Preliminary Report on InP Device 3D Simulation

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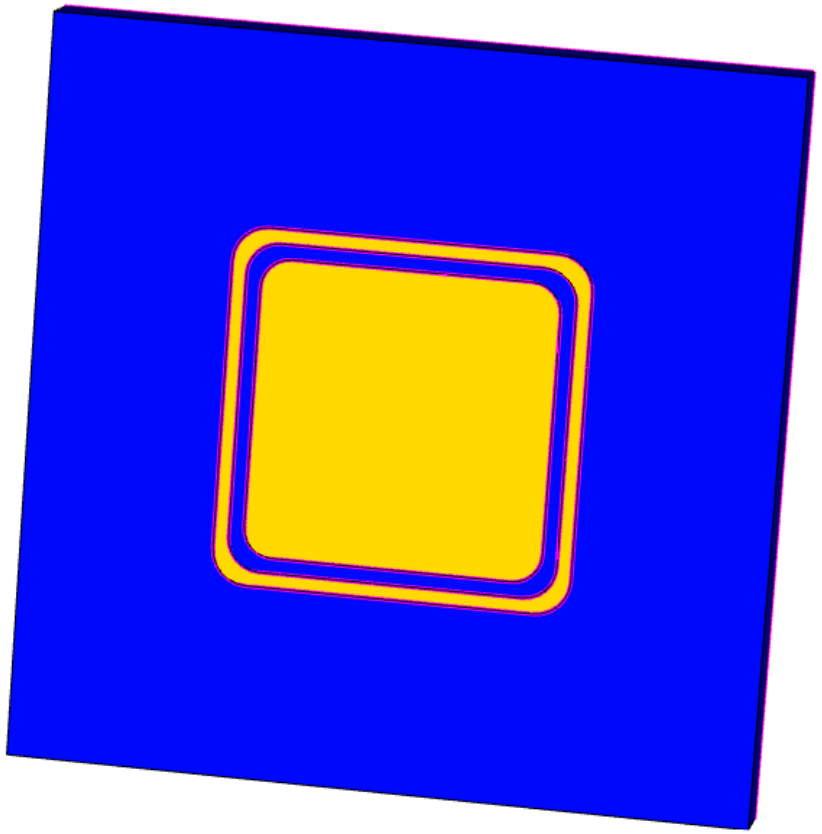
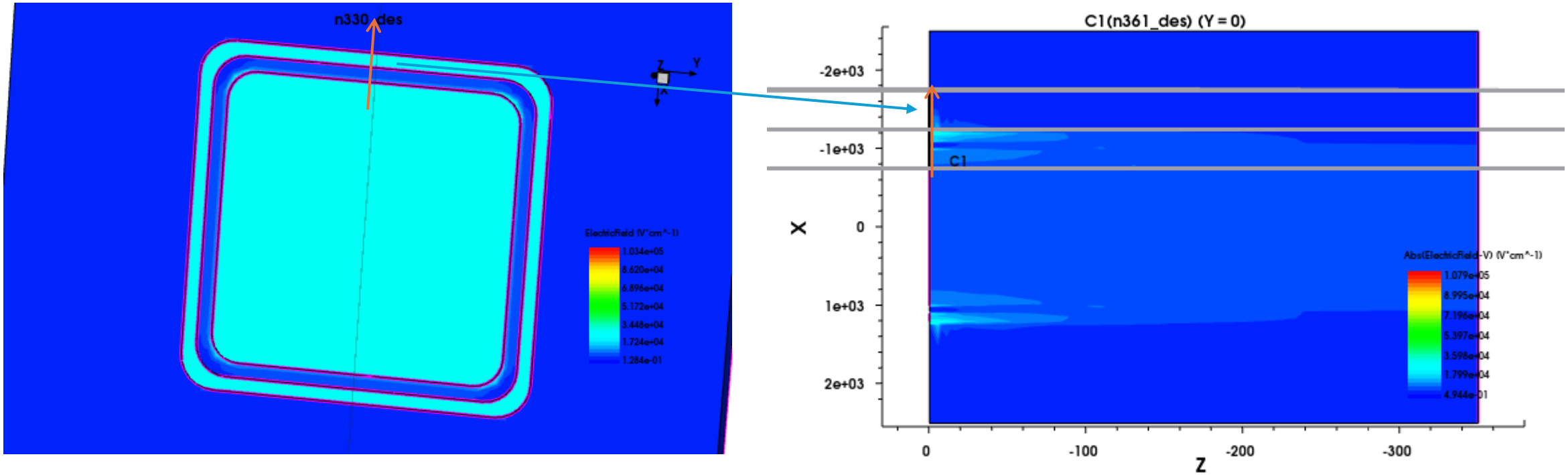
Device Snapshot

