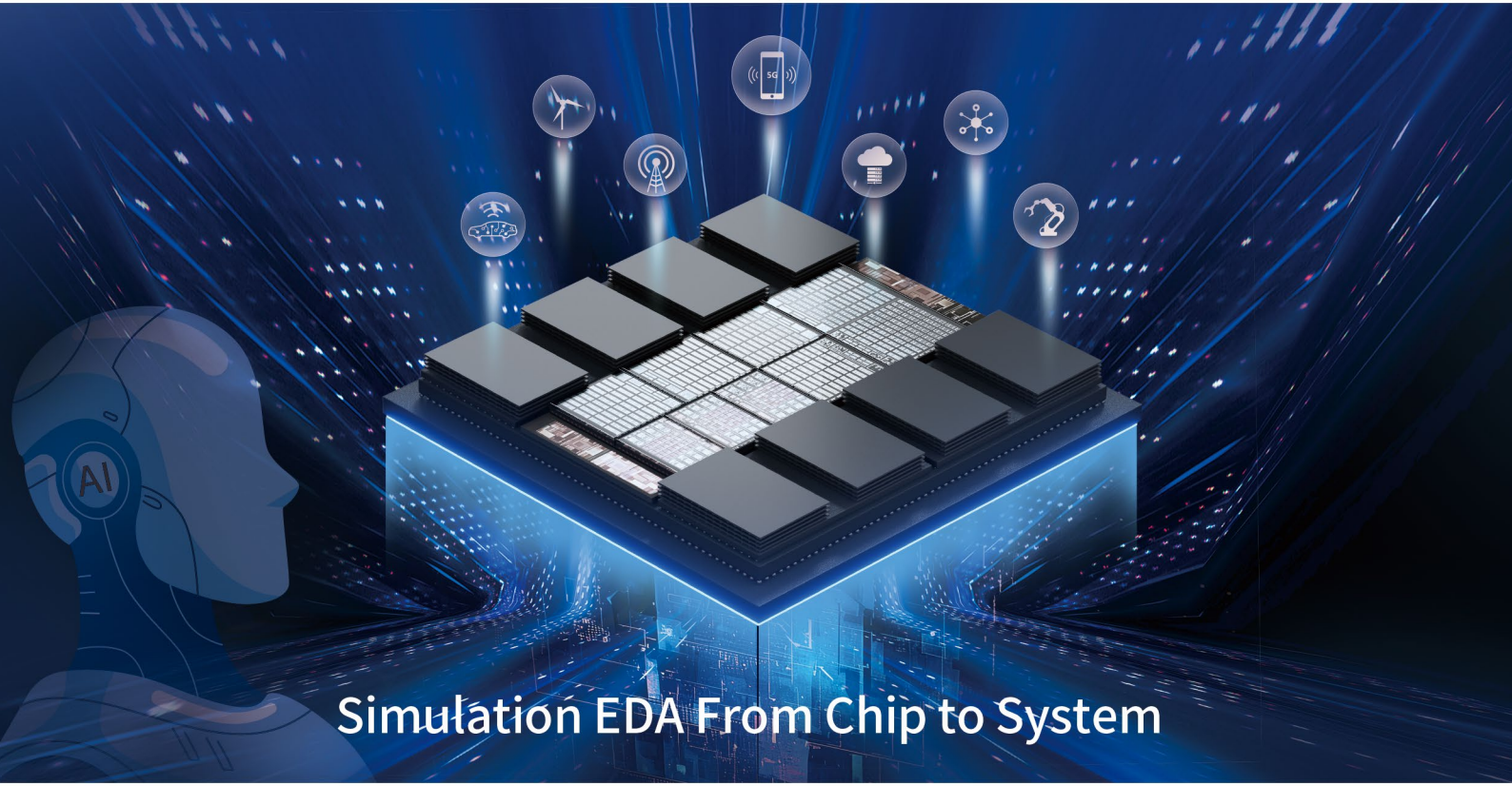
XPEEDIC

ACCELERATE YOUR IC DESIGN



Simulation EDA From Chip to System

CHIP

CHIPLET

PACKAGE

SYSTEM

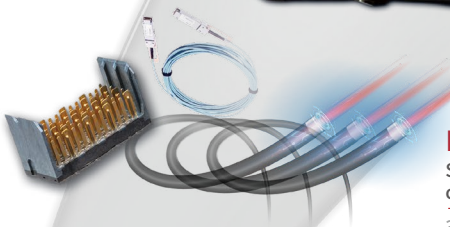
Xpeedic EDA Overview

Simulation EDA from Chip to System

System

Infrastructure/terminals, Data centers, Automotives

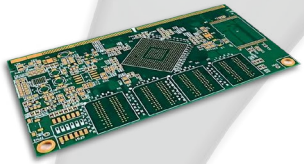
Multi-physics simulation including EM/Thermal/
Stress analysis, System-level verification



Interconnection

System(Infrastructure/terminals, Data centers, Automotives), Connectors/ cables/fibers and other arbitrary interconnection structures

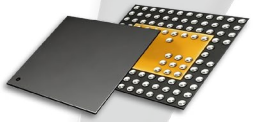
3D full-wave EM simulation, Electrical performance post simulation



PCB

PCB System (Infrastructure/terminals, High-performance computing and Storage, Network switching and routing)

Signal/Power Integrity, Multi-physics simulation including EM/Thermal/Stress analysis, System-level verification



Module

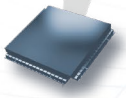
RF devices/modules, Power devices, Optical modules, antennas, Decoupling capacitors design

Signal/Power Integrity, Multi-physics simulation including EM/Thermal/Stress analysis, System-level verification

Package

Conventional/Advanced packaging (SiP, 2.5D/3D, Chiplet heterogeneous integration) design

