

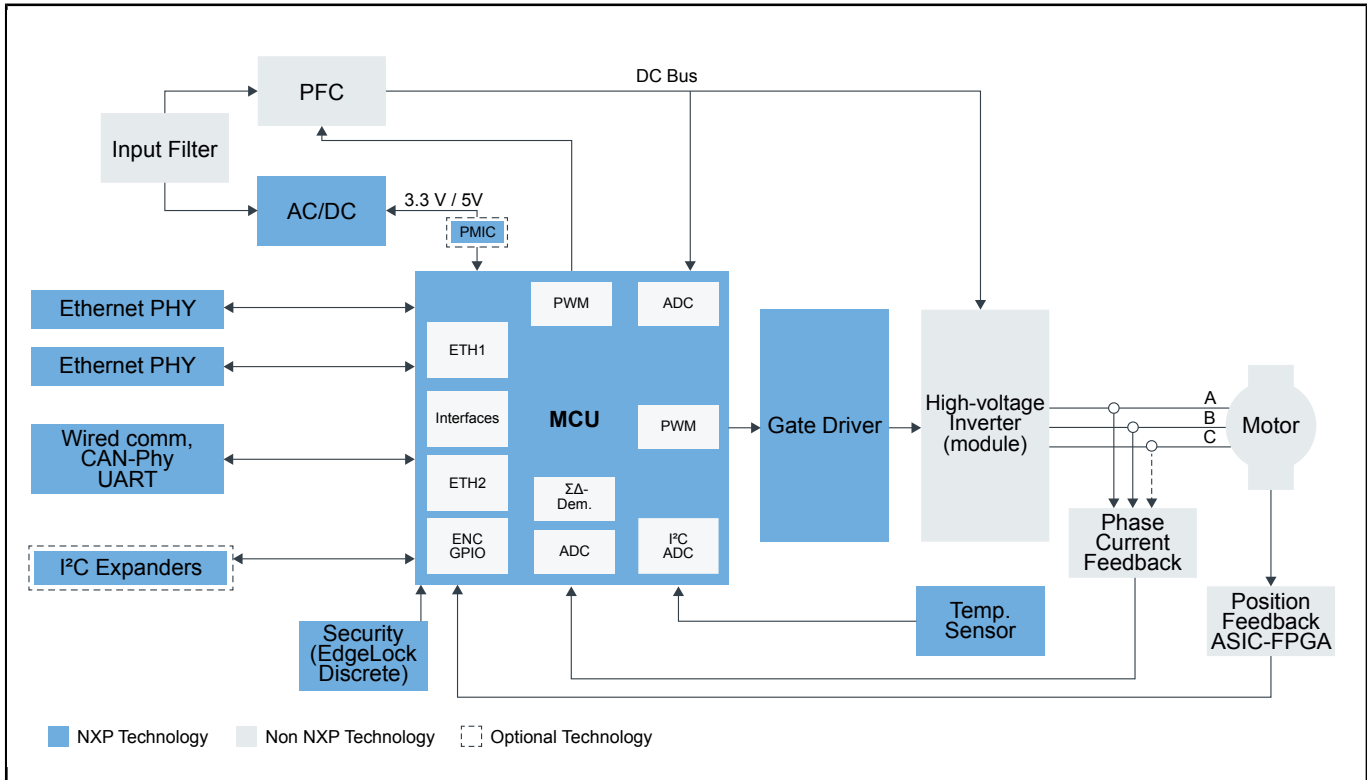


# Motor Drives

Last Updated: May 9, 2023

Motor drives precisely control speed and positioning to conserve energy and increase the lifespan of electric motors, which uses a foundation of secure edge processing, high-efficiency power management ICs, RTCs, thermal-efficient power drivers with current monitoring capability, USB and CAN transceivers, and voltage level translators.