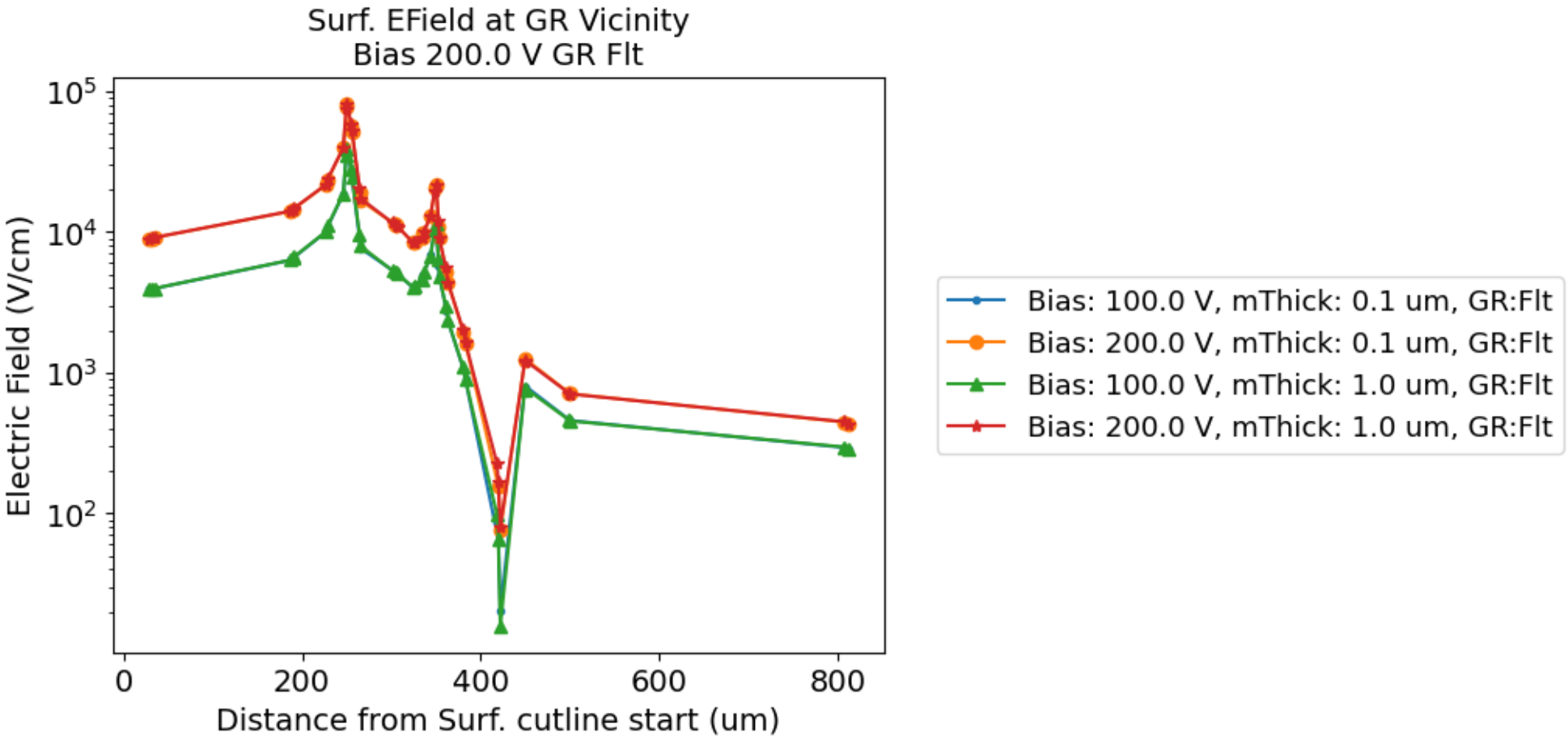


- Bulk Width: 5mm
- Electrode Width: 2 mm
- Guard Ring width: 100 um
- Pixel Pad to GR: 100 um
- Bulk Thickness: 350 um
- Electrode Material: Au
- Bulk Material, obviously: InP
- Bulk Trap: Lorentzian ~ mid bandgap, 100 meV width(quantized to 5 levels), 5e12 /cm3

