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标题: Temperature dependent effective mass in AlGaN/GaN high electron mobility transistor structures
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来源出版物: APPLIED PHYSICS LETTERS 卷: 101 期: 19 文献号: 192102 DOI: 10.1063/1.4765351 出版年: NOV 5 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: 25
摘要: The temperature-dependence of free-charge carrier mobility, sheet density, and effective mass of a two-dimensional electron gas in a AlGaN/GaN heterostructure deposited on SiC substrate is determined using the THz optical Hall effect in the spectral range from 0.22 to 0.32 THz for temperatures from 1.5 to 300 K. The THz optical Hall-effect measurements are combined with room temperature mid-infrared spectroscopic ellipsometry measurements to determine the layer thickness, phonon mode, and free-charge carrier parameters of the heterostructure constituents. An increase of the electron effective mass from (0.22 +/- 0.01)m(0) at 1.5 K to (0.36 +/- 0.03)m(0) at 300 K is observed, which is indicative for a reduction in spatial confinement of the two-dimensional electron gas at room temperature. The temperature-dependence of the mobility and the sheet density is in good agreement with electrical measurements reported in the literature. (C) 2012 American Institute of Physics. [http://dx.doi.org/10.1063/1.4765351]
入藏号: WOS:000311320100032
语种: English
文献类型: Article
KeyWords Plus: INFRARED ELLIPSOMETRY; HEMT STRUCTURES; FREE-CARRIER; PARAMETERS; GROWTH
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出版商: AMER INST PHYSICS
出版商地址: CIRCULATION & FULFILLMENT DIV, 2 HUNTINGTON QUADRANGLE, STE 1 N O 1, MELVILLE, NY 11747-4501 USA
Web of Science 类别: Physics, Applied
研究方向: Physics

IDS 号: 040JZ
ISSN: 0003-6951
29 字符的来源出版物名称缩写: APPL PHYS LETT
ISO 来源出版物缩写: Appl. Phys. Lett.
来源出版物页码计数: 4