Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Field-plate engineering for high breakdown voltage β-Ga_2O_3 nanolayer field-effect transistors

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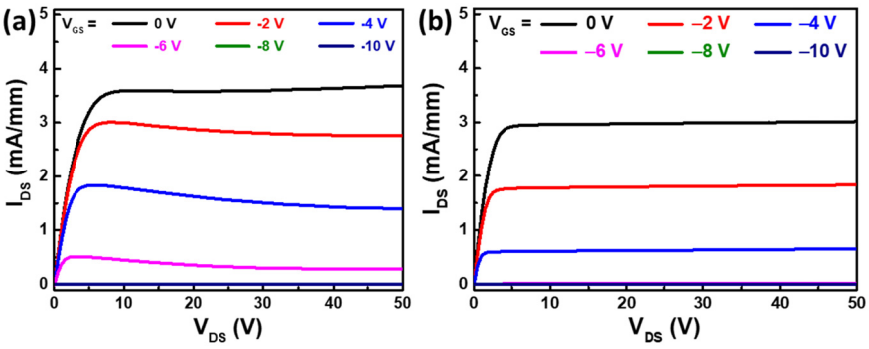

Figure S1 DC output characteristics of the β-Ga_2O_3 nanoFET (a) without and (b) with the field-modulating plate

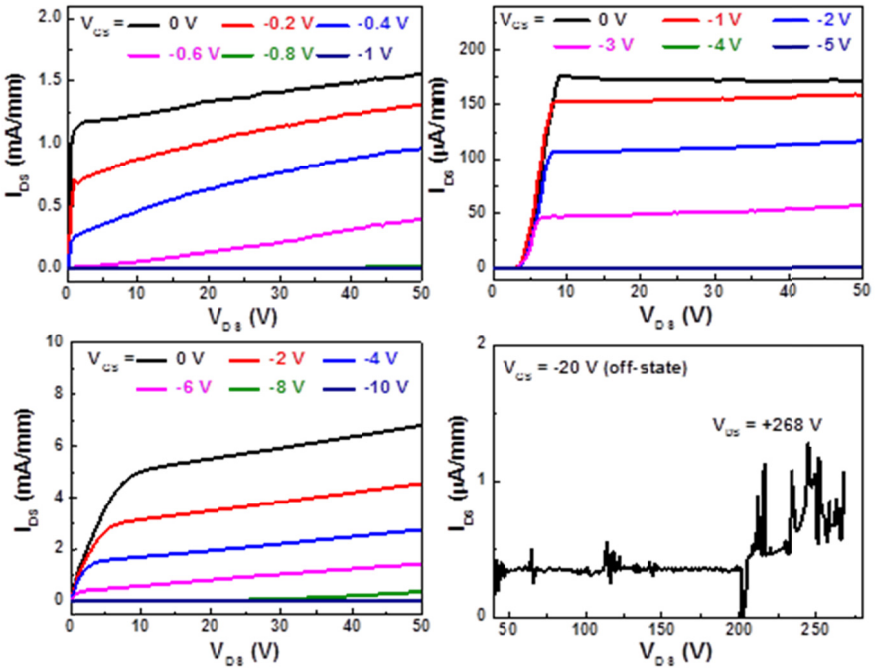

Figure S2 DC output and off-state three-terminal hard-breakdown results of the β-Ga_2O_3 nanoFETs with the field-modulating plate.

The materials parameters for the device simulation are below.

Dielectric constant for β-Ga_2O_3 : 10

Carrier concentration : $3.7\times10^{17}/cm^3$

Electron affinity : 4.0

Energy gap @ 300 K : 4.9

Conduction band density : $3.72\times10^{18}/cm^3$

Valance band density : $3.72\times10^{18}/cm^3$

Electron mobility : 118 $cm^2/V\cdot s$

impact ionization coefficient model $\alpha_n = 0.79\times10^6 cm^{-1}\exp\left(-\frac{2.92\times10^7\ V/cm}{E}\right)$