SECURE CONNECTIONS FOR A SMARTER WORLD

FACT SHEET
EV POWER INVERTER

EV POWER INVERTER CONTROL REFERENCE PLATFORM GEN 1

System control design enablement kit with functional safety support for developing ASIL D high voltage power inverters for electric vehicle traction motors.

OVERVIEW

The NXP EV power inverter control reference platform provides a hardware reference design, system enablement software, and functional safety enablement to develop a complete ASIL D compliant high voltage, high power traction motor inverter for electric vehicles.

FEATURES AND BENEFITS

- System control enablement kit for designing 100 kW class power inverters
- Efficient system BOM designed for ASIL D safety requirements
- Basic software enablement with inverter services layer, drivers & SDK
- ±0.1 high accuracy software RDC with advanced motor control software
- Drives up to ±15 A into a broad range of IGBT and SiC power devices
- <2 us iSense compatible 2 level IGBT OC protection with soft shutdown
- 5 kV galvanic signal isolation compatible with IGBTs up to 1700 V
- Standard signal interfaces for motor resolvers and output current sensors
- Support for redundant CAN bus interfaces

APPLICATIONS

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

FEATURED PRODUCTS

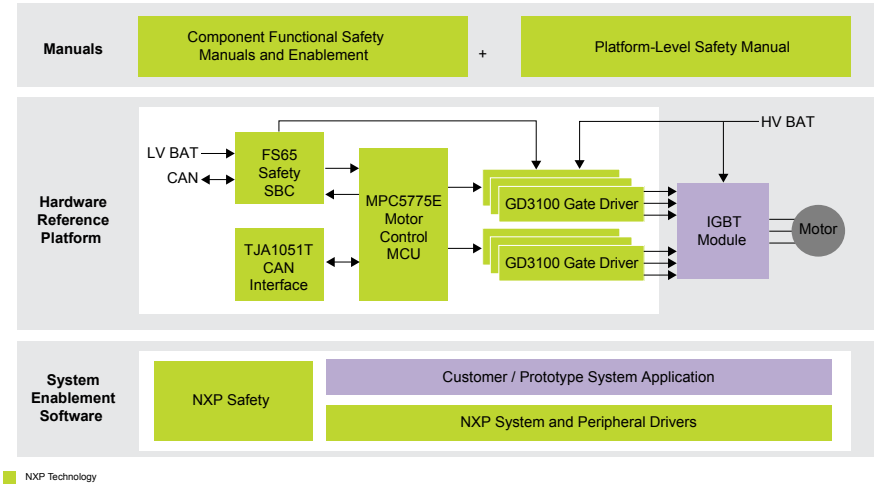
- NXP components featured in the platform include:
- GD3100 isolated IGBT gate driver with <2us short-circuit protection
- MPC5775E high performance ASIL D MCU with advanced motor control libraries and software resolver
- FS65 robust ASIL D SBC with fail-silent and Grade 0 capabilities
- TJA1051T redundant high-speed CAN bus interface

KIT INCLUDES

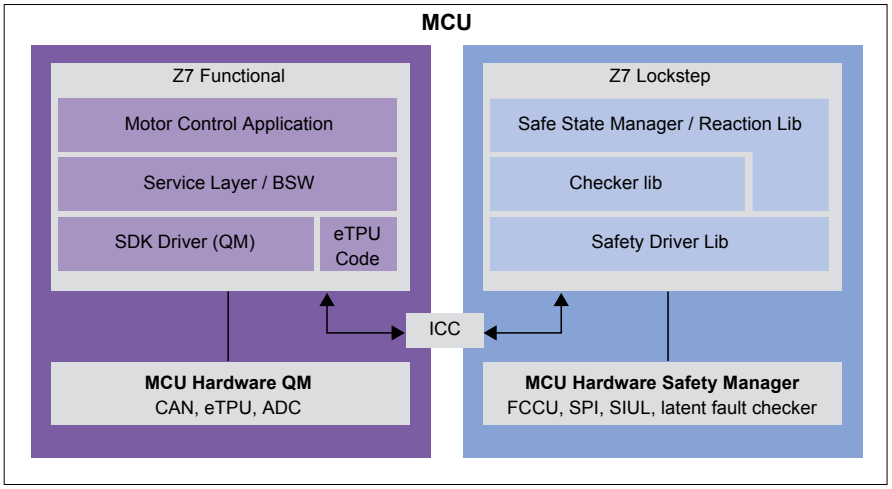
Offerings	Type	Offering Packages	
		Inverter Platform Enablement Kit	Inverter Platform Safety Kit
Hardware design package (schematics & layout)	DOC	DL	
NXP device datasheets	DOC	DL	
NXP device functional safety documents	DOC	DL	
NXP device software drivers (GD3100 & FS65)	SW	DL	
Reference design enablement kit including control, driver, RDC interface, & sensor boards	HW	X	
BSW with service level, SDK, driver & GUI software	SW	DL	
Reference design enablement kit user manual	DOC	DL	
Design guide application note	DOC	DL	
BSW user manual	DOC	DL	
System proof-of-concept prototype test results	DOC	DL	
Safety basic software & safe-state library	SW		DL
Basic safety software user manual	DOC		DL
Inverter safety concept manual			
Analysis & fault reaction matrix	DOC		DL

DL = downloadable from NXP

SYSTEM BLOCK DIAGRAM



SYSTEM ENABLEMENT AND FUNCTIONAL SAFETY MANAGEMENT SOFTWARE



The reference platform has been designed into an evaluation prototype demonstrating >98 % electrical efficiency operating from 340 V supply voltage. It is designed to interface to a Fuji M653 IGBT module rated for 800 A / 750 V operation (purchased separately from Fuji Electronics).

EVALUATION PROTOTYPE PERFORMANCE SUMMARY

Inverter Performance Summary		
Parameter	**Value**	**Units**
Operating Input Voltage Range	240-420	VDC
Maximum Output[1]	150	KVA
Nominal Voltage	340	VDC
Peak Current[2]	420	A, rms
Control Input Supply Voltage Range[3]	8.5 - 16	VDC
Motor Operating Speed	0-10,000	RPM
PWM Switching Frequency	3-12	kHz
Control Type	current/ speed/ torque	
Maximum Electrical Efficiency	98	%
Communication Interface	CAN	
Inverter Mechanical Envelope	28 x 28 x 15.43	cm
Power Devices	IGBT	1 module
Standby Power Consumption	<1	mA
HV Bus Capacitance	440	uF

[1] Measurement conditions: HV bus capacitance of 440 uF, Fuji M653 IGBT module

[2] 1K - 3K RPM

[3] Range extension to 18 VDC is possible with hardware design update

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