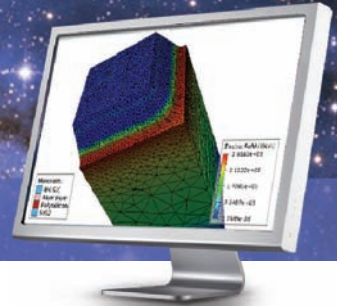


Victory Device

3D Device Simulation



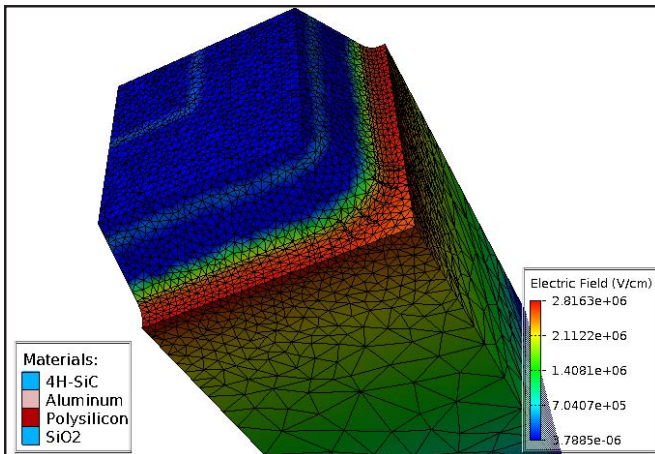
Victory Device is a general purpose 3D device simulator. A tetrahedral meshing engine is used for fast and accurate simulation of complex 3D geometries. Victory Device performs DC, AC, and transient analysis for silicon, binary, ternary, and quaternary material-based devices.

- **Tetrahedral mesh for accurate 3D geometry representation**
- **Voronoi discretization for conformal Delaunay meshes**
- **Advanced physical models with user-customizable material database for silicon and compound materials**
- **Stress-dependent mobility and bandgap models**
- **Highly customizable physical models using the C-Interpreter or dynamically linked libraries**
- **DC, AC, and transient analysis**
- **Drift-diffusion and energy balance transport equations**
- **Self-consistent simulation of self-heating effects including heat generation, heat flow, lattice heating, heat sinks, and temperature-dependent material parameters**
- **Advanced multi-threaded numerical solver library**
- **Atlas-compatible**
- **Silvaco's strong encryption is available to protect valuable customer and third party intellectual property**

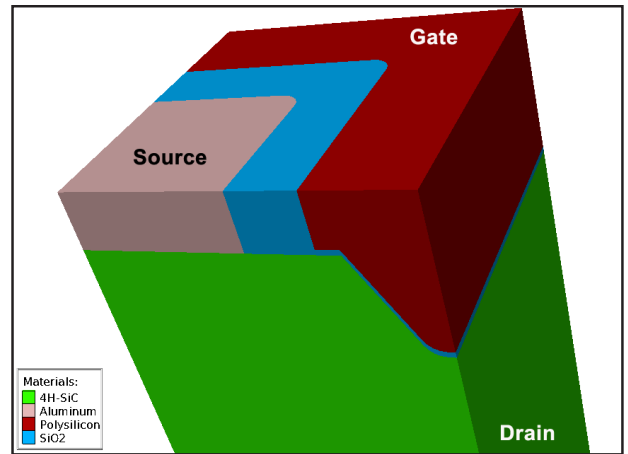
SILVACO

SiC Application Example

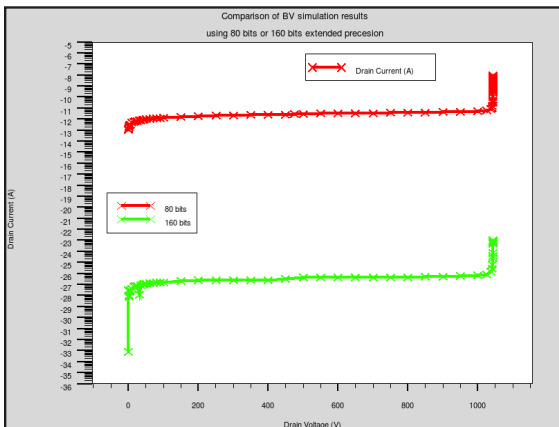
This 3D trench SiC MOSFET simulation includes rounded corners at the top and bottom of the trench. Automatic full 3D Delaunay mesh, corresponding discretization and extended precision numerics allow optimization of simulation time and accuracy.



