

EV POWER INVERTER CONTROL REFERENCE PLATFORM GEN 2

(SiC Version)



* Pictured is final SiC inverter platform provided Vepco Technology

Extending NXP power inverter control to realize the benefits of silicon carbide (SiC) MOSFET power switches

TARGET APPLICATIONS

- EV motor power inverters
- High-voltage DC-to-DC boost circuits
- High-voltage onboard chargers

FEATURED PRODUCTS

NXP components featured in the platform include:

- **GD31xx** isolated SiC MOSFET or IGBT gate driver with < 2 μ s short-circuit protection
- **MPC5775E** high-performance ASIL D MCU with advanced motor control libraries and software resolver
- **FS65** robust ASIL D SBC with fail-silent and Grade 0 capabilities
- **TJA1051T** redundant high-speed CAN bus interface
- **TJA1100** IEEE® 100BASE-T1 compliant automotive Ethernet PHY transceiver interface

NXP, Wolfspeed™ and Vepco® collaborated to develop an SiC-based 180 kW power inverter platform that demonstrates each of our technologies for the next generation of automotive powertrains.

The 180 kW power rating is targeted for passenger cars, where the largest adoption of power inverters is expected. This design can be adapted for other power levels as well.

EV-INVERTERHD PLATFORM FEATURES

- Dyno-ready, functionally safe, SiC MOSFET power inverter reference design
- A peak power rating of 180 kW, a top speed of 15,000 RPM and 97% peak efficiency that is 4-8% more efficient than previously demonstrated systems, directly translating to increased driving range or lighter battery packs
- The system can operate from a battery voltage of 350 VDC to 650 VDC and is capable of peak torque current levels of up to 450 A rms

The EV-INVERTERHD platform has higher efficiency and range vs. an IGBT-based power inverter. High power density enables easier integration into a vehicle and the platform is functional safety capable up to ASIL C/D levels, through management of random system faults by integrated protection and diagnostics.

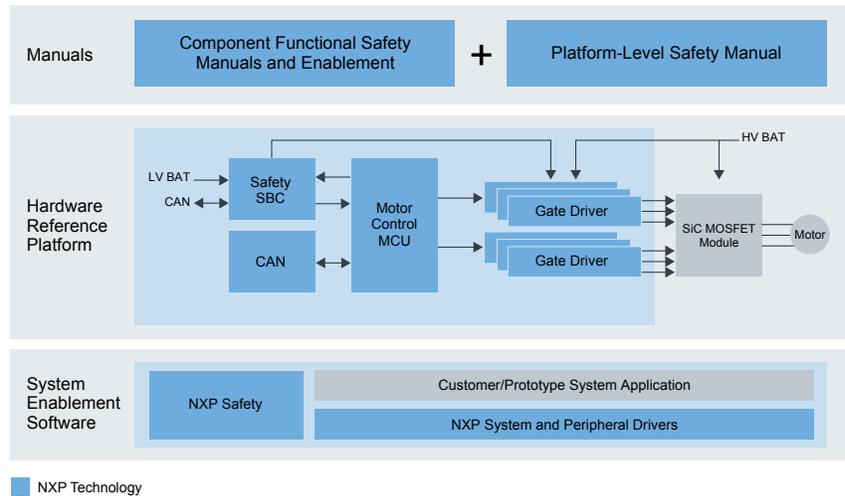
SOFTWARE AND TOOLS

- System-level enablement software and functional safety for ASIL D
- NXP BSW with service-level SDK, driver and GUI
- NXP S32DS IDE
- Optimized math software libraries for motor control algorithms

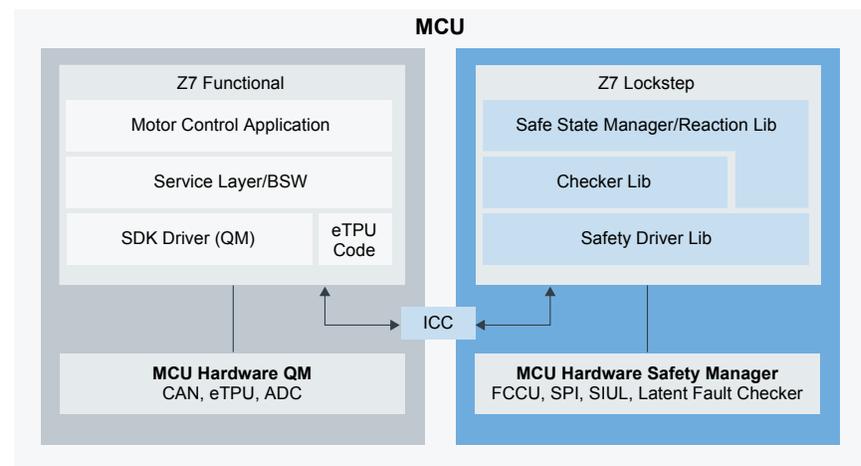
EV-INVERTERHD PLATFORM PERFORMANCE SUMMARY

PARAMETERS	VALUE
Motor	3-Phase PMSM
Rated Power	180 kW
Top Speed	>15 kHz rpm
Continuous Current	>220 A rms
Peak Current	>450 A, rms
DC Link	250 – 600 VDC
Peak Efficiency	> 99%
Power Density	20 kW/l
System Capability	ASIL C/D

SYSTEM BLOCK DIAGRAM



SYSTEM ENABLEMENT AND FUNCTIONAL SAFETY MANAGEMENT SOFTWARE



EV-INVERTERHD PLATFORM FEATURES

OFFERING	TYPE	EV-INVERTERHD PLATFORM ENABLEMENT KIT	EV-INVERTERHD PLATFORM SAFETY KIT*
EV-CONTROLEVMHD control board	HW	Ordered	
EV-POWERVEBHD power board	HW	Ordered	
Hardware design schematics and gerber files	DOC	DL*	
Hardware operation guide	DOC	DL*	
Software operation guide	DOC	DL*	
Safety concept application note	DOC	DL*	
Basic software	SW	DL*	
NXP device datasheets	DOC	DL	
NXP device functional safety documents	DOC	DL*	
Advanced functional safety SW and documentation	SW/DOC		DL^

* Downloadable with purchase of kit.

^ Projected to be available by end of Q2, 2021

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