Hybrid Electric Vehicle (HEV) Applications

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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
- **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
- **MM912_637**: Battery Sensor with LIN for 12 V Lead-Acid Batteries

#### DC/DC converter
- **56F824X_825X**: Digital Signal Controller

### Powertrain Block Diagram

![Powertrain Block Diagram](image)

### Recommended Products for Powertrain

#### Safety SBC
- **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
- **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)
- **S32Z and S32E Real-Time Processors**: S32Z and S32E Real-Time Processors
- **S32K39-37**: S32K39/37 Microcontrollers for Electrification Applications
- **GreenBox 3 Real-Time Development Platform**
- **MPC574xP**: Ultra-Reliable MPC574xP MCU for Automotive and Industrial Safety Applications
### Input Signal and Sensor Interface
- **CD1020**: Low-Cost 22-CH Multiple Switch Detect Interface

### Output Drivers
- **CD1020**: Low-Cost 22-CH Multiple Switch Detect Interface

### External Inputs (IVN & Gateway)
- **MPC574xB-C-G**: Ultra-Reliable MPC574xB/C/G MCUs for Automotive and Industrial Control and Gateway
- **S32G2**: S32G2 Processors for Vehicle Networking

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### Battery Management System
- **Battery Management System (BMS)**: Battery Management System (BMS)

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### Stop and Start System Block Diagram

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\begin{align*}
V_{BAT} & \quad \text{Safety SBC} \\
\text{MCU} & \quad \text{PreDriver Module} \quad \text{MOSFET} \\
& \quad \text{Low RDsON} \quad \text{M} \\
& \quad \text{Sensors} \\
\text{Current/Voltage/Position} \\
\end{align*}
\]
```

### Recommended Products for Stop and Start System

#### Microcontrollers (MCU)
- **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 |
|**S32 Automotive Platform:** S32 Automotive Platform |
| **Safety SBC** |
|**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** |
|**CAN Transceivers:** CAN Transceivers |
| **Pre-Driver Module** |
|**MC33937:** 3-Phase Field Effect Transistor Pre-Driver |
| **MOSFET Low RDs** |
|**MC12XS2:** 12 V Multipurpose Low RDSON eXtreme Switch |

View our complete solution for **Hybrid Electric Vehicle (HEV) Applications.**

**Note:** The information on this document is subject to change without notice.