TATA ELXSI

CASE STUDY

DC-DC CONVERTER SOFTWARE DEVELOPMENT AND VALIDATION

Overview

- Software Development and Validation of DC-DC Converter
- Isolated full-bridge DCDC converter from 48 V HV to 12 V LV
- Bidirectional conversion
- Customer: Automotive Tier 1
- Software compliance to
  - ASIL D
  - Automotive SPICE Level 2

Software Development – Scope

- High-Level Software Design, Low-Level Software Design
- Application Development(SWC) using Matlab/ Simulink
- Integration - MCAL, Bootloader, BSW
- BSW configuration
- Design and development of complex Device Drivers(manual coding)
- LV current de-rating planned for Temperature de-rating, HV voltage de-rating, LV voltage de-rating, and Power limit request
- Faults handling considered for Overvoltage fault, Under voltage fault, Over current fault, Temperature fault, interlock fault
- DCDC communicates with the Vehicle over the CAN network
- Diagnostics performed over UDS & OBD protocol
- Calibration through XCP
- Software Unit Testing, Software Integration Testing
- Hardware and Software Integration

Verification and Validation

- MIL/ SIL execution for Application SWC
- System Test Plan and Test Cases
- Identification of HILS equipments and set up the same for two variants
- Execution at HILS (dSpace) and test reports, Traceability update

FUNCTIONAL SAFETY

- Safety Plan and Supporting documents (CM Plan, Verification Plan, CRM Plan)
- Software FMEA
- Software DFA