Signal/Power Integrity design, Multi-physics simulation including EM/Thermal/Stress analysis

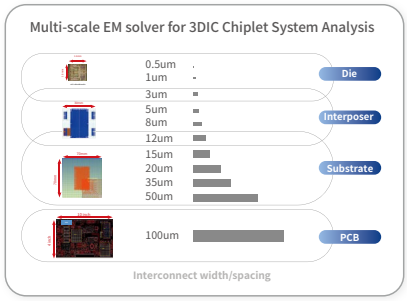


Chip

Analog/RF Chip Design on Silicon/ Compound Semiconductor Processes

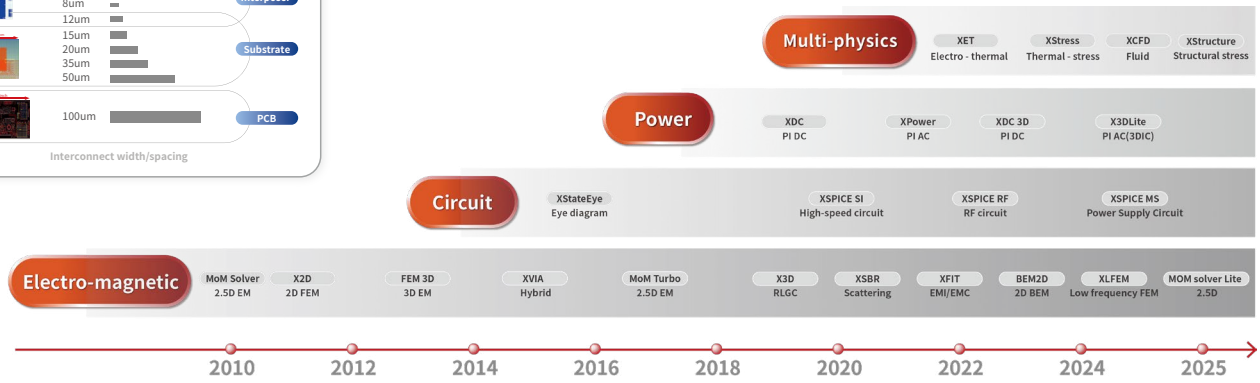
Passive PDK generation, EM simulation, Spice circuit simulation, and Circuit-EM co-simulation

Xpeedic EDA Core Technologies



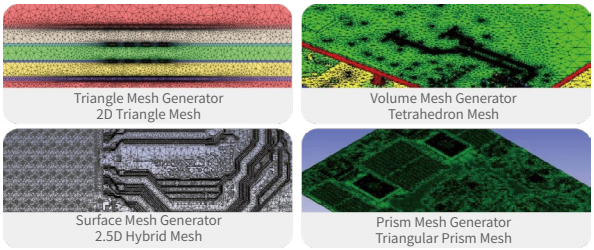
1 Industry Leading Solver Technology

Multi physics solver technology from circuit, electromagnetic, thermal to stress simulation

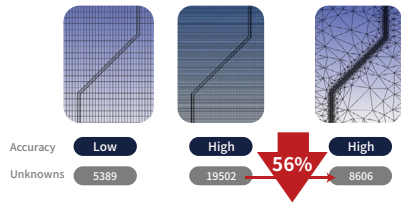


2 AI-based Mesh Technology

Multiple Adaptive Mesh Technology For Different Application Scenarios



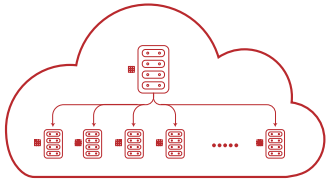
Convergent Results With Minimum Number Of Mesh Elements

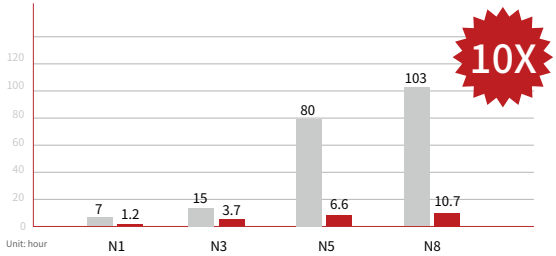


Auto Mesh Tunneling Technique

3 High Performance Distributed Parallel Computing Technology

Matrix-level Distributed Parallel Computing By MPI



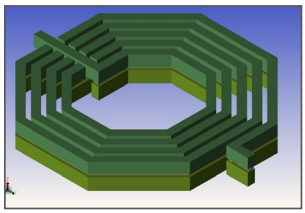


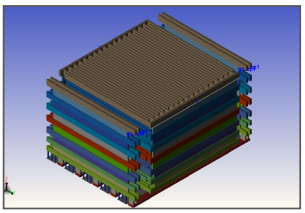
Success Cases: Use Metis for Advanced Packaging Simulation
Result: Metis delivers 10X simulation speed comparing to the other tools

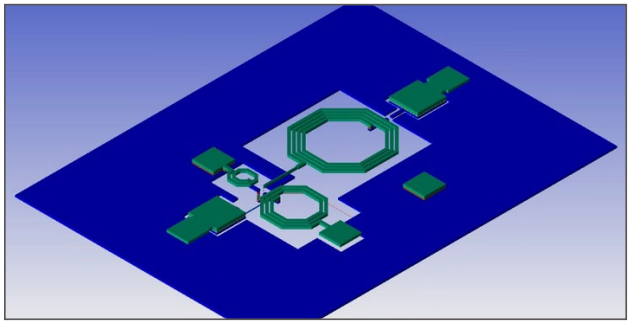
On-Chip Modeling for Advanced Process

Accurate and fast EM simulation to enable RF and analog IC designs

*IRIS: State-of-the-art 3D planar EM simulator
*iModeler: Fast passive component modeling and synthesis