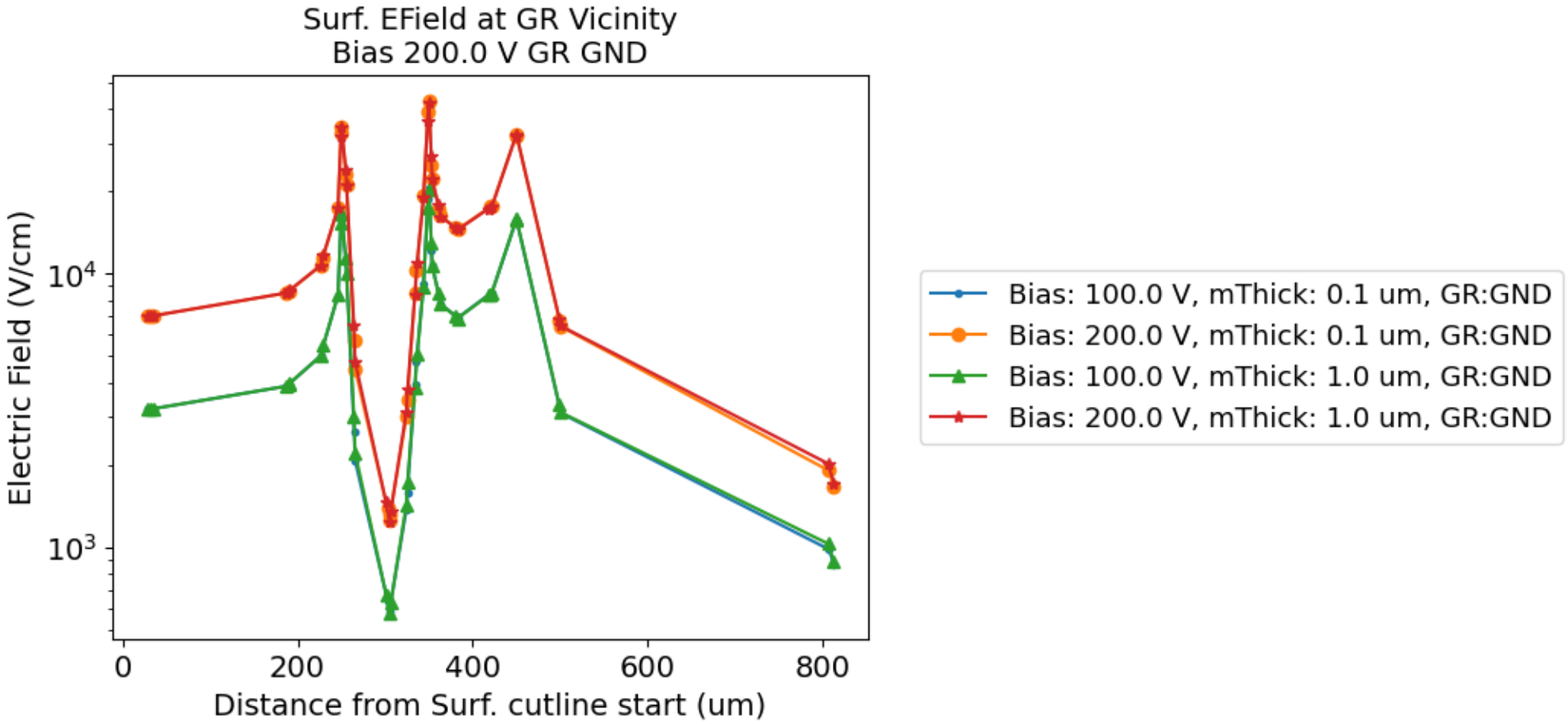
E-Field Extraction



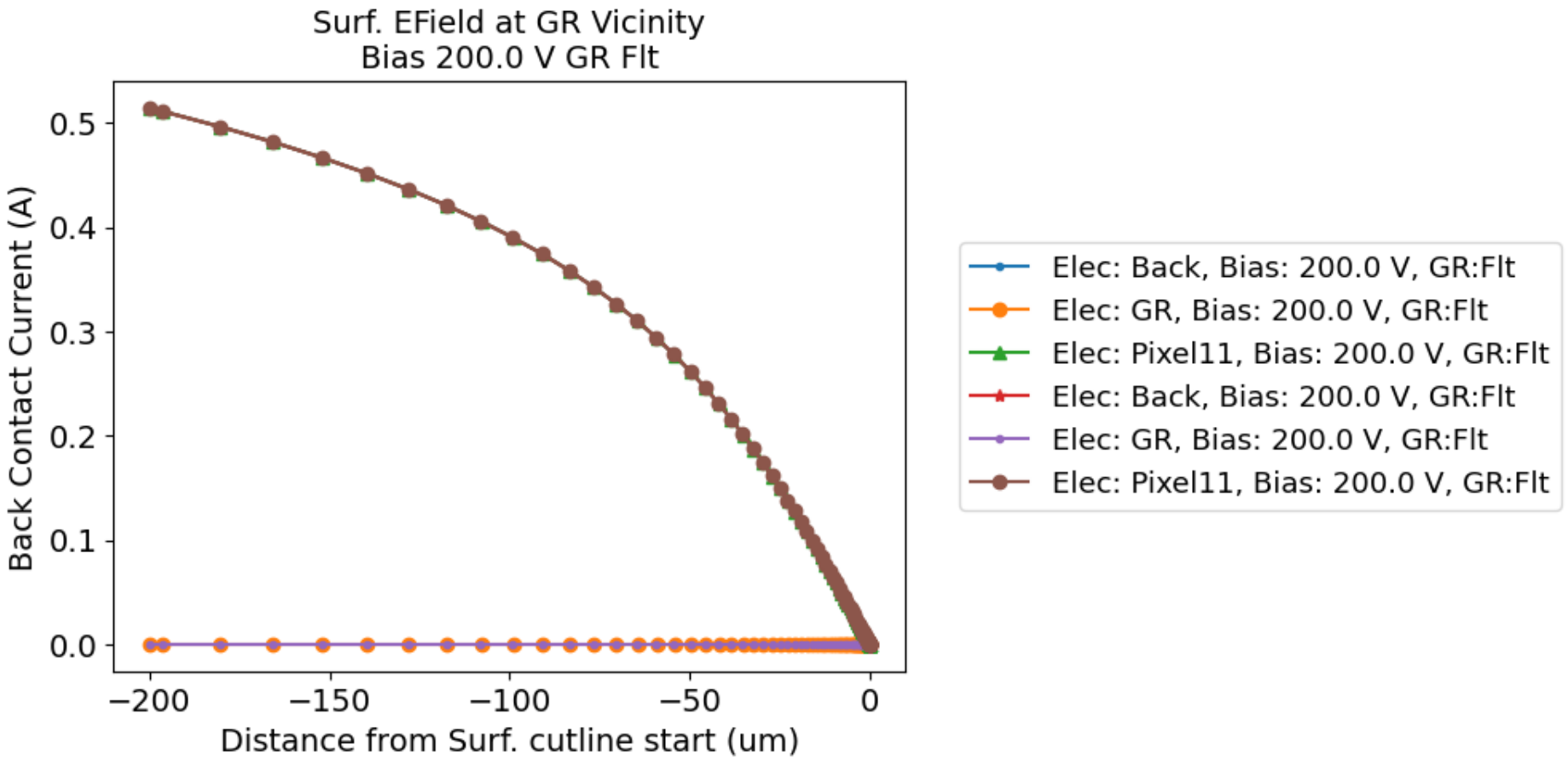
E-Field – GR Floating



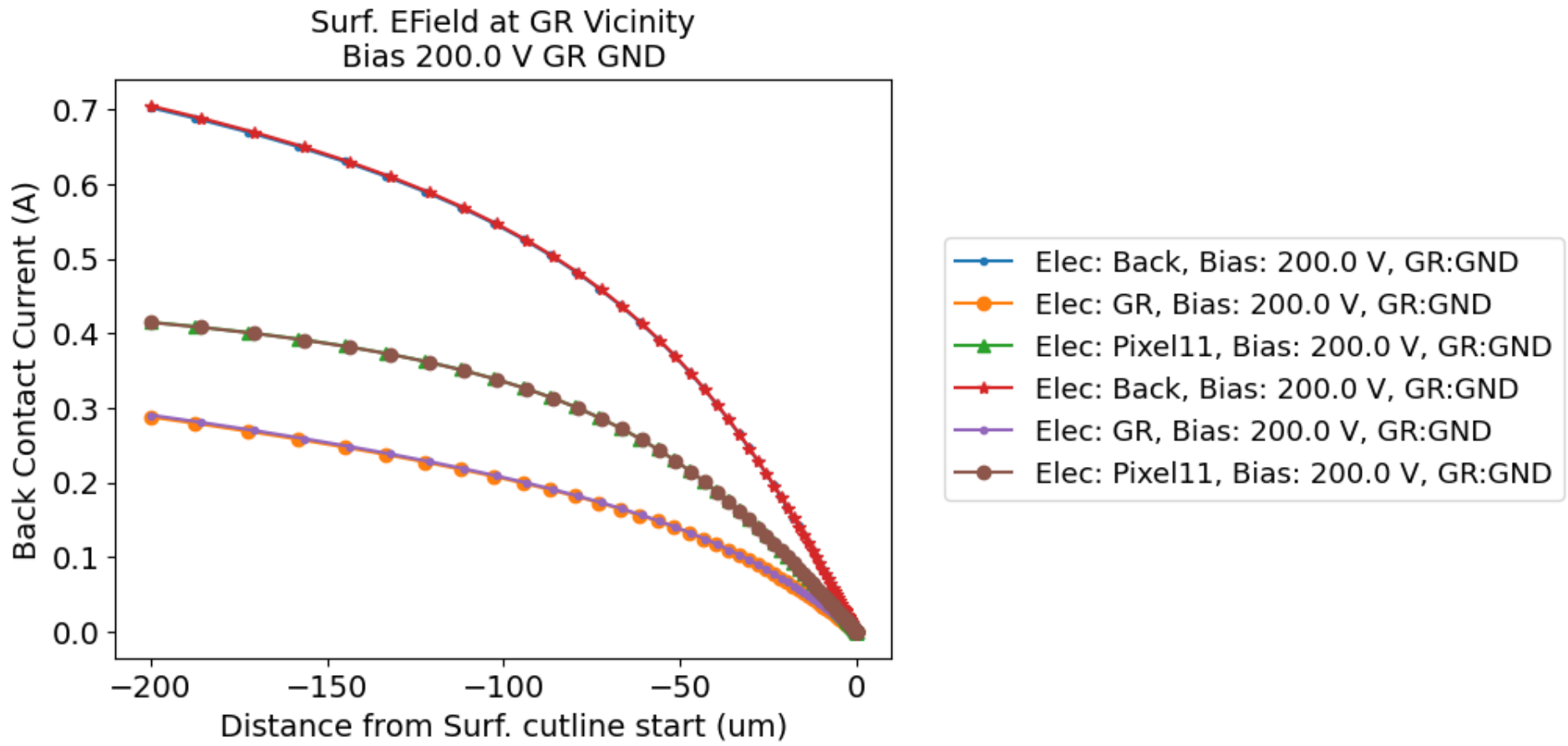
