



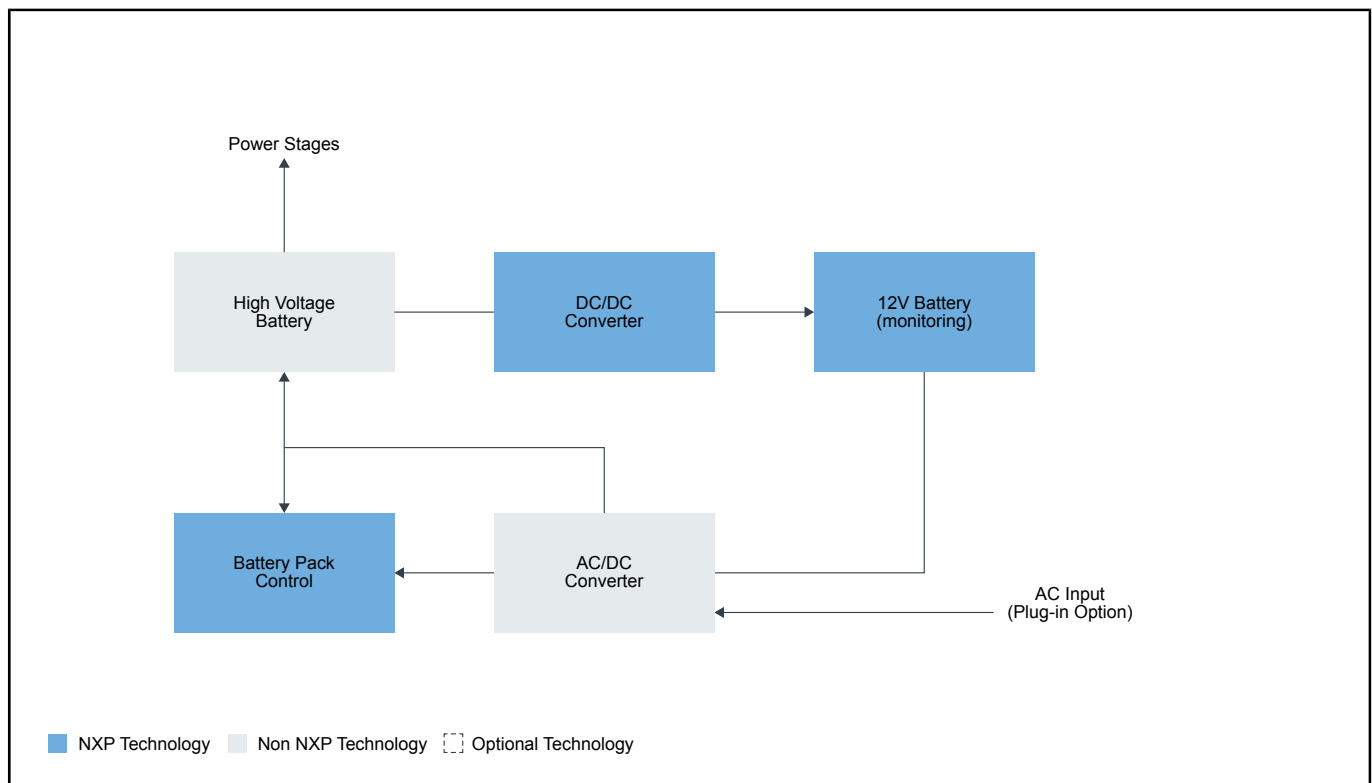
Hybrid Electric Vehicle (HEV) Applications

Last Updated: May 10, 2023

With the need for cleaner cars and fewer emissions, NXP has developed a portfolio that provides the building blocks for all the different electric vehicle types:

- Converter and charger: the AC-DC charger interfaces with the BMS to ensure a proper charge of electricity of the cells until it fulfills high-voltage requirements.
- Start/stop system: 8-, 16-bit MCUs with analog switches, system basis chips and transceivers to handle the high current and reliability.
- Hybrid control unit: controls power distribution, energy storage, engine and motor to enhance the efficiency of the HEV powertrain.