Analog/RF IC Design Process

iModeler
iModeler
Passive modeling and synthesis

IRIS
IRIS
Passive extraction

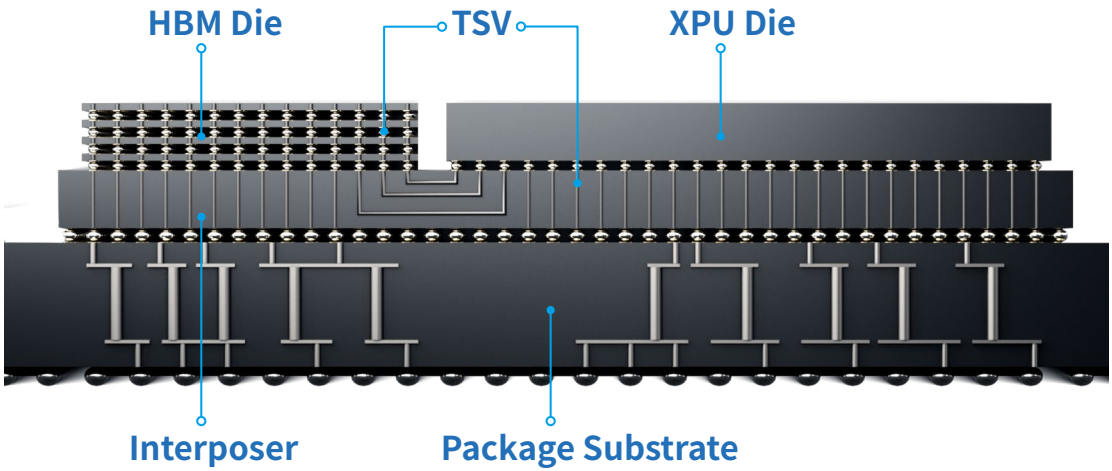
System Design
Schematic Design
Circuit Simulation
Layout
Verification
Tapeout

IRIS has been adopted by fabless on mainstream foundry nodes

Bulk	FinFET	FD-SOI	RF-SOI	SiGe BiCMOS	GaAs	IPD
tsmc 40nm 28nm 22nm	GlobalFoundries 12LP	GlobalFoundries 22FDX	GlobalFoundries 8SW	GlobalFoundries 8HP 9HP	win SEMICONDUCTORS	SMIC tsmc ST ON Semiconductor
UMC 28nm 40nm 22nm	SAMSUNG 14LPP 8LPP	SAMSUNG 28FDS	TPSCo TPS90	TOWERJAZZ SBC18	A	HR Silicon
SMIC 55nm 40nm 28nm			HHGrace	ST B55		TGV

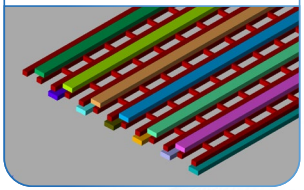
2.5D/3DIC Chiplet Advanced Packaging

Large-capacity EM solver to enable multi-die 2.5D/3D IC Chiplet SI/PI analysis



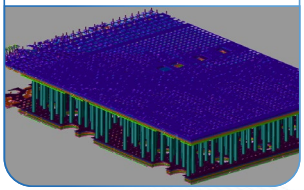
Signal Integrity

- Support S-parameter extraction for signal and parasitic effect analysis
- Multi-scale co-simulation accross chiplet-interposer-package



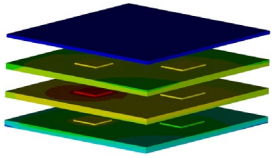
Power Integrity

- Power delivery network DC IR-drop analysis
- Power delivery network AC impedance analysis



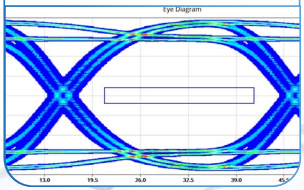
Multi-physics Simulation

- EMI Analysis and Electromagnetic Coupling Effects Evaluation
- Electro-thermal and stress reliability analysis
- Multi-scale co-simulation across chiplet-interposer-package