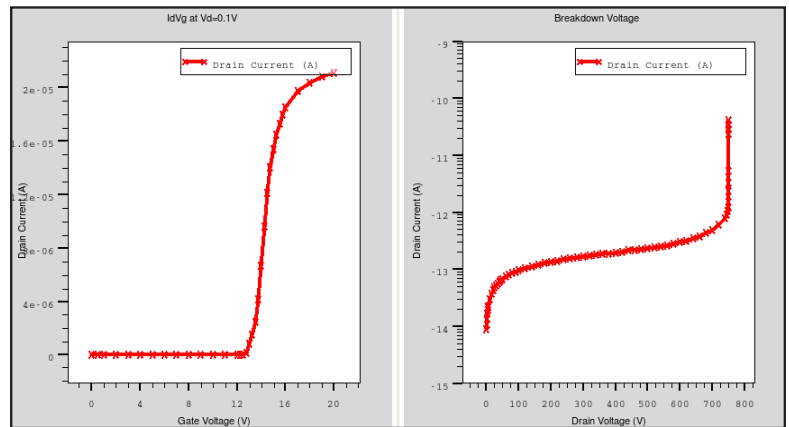
3D electric field distribution. Field is maximum at the corner of the trench.



3D Trench SiC MOSFET showing realistic process simulation at the corners.



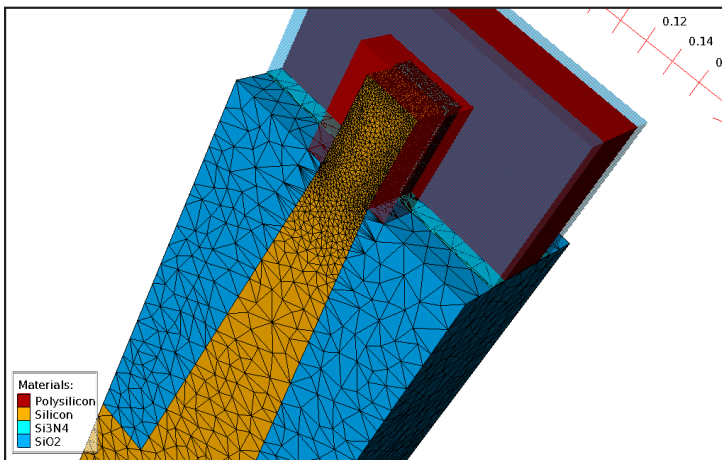
3D SiC MOSFET simulation results comparison using different extended precision (80 bit versus 160 bit).



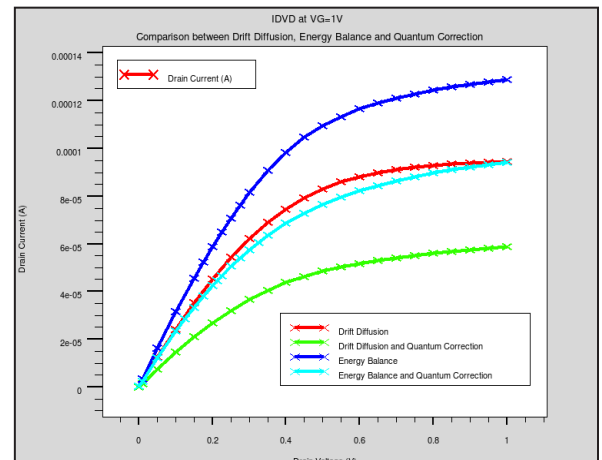
3D Trench SiC MOSFET IdVg and Breakdown Voltage simulation results.

