

# Sigrity PowerDC

DC and thermal analysis for packages and boards

The Cadence® Sigrity™ PowerDC™ environment provides fast and accurate DC analysis for IC packages and PCBs along with thermal analysis that also supports electrical and thermal co-simulation. Targeting both pre- and post-layout applications, the Sigrity PowerDC approach enables you to quickly identify IR drop, current density, and thermal issues that are among the leading field failure risks. Powerful features, including sense line location optimization and simplified design-rule checker (DRC) confirmation, work in concert with the fastest available simulation to support design improvements without excess cost and schedule impacts.

## Benefits

- Provide conclusive IR drop analysis for the complete package and board power delivery system
- Locate current and temperature hot spots to avoid risk of failure
- Optimize voltage regulator module (VRM) sense line locations
- Address interrelated effects with electrical/thermal co-simulation
- Pinpoint crucial voltage distributions and IR drop issues at multiple component locations
- Identify hard-to-find, high-resistance routing neckdowns
- Perform analysis in order of magnitude faster than otherwise possible
- Find path and loop resistance issues for the entire power delivery network, and generate a resistive SPICE circuit model for the design
- Avoid costly implementations, engineering delays, and field failures
- Capture Cadence Allegro® PowerTree™ tool data from schematic data and visualize the PDN topologies

- Using PowerTree information, simulate early and detect required component changes before the layout exists
- Automatically set up post-route analysis using PowerTree data captured during the logical design stage of PCB design
- Option to use a common analysis model library to avoid duplicate model settings for the same components
- Using the PowerTree interface, easily track changes (ECOs) to the PDN design and reuse previous setup information to quickly validate the changes
- Automatically create electrical constraints based on calculations from the IPC standard
- Interface with Cadence Voltus™ technology to enable chip/package/board electrical/thermal co-simulation

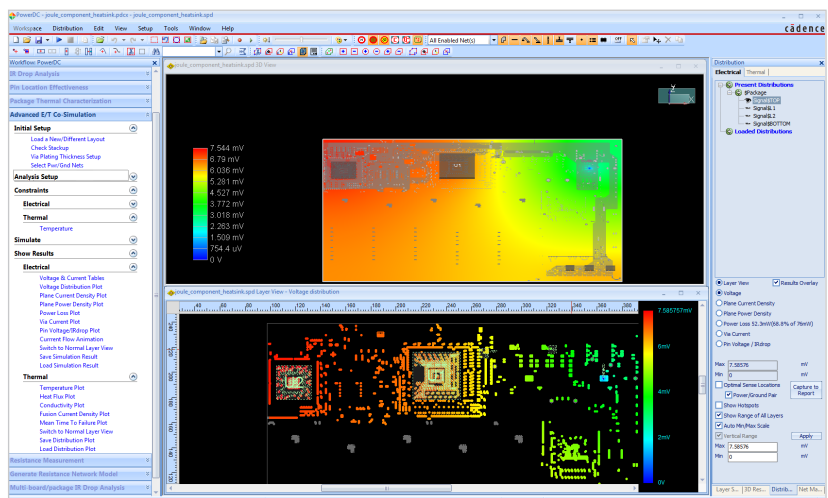


Figure 1: The Sigrity PowerDC environment's electrical and thermal co-simulation efficiently pinpoints design risks

## Features

### Electrical and thermal co-simulation

Powerful electrical simulation is combined with thermal distribution analysis in an automated environment that iterates on the vital interactions between current flow and temperature. This maximizes accuracy and fully considers effects such as the increasing electrical resistance that occurs at higher operating temperatures. This unified environment makes it easy for you to confirm that your design has met specified voltage and temperature thresholds, without having to spend significant effort sorting out difficult-to-judge impacts. The Sigrity PowerDC environment incorporates a task-focused workflow tuned for DC and thermal analysis. You can bring in design data from popular PCB and IC package layout systems, and you'll be guided through straightforward simulation set-up steps. A range of reporting and visualization options simplify issue identification, and interactive geometry editing enables what-if consideration of design improvement options.

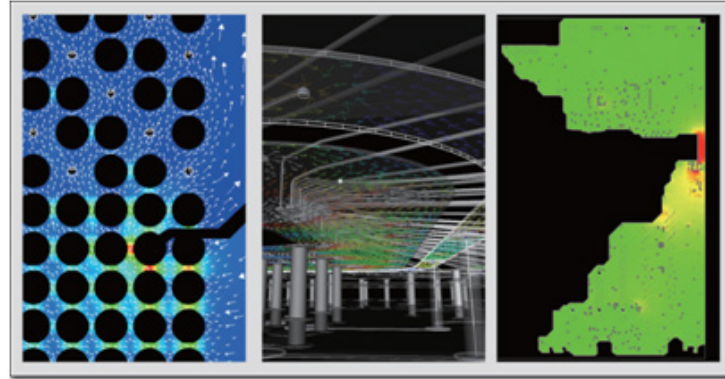


Figure 2: Sigrity PowerDC technology provides accurate simulation of problematic real-world structures such as cutouts, via fields, wirebonds, and neck downs

### Managing system-level IR drop

With voltage levels dropping and current requirements rising, accurate IR drop analysis is a critical step for today's high-performance designs. Design teams that effectively manage DC loss are able to achieve required tolerances of 5% and less. They are also rewarded with welcome additional room to achieve AC noise margins. Rapid Sigrity PowerDC simulations provide accurate results that take complex plane geometries and multiple voltage domains into account. Results are flexibly displayed, and post-layout DRC confirmation is provided.