## Servo Motor Drive Block Diagram

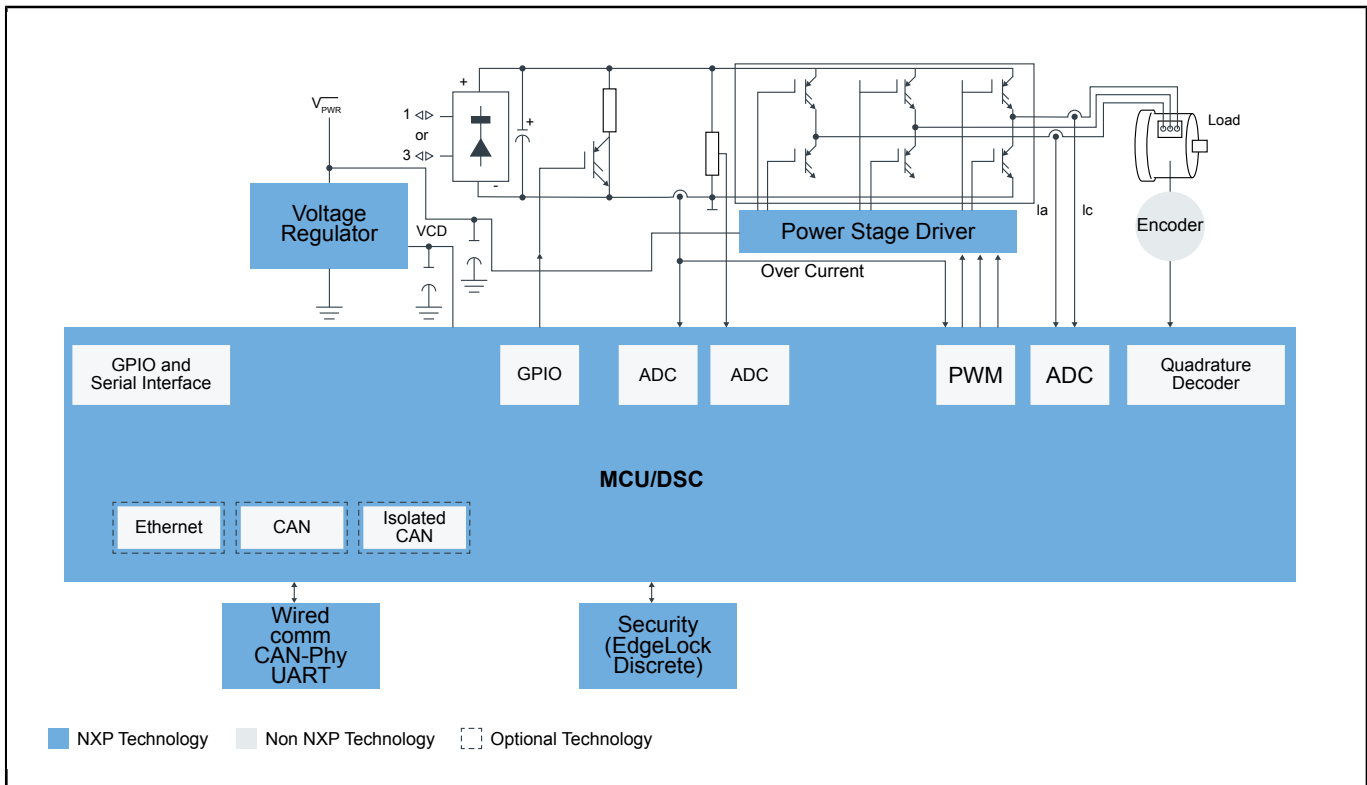


### Recommended Products for Servo Motor Drive

Microcontroller (MCU)	<ul style="list-style-type: none"> <li>• <b>MCX-A14X-A15X</b>: MCX A14x/15x MCUs with Arm<sup>®</sup> Cortex<sup>®</sup> M33, Scalable Device Options, Low Power and Intelligent Peripherals</li> <li>• <b>MCX-N94X-N54X</b>: MCX N94x/54x Highly Integrated Multicore MCUs with On-Chip Accelerators, Intelligent Peripherals and Advanced Security</li> <li>• <b>i.MX RT Crossover MCUs</b>: i.MX RT Crossover MCUs</li> <li>• <b>MPC5775B-E</b>: MPC5775B and MPC5775E Microcontrollers for Battery Management Systems (BMS) and Inverter Applications</li> </ul>
AC/DC	<ul style="list-style-type: none"> <li>• <b>AC-DC Solutions</b>: AC-DC Solutions</li> <li>• <b>TEA19363LT</b>: GreenChip SMPS Primary Side Control IC with QR/DCM Operation and Active x-Capacitor Discharge</li> </ul>
Wired Interfaces	<ul style="list-style-type: none"> <li>• <b>CAN Transceivers</b>: CAN Transceivers</li> <li>• <b>UARTs</b>: UARTs</li> <li>• <b>I<sup>2</sup>C, SPI, I3C Interface Devices</b>: I<sup>2</sup>C, SPI, I3C Interface Devices</li> </ul>
I2C Expanders	<ul style="list-style-type: none"> <li>• <b>I<sup>2</sup>C-Bus Repeaters/Hubs/Extenders</b>: I<sup>2</sup>C-Bus Repeaters/Hubs/Extenders</li> <li>• <b>PCAL9722</b>: 22-Bit SPI I/O Expander with Agile I/O Features</li> <li>• <b>PCAL9714</b>: 14-Bit SPI I/O Expander with Agile I/O Features</li> </ul>

	<ul style="list-style-type: none"> <li>• <a href="#">PCAL6416A</a>: Low-Voltage Translating 16-Bit I<sup>2</sup>C-Bus/SMBus I/O Expander</li> </ul>