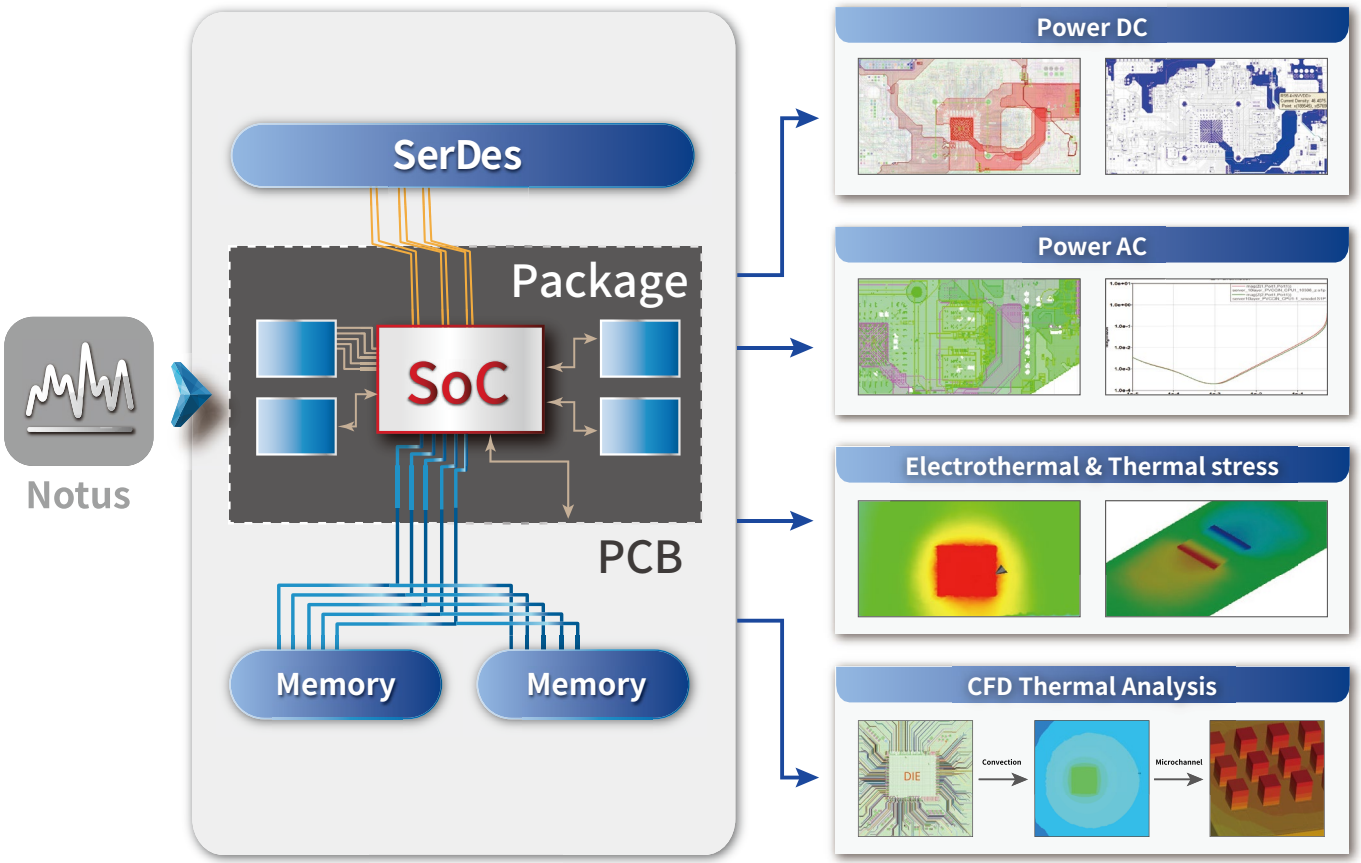
System Verification

- High speed signal analysis and checking
- Post processing of simulated and measured data



