

XcitePI

Elevate Chip Power Integrity to the Next Level

Use XcitePI to:

- ▶ Perform pre-layout noise analysis of IC power grid
- ▶ Compute voltage and current noise propagation and distribution in ICs and packages
- ▶ Evaluate different decoupling schemes
- ▶ Simulate the impacts of various distributions and characteristics of source excitations
- ▶ Assess the effects of chip packages
- ▶ Perform what-if comparisons to optimize electrical performance

XcitePI™, a groundbreaking tool that performs dynamic noise simulation of the full-chip power grid structure with package effects, helps determine the severity of power integrity issues. Used for pre-layout design and analysis of power grids of high-speed ICs, XcitePI can help companies in the computer, semiconductor, graphics, networking, communications and consumer electronics markets avoid costly respins.

Unique Analysis Capabilities

▶ Distributed Interaction between Chip and Package

In high-speed ICs, particularly with flip-chip packages, once noise is generated at certain locations in a chip, it often propagates more easily to other locations of the chip through the package power and ground structures rather than directly through the power grid itself. Accurate modeling of the noise behavior of high-speed ICs therefore necessitates the modeling of distributed electromagnetic wave propagation effects in packages and the distributed interactions between IC power grid and package structures. Existing power analysis tools either fail to consider off-chip package effects or model the package effects with lumped RLC or simplified S parameter models. Consequently, they are unable to take into account the distributed interaction between IC power grid and chip packages, thereby unable to determine the true transient noise distribution and behavior in the power delivery system. In contrast, XcitePI performs transient analysis of the IC power grid simultaneously with dynamic simulation of electromagnetic fields in the package planes, taking into account both the wave propagation effects in the package and distributed interaction of the IC power grid and package planes.

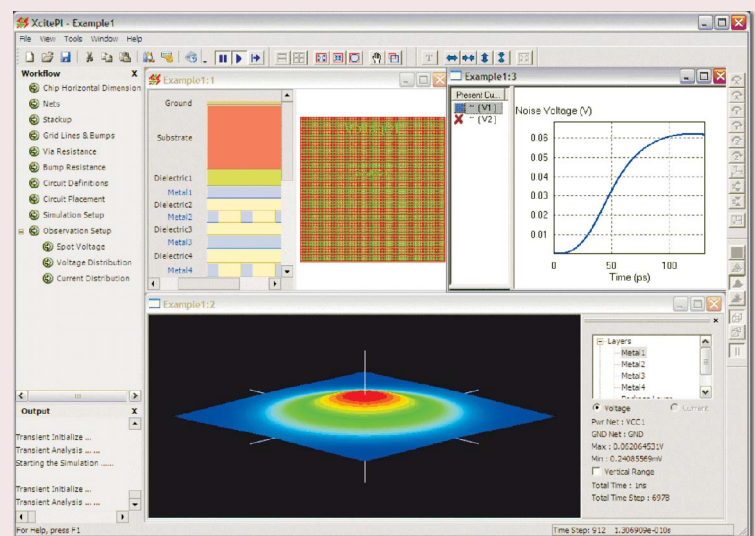


FIGURE 1. Transient analyses of full-chip power grid taking into account the package effects.

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► Accurate Model and Fast Simulation

Most existing power analysis tools consider only the resistive effects of the power grid, while some include capacitive and limited inductive coupling effects. When capacitive and limited inductive effects are taken into account in such tools, the simulation speed becomes very slow, making the simulation of full-chip structures unachievable. XcitePI models capacitive and inductive coupling between all the conductors of the power grid. It has an extremely fast special simulation engine that enables transient simulation of the full-chip power grid in minutes.

Easy to Follow User Interface

XcitePI has a very easy to use and modern user interface, based on Microsoft .Net platform, for problem setup, executing the simulation, and post-processing of simulated results. The user can conveniently set IC power grid physical parameters; specify characteristics and distributions of source excitations, decoupling capacitors and other loading circuits; and, define bumps, package power and ground planes, and other circuit models of off-chip structures. XcitePI provides dynamic animation of spatial distributions of voltages and currents on power grid and package planes, as well as transient responses at any identified locations. After the transient simulation is completed, XcitePI allows fast playback or detailed examination of simulated results. Transient simulation results can also be transformed into the frequency domain through Fourier transforms to obtain the frequency-domain characteristics of the power delivery system.

Who Should Use XcitePI

Electrical design engineers of chips and packages working on the power delivery systems of high-speed electronic systems in the computer, semiconductor, graphics, networking, communications, and consumer electronics industries.

Platforms

- User-friendly and intuitive graphical interface built with Windows 2000/XP 32-bit and 64-bit
- Linux platform available in the near future