Gate Driver	<ul style="list-style-type: none"> <li>• <a href="#">GD3162</a>: Advanced High Voltage Isolated Gate Driver with Dynamic Gate Strength Control</li> <li>• <a href="#">GD3160</a>: Advanced High Voltage Isolated Gate Driver with Segmented Drive for SiC MOSFETs</li> <li>• <a href="#">GD3100</a>: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs</li> <li>• <a href="#">GD3000</a>: 3-Phase Brushless Motor Pre-Driver</li> </ul>
Temperature sensor	<ul style="list-style-type: none"> <li>• <a href="#">P3T1035xUK</a>: I3C, I<sup>2</sup>C-Bus, ±0.5 °C Accuracy, Digital Temperature Sensor</li> <li>• <a href="#">P3T2030xUK</a>: I3C, I<sup>2</sup>C-Bus, 2.0 °C Accuracy, Digital Temperature Sensor</li> <li>• <a href="#">I3C/I<sup>2</sup>C Digital Temp. Sensors</a>: I3C/I<sup>2</sup>C Digital Temperature Sensors</li> <li>• <a href="#">PCT2075</a>: I<sup>2</sup>C-Bus Fm+, 1 Degree C Accuracy, Digital Temperature Sensor and Thermal Watchdog</li> </ul>
PMIC	<ul style="list-style-type: none"> <li>• <a href="#">PMICs and SBCs</a>: Power Management Integrated Circuits (PMICs) and System Basis Chips (SBCs)</li> <li>• <a href="#">UJA1169ATK</a>: Mini High-Speed CAN System Basis Chip</li> </ul>
Ethernet PHY	<ul style="list-style-type: none"> <li>• <a href="#">Ethernet</a> : Ethernet</li> </ul>
Security (EdgeLock Discrete)	<ul style="list-style-type: none"> <li>• <a href="#">SE050</a>: EdgeLock<sup>®</sup> SE050: Plug and Trust Secure Element Family – Enhanced IoT security with high flexibility</li> <li>• <a href="#">Authentication</a>: IoT Secure Elements and Authenticators</li> </ul>