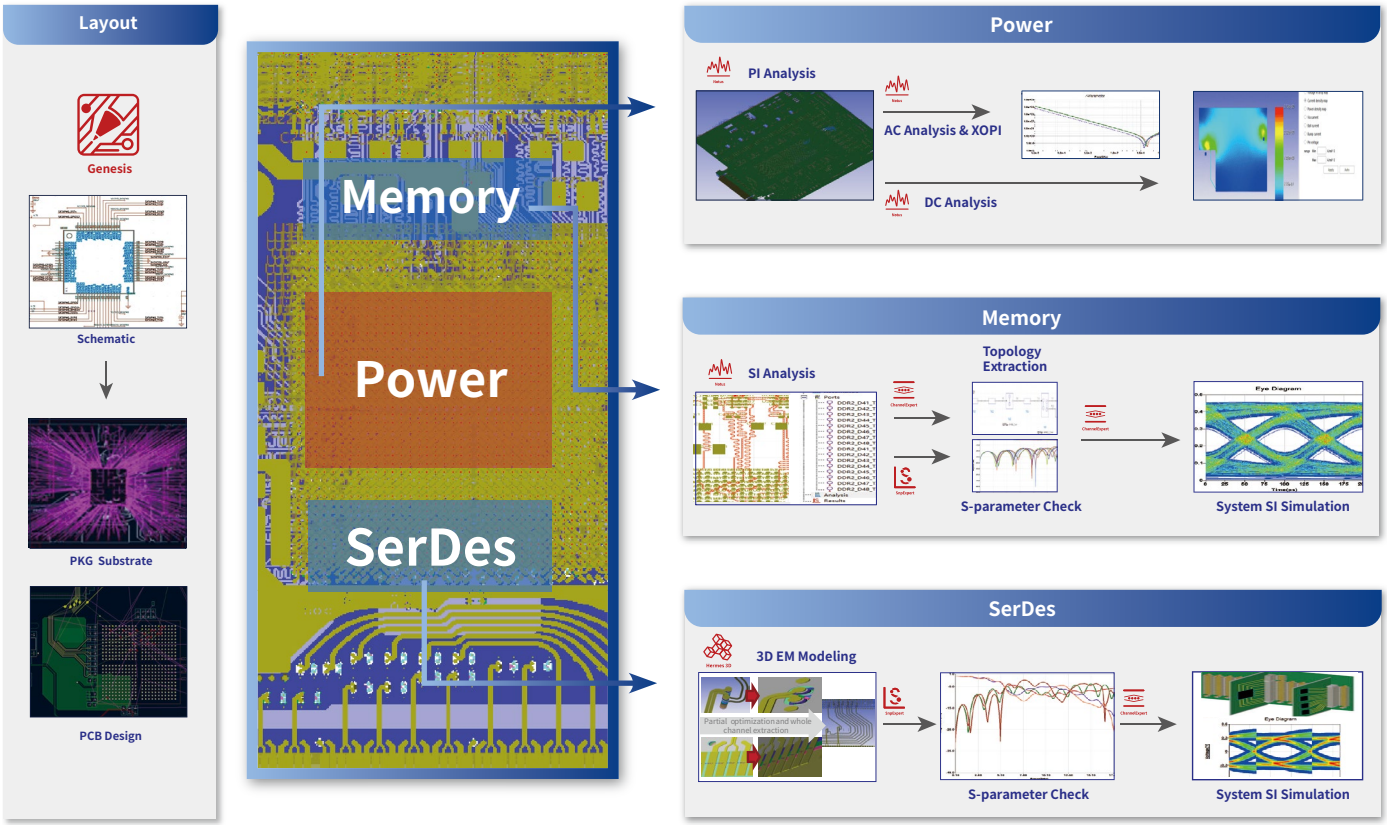
Multi-physics Simulation Platform

Power integrity, Electrothermal, and Thermal stress multi-physics analysis



High Speed Digital SI/PI Analysis

A comprehensive platform supporting high-speed serial/parallel interfaces



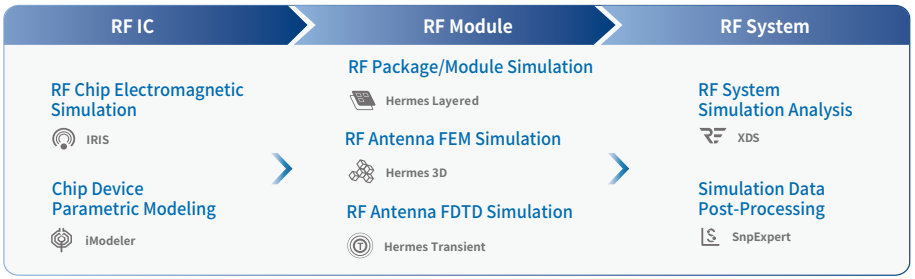
Power Integrity | Signal Integrity

RF Solution

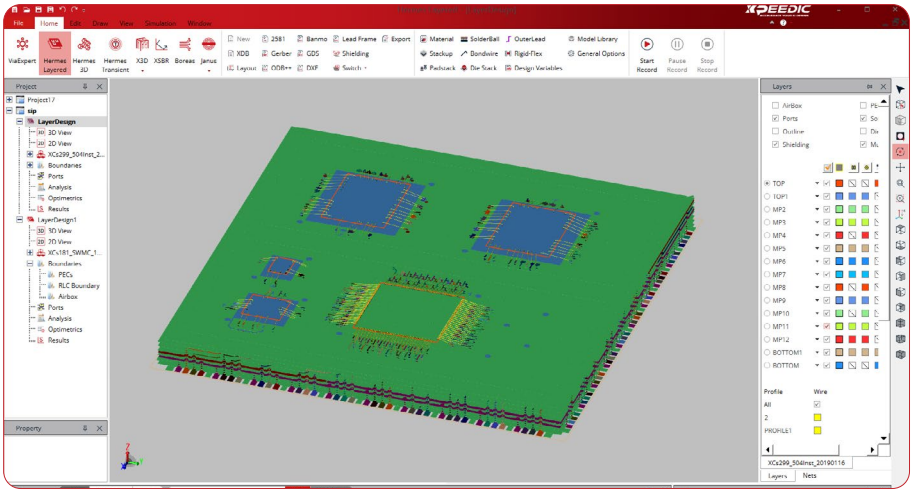
RF EDA solution from "chip, module to system", enabling RF system-level co-optimization

Key Features	Applications
IRIS • Seamless integrated with Virtuoso EM Simulation Flow for Integrated Passive Devices iModeler • Passive device parametric templates and AI-powered high-accuracy modeling	Chip-Level RF IC Design
XDS • RF module and system cross-scale field-circuit co-simulation with vendor model library integration Hermes Layered • Fast mmWave module modeling and adaptive mesh simulation	Module-Level RF Module/ System Design
Hermes 3D • Full-scale antenna modeling DC-to-THz • High-precision antenna near-iel and far-field simulation analysis SnpExpert • RF S-parameter visualization and electrical metrics • Report generation and de-embedding /calibration	System-Level Antenna Design & Post-Processing Simulation

