

# mPower

## Fast, scalable power integrity verification

### Features

- Unlimited scalability for analog and digital analysis of today's complex systems
- Integrated with design tools
- Tight Calibre integration
- Quad-view GUI for invocation and results debugging
- Broad range of foundries and technologies

### mPower Analog

- Static and dynamic analysis of the largest analog IC systems
- Simulation-based, high-capacity dynamic EM/IR analysis
- Schematic and post-layout simulation waveforms
- Compatible with any simulator and any extractor

### mPower Digital

- Low per-machine memory requirements
- Chip power modeling and packaging flows
- Uses industry-standard formats
- Vectored and vectorless analysis
- In-rush analysis
- Memory power profiling

### mPower power integrity analysis

The mPower power integrity solution is the only solution that provides uncompromised power integrity verification for digital, analog, and 3D IC across all design flows, at any scale. Analog, semi-custom and digital power integrity analysis can be readily integrated into existing design flows while scaling to circuits and chips of any size. The mPower solution enables high-confidence power analysis tape-out for all technologies and across all design types.

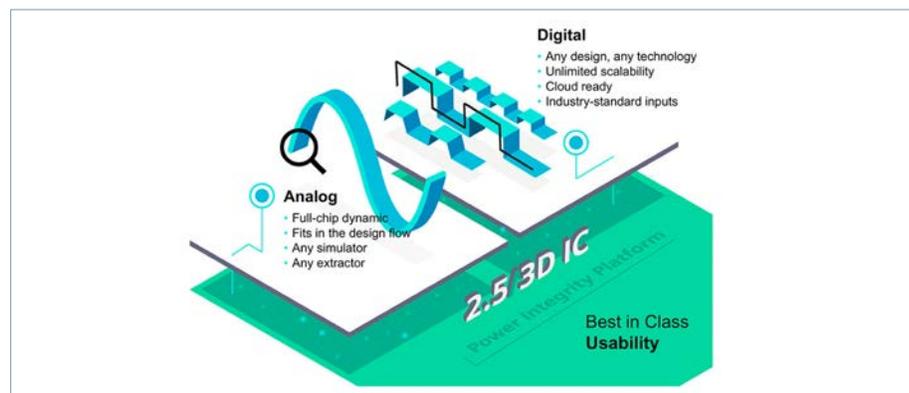
### Performance

Designed from the ground up to scale on heterogeneous networks, the mPower solution delivers highly accurate results in the best turn-around-time with the least cost. All mPower

engines are optimized for maximum parallelism on heterogeneous networks. For instance, while other tools require large amounts of memory on a primary machine, the mPower tool distributes its memory needs across the remotes to minimize the overall burden on the grid for both analog and digital designs.

The mPower software enables design teams to perform power integrity analysis from the smallest blocks to the largest full-chip layouts to verify that the design meets power-related design goals and performance:

- Verify power for all modes
- Identify and fix paths with insufficient voltage to drive loads
- Identify and fix reliability issues related to current density
- Enables full-chip workload analysis for complex SOC designs, such as artificial intelligence (AI) and machine learning (ML)



The mPower power integrity solution enables design teams to provide complete, high-confidence power coverage for all designs at any scale within their existing design and verification flows.

# mPower

- RTL and gate-level vectors
- Built-in timer

## Benefits

- Faster turnaround and tapeout times for designs of any size
- End-to-end power signoff
- Fast runtimes for the largest digital layouts and chips
- Fast, scalable dynamic analysis for analog layouts, from the smallest blocks to the largest analog circuits and full-chip designs
- Easy-to-use flow that can be readily integrated into existing analog and digital design and verification flows
- mPower GUI supports mPower invocations and results debug in easy-to-use, integrated design
- Proven correlation to silicon on advanced nodes for multiple foundries
- Cost savings on both computational and engineering resources

The mPower power integrity solution provides uncompromised power integrity verification for digital, analog, and 3D IC across all design flows, at any scale.