## AC and VFD Block Diagram

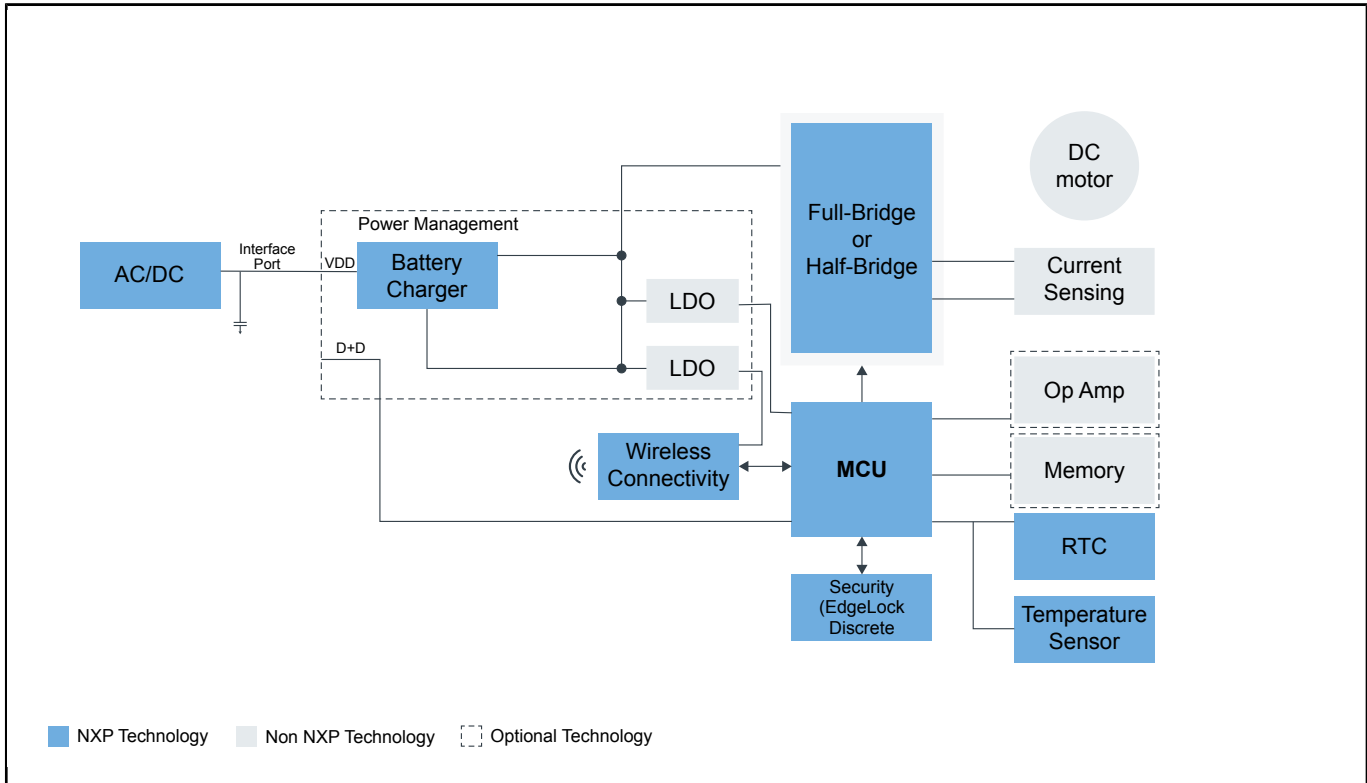


## Recommended Products for AC and VFD

Controllers (MCU)	<ul style="list-style-type: none"> <li>• <a href="#">MCX-A14X-A15X</a>: MCX A14x/15x MCUs with Arm<sup>®</sup> Cortex<sup>®</sup> M33, Scalable Device Options, Low Power and Intelligent Peripherals</li> <li>• <a href="#">MCX-N94X-N54X</a>: MCX N94x/54x Highly Integrated Multicore MCUs with On-Chip Accelerators, Intelligent Peripherals and Advanced Security</li> <li>• <a href="#">i.MX RT Crossover MCUs</a>: i.MX RT Crossover MCUs</li> <li>• <a href="#">KV Series Arm Cortex-M4/M0+/M7</a>: KV Series: Real-Time Motor Control and Power Conversion MCUs Based on Arm<sup>®</sup> Cortex<sup>®</sup>-M0+/M4/M7</li> <li>• <a href="#">KE Series Arm Cortex-M4/M0+</a>: Kinetis<sup>®</sup> E Series: 5V, Robust Microcontrollers (MCUs) Based on Arm<sup>®</sup> Cortex<sup>®</sup>-M0+/M4 Core</li> </ul>
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	<ul style="list-style-type: none"> <li>• <b>LPC553x</b>: LPC553x/S3x: Advanced Analog Arm®Cortex®-M33-Based MCU Family</li> <li>• <b>MCX Arm Cortex-M</b>: MCX Industrial and IoT Microcontrollers</li> <li>• <b>S32K Auto General-Purpose MCUs</b>: S32K Automotive General-Purpose Microcontrollers</li> <li>• <b>Digital Signal Controllers</b>: Digital Signal Controllers</li> </ul>
Voltage Regulator	<ul style="list-style-type: none"> <li>• <b>Power Management</b>: Power Management</li> <li>• <b>PF5020</b>: Multi-Channel (5) PMIC for Automotive Applications – 4 High Power and 1 Low Power, Fit for ASIL B Safety Level</li> <li>• <b>PF1550</b>: PMIC with 1A Li+ Linear Battery Charger for Low Power Processor Systems</li> </ul>
