

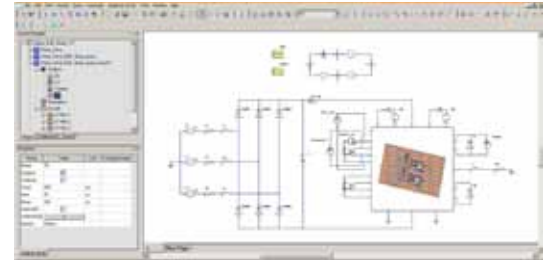
**Realize Your Product Promise™**

The ANSYS logo is displayed in a black rectangular box. The word "ANSYS" is written in a bold, sans-serif font, with "AN" in white and "SYS" in yellow. A registered trademark symbol (®) is located at the top right of the word.

**ANSYS®**

The text "Q3D Extractor" is written in a large, white, sans-serif font on a solid green background. The background of the entire page features a stylized, glowing green and white circuit board design with various traces and components, creating a high-tech, digital atmosphere.

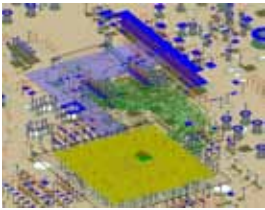
**Q3D Extractor**



Half-bridge converter with frequency-dependent parasitics integration modeled using Q3D Extractor and imported into ANSYS Simplorer

## For high-performance electronics design, ANSYS parasitic extraction tools lead the field.

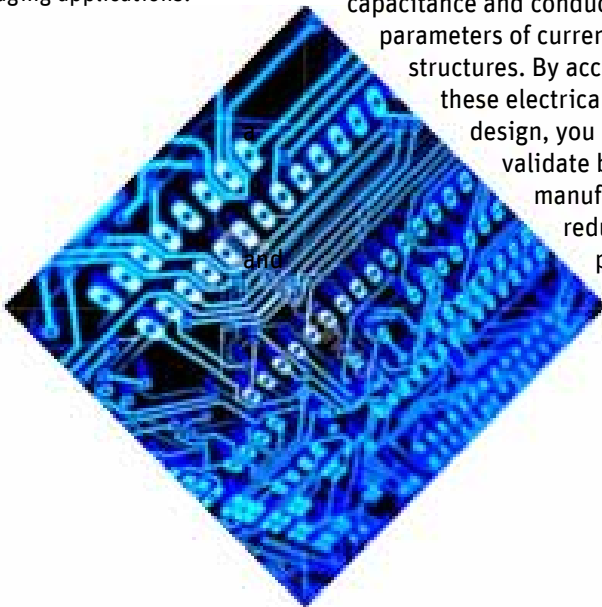
Extract electrical behavior of designs before manufacture to reduce product development time and prototype costs.



Q3D Extractor is ideal for advanced electronic packaging applications.