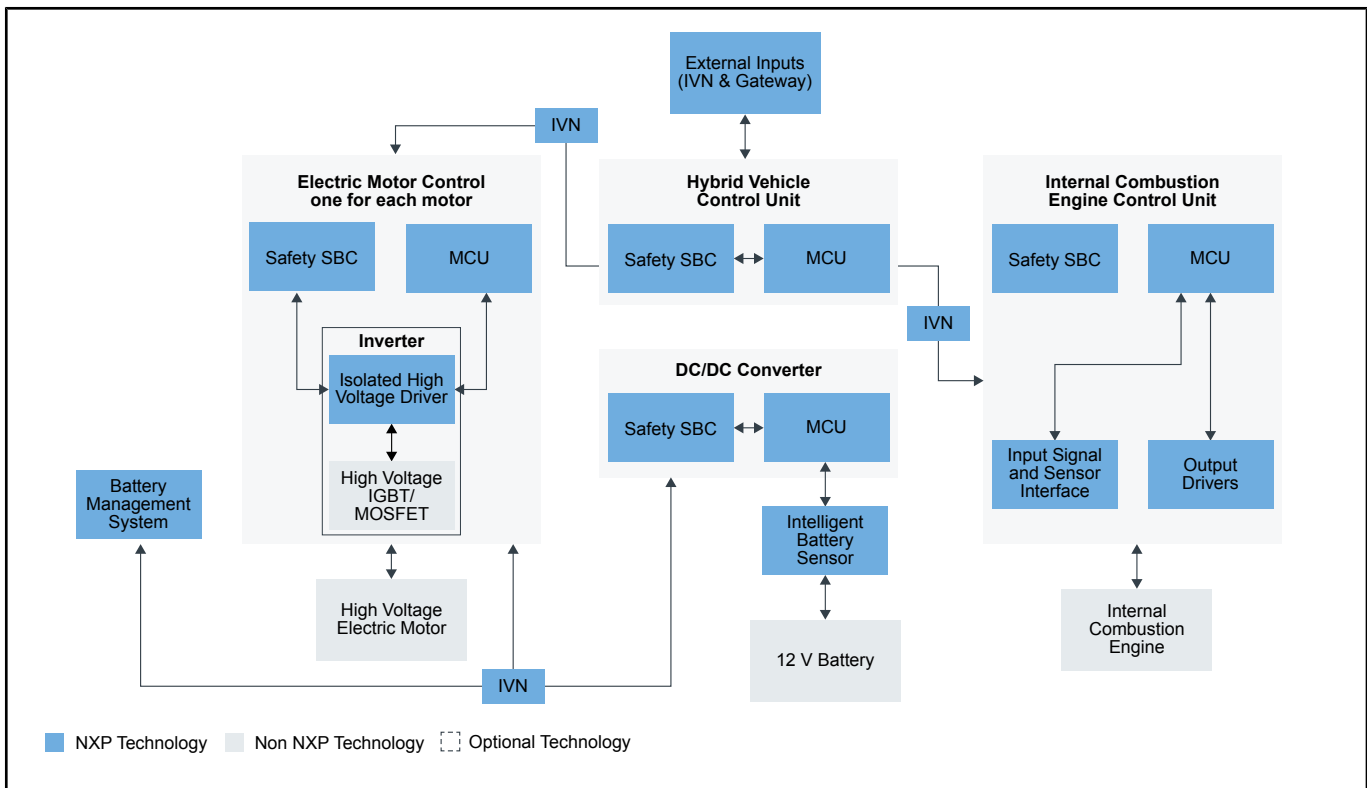
Converter and Charger Block Diagram



Recommended Products for Converter and Charger

| | |
|-------------------------|---|
| Battery Pack Control | <ul style="list-style-type: none"> • MPC560xB: Ultra-Reliable MPC56xB MCU for Automotive and Industrial General Purpose • S12XE: Ultra-Reliable S12XE High-Performance Automotive and Industrial Microcontrollers • S12XS: S12XS Automotive and Industrial Microcontrollers (MCUs) • S12P: S12P Automotive and Industrial Microcontrollers (MCUs) • S12G: Ultra-Reliable S12G General Purpose Automotive and Industrial Microcontrollers |
| 12 V Battery Monitoring | <ul style="list-style-type: none"> • MM912_637: Battery Sensor with LIN for 12 V Lead-Acid Batteries |
| DC/DC converter | <ul style="list-style-type: none"> • 56F824X_825X: Digital Signal Controller |

