PrimeSim Reliability Analysis

Unified workflow of proven technologies for full lifecycle reliability verification

Overview

The need for safety and reliability has become paramount with the emergence of mission-critical IC applications across automotive, aerospace, and medical industries. These applications require low defect rates (measured in defective parts per billion or DPPB), compliance with ISO26262 safety standards, and long-term reliability. IC hyperconvergence adds another layer of complexity by driving complex multi-function/multi-technology design integrations on the same SoC or package.

The need to verify safety and reliability on hyperconverged designs requires a holistic and cohesive approach to reliability verification. Disparate tools and solutions are grossly inadequate to meet the designer's needs.

PrimeSim Reliability Analysis is a comprehensive solution that unifies production-proven and foundry-certified reliability analysis technologies covering Electromigration/IR drop analysis, high sigma Monte Carlo, MOS Aging, analog fault simulation, and circuit checks (ERC) to enable full-lifecycle reliability verification.

PrimeSim Reliability Analysis is integrated with PrimeSim circuit simulation engines allowing users to seamlessly deploy foundry certified reliability analysis technologies and industry-leading simulation engines and verify reliability across early life, normal life, and end-of-life stages. PrimeWave, a newly architected environment delivers a rich and consistent reliability verification experience across all PrimeSim engines and PrimeSim Reliability Analysis technologies with unified setup and results post-processing.
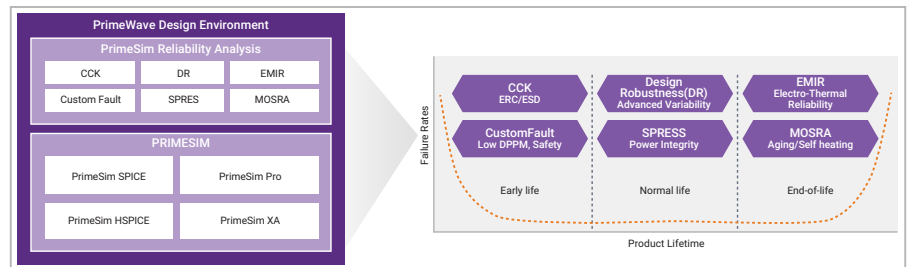

Figure 1: PrimeSim Reliability Analysis

Seamless Full Lifecycle Reliability Verification

Through the unified workflows offered by PrimeSim Reliability Analysis, PrimeSim simulation engines and the PrimeWave Design Environment, users can effortlessly step through various reliability verification checks.

Circuit checks are done using PrimeSim CCK; test coverage analysis is achieved using PrimeSim Custom Fault including early life failures; PrimeSim AVA performs high sigma Monte Carlo analysis including variation-induced normal life failures; PrimeSim EMIR provides static and dynamic electromigration/IR and self-heat analysis; and PrimeSim MOSTRA performs MOS Aging analysis for end-of-life failures. Integration with PrimeSim tools offers users the flexibility to deploy industry leading simulation engines such as PrimeSim XA; PrimeSim Pro; PrimeSim SPICE; and PrimeSim HSPICE; depending on the analysis.

Reliability Analysis	Description	Value Proposition	Lifecycle Stage
PrimeSim CCK	Static analog and digital circuit checks	Chip-level robustness verification in minutes!	Early life
Primesim Custom Fault	Analog fault simulation	Chip-level safety and test coverage analysis	Early life
PrimeSim AVA	ML-based high sigma Monte Carlo analysis	Ultra-fast 6-7σ Monte Carlo analysis for leaf cells	Normal life
PrimeSim Res Check (SPRESS)	Static power/signal net resistance check	Fast power / signal network integrity analysis	Normal life
PrimeSim EMIR	Dynamic EMIR analysis	Highest performance foundry-certified EMIR analysis	End-of-life
PrimeSim MOSRA	MOS Agin analysis	Highest performance foundry-certified Aging analysis	End-of-life

Table 1: PrimeSim Reliability Analysis—Technologies and Value Proposition

Foundry-certified, ISO 26262 Compliant, and Cloud Ready

- PrimeSim EMIR is certified with leading foundries such as TSMC and Samsung Foundry on advanced nodes including down to 3nm.
- PrimeSim MOS Aging features certified support for TSMC TMI Aging.
- PrimeSim Reliability Analysis technologies are part of the ISO 26262 TCL1 certified Synopsys Custom Design toolchain and thus can be reliably used to verify functional safety for ASIL-D applications.
- PrimeSim simulation engines and PrimeSim Reliability Analysis technologies are also cloud-ready with enablement and optimization for leading public cloud platforms.

For more information about Synopsys products, support services or training, visit us on the web at www.synopsys.com, contact your local sales representative or call 650.584.5000