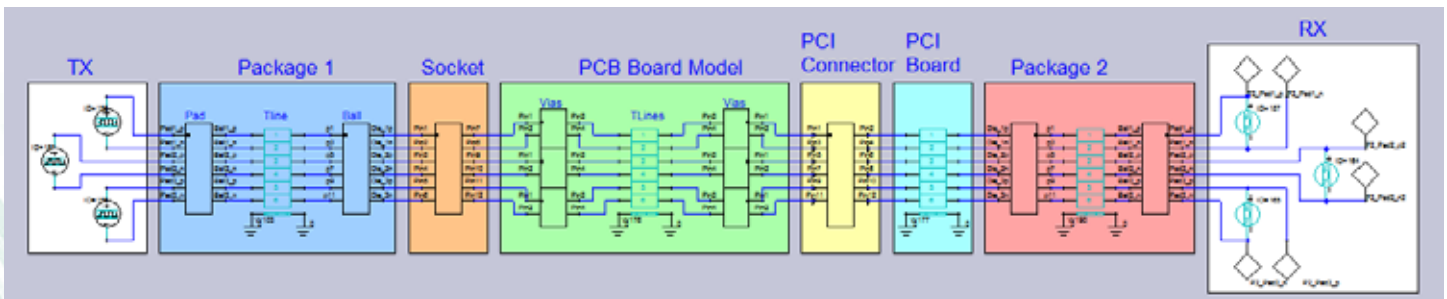
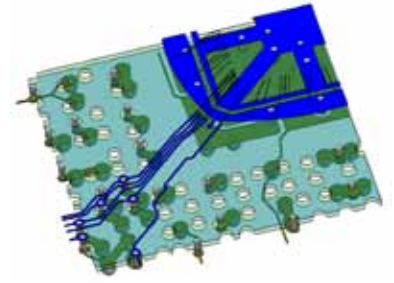
For designing advanced electronics packages and connectors used in high-speed electronic equipment or high-power bus bars and power converter components used in electrical power distribution, power electronics and electric drive systems, engineers around the world turn to ANSYS Q3D Extractor®. A premier 3-D simulation tool, Q3D Extractor calculates parasitic parameters of frequency-dependent resistance, inductance, capacitance and conductance (RLCG)

parameters of current-carrying structures. By accurately extracting these electrical parameters from design, you can simulate and validate behavior before manufacture, thereby reducing design time and prototype costs.



Q3D Extractor efficiently performs 3-D and 2-D electromagnetic field simulation of electronic structures based on mechanical or electrical (layout) CAD data. You then simply assign material properties, sinks and sources to the imported data and perform a simulation of the model. In addition to providing RLCG outputs, the solvers include current and voltage distributions along with CG and RL matrices.

Our software automatically generates a netlist in many formats, including SML (ANSYS Simplorer® format) and SPICE. Q3D Extractor is capable of generating S-parameters that can be exported using the Touchstone® format representing the n-port network parameter data of a device or passive interconnect network. You can include this type of frequency-dependent data in simulations through dynamic links with Ansoft® Designer® and Simplorer products.



Q3D Extractor can perform 3-D RLC extraction and 2-D transmission line analysis using W elements in a PCI Express® 3.0 simulation.

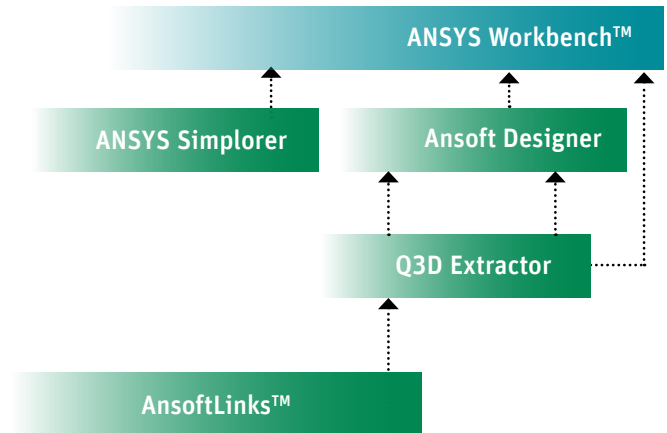
### 3-D Solid Modeling

Q3D Extractor includes a full-featured 3-D solid modeling tool as part of its user interface. Employing this modeler, you can import or create arbitrary 3-D high-frequency electronic structures, such as connectors, vias, wire bonds, solder balls, signal traces, and power and ground planes. In addition, you can apply Q3D Extractor to model low-frequency structures, such as AC drive power busses, DC links and IGBT module packaging structures.

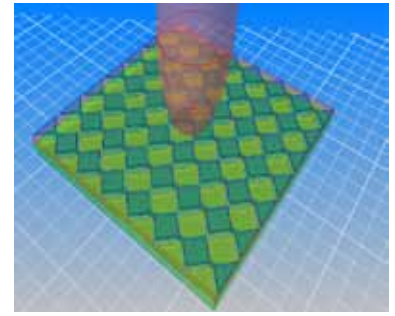
System Design

Physical-Based Model Design

CAD Geometry



Q3D Extractor imports MCAD and ECAD geometry and extracts electrical parasitics from critical components. You can then use the parasitics in ANSYS Simplorer or Ansoft Designer to study their effect on circuit performance.