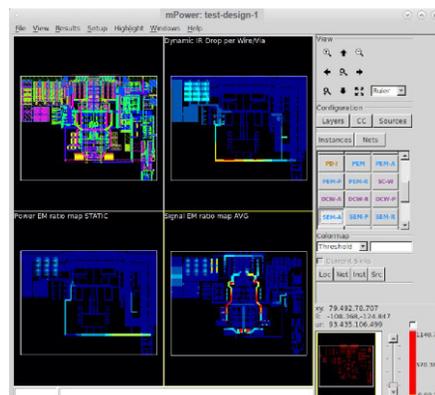
## Ease of deployment

The mPower solution is easy to adopt, in large part because it uses industry-standard formats and a simple and understandable command language, automatically reports results during the run, and can highlight results back into all major design tools.

## mPower GUI

The mPower GUI provides a fast, stable, and easy-to-use GUI for invocation and results debugging. Designers can use the mPower GUI to identify root cause, then highlight results into design tools through the Calibre® RVE interface for fixing. Features include:

- Fast, high-capacity for full-chip viewing
- Single or multiple page views
- Powerful filtering, query, navigation, and what-if capabilities
- Browse and highlight results for quick debugging
- Trace lowest resistance path from pin to source pad
- Plot current/voltage waveforms
- Custom maps



The synchronized quad-view mPower GUI simplifies and streamlines debug and analysis.

## mPower Analog

The mPower Analog software performs EM/IR analysis on transistor designs of any size—from the smallest bandgap reference to large analog systems and sensors. The mPower Analog tool brings scalability previously only available in the digital domain to transistor-level designs to enable static and dynamic analysis on large circuits that no other tool can handle.

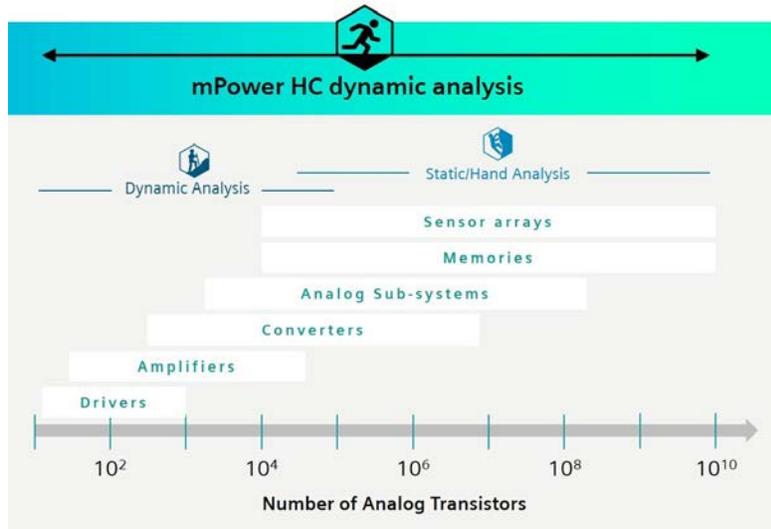
The mPower Analog software provides unparalleled flexibility on simulation and extraction:

- Use any extractor to drive post-layout SPICE simulation
- Use any SPICE simulator that can write a fast signal database (FSDB)
- Use waveform data from schematic or layout simulations
- Additional ease-of-use benefits with Siemens Calibre parasitic extraction tools and Analog FastSPICE (AFS) platform

## HC dynamic analysis

The unique mPower high-capacity (HC) dynamic analysis functionality is a simulation-based EM/IR analysis that can run on the largest, most complex blocks and chips to enable fast, accurate power integrity analysis of 5G sensors, AI/ML, multi-core, chiplets, and other large, complex IC systems. HC dynamic analysis provides the detailed analysis designers need to confidently sign-off designs for manufacturing, while enabling faster overall turnaround times by providing full-chip and array analyses from block-level SPICE simulations. It can also enable faster iterations early in the design cycle by using pre-layout SPICE simulations.

