MixedMode3D

CIRCUIT SIMULATION FOR ADVANCED 3D DEVICES

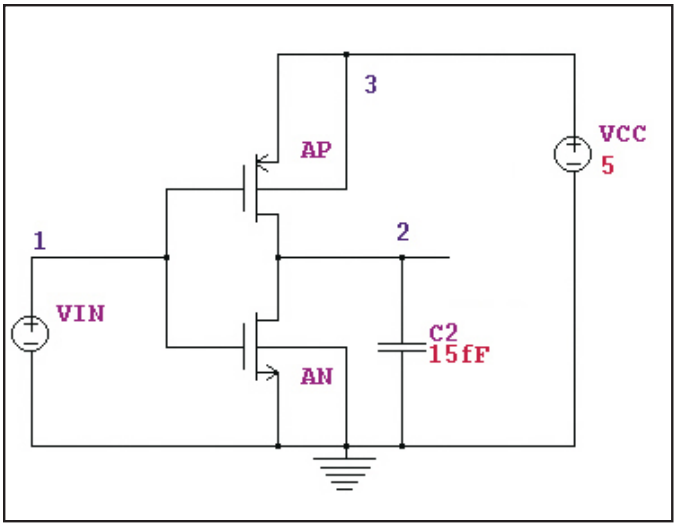
MixedMode3D is a circuit simulator that includes physically-based 3D devices in addition to compact analytical models. Physically-based devices are used when accurate compact models do not exist, or when devices that play a critical role must be simulated with very high accuracy. Physically-based devices may be simulated using any combination of ATLAS 3D modules. The physically-based devices are placed along side a circuit description that conforms to the SPICE netlist format. Applications of MixedMode3D include power circuits, high performance digital circuits, precision analog circuits, high-frequency circuits, thin film transistor circuits, and optoelectronic circuits.

Technical Specifications

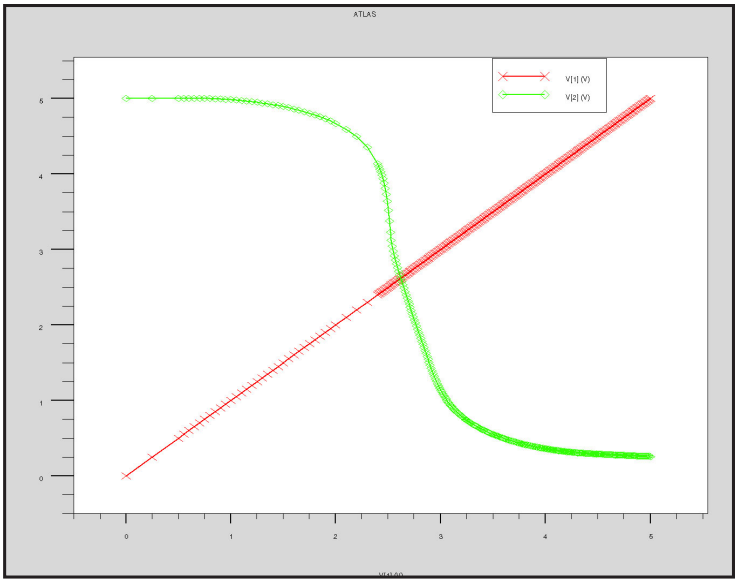
- SPICE input language circuit specification
- MixedMode3D circuits can include up to 200 nodes, 300 elements, and up to 10 physically-based ATLAS 3D devices
- MixedMode3D utilizes the SmartSpice Analog Circuit Simulator model library to provide an accurate and comprehensive description of the circuit element
- A wide range of SPICE models are available including: voltage, current and optical sources, MOSFET(level1,2,3, BSIM3v3, BSIM4, EKV, PSP, HiSIM2, HiSIM_HV, Silvaco HV MOS), Bipolar(Gummel Poon, VBIC, Mextram, HICUM), HBT, TFT(RPI a-Si, RPI poly-Si, UOTFT), Diode, JFET, MESFET(Curtice, TriQuint), HiSIM-IGBT

Inverter Simulation

MixedMode3D allows compact model devices to be replaced by physically-based devices.



CMOS inverter with transistors AN and AP simulated using physically-based devices.



Inverter voltage characteristics for node 1 and node2.