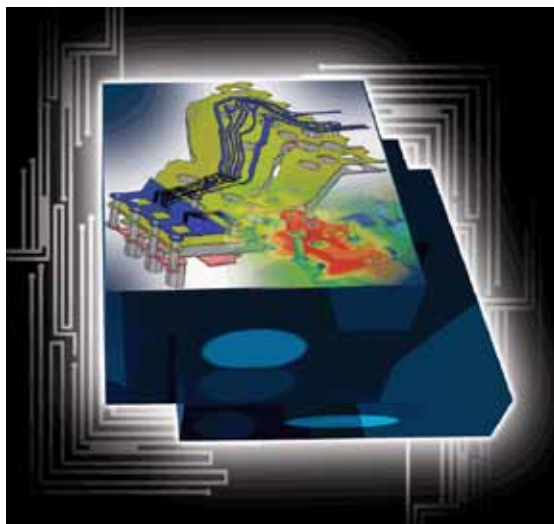


Q3D Extractor solves mutual parasitics that enable a touch-panel screen sensitivity.

## For power- and signal-integrity analysis, Q3D Extractor generates highly accurate reduced-order models for circuit simulation.

### Power- and Signal-Integrity Analysis

With the capability to generate highly accurate reduced-order (RLCG) models for use in a circuit simulation, ANSYS Q3D Extractor is ideal for creating models needed for power- and signal-integrity analysis. You can apply extracted data in studying crosstalk, ground bounce, interconnect delays and ringing, as well as to understand performance of high-speed electronic designs — such as multi-layer printed circuit boards, advanced electronic packages and 3-D on-chip passive components.

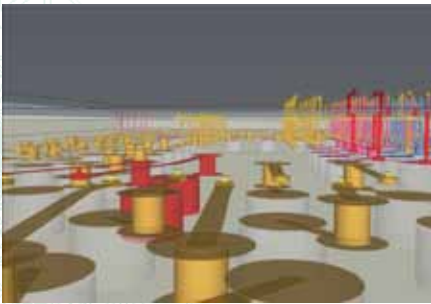


### Power Electronic Design

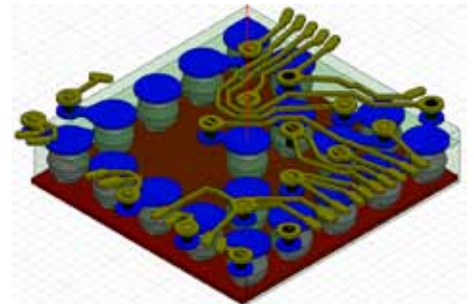
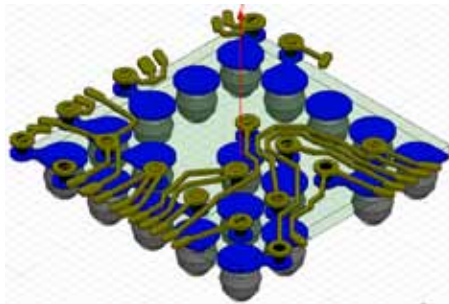
Q3D Extractor makes easy work of designing power electronic equipment used in hybrid-electric vehicles (HEVs) and power distribution applications. You can apply it to optimize inverter architectures and to minimize bus inductances, over-voltages and short-circuit currents. By adding magnetic material support, you can quickly analyze transformers, chokes and other components used in power supplies. Q3D Extractor offers fast insight into the magnetic behavior of individual designs.

