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MgO/GaN MOSFETs의 dc 특성 및 Gate Breakdown 특성 Simulation
Simulation of dc Performance and Gate Breakdown Characteristics of MgO/GaN MOSFETs

조 현, 김진곤, B.P. Gila*, K.P. Lee*, C.R. Abernathy*, S.J. Pearton*, F. Ren**
밀양대학교 신소재공학부, *Department of Materials Science and Engineering, University of Florida, **Department of Chemical Engineering, University of Florida
(hcho@mnu.ac.kr)

The effects of oxide thickness and gate length of MgO/GaN metal oxide semiconductor field effect transistors (MOSFETs) on I-V, threshold voltage and breakdown voltage characteristics were examined using a drift-diffusion model. The saturation drain current scales in an inverse logarithmic fashion with MgO thickness and is $<10^{-3}$ A•μm^{-1} for 0.5 μm gate length devices with oxide thickness >600 Å or for all 1 μm gate length MOSFETs with oxide thickness in the range of >200 Å. Gate breakdown voltage is >100 V for gate length >0.5 μm and MgO thickness > 600 Å. The threshold voltage scales linearly with oxide thickness and is <2 V for oxide thickness <800 Å and gate lengths <0.6 μm. The GaN MOSFET shows excellent potential for elevated temperature, high speed applications.