Powertrain Block Diagram

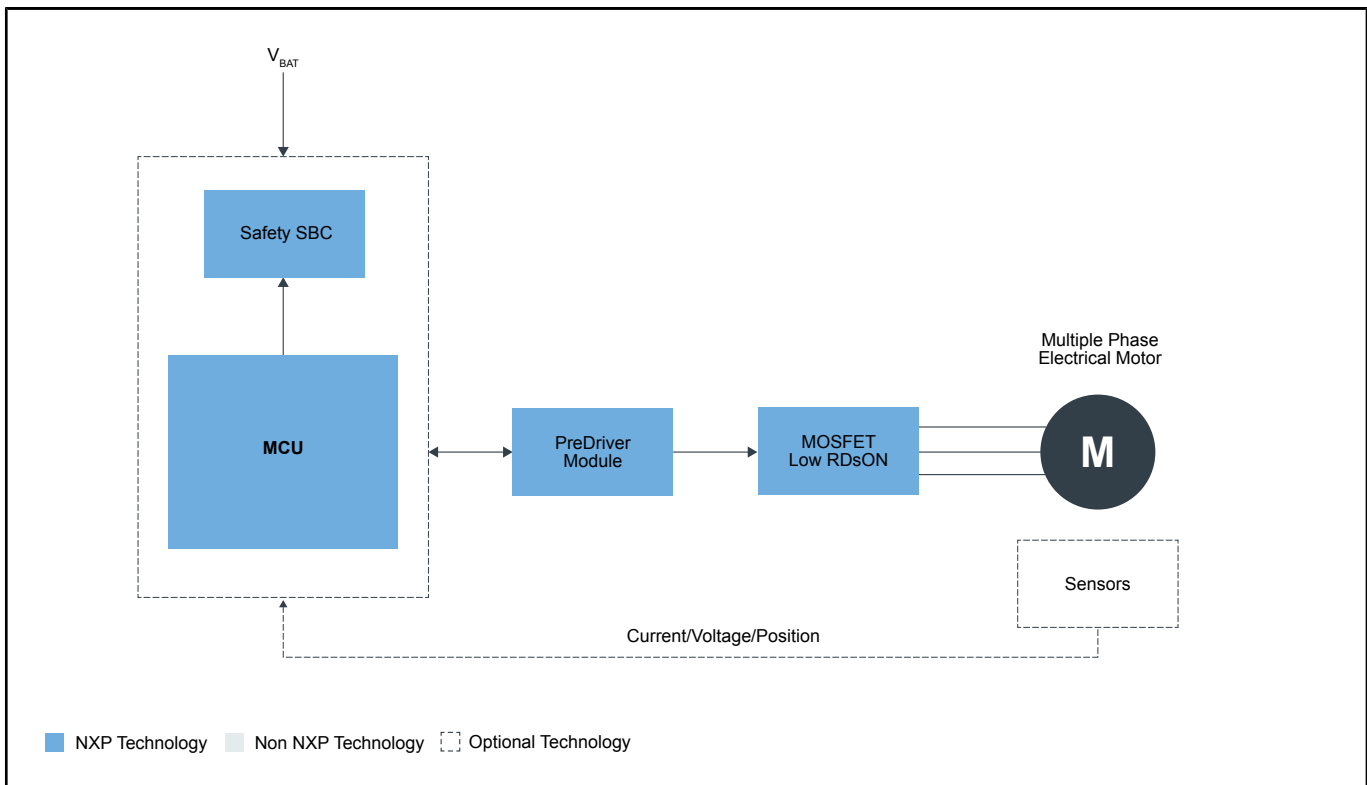


Recommended Products for Powertrain

| | |
|------------------------|---|
| Safety SBC | <ul style="list-style-type: none"> • FS6600: Safety System Basis Chip for S32S2 Microcontroller, Fit for ASIL D • FS6500: Grade 1 and Grade 0 Safety Power System Basis Chip with CAN Flexible Data Transceiver • FS26: Safety System Basis Chip with Low Power, for ASIL D Systems • FS4500: Grade 1 and Grade 0 Safety Power System Basis Chip with CAN Flexible Data Transceiver |
| Gate Driver | <ul style="list-style-type: none"> • GD3162: Advanced High Voltage Isolated Gate Driver with Dynamic Gate Strength Control • GD3160: Advanced High Voltage Isolated Gate Driver with Segmented Drive for SiC MOSFETs • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs |
| Microcontrollers (MCU) | <ul style="list-style-type: none"> • S32Z and S32E Real-Time Processors: S32Z and S32E Real-Time Processors • S32K39-37: S32K39/37/36 Microcontrollers for Electrification Applications • MPC574xP: Ultra-Reliable MPC574xP MCU for Automotive and Industrial Safety Applications • MPC5777C: Ultra-Reliable MPC5777C MCU for Automotive and Industrial Engine Management |

| | |
|-----------------------------------|---|
| | <ul style="list-style-type: none"> • MPC564xL: Ultra-Reliable Dual-Core 32-bit MCU for Automotive and Industrial Applications • MPC5775B-E: MPC5775B and MPC5775E Microcontrollers for Battery Management Systems (BMS) and Inverter Applications |
| Input Signal and Sensor Interface | <ul style="list-style-type: none"> • CD1020: Low-Cost 22-CH Multiple Switch Detect Interface |
| Output Drivers | <ul style="list-style-type: none"> • CD1020: Low-Cost 22-CH Multiple Switch Detect Interface |
| External Inputs (IVN & Gateway) | <ul style="list-style-type: none"> • MPC574xB-C-G: Ultra-Reliable MPC574xB/C/G MCUs for Automotive and Industrial Control and Gateway • S32G2: S32G2 Processors for Vehicle Networking |