E-Field – GR Grounded



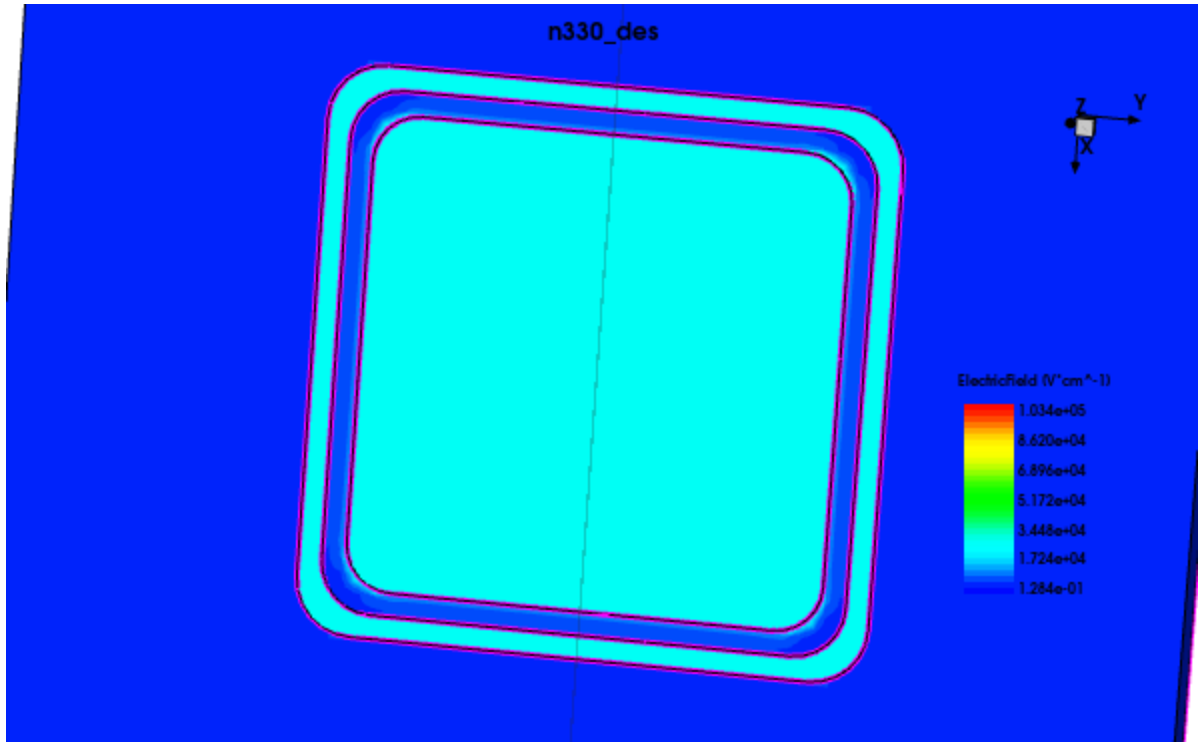
IV Curve – GR Floating



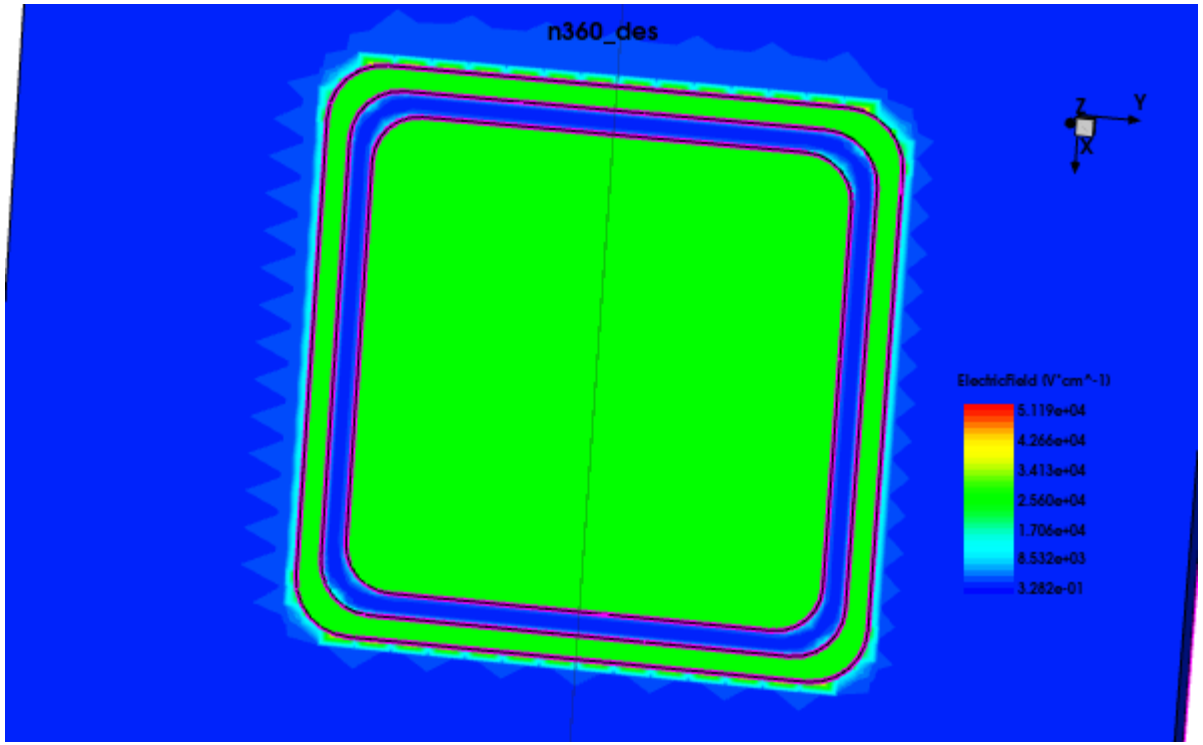
IV Curve – GR GND