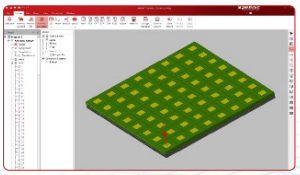
Overview



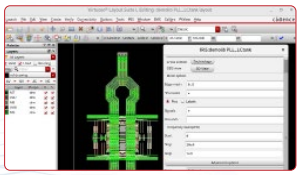
Design Scenarios



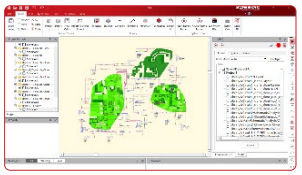
RF package EM simulation analysis



RF package layerd 8x8 array antenna simulation analysis



RF IC passive interconnect network parasitic extraction

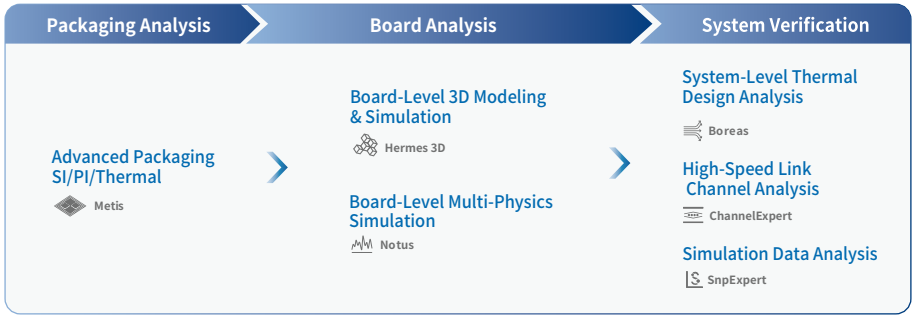


RF terminal system field-circuit modeling and co-simulation

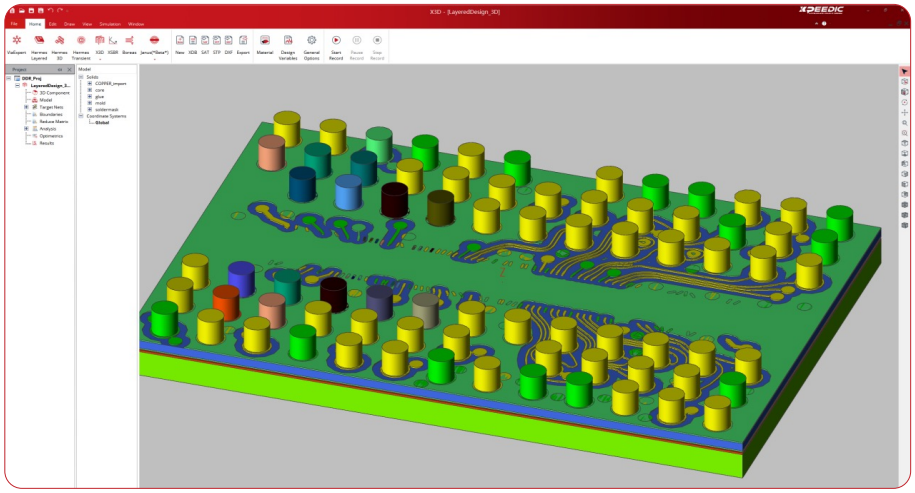
Memory Solution

Memory EDA solution across chip–package–module–board–system

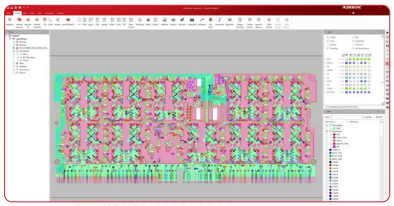
▶ Overview



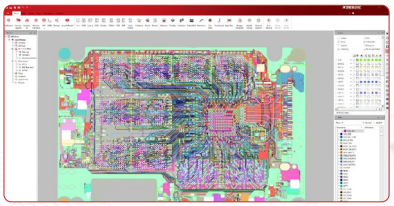
▶ Design Scenarios



DDR package modeling and simulation



DIMM SI/PI modeling and simulation



SSD board-level SI/PI modeling and simulation

Applications	Key Features
Package-Level Advanced Packaging and Module Design	Metis • Advanced packaging electro-thermal coupling analysis
	Hermes 3D • Full-wave EM analysis for complex 3D package structures like multi-die stacking
PCB System-Level Mainboard and Expansion Board Design	Notus • Signal–power–thermal -stress simulation for memory packages/PCBs
Memory Interconnect Structures Connector and Cable Design Optimization	Hermes 3D • Modeling and analysis for various structural components like high-speed connectors
	CableExpert • Modeling and analysis of high-speed memory extension cables • Parametric design and frequency-domain modeling optimization
Full Memory Link Bus and Channel Simulation Verification	ChannelExpert • Eye diagram, jitter and BER analysis for DDR/HBM/PCIe channels • JEDEC-compliant protocol model verification

Power Device Solution

Power Device EDA Solution across chip-module-system for electrical performance, thermal management and reliability challenges

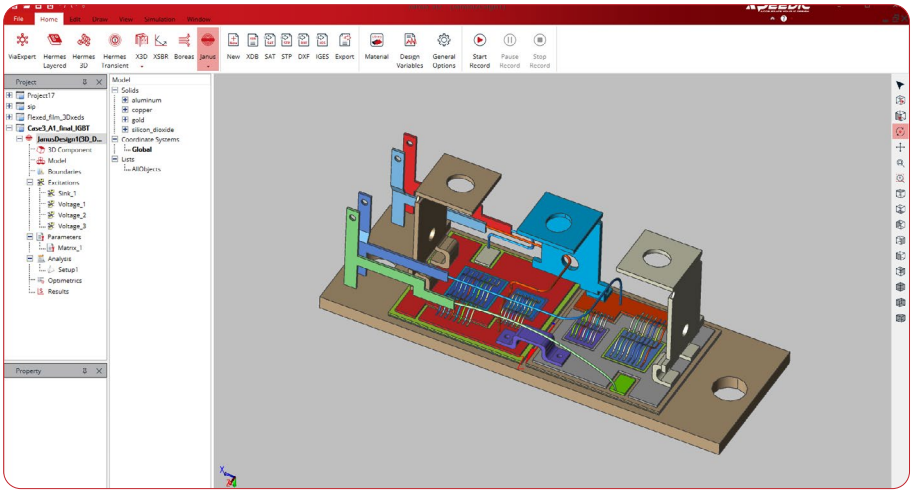
Overview

Power Device EDA Solution

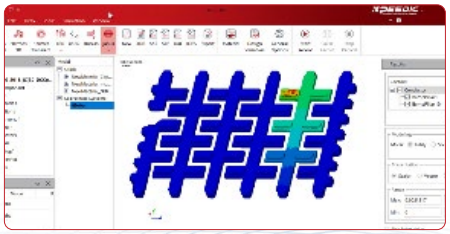
- Module DC Power Analysis — Janus
- Package Module Parasitic Parameter Extraction — X3D
- Power Device EDA
- Electro-Thermal-Stress Coupling Simulation — Notus
- System-Level CFD Analysis — Boreas

Key Features	Applications
Janus · DC and IR-drop analysis for power chip modules X3D ·Accurate R/L/C parasitic modeling for power devices and package interconnect structures	Package-Level Power Chip-Level Device Module Design, DC Power Analysis & Parameter Extraction
Notus ·Multi-physics simulation platform for packages and power modules ·Electro-thermal-stress coupling analysis	Package-Level Module Multi-Physics Simulation
Boreas · Board and rack-level thermal distribution simulation for multiple cooling solutions · CFD thermal analysis for data centers and EV systems	System-Level Volume Thermal Analysis

