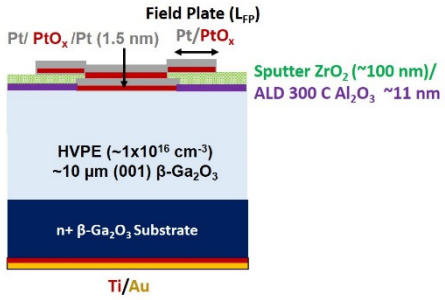

Figure 1: Schematic of the vertical β-Ga_2O_3 SBD of 100 µm diameter fabricated on low-doped 10 µm drift layer HVPE (001) with Pt cap/ PtO_x/Interlayer Pt (1.5 nm) Schottky contacts. The 30 µm field-plate was formed with high permittivity ZrO_2 dielectric with underneath thin Al_2O_3

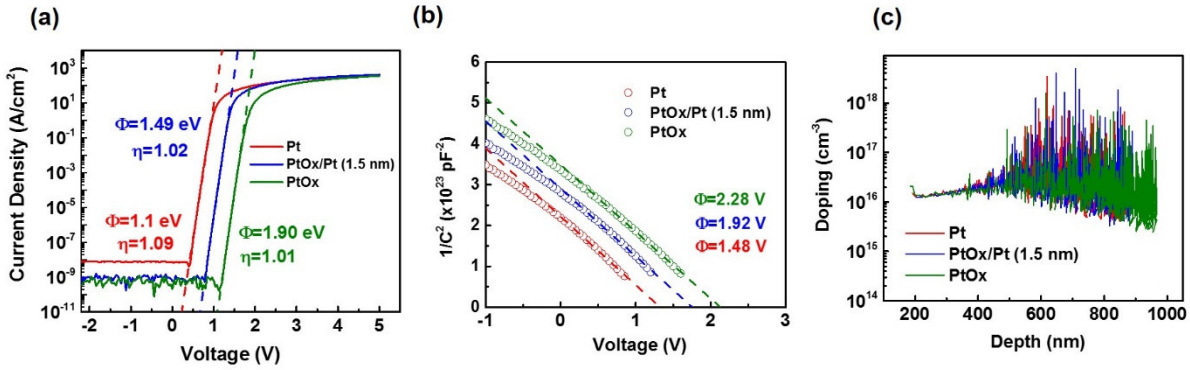

Figure 2: (a) J-V showing lower turn-on voltage and SBH for Pt and PtO_x/Pt(1.5 nm) SBDs than PtO_x (b) C-V extracted SBH showing lower SBH for Pt and PtO_x/Pt(1.5 nm) than PtO_x (c) Similar doping profile observed in all SBDs

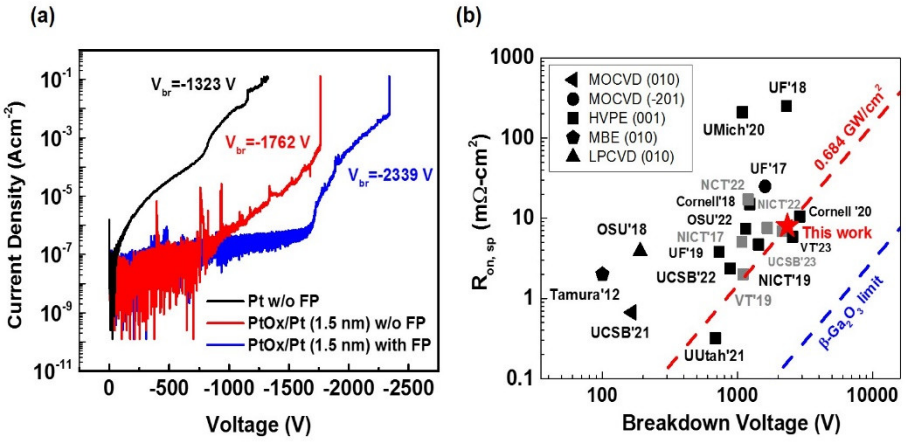

Figure 3: Reverse J-V showing (a) PtO_x/Pt (1.5 nm) provides substantially lower leakage and higher breakdown voltage compared to Pt SBDs. The ZrO_2 field-plate further improves the breakdown voltage to ~2.34 kV (b) Benchmark plot of on-resistance versus breakdown voltage from this work and other reports. A BFOM of 0.684 GW/cm^2 is achieved with the field plate PtO_x/Pt (1.5 nm) diodes.

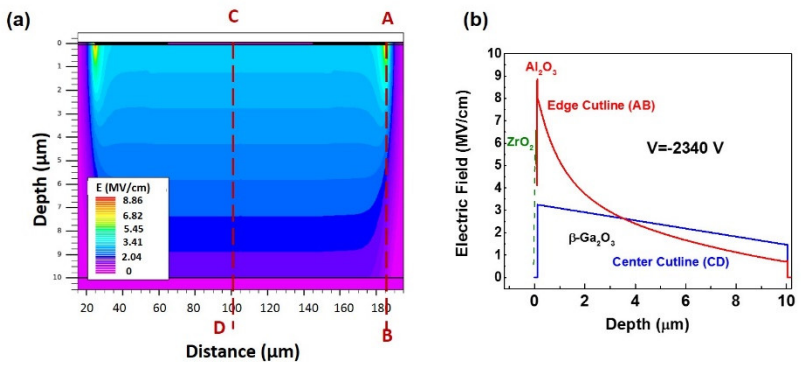

Figure 4: (a) Simulated electric field contour plot of the PtO_x/Pt(1.5 nm) Schottky diode with ZrO_2 dielectric field-plate at voltage V=-2.34 kV. (b) Electric field at the center of the anode through cutline CD shows a punch-through field profile achieved at the breakdown voltage with a maximum value of ~3.25 MV/cm. Electric field at the field-plate edge along cutline AB reveals that a peak field of 8.86 MV/cm and 8 MV/cm appear in Al_2O_3 and β-Ga_2O_3, respectively, indicating either one or both of them can be the critical locations of breakdown.