FinFET Application Example

This 3D FinFET is simulated with a 3D fully unstructured tetrahedral mesh. The mesh is fully automated including refinement on doping and interfaces.



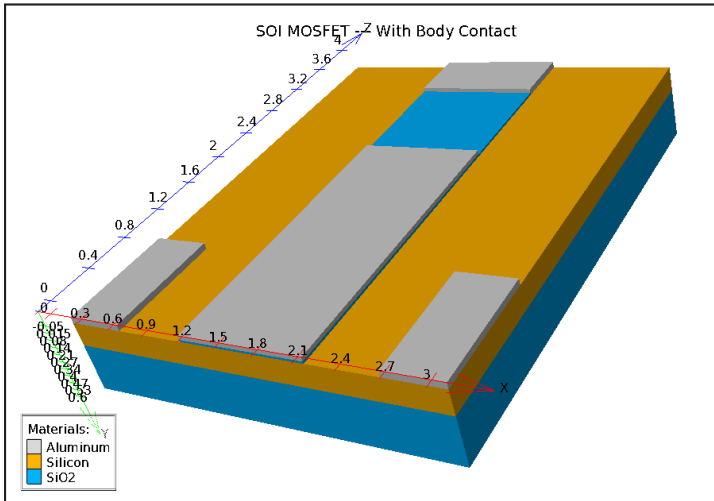
3D FinFET structure.



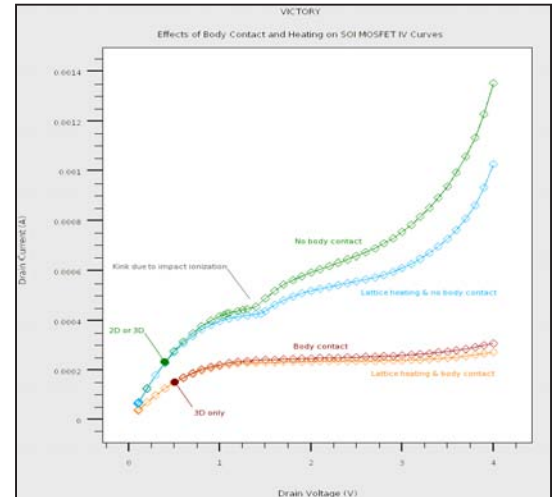
Comparison between drift diffusion, energy balance and quantum correction.

SOI Application Example

This 3D SOI MOSFET device simulation shows how to use a body contact to suppress the kink effect. Also shown is the effect of lattice heating on the IV curves.



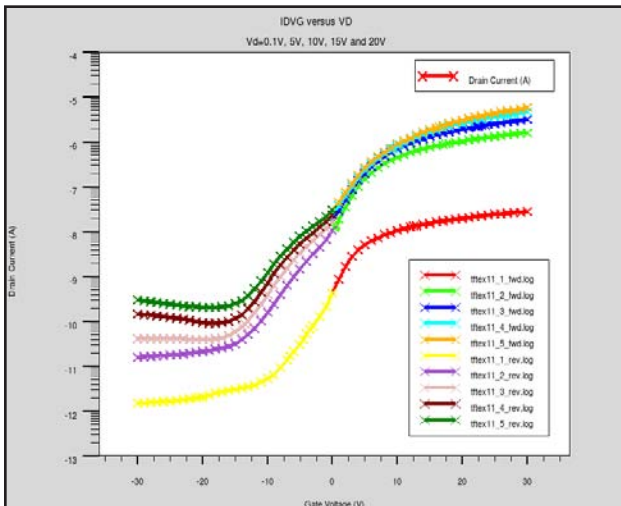
3D SOI MOSFET with body contact.



