

# Electrical Package Characterization

## Electrical Co-Design And Modeling

Amkor's electrical team is experienced in the latest simulation tools and packaging technologies. This allows our world-class staff to reduce design cycle times and provide expert advice and service to customers.

Amkor plays a leading role in supporting the development of next generation packages and electronic technology for existing and emerging products. Our unparalleled design expertise provides the following "best-in-class" electrical services.

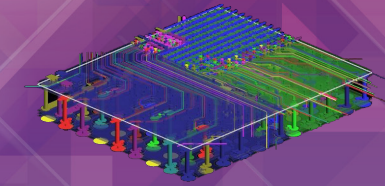
- ▶ Highly trained and experienced staff members
- ▶ High quality, reliable and accurate designs
- ▶ Design for Performance (DFP), Design for Cost (DFC) and Design for Manufacturing (DFM)
- ▶ Excellent customer design collaboration to meet electrical, thermal and mechanical requirements

## Going Beyond The Basics

With rapidly increasing data transfer rates, the need to optimize package layout and electrical performance is more crucial than ever. Delivering an optimum package design requires more than a robust layout and post-layout electrical simulation; it requires close interaction with customers and substantial engineering support during the entire layout phase.

Amkor's electrical engineering team works closely with customers and package designers to make sure the package layout meets the required signal integrity (SI) and power integrity (PI) performance specifications. Our electrical analysis tools are tightly integrated with package layout tools and the assistance of our design automation team. As a result, electrical constraints can be passed to the design team during the design process, minimizing electrical design rule violations. This allows for quicker design turnaround times while delivering a reliable and cost effective solution.

Comprehensive design optimization is possible by using electrical, thermal and mechanical characterization. Amkor's experts can help identify and optimize cost-effective solutions that satisfy our customers' operating conditions and reliability expectations. Using this co-design methodology, signal and power integrity issues can be predicted in a timely manner and fixed well before prototypes are built.



## PACKAGE LAYOUT, ELECTRICAL MODELING & SIMULATION TOOLS

- ▶ Cadence Allegro Package Designer and SIP Layout
- ▶ Cadence/Sigrity Tool Suite - PowerSI, BBSpice, SPEED2000, PowerDC, XtractIM, 3D-EM, T2B, System SI
- ▶ Mentor Xpedition Enterprise
- ▶ AutoCAD
- ▶ ANSYS Q3D Extractor
- ▶ ANSYS HFSS
- ▶ ANSYS SIwave
- ▶ Keysight ADS
- ▶ Keysight Momentum
- ▶ Synopsys HSPICE

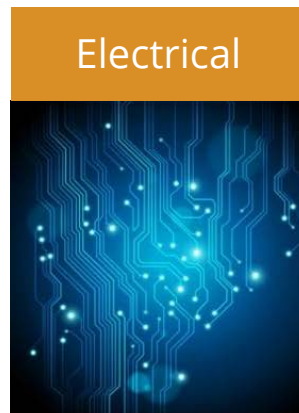
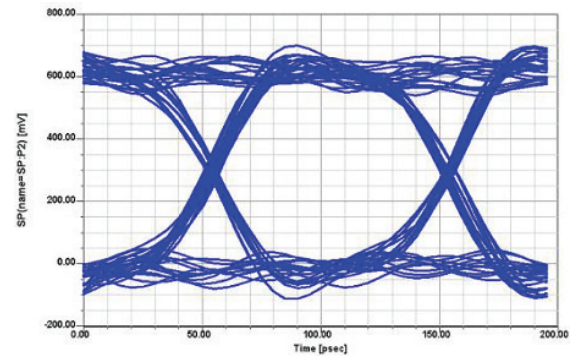
# Electrical Package Characterization

## Signal And Power Integrity

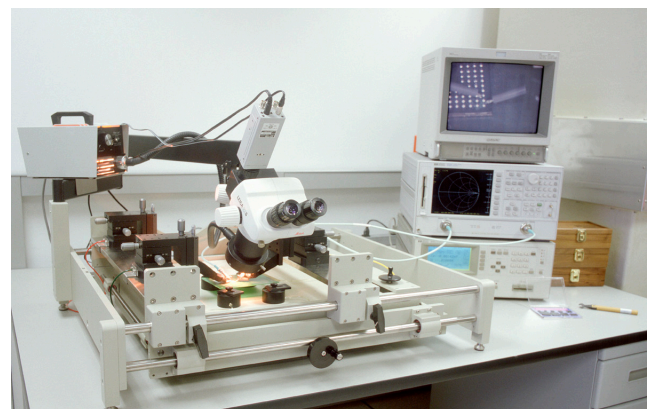
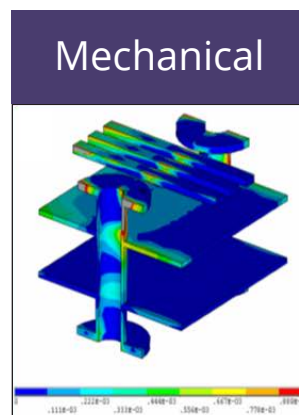
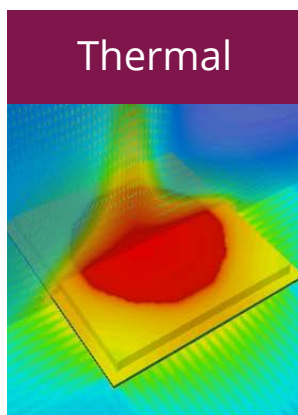
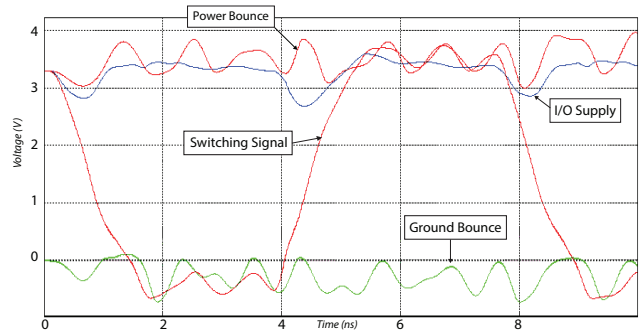
With ever shrinking silicon nodes, faster I/O buffers and decreasing operating margins, signal and power integrity is a critical element of package design. Voltage fluctuations in the power distribution network due to IR drop, Ldi/dt noise or LC resonance seriously impact package performance.

Using highly integrated signal and power integrity analysis capabilities, packages are characterized with multiple simulations by exercising various bus/signal channels with their respective driver/receiver and associated power/ground domains. Amkor uses highly accurate, industry-standard 2D, 3D, quasi-static and full-wave field solvers.

## Eye Diagram



## Simultaneous Switching Noise



Visit [amkor.com](http://amkor.com) or email [sales@amkor.com](mailto:sales@amkor.com) for more information.



With respect to the information in this document, Amkor makes no guarantee or warranty of its accuracy or that the use of such information will not infringe upon the intellectual rights of third parties. Amkor shall not be responsible for any loss or damage of whatever nature resulting from the use of, or reliance upon it and no patent or other license is implied hereby. This document does not in any way extend or modify Amkor's warranty on any product beyond that set forth in its standard terms and conditions of sale. Amkor reserves the right to make changes in its product and specifications at any time and without notice. The Amkor name and logo are registered trademarks of Amkor Technology, Inc. All other trademarks mentioned are property of their respective companies. © 2019 Amkor Technology, Incorporated. All Rights Reserved. SS031-EN Rev Date: 03/19