Some Fancy Figures - EField

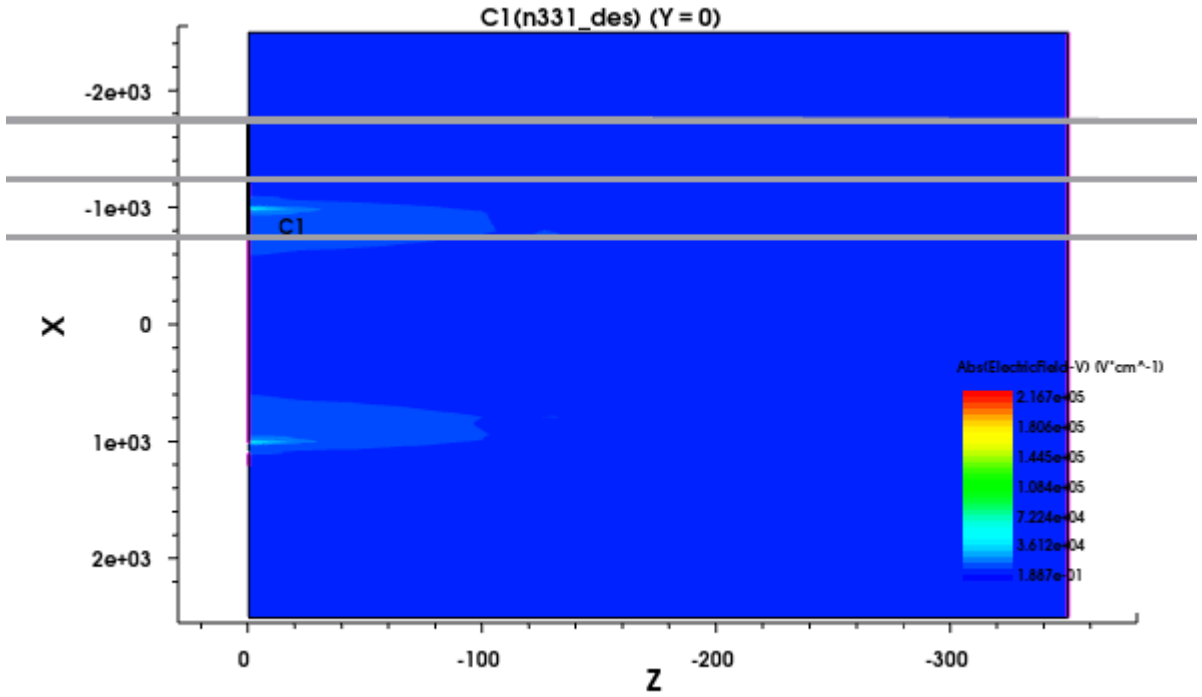


GR Floating

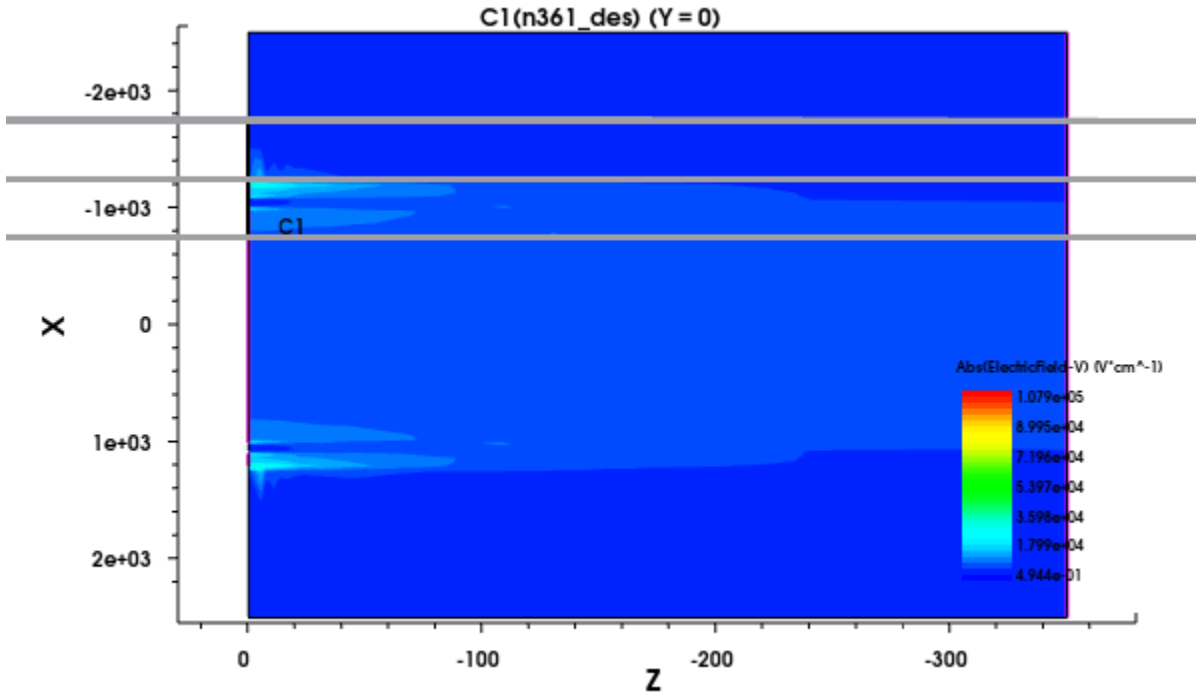


GR GND

Some Fancy Figures – Efield (Cutplane)