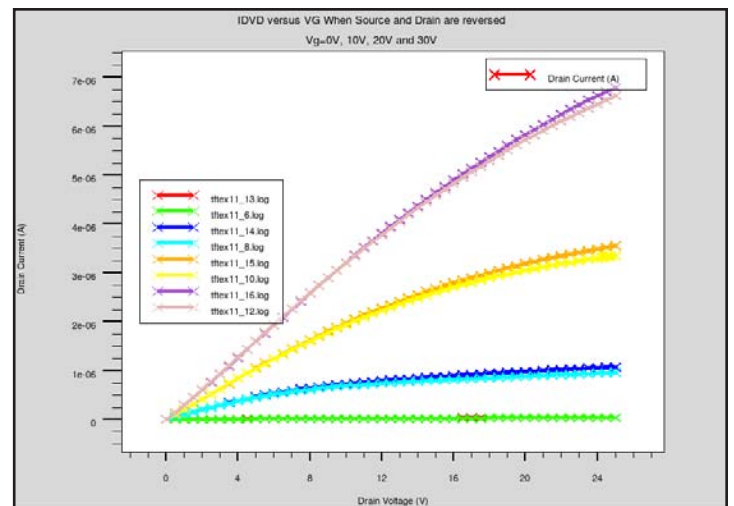
IdVd 3D SOI MOSFET simulation with body contact showing the kink suppression effect.

TFT Application Example

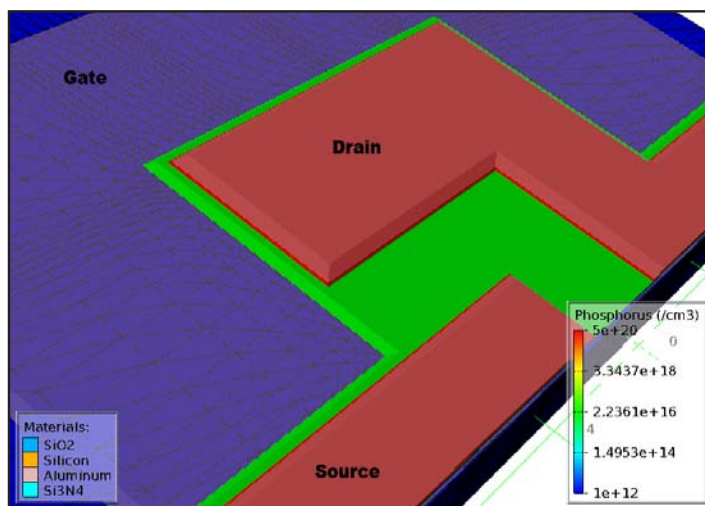
This layout-driven 3D n-type A-Si:H TFT simulation demonstrates specific 3D effect in the IdVd curve when the source and drain contacts are reversed.



3D TFT A-Si:H IdVg simulation.



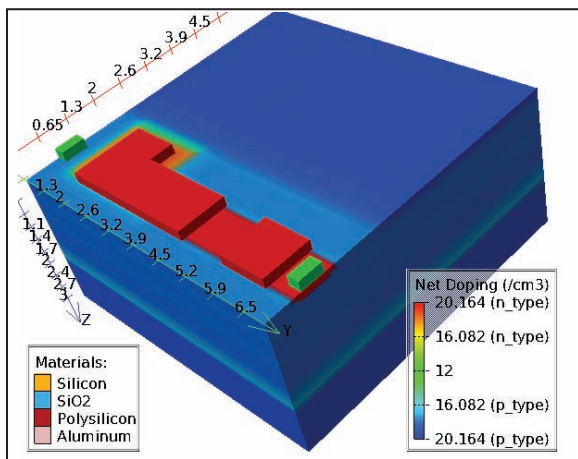
3D TFT A-Si:H IdVd simulation with reverse source and drain.



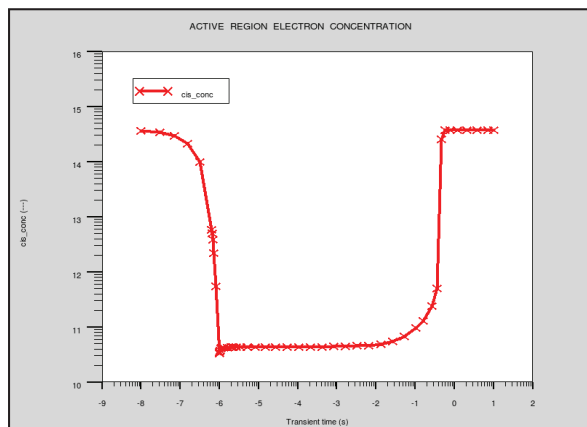
3D TFT A-Si:H TFT structure.