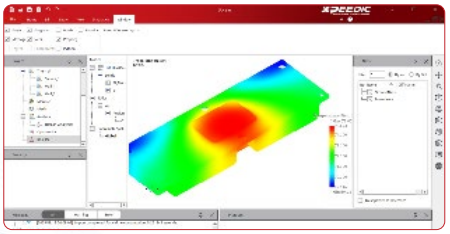
Design Scenarios



IGBT module DC analysis



PDN Power Loss Analysis

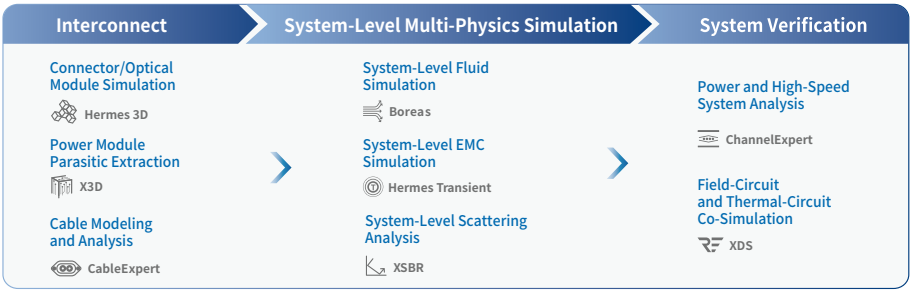


Server thermal module simulation

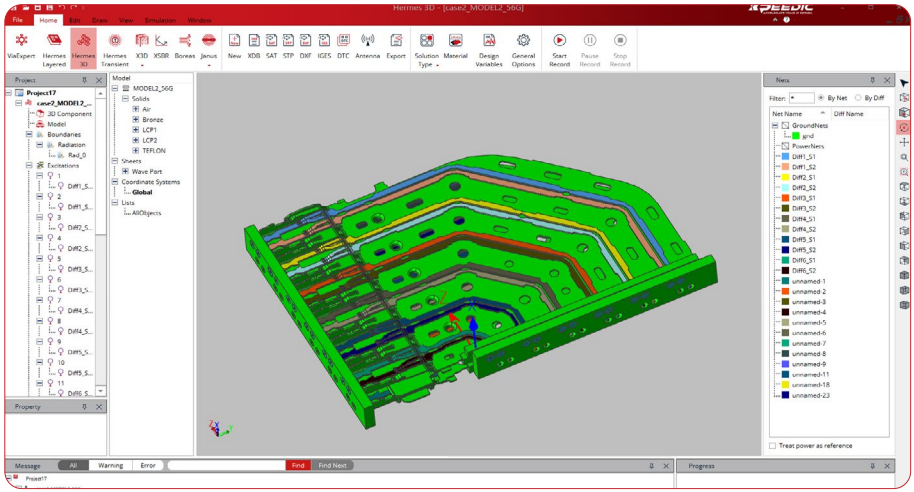
Data Center Solution

Multi-physics co-simulation from Package, Board to System for data center challenges in high-speed interconnect, power delivery, and thermal management

▶ Overview

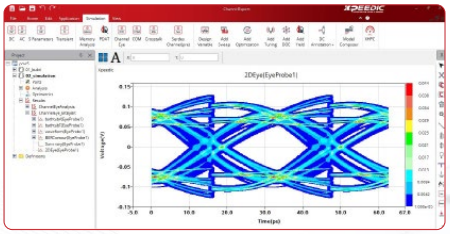


▶ Design Scenarios



High-speed connector modeling

High-speed cable modeling



PCIe 5.0 channel eye-diagram simulation

Applications	Key Features
PCB-Level Multi-Physics Analysis	Notus ・Power stability evaluation and decoupling capacitor optimization ・Temperature monitor and thermal management ・High-speed circuit topology extraction and eye diagram analysis
System-Level 3D EM Simulation	Hermes 3D ・Full-structure 3D modeling, supporting simulation from DC to THz frequencies
System-Level Parasitic Parameter Extraction	X3D ・RLGC extraction for electronic system conductor structures from low to medium-high frequencies
System-Level Next-Generation Digital System SI Analysis	ChannelExpert ・High-speed channel frequency-domain S-parameter and time-domain eye diagram analysis (ChannelExpert) ・Accurate multi-model simulation and AMI modeling
System-Level Next-Generation Cable Interconnect Architecture	CableExpert ・Complex cable structures fast construction and custom topology design
System-Level Electronic System Thermal Analysis	Boreas ・Full-system CFD thermal analysis

Smart Terminal

Solution

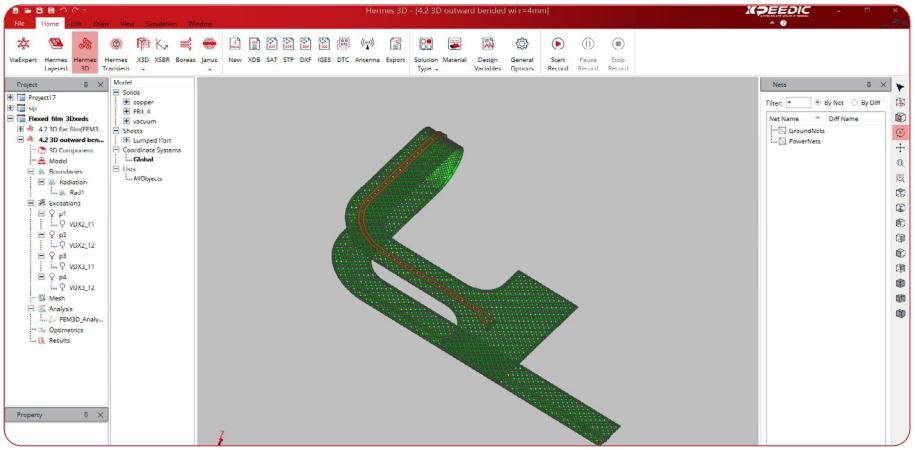
One-stop smart terminal solution, enabling simulation from chip, package, PCB to system verification