Power Stage Driver	<ul style="list-style-type: none"> <li>• <b>GD3162</b>: Advanced High Voltage Isolated Gate Driver with Dynamic Gate Strength Control</li> <li>• <b>GD3160</b>: Advanced High Voltage Isolated Gate Driver with Segmented Drive for SiC MOSFETs</li> <li>• <b>GD3100</b>: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs</li> <li>• <b>GD3000</b>: 3-Phase Brushless Motor Pre-Driver</li> <li>• <b>MC34937</b>: Three Phase Field Effect Transistor Pre-driver</li> </ul>
Driver	<ul style="list-style-type: none"> <li>• <b>GD3162</b>: Advanced High Voltage Isolated Gate Driver with Dynamic Gate Strength Control</li> <li>• <b>GD3160</b>: Advanced High Voltage Isolated Gate Driver with Segmented Drive for SiC MOSFETs</li> <li>• <b>GD3100</b>: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs</li> <li>• <b>GD3000</b>: 3-Phase Brushless Motor Pre-Driver</li> </ul>
Wired Interfaces	<ul style="list-style-type: none"> <li>• <b>CAN Transceivers</b>: CAN Transceivers</li> <li>• <b>Ethernet</b> : Ethernet</li> <li>• <b>UARTs</b>: UARTs</li> <li>• <b>I<sup>2</sup>C, SPI, I3C Interface Devices</b>: I<sup>2</sup>C, SPI, I3C Interface Devices</li> </ul>
Security (EdgeLock Discrete)	<ul style="list-style-type: none"> <li>• <b>SE050</b>: EdgeLock® SE050: Plug and Trust Secure Element Family – Enhanced IoT security with high flexibility</li> </ul>