### EM Circuit Cosimulation

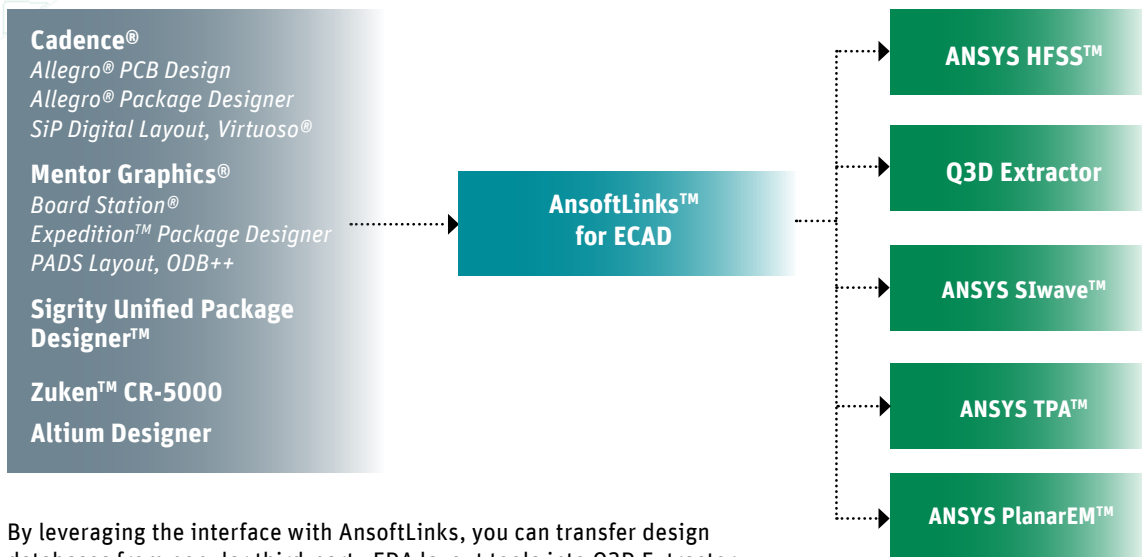
To create an advanced design flow ideal for predicting signal- and power-integrity performance issues, you can link Q3D Extractor with Simplorer or Ansoft Designer. Q3D Extractor investigates the effects that electrical parasitics have on circuit performance, enabling design modification to ensure that you realize your product promise. The included 2-D extractor tool creates highly accurate transmission line models based on a finite element solution.



Courtesy Gem Design Technologies Inc. and Kitakyushu Foundation for the Advancement of Industry, Science and Technology.



Q3D Extractor is ideal for electronic packaging design.

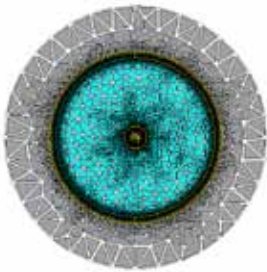


By leveraging the interface with AnsoftLinks, you can transfer design databases from popular third-party EDA layout tools into Q3D Extractor and other ANSYS simulation products.

<i>Capability</i>	Licenses		
	Multiprocessing	Distributed Solve	HPC
Distributed Solve Engines			X
Multiple Cores	X		X
Distributed Frequency Sweeps		X	X
Distributed Design Variations		X	

Q3D Extractor takes advantage of the power of modern computer hardware with multiprocessing, distributed computing and HPC options.

## ANSYS Q3D Extractor is integral to a systems solution that involves circuits and components.



Q3D Extractor and related electromagnetics tools are one part of our suite that delivers state-of-the-art functionality — depth, breadth, a plethora of advanced capabilities and integrated multiphysics — providing confidence that your simulation results reflect real-world outcomes. The comprehensive range of solutions provides access to virtually any field of engineering simulation that a design process requires. Organizations around the world trust ANSYS to help them realize their product promises.

