Synopsys PrimeSim Reliability Analysis Solution Accelerates Design of Hyper-Convergent ICs for Mission-Critical Applications

Foundry-Certified, Full-Lifecycle Reliability Signoff Prevents Over-Design and Costly Late-Stage ECOs for Automotive, Aerospace and Defense, Medical and 5G Designs

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Highlights for this Announcement:

- Unified workflow of proven technologies provides high-performance reliability analysis across the product lifecycle compliant with standards such as ISO 26262
- Integration with PrimeSim™ Continuum solution enables seamless use of industry-leading simulators for electromigration/IR drop analysis, MOS aging, high-sigma Monte Carlo, analog fault and other reliability analyses
- Integration with PrimeWave™ design environment provides a consistent reliability verification workflow enabling weakness analysis, results visualization and what-if exploration

To accelerate time-to-reliability compliance of hyper-convergent designs targeting mission-critical applications, Synopsys, Inc. (Nasdaq: SNPS) today shared that several leading semiconductor companies have adopted its new PrimeSim™ Reliability Analysis solution that unifies production-proven, foundry-certified reliability analysis technologies for analog, mixed-signal and full-custom designs. Integration with PrimeSim Continuum solution provides a rich set of industry-leading simulation and analysis technologies to accelerate reliability analysis across the product lifecycle. With the exhaustive reliability assessment for early life, normal life and end-of-life failures, design engineers can minimize costly late-stage engineering change orders (ECOs) and defect escapes, and improve safety, reliability and overall design performance with better silicon correlation for next-generation, domain-specific architectures targeting complex automotive, aerospace and defense, medical and 5G applications.

"A more holistic approach is needed to address the challenges with today's hyper-converged and mission-critical IC designs, including comprehensive electrical and manufacturing reliability and thermal assessments," said Raja Tabet, senior vice president of the Custom Design and Manufacturing Group at Synopsys. "PrimeSim Reliability Analysis solution represents a pioneering approach to safety and reliability analysis, reimagining design for high reliability. Part of the PrimeSim Continuum family of solutions, PrimeSim Reliability Analysis solution accelerates full-lifecycle reliability signoff, enabling faster time-to-results and higher designer productivity."

Holistic, Cohesive and High-Performance Reliability Verification
The need for safety and reliability has become paramount for critical IC applications across areas such as automotive, aerospace and medical, which require low defect rates that are often measured in defective parts per billion (DPPB), higher functional safety including compliance with industry standards such as ISO 26262 and higher long-term reliability under stringent operating conditions. IC hyper-convergence adds another layer of analysis complexity due to multi-function/multi-technology design integrations on the same SoC or system-in-package (SIP).

Synopsys' PrimeSim Reliability Analysis solution features fast conventional and machine learning- (ML-) driven technologies that deliver significant speedup for high-sigma leaf cell characterization, static circuit checks, power/signal network integrity resistance, EM and IR signoff analysis, MOS aging analysis and safety and test coverage analysis using analog fault simulation. Certified by TSMC and qualified by Samsung Foundry, Intel and GlobalFoundries (GF), PrimeSim Reliability Analysis technologies deliver high performance while maintaining high quality-of-results.

By providing cohesive reliability verification across early, normal and end-of-life scenarios, PrimeSim Reliability Analysis solution addresses the industry's need to produce safe and trusted hyper-converged designs. It is complemented by the Synopsys Silicon Lifecycle Management Platform solutions, which provide comprehensive post-silicon reliability monitoring, analysis and mitigation.

PrimeSim Reliability Analysis technologies are part of the ISO 26262 TCL1-certified Synopsys Custom Design Platform and can be reliably used to verify functional safety for ASIL D applications. Integration with PrimeWave™ design environment, also part of the PrimeSim Continuum solution, provides a seamless reliability verification experience, enabling unified simulation management, weakness analysis, results visualization and what-if exploration. All these technologies are cloud-ready with optimization for leading public cloud platforms and containerized environments.

Customers' Perspectives

Dialog Semiconductor, a Renesas Company
"The Analog Circuit Check technology of PrimeSim Reliability Analysis solution accelerated the reliability signoff on our analog IPs by enabling detection of critical design issues early in the design cycle," said Vivek Bhan, senior vice president, Custom Mixed Signal Business Group at Renesas. "We value the agile support offered by Synopsys, particularly in the development of custom circuit checks, and look forward to future collaborations."

TDK-Micronas GmbH
"Automotive ICs govern the operation of a plethora of mission-critical functions such as advanced driver assistance systems (ADAS), braking and steering and, therefore, require systematic FMEDA [failure modes, effects and diagnostic analysis] analysis to ensure high levels of functional safety," said Dr. Mario Anton, vice president of R&D. "The analog fault simulation technology of PrimeSim Reliability Analysis solution offers high-performance, customizable fault models and an open fault database, enabling our designers to easily calculate IP-level FMEDA metrics and verify ISO 26262 compliance on our automotive ICs."

STMicroelectronics
"High reliability and long operating lifetimes are critical requirements for ICs, especially in automotive and space applications," said Shamsi Azmi, senior director. "The electromigration analysis technology in PrimeSim Reliability Analysis solution is easy to use, delivers improved performance and has been extensively used to analyze our analog IPs. We worked closely with Synopsys to develop a sophisticated variation-aware aging flow using the MOS aging technology in PrimeSim Reliability Analysis solution and PrimeSim XA's Monte Carlo analysis technology to model the impact of device variation in aging analysis, improving the long-term reliability of our memory and analog/mixed-signal IP."

AMD
"High sigma Monte Carlo analysis is critical to ensuring the robustness of standard cell libraries for today's demanding HPC, data center and mobile applications," said Mydung Pham, corporate VP. "The advanced variability analysis technology in PrimeSim Reliability Analysis enables 4-7 sigma characterization at a fraction of the runtime cost of brute-force Monte Carlo analysis, with tight correlation to PrimeSim HSPICE, and is deployed for library characterization within AMD. We look forward to collaborating with Synopsys to broaden usage of this technology for other applications."

Availability

The Synopsys PrimeSim Reliability Analysis solution is now available. More information is available at: synopsys.com/primesimreliabilityanalysis

About Synopsys

Synopsys, Inc. (Nasdaq: SNPS) is the Silicon to Software™ partner for innovative companies developing the electronic products and software applications we rely on every day. As an S&P 500 company, Synopsys has a long history of being a global leader in electronic design automation (EDA) and semiconductor IP and offers the industry's broadest portfolio of application security testing tools and services. Whether you're a system-on-chip (SoC) designer creating advanced semiconductors, or a software developer writing more secure, high-quality code, Synopsys has the solutions needed to deliver innovative products. Learn more at www.synopsys.com.

Editorial Contact:
Simone Souza
Synopsys, Inc.
650-584-6454
simone@synopsys.com

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