufactured by 1-mu m Si CMOS technology applied to epitaxial Si-layers (d approximate to 15 mu m) deposited on thick Si substrates (d = 640 mu m). It was shown that for transistors with the channel width to length ratio W/L = 20/3 mu m without any special antennas used for radiation input, the noise equivalent power (NEP) for radiation frequency nu approximate to 76 GHz can reach NEP similar to 6x10(-10) W/Hz(1/2). With estimated frequency dependent antenna effective area S-est for contact wires considered as antennas, the estimated possible noise equivalent power NEPpos for n-MOSFET structures themselves can be from similar to 15 to similar to 10(3) times better in the specral range of nu similar to 55-78 GHz reaching NEPpos similar to 10(-12) W/Hz(1/2).
入藏号: WOS:000302538800012
语种: English
文献类型: Article
作者关键词: n-MOSFETs; sub-THz detectors; NEP
KeyWords Plus: TERAHERTZ RADIATION
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出版商: VERSITA
出版商地址: SOLIPSKA 14A-1, 02-482 WARSAW, POLAND
Web of Science 分类: Engineering, Electrical & Electronic; Optics; Physics, Applied
学科类别: Engineering; Optics; Physics
IDS 号: 922HU
ISSN: 1230-3402
29 字符的来源出版物名称缩写: OPTO-ELECTRON REV
ISO 来源出版物缩写: Opto-Electron. Rev.
来源出版物页码计数: 6