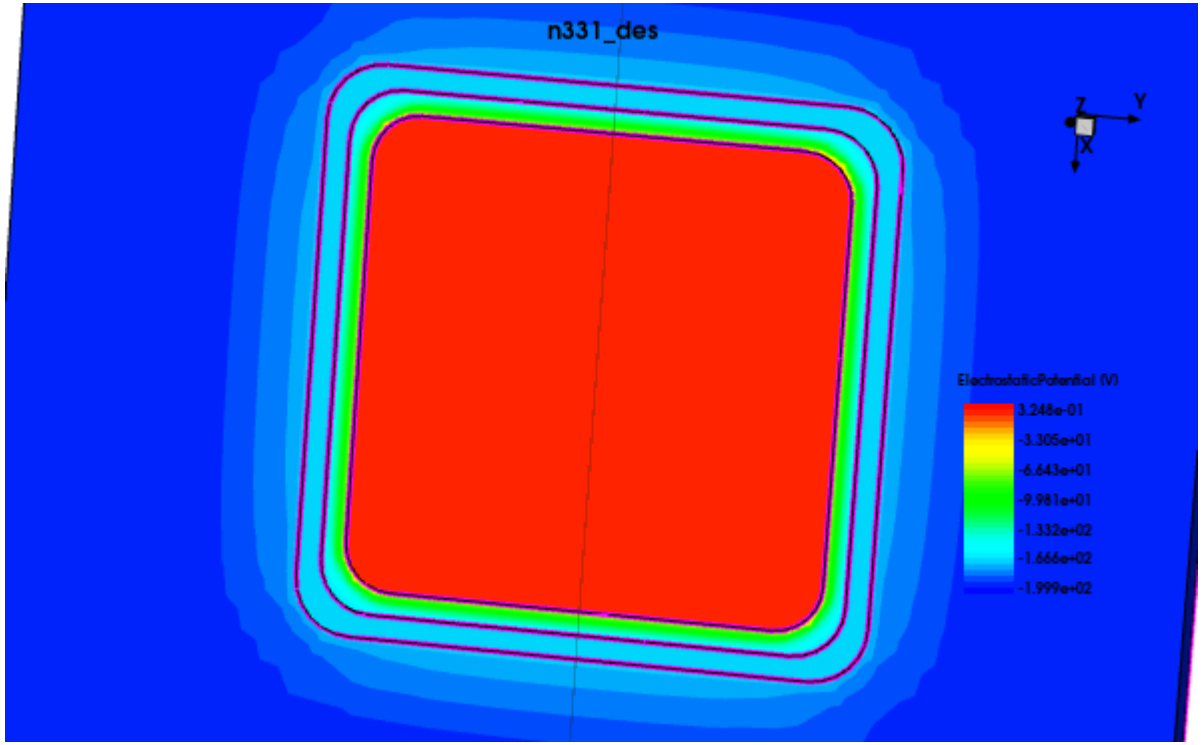


GR Floating

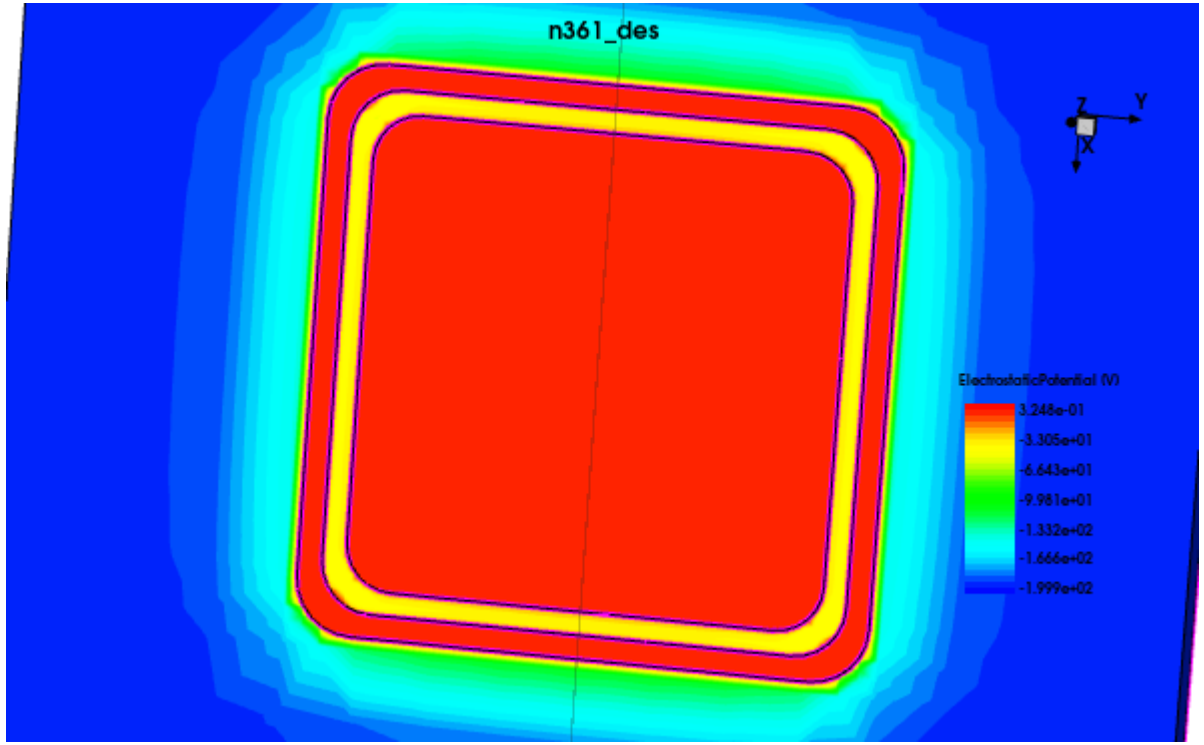


GR GND

Some Fancy Figures - Potentials

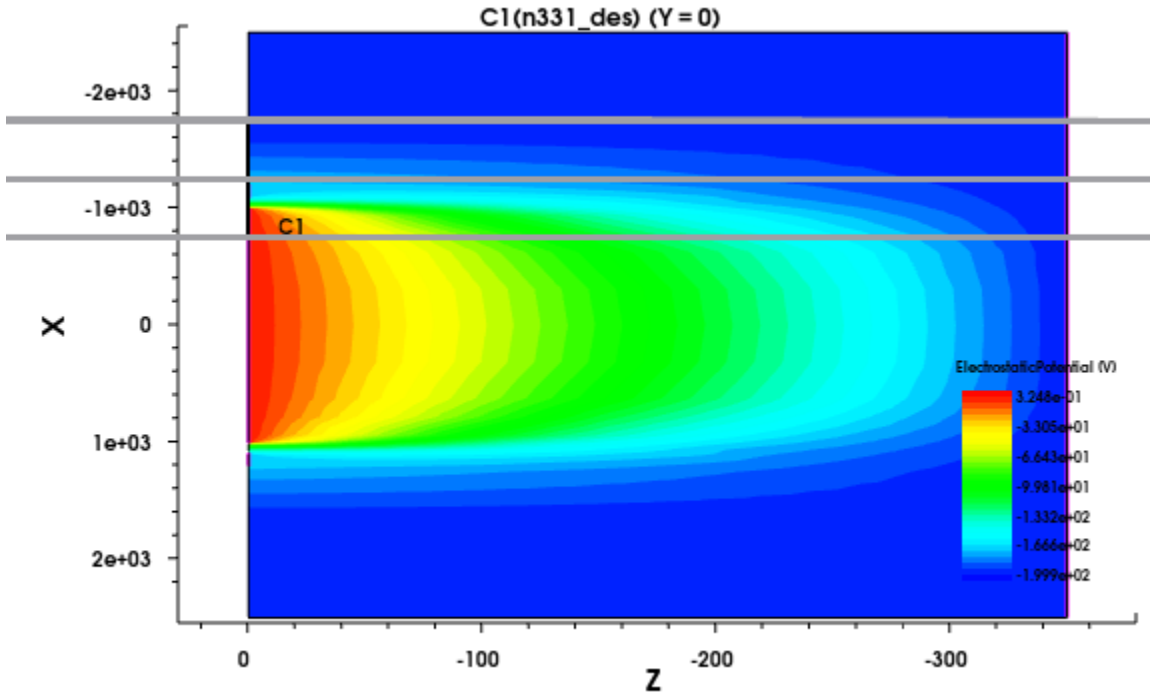


GR Floating

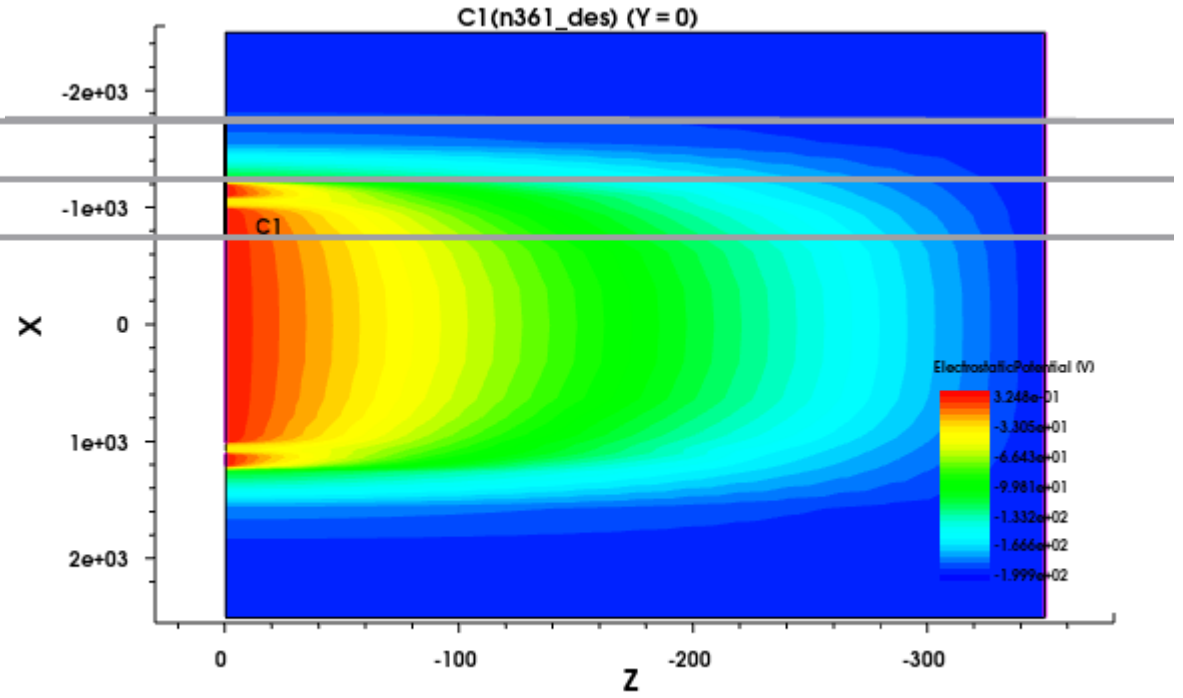


GR GND

Some Fancy Figures – Potentials (Cutplane)