### ANSYS Workbench Integration

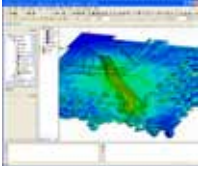
Our parasitic extraction technology is fully integrated into the ANSYS Workbench environment, enabling you to perform thermal calculations using DC power loss data (from Q3D Extractor) as a thermal source (in Workbench). This capability is particularly useful for applications such as DC power connectors and bus bars. Additionally, you can perform statistical yield analysis and design of experiment studies for six sigma analysis with ANSYS DesignXplorer™.

### High-Performance Computing

ANSYS Q3D Extractor leverages available computing power for fast turnaround of detailed parasitic extraction for even the largest designs. The remote simulation manager and distributed solve option support Platform LSF®, Sun™ Grid Engine, PBS Professional™ and Windows® HPC Server 2008 Job Scheduler. The HPC option also provides the ability to perform multiprocessing and to distribute CG, AC RL and DC RL solver processes over processors, cores and machines.

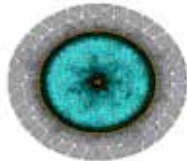
## ANSYS Q3D

### Modeling



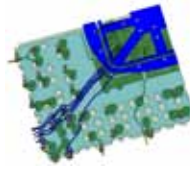
*Q3D Extractor includes a full-featured 3-D ACIS-based, solid modeling tool to create or edit imported geometry.*

### Automatic Adaptive Meshing



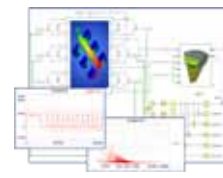
*Meshing algorithms automatically generate appropriate, efficient and accurate mesh for solving using the proven finite element method.*

### Solvers



*Powerful solvers RL (AC and DC), CG and transmission line modeler extract electrical parasitics from structures.*

### Circuit Models



*Q3D Extractor automatically generates RLC circuit models for use in Simplorer, Ansoft Designer and other SPICE-based circuit simulators.*

Pre-Processing

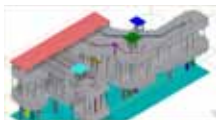
Simulation

Post-Processing

Archive

## Other ANSYS Engineering Simulation Capabilities

### ECAD, MCAD



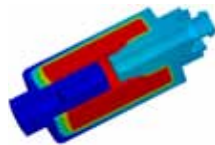
ANSYS DesignModeler™ and ANSYS SpaceClaim DirectModeler provide modeling and geometry creation functions for electronics analysis. The entire ANSYS suite is CAD-independent, enabling data import from various sources. In addition, we collaborate with leading CAD developers to ensure an efficient workflow.

### Integration



ANSYS Workbench is the framework for the industry's broadest and deepest suite of advanced engineering simulation technology. It delivers unprecedented productivity, enabling Simulation-Driven Product Development™.

### Multiphysics



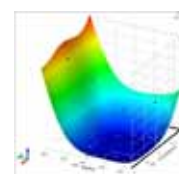
To help ensure a successful product, R&D teams must accurately predict how complex products will behave in a real-world environment. The ANSYS suite captures the interaction of multiple physics: structural, fluid dynamics, electromechanics, and systems interactions. A single, unified platform harnesses the core physics and enables their interoperability.

### HPC



High-performance computing enables creation of large, high-fidelity models that yield accurate and detailed insight. ANSYS offers scalable solutions and partners with hardware vendors to ensure that you get the power and speed you need.

### Design Optimization



Good design starts with identifying the relationship between performance and design variables. ANSYS DesignXplorer™ enables engineers to perform design of experiments (DOE) analyses, investigate response surfaces, and analyze input constraints in pursuit of optimal design candidates.

### Data Management



ANSYS EKM™ addresses critical issues associated with simulation data, including backup and archival, traceability and audit trail, process automation and capture of engineering expertise, and IP protection.

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ANSYS is dedicated exclusively to developing engineering simulation software that fosters rapid and innovative product design. Our technology enables you to predict with confidence that your product will thrive in the real world. For more than 40 years, customers in the most demanding markets have trusted our solutions to help ensure the integrity of their products and drive business success through innovation.

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