## Portable Brushed DC Motor Block Diagram

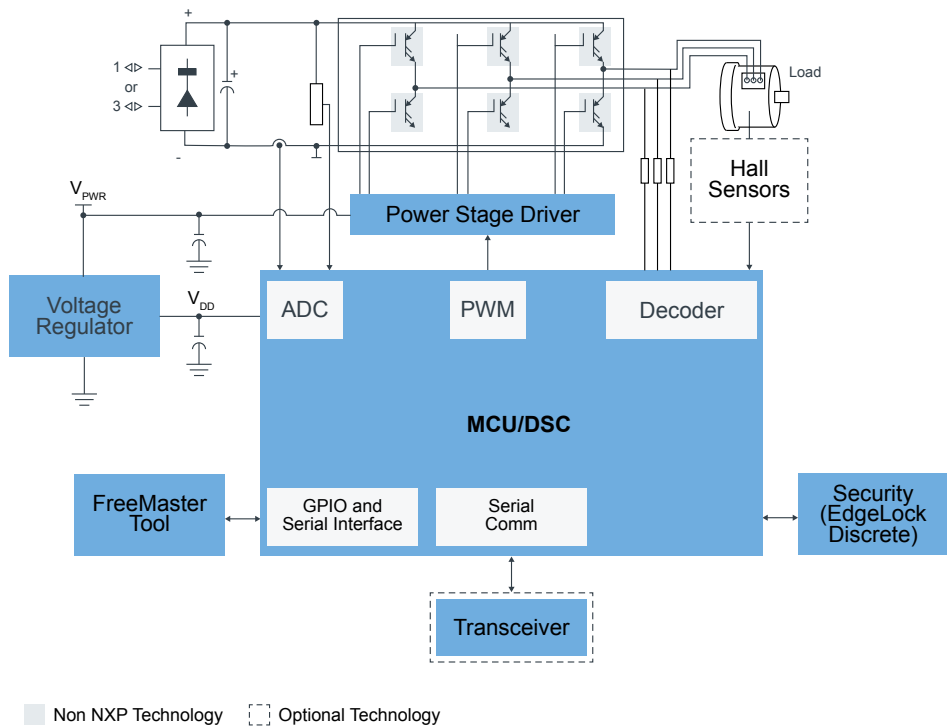


### Recommended Products for Portable Brushed DC Motor

MCU	<ul style="list-style-type: none"> <li>• <b>MCX-A14X-A15X</b>: MCX A14x/15x MCUs with Arm® Cortex® M33, Scalable Device Options, Low Power and Intelligent Peripherals</li> <li>• <b>MCX-N94X-N54X</b>: MCX N94x/54x Highly Integrated Multicore MCUs with On-Chip Accelerators, Intelligent Peripherals and Advanced Security</li> </ul>
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	<ul style="list-style-type: none"> <li>• <a href="#">KE Series Arm Cortex-M4/M0+</a>: Kinetis<sup>®</sup> E Series: 5V, Robust Microcontrollers (MCUs) Based on Arm<sup>®</sup> Cortex<sup>®</sup>-M0+/M4 Core</li> <li>• <a href="#">MCX Arm Cortex-M</a>: MCX Industrial and IoT Microcontrollers</li> <li>• <a href="#">LPC800 Arm Cortex-M0+</a> : LPC800 Series: Low-Cost Arm<sup>®</sup> Cortex<sup>®</sup>-M0+-Based MCUs</li> </ul>
AC/DC	<ul style="list-style-type: none"> <li>• <a href="#">AC-DC Solutions</a>: AC-DC Solutions</li> <li>• <a href="#">TEA19363LT</a>: GreenChip SMPS Primary Side Control IC with QR/DCM Operation and Active x-Capacitor Discharge</li> </ul>
Battery Charger	<ul style="list-style-type: none"> <li>• <a href="#">Battery Chargers</a>: Battery Chargers</li> <li>• <a href="#">MC34671</a>: 600 mA Single-Cell Li-Ion / Li-Polymer Battery Charger</li> </ul>
Security (EdgeLock Discrete)	<ul style="list-style-type: none"> <li>• <a href="#">SE050</a>: EdgeLock<sup>®</sup> SE050: Plug and Trust Secure Element Family – Enhanced IoT security with high flexibility</li> <li>• <a href="#">Authentication</a>: IoT Secure Elements and Authenticators</li> </ul>
Temperature Sensor	<ul style="list-style-type: none"> <li>• <a href="#">P3T1035xUK</a>: I3C, I<sup>2</sup>C-Bus, ±0.5 °C Accuracy, Digital Temperature Sensor</li> <li>• <a href="#">P3T2030xUK</a>: I3C, I<sup>2</sup>C-Bus, 2.0 °C Accuracy, Digital Temperature Sensor</li> <li>• <a href="#">I3C/I<sup>2</sup>C Digital Temp. Sensors</a>: I3C/I<sup>2</sup>C Digital Temperature Sensors</li> <li>• <a href="#">PCT2075</a>: I<sup>2</sup>C-Bus Fm+, 1 Degree C Accuracy, Digital Temperature Sensor and Thermal Watchdog</li> </ul>
Full-Bridge	<ul style="list-style-type: none"> <li>• <a href="#">BLDC, H-Bridge, Stepper</a>: BLDC, H-Bridge and Stepper Motor Drivers</li> </ul>
Full-Bridge or Half-Bridge	<ul style="list-style-type: none"> <li>• <a href="#">MC33926</a>: H-Bridge, Brushed DC Motor Driver, 5-28 V, 5 A, 20 kHz</li> <li>• <a href="#">HB2000</a>: SPI Programmable 10 A H-Bridge Brushed DC Motor Driver</li> <li>• <a href="#">BLDC, H-Bridge, Stepper</a>: BLDC, H-Bridge and Stepper Motor Drivers</li> </ul>
RTC	<ul style="list-style-type: none"> <li>• <a href="#">Real-Time Clocks</a>: Real-Time Clocks</li> </ul>
Wi-Fi	<ul style="list-style-type: none"> <li>• <a href="#">Wireless Connectivity</a>: Wireless Connectivity</li> </ul>

