Utmost III supports the characterization and model extraction for MOS, BJT, Diode, JFET, GaAs, SOI and TFT devices.

Utmost III provides the widest selection of measurement equipment from a variety of vendors.

Fully interactive, semi-automated or batch-mode operation is supported.

Real-time model tuning using the rubberband feature.

Integrated with Silvaco TCAD Software and Spayn statistics program for smooth development of pre-silicon models.

Supports all leading SPICE simulators.

Silvaco’s strong encryption is available to protect valuable customer and third party intellectual property.

Utmost III generates accurate, high quality SPICE models for analog, mixed-signal and RF applications. Utmost III is in use worldwide by leading IDMs, foundries and fabless companies to perform data acquisition, device characterization, model parameter extraction and model verification.
Utmost III addresses the practical needs of device characterization and modeling engineers with a flexible, productive workflow. It acquires measured or TCAD simulated data, extracts parameters, and delivers accurate, high quality SPICE models.

- Flexible measurement and analysis environment for device characterization and model generation
- Supports widest selection of instrument drivers, prober drivers, device models, operating platforms, and commercial circuit simulators
- Splits device characterization and/or modeling problems into separate measurement and analysis tasks
- Stores measured results in measurement log files for future analysis (search, averaging) so that valuable probe time is minimized
- Common data sets can be used to extract more than one model type
- Supports single test or step-and-repeat operation
- Extracts parameters by using comprehensive library of built-in extraction algorithms, flexible user-defined local optimization strategies, more interactive global optimization procedures, or a combination of all three
- Stores extracted parameters in multiple formats, including SPICE library formats that can be read back into Utmost III as an initial estimate during future model extractions
Utmost III provides intuitive and comprehensive menus to select and drive all of the required instruments for device data acquisition.

- Drives most commonly used DC analyzers, AC analyzers, capacitance meters, switching matrix controllers, pulse generators, and oscilloscopes
- Controls most commercial automatic and semi-automatic probers
- Drives many temperature ovens and hot chucks
- Fully interactive, semi-automatic, or batch-mode operation
- Step-and-repeat operation, including wafer cassette control
- Comprehensive selection of DC, AC, transient, and capacitance test routines for MOSFET, BJT, Diode, JFET, GaAs, SOI, TFT, and HBT modules
- Performs all required measurements on packaged devices or on wafer
- Interfaces to process and device simulators and to the Spyne Statistical Parameter Analysis tool
- Supports the widest variety of models and circuit simulators
- Includes comprehensive set of DC extraction routines for process-monitor and device model parameters
- Flexible local optimization procedures for any supported model as substitute or supplement to built-in routines
- Supports bipolar routines to extract resistances, breakdown, saturation, leakage, forward and reverse gain, early voltage, knee current, bipolar junction capacitance, and basic Gummel-Poon parameters from DC measured characteristics
- Provides AC extraction routines for cut off frequency, forward and reverse transit time, base resistance, and excess phase parameters
- Extracts DC MOSFET parameters including length reduction, width reduction, threshold voltage, low-field mobility, body effect, velocity saturation, resistance, breakdown, and subthreshold slope parameters
- Supports the extraction of overlap and junction capacitance parameters

Utmost III extracts MOSFET parameters, including BSIM4.

Utmost III extracts parameters for Bipolar (above), Diode, JFET, GaAs, SOI, TFT, HBT, and passive devices for RF.

- SOI module permits characterization of all transistor properties, including 4/5 terminals device, bipolar parasitic effects, and Body or BackGate currents
- Measured s-parameters can be converted to h, z, and y-parameters
- Supports standard, calibration and two step de-embedding procedures for correct measurement of s-parameters
- Includes special extraction algorithms for the extraction of BSIM1, BSIM2, BSIM3, BSIM4, MOS9 and MOS11 parameters, for single or multiple geometries
- Universal multi-target / multi-geometry measurement routine for SOI and MOS technology
- Gate current measurement and parameter extraction routine for BSIM4, MOS11
Utmost III supports Levenberg-Marquadt and Downhill Simplex optimization methods.

