Silvaco is an established leader in providing affordable and high quality SPICE modeling service with fast turnaround time.

Benefits
- Leader in supplying accurate high quality SPICE models
- Aggressive in providing cost effective service with rapid turnaround
- Extraction of accurate, high quality SPICE models for analog, digital, mixedmode and RF applications
- All commercially available SPICE models supported
- Extraction of DC, AC (s-parameters), capacitance, temperature, and noise SPICE parameters
- Either packaged parts or wafers are acceptable
- Temperature range from -40°C to +150°C
- Worst case and corner model generation

Complete SPICE Modeling Services
Silvaco provides SPICE modeling services for the semiconductor industry. We offer an experienced staff of engineers and state-of-the-art laboratory. Our services are affordable, and designed to provide the accuracy and rapid turn around time required by our customers.

Silvaco’s modeling services are ideally suited to either complement in-house SPICE modeling capabilities when time is critical, or to provide complete SPICE modeling services for occasional needs. We support CMOS, Bipolar, Diode, JFET, SOI, TFT and HBT technologies.

Modeling service is performed by using Utmost IV modeling and device characterization software: Automated data acquisition, SPICE model parameter extraction, model validation and model generation. Utmost IV is a state-of-the-art device characterization and SPICE modeling software.
SPICE Modeling Lab
Equipment List

Probers
Cascade Microtech 12861 8inch thermal attoguard prober (-40°C to 150°C)
Micromanipulator Model 6600 thermal 8inch prober (room temperature to 150°C)

Temperature environment for packaged parts
Tenney Jr environmental chamber (-40 to 150°C)

DC Analyzers
HP4155
HP4145
HP4142 (1x HCU, 2x HPSMU, 1x MPSMU)

LCR Analyzers
HP4284
HP4285

Network Analyzer
HP8753 (6 GHz)

Dynamic Signal Analyzer
HP3561

Digitizing Oscilloscope
HP54501

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SPICE Modeling Process Flow

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<th>Step</th>
<th>Customer</th>
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<tr>
<td>Customer’s Wafer or Package Parts</td>
<td>✔️</td>
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<tr>
<td>Test Chip Document (Device Locations, Pad Connections, and Maximum Voltages)</td>
<td>✔️</td>
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<tr>
<td>Measured Data (DC, AC, Capacitance, Temperature, Noise)</td>
<td>✔️</td>
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</tr>
<tr>
<td>Extracted and Optimized SPICE Models</td>
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<tr>
<td>Process Related Parameter Variation. VTO, LD, WD, TOX, RSH, IDSAT, etc.</td>
<td>✔️</td>
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<tr>
<td>Typical and Worst Case Corner Models</td>
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<tr>
<td>Test Circuit Netlist for Model Validation</td>
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<tr>
<td>Model Validation and SPICE Model Library Generation</td>
<td>✔️</td>
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</table>
Silvaco SPICE Modeling Services

MOS Technology
- Typically ten to twelve NMOS and PMOS geometries are measured at specified temperature points for DC model
- Area and sidewall junction capacitances, oxide capacitance and overlap capacitances are measured and parameters extracted
- Extracted AC models are verified by measuring and simulating ring oscillator data
- Complete noise characterization for noise voltage and noise current
- Models available include Level 1,2,3, BSIM3, BSIM4, HV MOS Level 88, HiSIM, HiSIMHV and HiSIMHV2

BIPOLAR Technology
- DC, junction capacitances, AC (s-parameters), temperature measurements for DC
- Models available include Gummel Poon, Mextram, VBIC
- Macro models to include parasitic device effects

Other Supported Technologies
- Diode: Level 1, 2, 3
- TFT: Poly and Amorphous TFT models
- SOI: BSIMSOI

Deliverables
- Measured versus simulated data plots provided
- SPICE formatted libraries
- Raw measured data files can also be provided

Complete Solutions for your Modeling Needs

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