3-Phase Reference Design for HybridPACK™ Drive IGBT/SiC Module Featuring GD3100

RDGD3100I3PH5EVB Receive alerts

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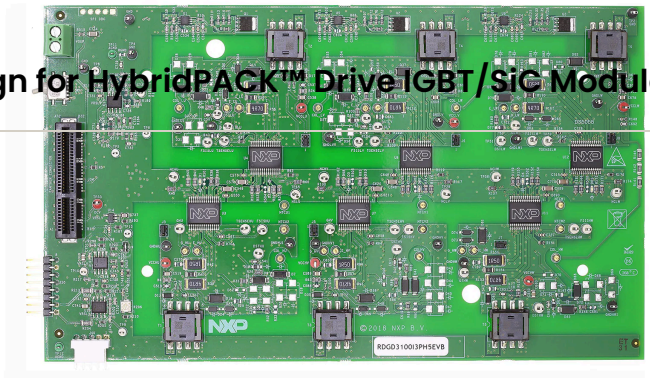

Roll over image to zoom in

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RDGD3100I3PH5EVB reference design is "Not recommended for new designs", we recommend using the 3 Phase Reference Design for HP Drive Featuring GD3160 (RDGD3160I3PH5EVB (/design/design-center/development-boards-and-designs/3-phase-reference-design-for-hp-drive-featuring-gd3160:RDGD3160I3PH5EVB)).

The RDGD3100I3PH5EVB is a fully functional three-phase power gate drive reference design populated with six GD3100 gate drivers (/products/power-management/motor-and-solenoid-drivers/powertrain-and-engine-control/advanced-high-voltage-isolated-gate-driver-for-igbt-and-sic-mosfets:GD3100) with fault management and supporting control circuitry.

This board supports SPI daisy chain communication for programming and communication with three high-side gate drivers and three low-side gate drivers independently. Included is S32SDEV-CONI8 PCIe cable for connecting to MCU controller board MPC5777C-DEVB (/products/no-longer-manufactured/mpc5777c-bms-and-engine-control-development-board:MPC5777C-DEVB) (not included). This board is designed to be connected to a HybridPACK™ Drive IGBT module footprint (not included).

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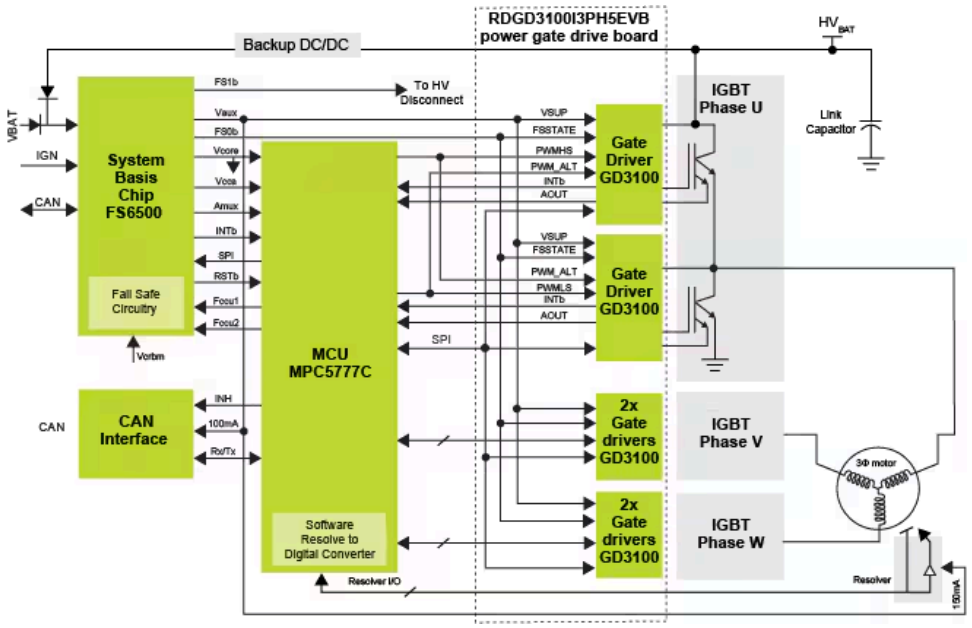
DESIGN FILES SOFTWARE