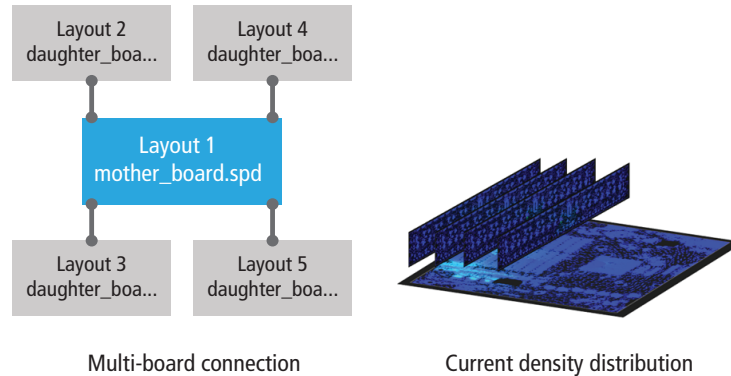


Figure 3: The Sigrity PowerDC environment is capable of analyzing multi-board configurations

### Optimizing voltage regulator module (VRM) settings

Adding a VRM remote sense at the right spot helps avoid IR drop by detecting changes in current load and compensating for it. Sigrity PowerDC technology provides single-step automation for the intelligent selection of the ideal VRM sense line location. This yields a margin improvement of 10% or more when compared with seemingly reasonable alternative placements. The Sigrity PowerDC environment automatically balances current levels,

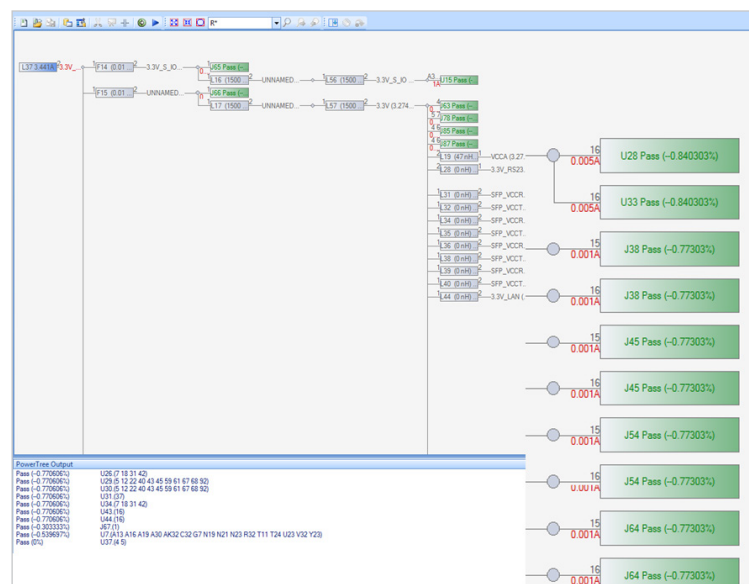


Figure 4: PowerTree technology enables pre-route analysis of the PDN to ensure the correct source, sink, and discrete components have been selected to meet the design criteria.

supports grouping of multiple VRMs, and guides you as you increase VRM nominal output voltage to the maximum safe level of compensation.

### Realistic assessment of critical structures

Designs today often include fewer layers, along with higher component, via, and routing densities that combine to reduce the area for power nets. Realistically, planes are not solid but include cutouts and Swiss cheese via fields. Spreadsheet estimations and simple DC and thermal tools are only helpful if margins are ample. Complex designs with multiple sinks, various voltage levels, and irregular plane structures demand highly accurate approaches to avoid field failures such as vias that act like fuses and thermal stress in areas that neck down or have dynamic plane cuts. The Sigrity PowerDC environment accurately simulates the behavior of materials from die attach to copper and important structures such as wirebonds. The electrical/thermal co-simulation takes accuracy to an even higher level by simultaneously converging on combined current and temperature impacts.

### Multi-structure analysis

Multi-structure analysis provides an intuitive and easy way to perform electrical or electrical/thermal co-simulation for a multi-board system. After the analysis, all detailed results of each block are integrated into a single signoff report. This capability simplifies the setup process and reduces the analysis time, making the DC analysis of a complicated system a practical requirement for your signoff methodology.

### Integration

- Works with Microsoft Windows and Linux
- Interfaces to PCB and IC package layout databases from Cadence, Mentor Graphics, Altium, Zuken, and AutoCAD

### Cadence Services and Support

Cadence application engineers can answer your technical questions by telephone, email, or Internet—they can also provide technical assistance and custom training

- Cadence certified instructors teach more than 70 courses and bring their real-world experience into the classroom
- More than 25 Internet Learning Series (iLS) online courses allow you the flexibility of training at your own computer via the Internet
- Cadence Online Support gives you 24x7 online access to a knowledgebase of the latest solutions, technical documentation, software downloads, and more
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