- Offers flexible local optimization facility and global parameter optimization boundary boxes
- Optimize multiple device geometries simultaneously (up to 36 devices) and mix device currents and conductances as optimization targets
- Rubberband interactive parameter extraction enables modeling engineers to observe the effects of parameter variations on device characteristics
- Supports single or multi-geometry optimization with graphical updating of simulated characteristics
- Supports multi-step optimization all in real-time
- Supports graphical parameter sensitivity and quality-of-fit information
- Supports widest selection of commercially available device models
- Generates models for SmartSpice, HSPICE, Spectre and ELDO
- Offers fast built-in SPICE simulation library (ModelLib statically linked: cannot benefit from flexibility as Utmost IV)
- External SPICE mode allows you to connect to any SPICE simulator
- Supports the conversion of model parameter sets from one model to another
- Macro modeling and parameter extraction is available for devices which cannot be adequately modeled by any existing device models
- User-defined models linked dynamically
- Support for SmartSpice interpreter models
- Fast simulation using ModelLib Model and Fast internal solver

**Supported SPICE Models**

**MOSFET models**
- Berkeley Level 1
- Berkeley Level 2
- Berkeley Level 3
- BSIM1
- BSIM2
- BSIM3
- BSIM4
- BSIMMG
- BSIM5
- PSP Level 1000
- Philips Level 9
- EKV
- LDMOS Level 20
- Philips Level 11
- User models
- HV MOS Level 88
- HiSIM
- Philips 30
- Philips 31

**Bipolar models**
- Gummel-Poon
- Quasi RC
- IGBT
- QBBJT MEXTRAM
- HBT
- HICUM
- MEXTRAM504
- User models
- Mextram 503
- VBIC95
- Philips Modella

**SOI model**
- Honeywell
- FLORIDA FD
- FLORIDA NFD
- BSIM3SOI FD
- BSIM3SOI DD
- BSIM3SOI PD
- STAG SOI
- CEA/LETI
- User models

**MESFET model**
- JFET
- Statz
- Curtice 1
- Curtice 2
- User models
- TriQuint
- TriQuint 3
- Parker-Skellen

**TFT models**
- Amorphous TFT
- Polysilicon TFT
- RPI a-Si
- RPI p-Si
- User models
• Operates in manual, semi-automatic, automatic, and batch mode operation
• Includes technology modules for MOS, Bipolar, Diode, JFET, GaAs, SOI, TFT, and HBT
• Automatically converts TCAD device characteristics from TCAD process and device simulations
• Performs detailed parameter extractions on TCAD data in batch mode to develop nominal and worst-case models for a process under development
• Stores model parameters and device characteristics in Spayn format for statistical parametric analysis and worst-case model definitions
Spice Modeling Services

- Leader in supplying accurate SPICE models from wafers or packaged parts
- Aggressive in providing cost effective models with rapid turnaround
- Model extraction provided for MOS, Bipolar, Diode, JFET, GaAs, SOI, TFT, HBT
- Extraction of DC, AC (s-parameters), capacitance, temperature, noise, SPICE parameters
- Temperature range from -55 degrees C to +150 degrees C
- All commercially available SPICE models supported
- Model validation in accordance with Global Semiconductor Alliance (GSA), Compact Modeling Council, and IEEE test procedure #P1485 recommendations
- Worst-case and corner model generation

Utmost III Inputs/Outputs

- Measured data (DC, CAP, RF, ETC.)
- SPICE Simulator
  SmartSpice, HSPICE, Spectre, ELDO, PSPICE
- TCAD simulated data
- Measurement equipment interface

Utmost III

- SPICE Model parameters
- Plots and data simulated vs measured data
- Spayn

Utmost III

- SmartSpice, HSPICE, Spectre, ELDO, PSPICE
- Spayn
- Measurement equipment interface

- Measured data (DC, CAP, RF, ETC.)
- TCAD simulated data

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