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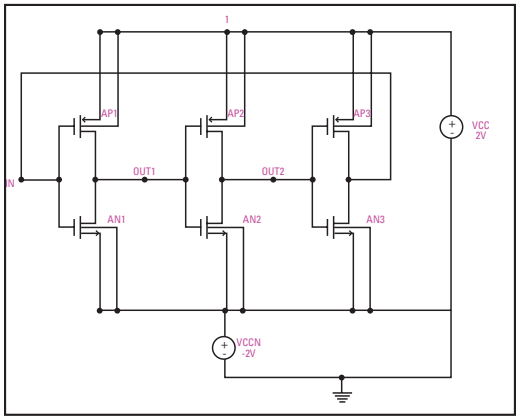
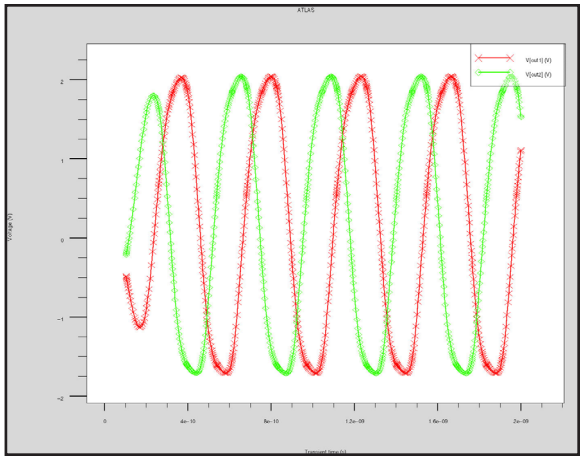
Ring Oscillator

Up to 10 physically-based devices can be used to create circuits such as ring oscillators.



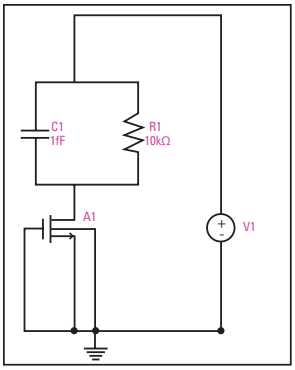
3-stage ring oscillator using physically-based devices.



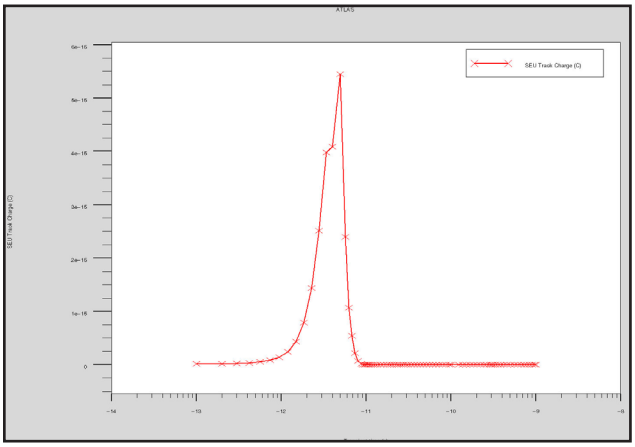
Ring oscillator IV characteristics.

Single Event Upset Simulation

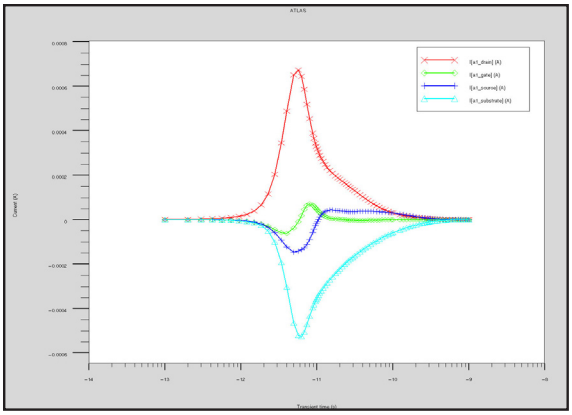
The effects on a Single Event Upset (SEU) pulse on a circuit element can be simulated using MixedMode3D. A SEU pulse can be applied to any physically-based device in the circuit.



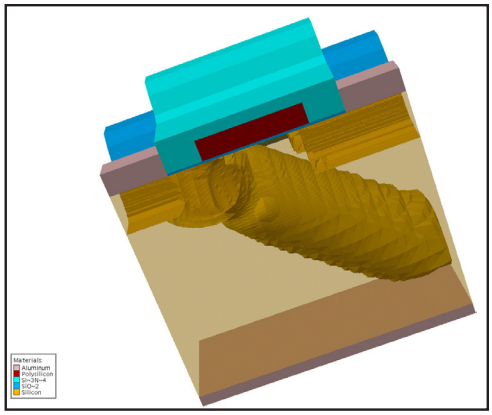
Simple circuit with physically-based MOSFET device during SEU strike.



SEU pulse charge as a function of time.



IV characteristics during SEU pulse.



Electron concentration isosurface at time=4e-12s.

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