Overview

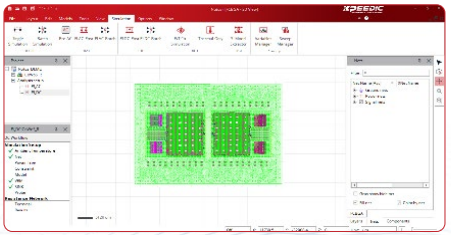
Key Features	Applications
IRIS • Full-wave EM analysis for SoC on-chip analog circuits and 5G RF circuits	Chip-Level Analog/RF Chip Design
Metis • Chiplet interposer SI, PI, and thermal stress analysis	Package-Level 2.5D/3D Advanced Packaging Interposer, Package Substrate, PCB Design
Hermes • Low-voltage, high-current power integrity and thermal stress analysis • Product reliability optimization under harsh environments Notus • High-speed channel & antenna radiation analysis • Multi-physics coupling simulation	PCB Board-Level Package Substrate, PCB Multi-Physics Simulation Analysis
ChannelExpert • High-speed channel system-level verification • Reduce high-speed signal transmission distortion	System-Level Verification

On-chip Simulation	Package/PCB Board-Level Design and Simulation	System Verification
On-chip Passive EM Simulation IRIS	3D Full-wave EM Simulation Hermes 3D Multi-Physics Simulation Notus	System-Level EMC Analysis Hermes Transient High-Speed Link Channel Analysis ChannelExpert

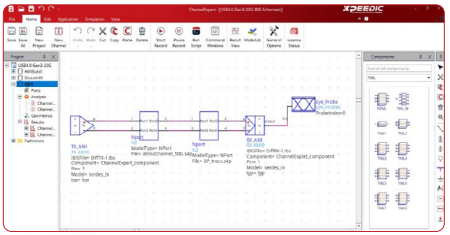
Design Scenarios



Smart terminal flexible PCB simulation



High-performance AI-chip PI simulation



USB4.0 high-speed system verification

Product Family

To enable next generation intelligent electronic system

Modeling

TmlExpert
Transmission Line Modeling

ViaExpert
High-speed Via Modeling

CableExpert
Cable Harness Modeling

iModeler
Passive PDK Modeling

Design

Genesis XSCH
Genesis Schematic Design

Genesis XPKG
Genesis Package Design

Genesis XPCB
Genesis PCB Design

Genesis XLIB
Genesis Component Library Design

Multiphysics Simulation

IRIS
Fast On-chip EM Simulation

Metis
3DIC Multiphysics Simulation

Notus
Package & PCB Multiphysics Simulation

Hermes Layered
Package & PCB High Frequency Simulation

Hermes 3D
3D High Frequency Simulation

Hermes Transient
System-Level EMC Simulation

X3D
RLGC Parastic Extraction

XSBR
System-Level Scattering Analysis

Boreas
System-Level CFD Simulation

Janus
3D Low Frequency Simulation

System Verification

ChannelExpert
High-speed System Analysis

XDS
RF System Design

Automated Measurement

SnpExpert
S-parameter Exploration

MeasureExpert
Automated Measurement and Analysis

Cloud-based Management

XPLM
Electronics Design Lifetime Management

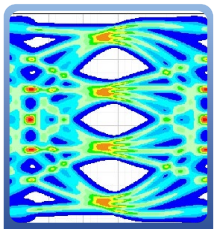
LicenseManager
License Management

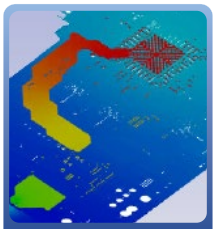
JobQueue
HPC Management

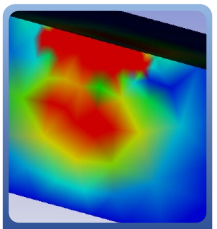
LibManager
Library Management

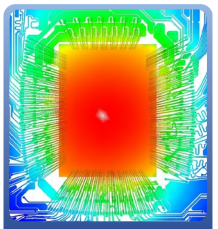
More Applications

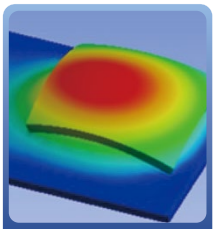
12 applications to accelerate electronic system design

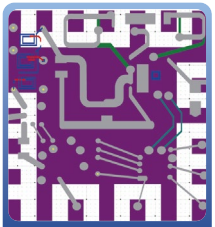

Signal Integrity

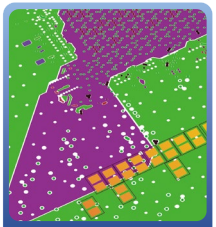

Power Integrity

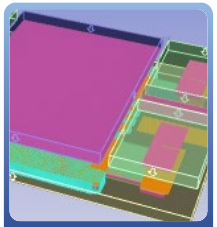

Electromagnetic Compatibility

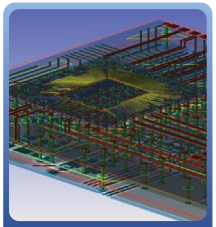

Electro-Thermal Analysis


Stress and Reliability


Radio Frequency System


Package Substrate


3DIC Chiplet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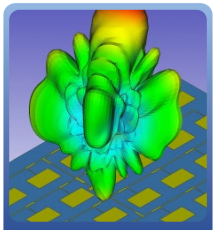
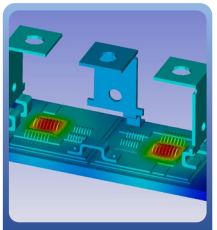
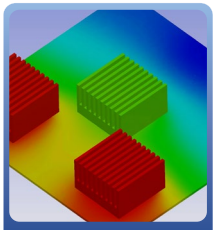

Planar Antenna


Power Semiconductor Device


CFD Thermal Analysis

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