CMOS Image Sensor Example

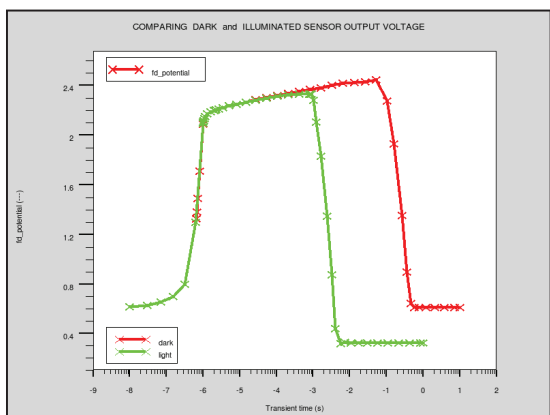
3D process and Device simulation showing transient response of a CMOS Image Sensor under dark and illumination condition.



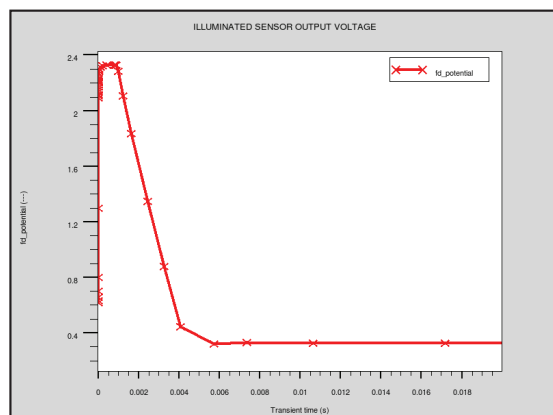
3D doping distribution of a CMOS image sensor.



Active region electron concentration under dark condition.

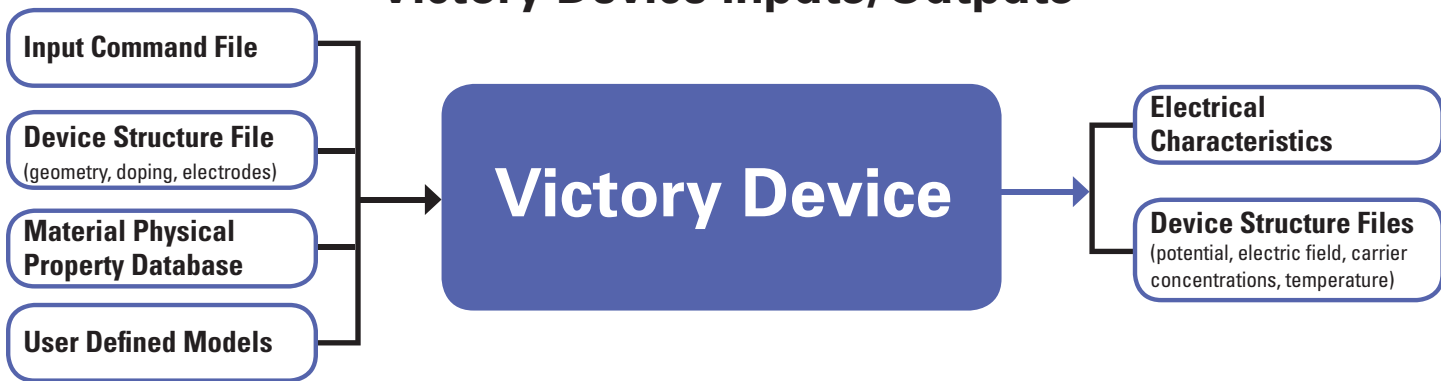


Comparison of dark and illuminated sensor output voltage.



Illuminated sensor output voltage.

Victory Device Inputs/Outputs



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