Product Details

Block Diagram | Supported Devices | Features

Block Diagram

Power Gate Drive



Supported Devices

Processors and Microcontrollers

Ultra-Reliable MPC57xx MCUs	• **MPC5777C** (/products/processors-and-microcontrollers/power-architecture/mpc5xxx-microcontrollers/ultra-reliable-mpc57xx-mcus/ultra-reliable-mpc5777c-mcu-for-automotive-and-industrial-engine-management:MPC5777C)**:** Ultra-Reliable MPC5777C MCU for Automotive and Industrial Engine Management • **MPC5775B-E** (/products/processors-and-microcontrollers/power-architecture/mpc5xxx-microcontrollers/ultra-reliable-mpc57xx-mcus/mpc5775b-and-mpc5775e-microcontrollers-for-battery-management-systems-bms-and-inverter-applications:MPC5775B-E)**:** MPC5775B and MPC5775E Microcontrollers for Battery Management Systems (BMS) and Inverter Applications

Power Management

System Basis Chips	• **FS6500** (/products/power-management/pmics-and-sbcs/system-basis-chips/grade-1-and-grade-0-safety-power-system-basis-chip-with-can-flexible-data-transceiver:FS6500)**:** Grade 1 and Grade 0 Safety Power System Basis Chip with CAN Flexible Data Transceiver
Powertrain and Engine Control	• **GD3100** (/products/power-management/motor-and-solenoid-drivers/powertrain-and-engine-control/advanced-high-voltage-isolated-gate-driver-for-igbt-and-sic-mosfets:GD3100)**:** Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs

Interfaces

3.3 V / 5 V IO CAN Transceivers	• **TJA1042** (/products/interfaces/can-transceivers/can-with-flexible-data-rate/high-speed-can-transceiver-with-standby-mode:TJA1042)**:** High-Speed CAN Transceiver with Standby Mode

Features

MC33GD3100

- Advanced single-channel gate driver for IGBT© and SiC MOSFETs. Integrated galvanic isolation and low on-resistance drive transistors provide high charging and discharging current, low dynamic saturation voltage and rail-to-rail gate voltage control

Key Features

- SPI interface for safety monitoring, programmability and flexibility
- Low propagation delay and minimal PWM distortion
- Integrated galvanic signal isolation (up to 8 kV)
- Integrated gate drive power stage capable of 15 A peak source and sink
- Fully programmable Active Miller clamp
- Compatible with negative gate supply
- Compatible with current sense and temperature sense IGBTs
- Integrated soft shutdown, two-level turn-off, active clamp, and segmented drive for wave shaping
- CMTI > 100 V/ns
- Compatible with 200 V to 1700 V IGBT/SiC, power range > 125 kW
- Operating temperature range -40 °C to 125 °C
- External creepage distance (CPG): > 7.8 mm

	• Operating frequency > 40 kHz • 5.0 V and 3.3 V tolerant MCU interface available
SPI interface	• Safety monitoring and programming control features PCIe connector provides external I/O connections (including GDIC control and SPI, motor current and application feedback and power supply control), cable harness included ◦ PCIe cable harness included • Additional SPI test port for GDIC debug • Connector for resolver/motor position sense • Connector for motor phase current sense
ASIL D ISO 26262 compliant	• GD3100 is compliant with ISO 26262 ASIL C/D functional safety requirements
AEC-Q100	• Automotive grade qualified
Safety Features	• Certified to ASIL D ISO 26262 functional safety requirements for full diagnostics • Current, DESAT, and temperature sense inputs and ADC reporting for IGBT/SiC monitoring • Fast short-circuit protection, overcurrent protection, temperature warning and shutdown • Interrupt pin for fast response to faults • Built-in self-check of all analog and digital circuits • Continuous watchdog of die-to-die communications • Deadtime enforcement • Over and undervoltage supervision of all power supplies on both low and high voltage sides • Fail-safe state management pins on both low and high voltage sides • VGE real time cycle-by-cycle monitoring
Not Included (order separately):	• MPC5777C-DEVB MCU: Based on the 32-bit Power Architecture® MPC5777C ultra-reliable MCU together with the FS65 System Basis Chip and the TJA1100 and TJA1145T/FD Ethernet and CAN FD PHY transceivers, the MPC5777C-DEVB facilitates hardware and software development, offering system performance, safety, and security. • DC link capacitor • IGBT module • Water cooling jacket

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