

# VIRTUOSO SPECTRE CIRCUIT SIMULATOR

Virtuoso® Spectre Circuit Simulator provides fast, accurate simulations for tough analog and mixed-signal circuits. Tightly integrated with the Virtuoso custom design platform, Virtuoso Spectre® technology provides detailed transistor-level analysis in multiple domains.

## VIRTUOSO CUSTOM DESIGN PLATFORM

The Virtuoso custom design platform is a comprehensive system for fast, silicon-accurate design and is optimized to support “meet-in-the-middle” design methodologies such as advanced custom design. Virtuoso includes the industry’s only specification-driven environment, multi-mode simulation with common models and equations, vastly accelerated layout, advanced silicon analysis for 0.13 microns and below, and a full-chip, mixed-signal integration environment. The Virtuoso platform is available on the Cadence® CDBA database and the industry-standard OpenAccess database. With the Virtuoso platform, design teams can quickly design silicon that is right and on time at process geometries from one micron to 90 nanometers and beyond.

## VIRTUOSO SPECTRE SIMULATOR

Virtuoso Spectre simulator provides fast, accurate SPICE-level simulation for tough analog and mixed-signal circuits. It is tightly integrated with the Virtuoso custom design platform and provides

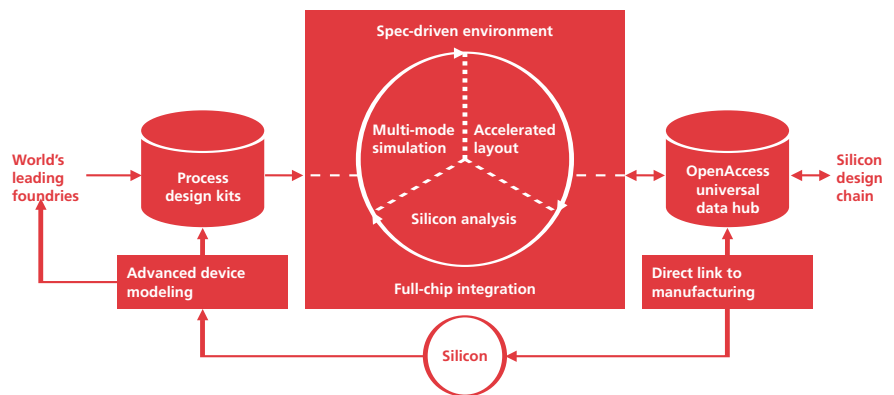


Figure 1: Virtuoso custom design platform

detailed transistor-level analysis in multiple domains. Superior architecture allows for low memory consumption and high-capacity analysis.

### BENEFITS

- High-performance, high-capacity SPICE-level simulations (3x SPICE)
- Higher design quality using silicon-accurate device models shared within Virtuoso Multi-mode Simulation
- Better design accuracy using silicon-calibrated models from industry-leading Virtuoso advanced modeling technologies

- Minimal translation to move between design domains with all simulators sharing the same syntax

### FEATURES

#### ADVANCED CIRCUIT SIMULATION TECHNIQUES

Advanced Virtuoso Spectre architecture provides fast, accurate analysis for large circuits with up to 50,000 transistors. Reliable time-step and convergence controls eliminate the dreaded “time step too small” error in most SPICE simulators. Virtuoso Spectre simulator uses successive convergence techniques

to provide rapid direct current (DC) convergence — even on tough, meta-stable circuits (flip-flops and memory cells). Virtuoso Spectre simulator has built-in support for finding potential manufacturing problems with an integrated Monte Carlo analysis\*, parametric statistical analysis, and DC mismatch analysis (see *Figure 2*).

### BUILT-IN VERILOG-A BEHAVIORAL MODELING

Fully compliant Verilog-A 2.0 analog hardware description language capability for advanced behavioral modeling is built in. Virtuoso Spectre simulation combines top-down and bottom-up modeling capability in a single simulation. It is also the analog simulation core in Virtuoso AMS Designer.

### ADVANCED DEVICE MODELING AND SUPPORT

Virtuoso Spectre simulation supports MOS, BJT, specialty transistor models, resistors, capacitors, inductors, transformers and magnetic cores, lossy and lossless transmission lines, independent and controlled voltage and current sources, and Z and S domain sources.

