Automotive IC Features

- Automotive ICs are Mixed-Signal designs with strict requirement on reliability and safety.

Mixed-Signal Verification for Automotive ICs

- Mixed-signal simulations increase verification coverage of design
- Verify digital and analog interactions
- Parametric verification of design for reliability
- Compatible with existing full-chip verification and regression environment
- Integration in Requirement tracking process
- Reasonable Simulation time and Accuracy

Increasing verification coverage

- The scenarios verified by Mixed-signal simulation require varying degree of accuracy for analog sub-blocks.
- RN models are (re)used in MS simulations to improve simulation performance
- SPICE and FastSPICE solver used to tradeoff Accuracy-Performance based on functional verification objectives
- Increased simulation performance allows more scenarios to be simulated hence increasing verification coverage

Use of Model Abstractions

- RN models selected based on accuracy requirement of test scenarios
- Using digital model instead of SPICE netlist choice of analog solver

Checkers and monitors: Coverage based verification

- Requirement tracking tool shall be used to comply with processes such as ISO26262

Application for Future ICs

- Mixed-Signal Simulation verification increased verification coverage
- The flow is reused for verification of other designs

Results

- 44 Mixed-signal scenarios were simulated using Inhouse regression tool for digital verification
- The scenarios verified the design in multiple functional modes and parametric variations
- Runtime of complete regression suite was about 24 hours and was within time line of project
- Automated setup allowed multiple iteration of regression suite performed during design cycle
- Mixed-Signal Simulation verification increased verification coverage

Specification TestPlan and Coverage Optimize Accuracy and Speed Analyze