



DIGITAL INDUSTRIES SOFTWARE

# Analog FastSPICE

Industry standard SPICE simulation for nm AMS,  
RF and custom digital designs

## Benefits

### Fastest nanometer-accurate circuit simulation

- Certified to Gate All Around (GAA) and FinFET process by leading foundries
- ISO 26262 certified
- > 5x faster than traditional SPICE
- > 2x faster than parallel SPICE
- Powered by AFS eXTreme technology
- 300M-element capacity

## Summary

Nanometer-scale analog, RF, mixed-signal and custom-digital circuit design is extraordinarily demanding. Designers must worry about a myriad of issues, from tight specifications to intensive physical effects. Successful design demands a fast, full-featured verification platform that never sacrifices accuracy. Siemens EDA's Analog FastSPICE uniquely delivers.

Analog FastSPICE (AFS)		
Accurate, high performance, high capacity, high scalability	Full-spectrum and multi-tone analyses	Advanced reliability and aging analyses
Foundry-certified PDKs	Supports industry-standard syntax and outputs	Supports custom IC SPICE flows

## Analog FastSPICE

### Benefits and Features *continued*

#### Fastest mixed-signal simulation

- Supports all leading digital solvers
- Best-in-class usability, allowing maximum reuse of verification infrastructure
- Advanced verification and debug capabilities to improve verification coverage
- MATLAB® Simulink® co-simulation

#### Fastest full-spectrum device noise analysis

- Includes all device noise sidebands/ harmonics
- Transient noise within 1 to 2 dB silicon data

#### Single/multi-tone RF analysis

- PSS and Pnoise with >3M element capacity
- Harmonic balance with > 6M element capacity

#### Fastest variation-aware design and verification

- Improved design quality and time-to-market
- SPICE accurate, high-sigma verification
- >1,000x faster than brute force simulation
- Easy to use and deploy

### Introduction - full paragraphs:

With foundry-certified accuracy by the world's leading foundries, Analog FastSPICE (AFS) delivers nanometer SPICE accuracy > 5x faster than traditional SPICE and > 2x faster than parallel SPICE simulators, powered by AFS eXTreme technology. AFS also offers the fastest mixed-signal simulation with the Symphony™ platform. For silicon-accurate characterization, AFS includes the industry's only comprehensive full-spectrum device noise analysis and integrates with Solido™ Design Environment delivering full variation-aware design coverage in orders-of-magnitude fewer simulations, but with the accuracy of brute force techniques.

Design teams at over 250 semiconductor companies worldwide rely on AFS to design their nm-scale ADCs, DACs, PLLs, high-speed I/O, high-speed clocking, CMOS image sensors, memories, PMIC and RFICs. AFS customers include the world's leading suppliers of consumer electronics, mobile communications platforms, application processors, server ICs, network processors, image sensors, and automotive ICs. As a single executable, AFS operates either stand-alone from the command line or integrated with industry leading analog design environments. It uses standard compute platforms from a single core up to 32 cores. AFS supports standard SPICE netlist formats, standard foundry models, and produces outputs in industry-standard formats.

Design teams can choose the most appropriate license configuration for their needs. AFS features include: AFS Circuit Simulator, AFS Transient Noise Analysis, AFS RF Analyses, Symphony, AFS Mega, and Solido Design Environment.

### Analog FastSPICE key functionality

#### AFS circuit simulator nanometer SPICE accuracy

- >50M-element capacity
- >150 dB transient dynamic range
- >5x faster than traditional SPICE
- >2x faster than parallel SPICE
- DC, transient, AC, and noise analyses Monte Carlo, alter, and sweep support

#### AFS eXTreme technology

- Nanometer SPICE accuracy
- >300M-element capacity
- >3x faster than post-layout SPICE Transient, transient noise, RF, and mixed-signal analyses

## Analog FastSPICE

### AFS transient noise analysis

- Full-spectrum accuracy to noise floor device noise analysis for any circuit type
- Same element capacity as Transient Validated to within 1 to 2 dB of silicon

### AFS RF analyses

- Shooting newton (SN) and harmonic balance (HB) analyses
- PSS SN - pac/pxf/pnoise/pstb/psp
  - Full-Spectrum periodic noise and oscillator noise
  - Single-tone PSS, sampled and modulated pnoise, Sampled pac and pxf
  - >3M element PSS convergence, no maxsideband
- HB - hbac/hbxf/hbnoise/hbstb/hbsp
  - Multi-Tone HB and modulated hbnoise
  - >6M element HB convergence

### Analog FastSPICE specification

#### Input/Output

- Leading SPICE netlist formats DSPF back-annotation
- VCD, .vec
- FSDB, tr0, PSF, Nutmeg, WDB

### Model support

- BSIM3/4, BSIM6/BSIM-BULK, BSIMSOI, BSIM-CMG, BSIM-IMG, BSIMSOI, MOS11, PSP, EKV, HiSIM2, HiSIM-SOI, HiSIM\_HV, GaN ASM, GaN MVSG
- MOS1/3, MOSVAR, JFET, diode, Juncap
- UTSOI, L-UTSOI, MM20, VBIC, Simkit Interface, BJT, HICUM L0/L2, Mextram, Gummel-Poon, S-parameter, W-element, bsource
- Verilog-A, Verilog-AMS

### Analog FastSPICE powers Siemens EDA signoff IC flows:

- Variation-aware verification with the Solido™ Design Environment
- Library characterization with the Solido™ Characterization Suite
- Mixed-signal verification with the Symphony platform
- Waveform viewing and customized post-processing with **Solido Waveform Analyzer**
- Context-aware ESD Simulation with **Calibre® PERC™**
- EM IR Simulation with **mPower™** for power and signal reliability
- Transistor-level Fault Simulation with **Tessent DefectSim** for analog defects
- Library creation for cell-aware ATPG & scan-based diagnosis with **Tessent CellModelGen**
- Electro-thermal analysis with **Calibre® 3DThermal** for 3D IC design flows

### Analog FastSPICE support

- Standalone command line
- Leading EDA design environments
- Commercially available cloud offerings

### Hardware requirements

- Single-core or multi-core systems
- Minimum memory recommendation:
  - For installation: 3 GB of disk space
  - For simulation: 2 GB of physical memory (RAM) and 2 GB of swap space (virtual memory)
- Operating System:
  - Linux® RHEL7+
  - SLES12+

### Siemens Digital Industries Software [siemens.com/software](https://www.siemens.com/software)

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