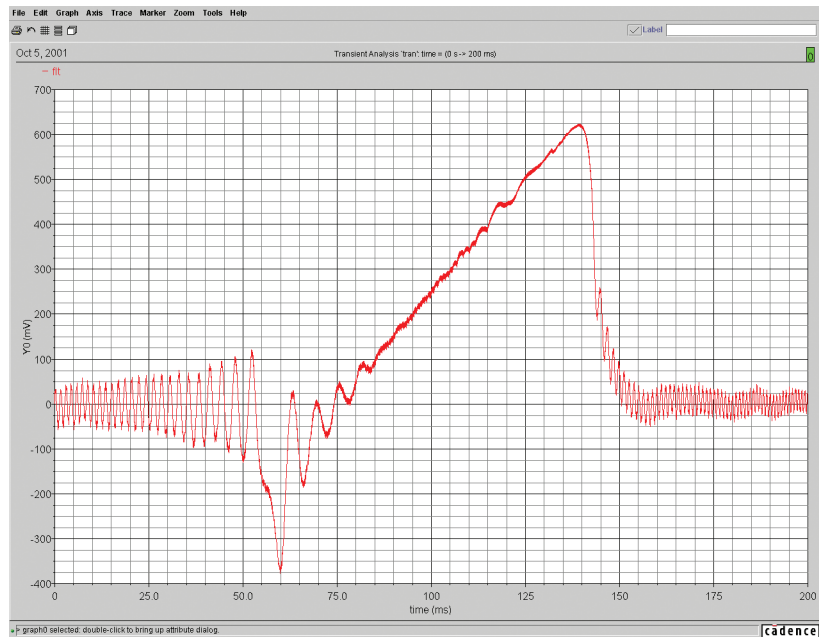
The user-defined model interface includes a compiled model interface (CMI) that is shared across all platform simulators. It allows for the rapid inclusion of user-defined models for a “model once, use everywhere” capability. Virtuoso Spectre simulator also provides a curve-tracer analysis capability for rapid model development and debugging.

## SPECIFICATIONS

### COMPREHENSIVE DEVICE MODEL SUPPORT

- MOSFET models, including BSIM1, 2, and 3, with approved versions of BSIM3v3 (3.2.1 and 3.2.2) and BSIM4 from the Compact Modeling Council; high-voltage MOS (HVMOS), MOS9, and EKV; mature models for MOS1, 2, and 3; and specialized switch-level MOS0
- Bipolar junction transistor (BJT) models, including VBIC, HICUM, HBT (for SiGe), Gummel-Poon, and Ebers-Moll models
- Diode models used for either junction or Schottky Barrier diodes with reverse breakdown

\*Separate license required to run Monte Carlo analysis



*Figure 2: The superior accuracy of Virtuoso Spectre is perfect for difficult simulations of analog and mixed-signal design*

- GaAs metal semiconductor field-effect transistor (MESFET), a completely symmetrical model (developed by Statz, Newmann, Smith, Pucel, and Haus)
- Silicon on insulation (SOI), including the Berkeley Technology Associates (BTA) SOI model and the University of California, Berkeley partially-depleted BSIM3SOI model
- Rensselaer Polytechnic Institute’s Poly and Amorphous Silicon Thin-Film models

### COMPREHENSIVE CIRCUIT ANALYSIS

- DC, AC, and transient analysis
- Noise, transfer function, and sensitivity analysis
- Monte Carlo\* and parametric statistical support
- Full support for sweeping analysis and circuit parameters
- Built-in measurement language

### DESIGN INPUTS/OUTPUTS

- Virtuoso Spectre
- HSPICE
- SPICE 2/3
- S-Parameter data files
- PSF waveform format

### PLATFORM/OS

- Sun/Solaris
- HP-UX
- IBM
- Linux

## CADENCE SERVICES AND SUPPORT

- Customer-focused solutions that increase ROI, reduce risk, and achieve your design goals faster
  - Collaborative approach and design infrastructure — virtual teaming
  - Proven methodology and flow tuned to your design environment
  - Design and EDA implementation expertise
- Product and flow training to fit your needs and preferred learning style
  - More than 80 instructor-led courses — certified instructors, real-world experience
  - More than 25 Internet Learning Series (iLS) online courses
- Cadence customer support that keeps your design team productive
  - Cadence applications engineers provide technical assistance
  - SourceLink® online support gives you access to software updates, technical documentation, and more — 24 hours a day, 7 days a week

## FOR MORE INFORMATION

Email us at [info@cadence.com](mailto:info@cadence.com), or log on to [www.cadence.com](http://www.cadence.com).