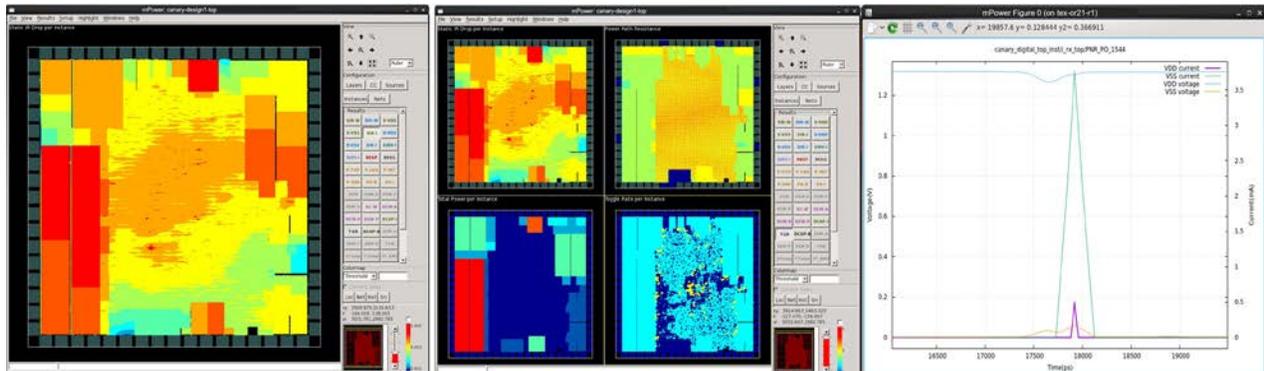
The mPower Analog HC dynamic analysis functionality provides full coverage of simulation-based signoff of large analog circuits across scale, without requiring any analog design flow changes. This top-level EM/IR analysis fits within existing design flows to enable designers to accurately and confidently analyze large blocks and chips that couldn't previously be analyzed.



mPower Analog HC dynamic analysis provides full coverage with simulation-based sign-off across scale, delivering confidence in the results.

### mPower Digital

The mPower Digital solution provides digital power integrity analysis with massive scalability to enable design teams to analyze the largest designs quickly and accurately.



Because it uses non-proprietary formats, the mPower Digital solution can be quickly and easily integrated into all design and verification flows.

### Simple to adopt and deploy

The mPower Digital software allows design teams to leverage industry-standard inputs throughout the flow to minimize cost and increase re-use. The mPower tool provides accurate results with standard Liberty models. For advanced nodes, industry-standard CCSP extensions to the standard Liberty models can be used for increased accuracy.

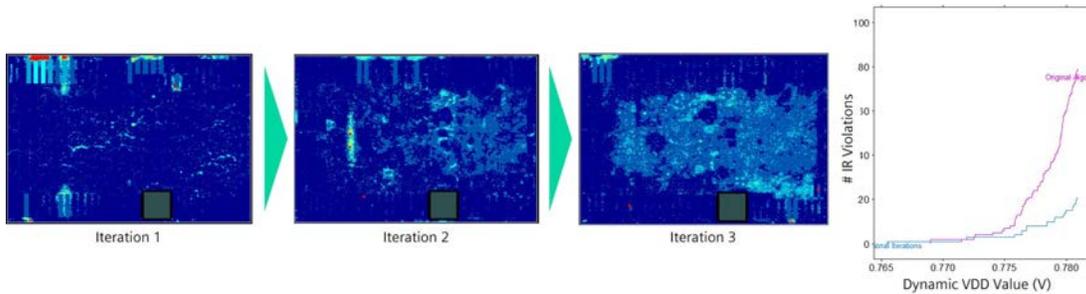
For memories, the mPower Digital tool supports multiple levels of modeling, from the simple LEF plus Liberty to GDSII views to fully-embedded transistor-level models, to provide a rich tradeoff between performance and accuracy.