| External Inputs (IVN & Gateway) | <ul style="list-style-type: none"> • MPC574xB-C-G: Ultra-Reliable MPC574xB/C/G MCUs for Automotive and Industrial Control and Gateway • S32G2: S32G2 Processors for Vehicle Networking |
| Battery Management System | <ul style="list-style-type: none"> • Battery Management System (BMS): Battery Management System (BMS) |
| Battery Management System | <ul style="list-style-type: none"> • Battery Management System (BMS): Battery Management System (BMS) |

Stop and Start System Block Diagram



Recommended Products for Stop and Start System

| | |
|------------------------|--|
| Microcontrollers (MCU) | <ul style="list-style-type: none"> • MPC560xB: Ultra-Reliable MPC56xB MCU for Automotive and Industrial General Purpose • S12XE: Ultra-Reliable S12XE High-Performance Automotive and Industrial Microcontrollers • S12XS: S12XS Automotive and Industrial Microcontrollers (MCUs) |
|------------------------|--|

| | |
|---------------------|--|
| | <ul style="list-style-type: none"> • S12P: S12P Automotive and Industrial Microcontrollers (MCUs) • S12G: Ultra-Reliable S12G General Purpose Automotive and Industrial Microcontrollers • S32 Automotive Platform: S32 Automotive Processing Platform |
| Safety SBC | <ul style="list-style-type: none"> • FS4500: Grade 1 and Grade 0 Safety Power System Basis Chip with CAN Flexible Data Transceiver • FS26: Safety System Basis Chip with Low Power, for ASIL D Systems • FS6600: Safety System Basis Chip for S32S2 Microcontroller, Fit for ASIL D |
| CAN/LIN Transceiver | <ul style="list-style-type: none"> • CAN Transceivers: CAN Transceivers |
| Pre-Driver Module | <ul style="list-style-type: none"> • MC33937: 3-Phase Field Effect Transistor Pre-Driver |
| MOSFET Low RDs | <ul style="list-style-type: none"> • MC12XS2: 12 V Multipurpose Low RDSON eXtreme Switch |

View our complete solution for [Hybrid Electric Vehicle \(HEV\) Applications](#).

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