论文

4H-SiC隐埋沟道MOSFET亚阈特性研究

郜锦侠, 张义门, 张玉明, 汤晓燕

(宽禁带半导体材料与器件教育部重点实验室, 西安电子科技大学微电子学院, 西安 710071)

摘要　在推导一个等效沟道厚度模型的基础上，对SiC隐埋沟道MOSFET亚阈特性进行了研究。首先利用泊松方程的解对等效沟道厚度的计算式进行了推导，计算结果表明，在$N^+_D/N^-_A \leq 43$的情况下，等效沟道厚度与栅压和沟道深度无关，亚阈区峰值电势随栅压线性变化，推出了一个简化的亚阈电流表达式，并在计算中计入了界面态的影响。该表达式可用来对沟道载流子浓度进行提取。

关键词　等效沟道厚度　SiC　隐埋沟道　MOSFET　亚阈特性

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Subthreshold characteristics for SiC buried-channel MOSFETs based on an equivalent channel thickness model

GAO Jin-xia, ZHANG Yi-men, ZHANG Yu-ming, TANG Xiao-yan

(Key Lab of Ministry of Education for Wide Band-Gap Semiconductor Materials and Devices, Microelectronics Institute, Xidian University, Xi'an 710071, China)

Abstract The subthreshold characteristics for SiC Buried-Channel MOSFETs were studied based on an equivalent channel thickness model. The expression of equivalent channel thickness was developed with the solution of Poisson's equation .The results show that the equivalent channel thickness is independent of gate voltage if $N^+_D/N^-_A \leq 43$. The peak potential at subthreshold region varies with gate voltage linearly, and a simple expression of drain current in subthreshold region is obtained, in which the effect of interface state is included. The expression can be used to extract some important parameters.

Key words　equivalent channel thickness　SiC　buried channel　MOSFET　subthrethold characteristics

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通讯作者 郜锦侠 gaogao_505@163.com