The mPower Digital tool automatically reports results during the run, enabling designers to get critical information while a run is in progress.

Because the mPower TCL command language is simple and straightforward, designers can quickly achieve full proficiency.

### High coverage vectorless analysis

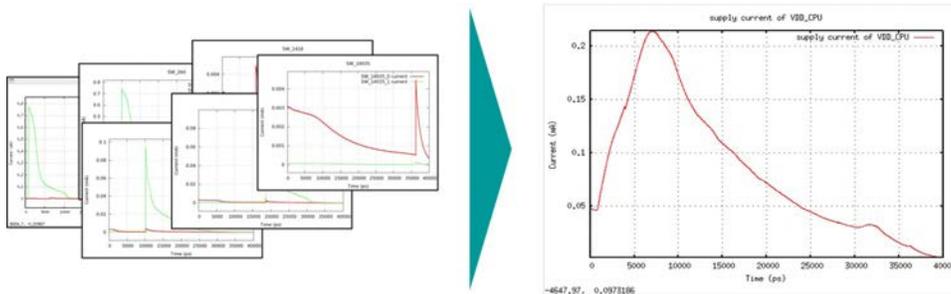
The mPower Digital software employs a vectorless algorithm that selects a subset of instances based on switching power, load, and other parameters. Even though all instances aren't sampled in a single run, the high-coverage algorithm ensures that all instances are sampled over multiple iterations, enabling the mPower Digital tool to find new violations.



Multiple iterations ensure full coverage for fast, accurate analysis.

### In-rush analysis for power-gated designs

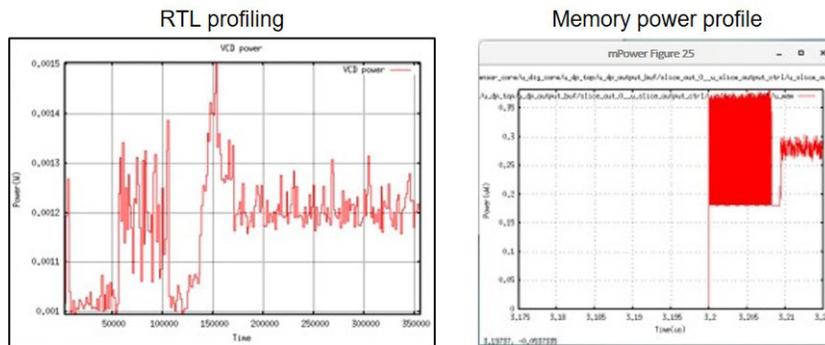
The mPower Digital software simulates turn-on/turn-off of power-gated designs for peak current and turn-on time analysis. Automatic calculation of the required simulation time eliminates guesswork and minimizes over-simulation.



Turn-on/turn-off simulation provides fast, efficient analysis of power-gated designs.

### RTL profiling and vectored analysis

The mPower Digital tool can use either gate-level or RTL-levels vectors for vectored simulation. Using RTL-level vectored EM/IR analysis shortens the analysis timeline and saves both compute and engineering resources. The event-based propagation captures glitches using an accurate stage delay. RTL profiling quickly identifies high-power frames, and is intended for large VCDs early in design cycles. Memory instance power profiling can be used to drive power aware MEMBIST insertion.



RTL and memory power profiling provide fast, accurate vectored simulation.

## Siemens power analysis toolsuite

The mPower power integrity solution completes the Siemens overall electro-physical signoff suite, addressing power, performance, and reliability analysis. Other offerings in this suite include the [PowerPro platform](#), Analog FastSPICE ([AFS platform](#)), [Calibre PERC reliability platform](#), [Calibre YieldEnhancer](#) with SmartFill technology, and [HyperLynx](#) toolsuite..



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