Accepted Manuscript

A method to determine electron mobility of the two-dimensional electron gas in AlGaN/GaN heterostructure field-effect transistors

Peng Cui, Zhaojun Lin, Chen Fu, Yan Liu, Yuanjie Lv

PII: S0749-6036(17)31578-1

DOI: 10.1016/j.spmi.2017.08.030

Reference: YSPMI 5205

To appear in: Superlattices and Microstructures

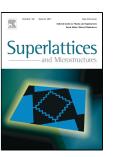
Received Date: 30 June 2017

Revised Date: 11 August 2017

Accepted Date: 11 August 2017

Please cite this article as: Peng Cui, Zhaojun Lin, Chen Fu, Yan Liu, Yuanjie Lv, A method to determine electron mobility of the two-dimensional electron gas in AlGaN/GaN heterostructure field-effect transistors, *Superlattices and Microstructures* (2017), doi: 10.1016/j.spmi.2017.08.030

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



ACCEPTED MANUSCRIPT

A method to determine electron mobility of the two-dimensional

electron gas in AlGaN/GaN heterostructure field-effect transistors

Peng Cui a, Zhaojun Lin a,*, Chen Fu a, Yan Liu a, and Yuanjie Lv b

^aSchool of Microelectronics, Shandong University, Jinan, 250100, China

^bNational Key Laboratory of Application Specific Integrated Circuit (ASIC),

Semiconductor Research Institute, Shijiazhuang, 050051, China

Abstract

Taking into consideration the resistance variation in the free-contact area versus

the gate bias, an applicable method to determine the electron mobility in AlGaN/GaN

heterostructure field-effect transistors was presented. Based on the measured

capacitance-voltage and current-voltage curves, the new method employed iteration

calculation with different scattering mechanisms. Compared to the electron mobility

calculated by the traditional method, the electron mobility calculated by the new

method shows an apparent difference, especially for the device with a big gate length.

This difference originates from the device with a big gate length that has a stronger

polarization Coulomb field scattering. At last, the correctness and necessity of this

method was demonstrated by the comparison between the experimental and calculated

transconductance values.

Keywords: AlGaN/GaN HFETs; electron mobility; transconductance; polarization

Coulomb field scattering

* Corresponding author at: School of Microelectronics, Shandong University, Jinan 250100, China. Tel.: +86 0531 88363700; fax: +86 0531 88563700

E-mail address: linzj@sdu.edu.cn

1

Download English Version:

https://daneshyari.com/en/article/7940221

Download Persian Version:

https://daneshyari.com/article/7940221

Daneshyari.com