## Brushless DC Motor (BLDC) Control Block Diagram



### Recommended Products for Brushless DC Motor (BLDC) Control

<p>MCU/DSC</p>	<ul style="list-style-type: none"> <li>• <a href="#">MCX-A14X-A15X</a>: MCX A14x/15x MCUs with Arm® Cortex® M33, Scalable Device Options, Low Power and Intelligent Peripherals</li> <li>• <a href="#">MCX-N94X-N54X</a>: MCX N94x/54x Highly Integrated Multicore MCUs with On-Chip Accelerators, Intelligent Peripherals and Advanced Security</li> <li>• <a href="#">S32M2</a>: S32M2 Integrated Solution for 12V Motor Control</li> <li>• <a href="#">KV Series Arm Cortex-M4/M0+/M7</a>: KV Series: Real-Time Motor Control and Power Conversion MCUs Based on Arm® Cortex®-M0+/M4/M7</li> <li>• <a href="#">KE Series Arm Cortex-M4/M0+</a>: Kinetis® E Series: 5V, Robust Microcontrollers (MCUs) Based on Arm® Cortex®-M0+/M4 Core</li> <li>• <a href="#">Digital Signal Controllers</a>: Digital Signal Controllers</li> <li>• <a href="#">LPC5500 Arm Cortex-M33</a>: LPC5500 Series: Arm® Cortex®-M33 Based Microcontroller Series for Mass Market, Leveraging 40nm Embedded Flash Technology</li> <li>• <a href="#">MCX Arm Cortex-M</a>: MCX Industrial and IoT Microcontrollers</li> <li>• <a href="#">S32K Auto General-Purpose MCUs</a>: S32K Automotive General-Purpose Microcontrollers</li> </ul>
<p>Power Stage Driver</p>	<ul style="list-style-type: none"> <li>• <a href="#">GD3162</a>: Advanced High Voltage Isolated Gate Driver with Dynamic Gate Strength Control</li> <li>• <a href="#">GD3160</a>: Advanced High Voltage Isolated Gate Driver with Segmented Drive for SiC MOSFETs</li> <li>• <a href="#">GD3100</a>: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs</li> <li>• <a href="#">GD3000</a>: 3-Phase Brushless Motor Pre-Driver</li> <li>• <a href="#">MC33937</a>: 3-Phase Field Effect Transistor Pre-Driver</li> </ul>
<p>Voltage regulator</p>	<ul style="list-style-type: none"> <li>• <a href="#">Power Management</a>: Power Management</li> </ul>
<p>Software</p>	<ul style="list-style-type: none"> <li>• <a href="#">FreeMASTER Run-Time Debugging Tool</a></li> <li>• <a href="#">RTCESL</a>: Real Time Control Embedded Software Motor Control and Power Conversion Libraries</li> <li>• <a href="#">Model-Based Design Toolbox (MBDT)</a></li> </ul>
<p>Transceiver</p>	<ul style="list-style-type: none"> <li>• <a href="#">CAN Transceivers</a>: CAN Transceivers</li> <li>• <a href="#">CAN with Flexible Data Rate</a>: High Speed CAN with Flexible Data Rate (CAN FD)</li> <li>• <a href="#">CAN Signal Improvement</a>: CAN Signal Improvement Capability (SIC)</li> <li>• <a href="#">Secure CAN Transceivers</a>: Secure TJA115x CAN Transceiver Family</li> </ul>

Security (EdgeLock Discrete)

- [SE050](#): EdgeLock® SE050: Plug and Trust Secure Element Family – Enhanced IoT security with high flexibility

View our complete solution for [Motor Drives](#).

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

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