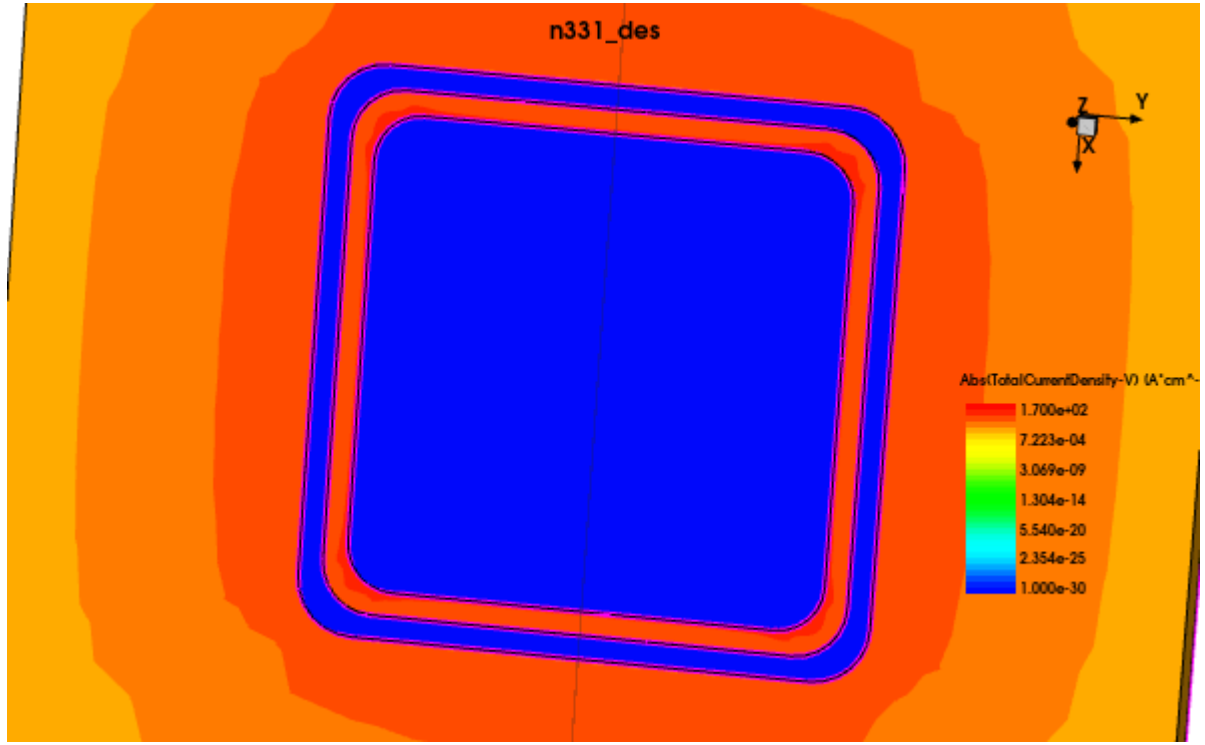


GR Floating

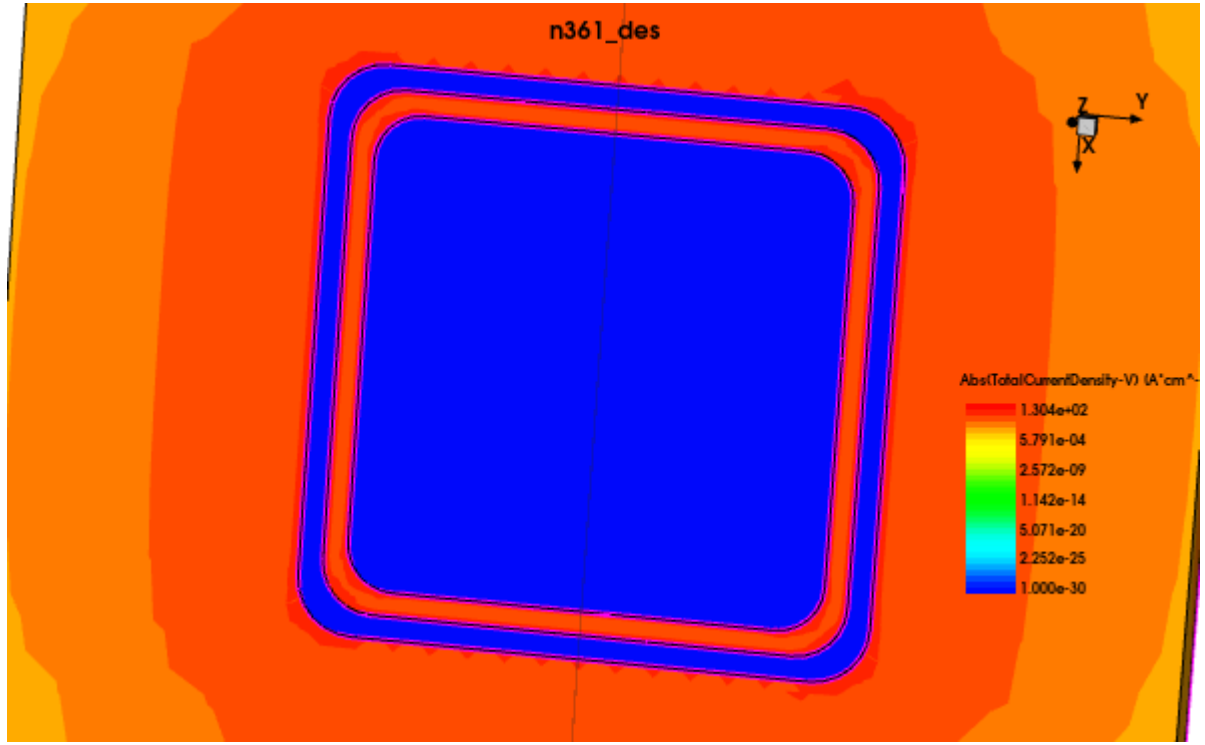


GR GND

Some Fancy Figures - Currents

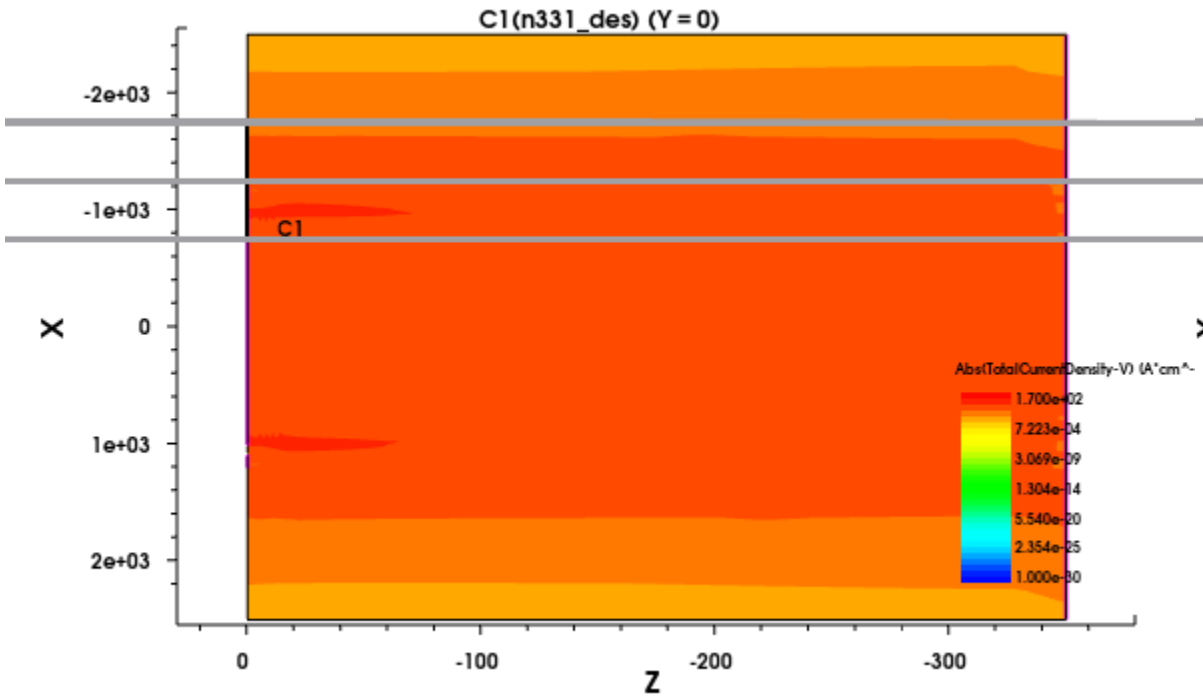


GR Floating

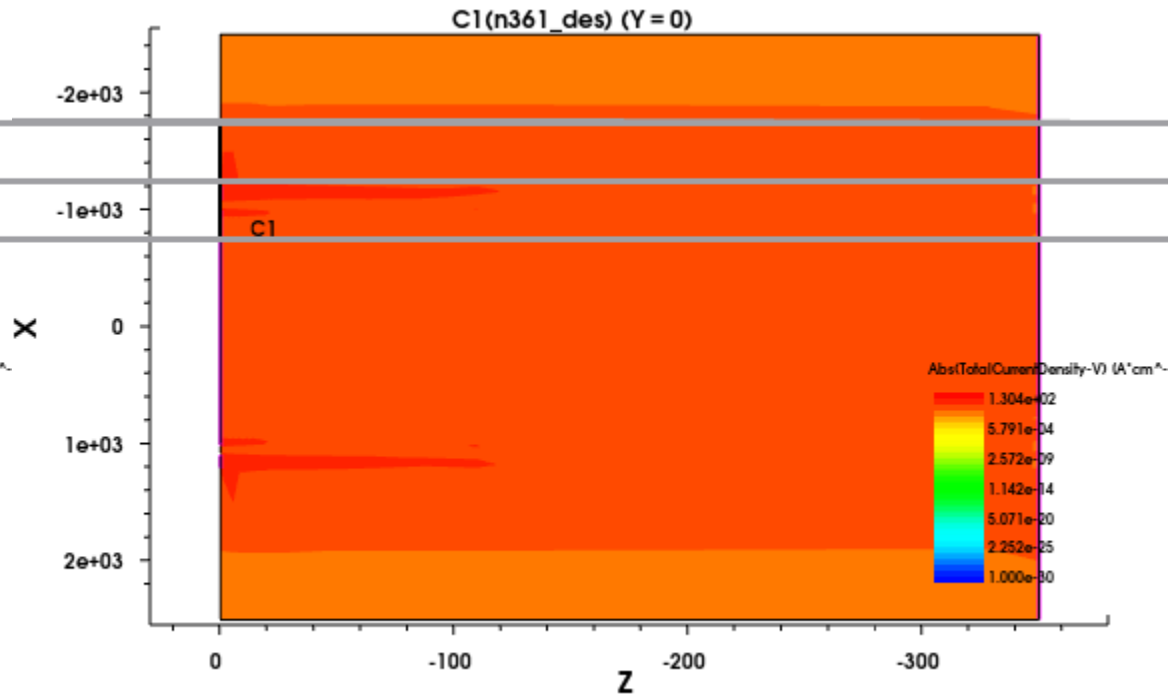


GR GND

Some Fancy Figures – Currents (Cutplane)



GR Floating



GR GND

Summary

- Prepared a starting point for InP Device 3D simulation
- Surface E-Field was extracted but in lower resolution due to mesh optimization for 3D simulation speed.
- IV curve was also extracted showing 0.5~0.7 A at -200 V of backsid e bias condition → Needs further tuning
- Extracted some fancy(?) figures on the 3D simulation model.
- The 3D simulation model is parameterized for pixel structure. We can simulate n x n pixel with a single guard ring without too much effort from now on.