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)               | * MCX A14x/15x MCUs with Arm® Cortex® M33, Scalable Device Options, Low Power and Intelligent Peripherals  
|                                    | • MCX-N94X-N54X: MCX N94x/54x Highly Integrated Multicore MCUs with On-chip Accelerators, Intelligent Peripherals and Advanced Security  
|                                    | • i.MX RT Crossover MCUs: i.MX RT Crossover MCUs  
|                                    | • MPC5775B and MPC5775E Microcontrollers for Battery Management Systems (BMS) and Inverter Applications |
| AC/DC                              | * AC-DC Solutions: AC-DC Solutions  
|                                    | • TEA19363LT: GreenChip SMPS Primary Side Control IC with QR/DCM Operation and Active x-Capacitor Discharge |
| Wired Interfaces                   | * CAN Transceivers: CAN Transceivers  
|                                    | • UARTs: UARTs  
| I²C Expanders                       | * I²C-Bus Repeaters/Hubs/Extenders: I²C-Bus Repeaters/Hubs/Extenders  
|                                    | • PCAL9722: 22-Bit SPI I/O Expander with Agile I/O Features  
|                                    | • PCAL9714: 14-Bit SPI I/O Expander with Agile I/O Features  
|                                    | • PCAL6416A: Low-Voltage Translating 16-Bit I²C-Bus/SMBus I/O Expander |
### 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
- GD3000: 3-Phase Brushless Motor Pre-Driver

### Temperature Sensor
- P3T1035xUK: I3C, I²C-Bus, ±0.5 °C Accuracy, Digital Temperature Sensor
- P3T2030xUK: I3C, I²C-Bus, 2.0 °C Accuracy, Digital Temperature Sensor
- 3C/PC Digital Temp. Sensors: I3C/I²C Digital Temperature Sensors
- PCT2075: I²C-Bus Fm+, 1 Degree C Accuracy, Digital Temperature Sensor And Thermal Watchdog

### PMIC
- PMICs and SBCs: Power Management Integrated Circuits (PMICs) and System Basis Chips (SBCs)
- UJA1169ATK: Mini High-Speed CAN System Basis Chip

### Ethernet PHY
- Ethernet: Ethernet

### Security (EdgeLock Discrete)
- EdgeLock® SE050: Plug and Trust Secure Element Family – Enhanced IoT security with high flexibility
- Authentication: IoT Secure Elements and Authenticators

## AC and VFD Block Diagram

![AC and VFD Block Diagram](image)

### Recommended Products for AC and VFD

**Controllers (MCU)**
- MCX A14x/15x MCUs with Arm® Cortex® M33, Scalable Device Options, Low Power and Intelligent Peripherals
- MCX-N94x/N54x: MCX N94x/54x Highly Integrated Multicore MCUs with On-chip Accelerators, Intelligent Peripherals and Advanced Security
- LMX RT Crossover MCUs: LMX RT Crossover MCUs
- KV Series Arm Cortex-M4/M0+/M7: KV Series: Real-Time Motor Control and Power Conversion MCUs Based on Arm® Cortex® M0+/M4/M7
- KE Series Arm Cortex-M4/M0+: Kinetis® E Series: 5V, Robust Microcontrollers (MCUs) Based on Arm® Cortex® M0+/M4 Core
- LPC553x/S3x: Advanced Analog Arm® Cortex®-M33-Based MCU Family
- MCX Arm Cortex-M: MCX Industrial and IoT Microcontrollers
### Portable Brushed DC Motor Block Diagram

![Portable Brushed DC Motor Block Diagram](image)

**Recommended Products for Portable Brushed DC Motor**

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
</table>
| **MCU** | - MCX A14x/15x MCUs with Arm® Cortex® M33, Scalable Device Options, Low Power and Intelligent Peripherals  
- MCX-N94x-N54x: MCX N94x/54x Highly Integrated Multicore MCUs with On-chip Accelerators, Intelligent Peripherals and Advanced Security  
- KE Series Arm Cortex-M4/M0+: Kinetis® E Series: 5V, Robust Microcontrollers (MCUs) Based on Arm® Cortex®-M0+/M4 Core |

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### Voltage Regulator

- **Power Management:** Power Management  
- **PF5020:** Multi-Channel (5) PMIC for Automotive Applications – 4 High Power and 1 Low Power, Fit for ASIL B Safety Level  
- **PF1550:** PMIC with 1A Li+ Linear Battery Charger for Low Power Processor Systems

### Power Stage 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  
- **GD3000:** 3-Phase Brushless Motor Pre-Driver  
- **MC34937:** Three Phase Field Effect Transistor Pre-driver

### 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  
- **GD3000:** 3-Phase Brushless Motor Pre-Driver

### Wired Interfaces

- **CAN Transceivers:** CAN Transceivers  
- **Ethernet:** Ethernet  
- **UARTs:** UARTs  
- **I²C, SPI, I3C Interface Devices:** I²C, SPI, I3C Interface Devices

### Security (EdgeLock Discrete)

- EdgeLock® SE050: Plug and Trust Secure Element Family – Enhanced IoT security with high flexibility
<table>
<thead>
<tr>
<th>Category</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCX Arm Cortex-M</td>
<td>MCX Industrial and IoT Microcontrollers</td>
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<tr>
<td>LPC800 Arm Cortex-M0+</td>
<td>LPC800 Series: Low-Cost Arm® Cortex®-M0+-Based MCUs</td>
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<tr>
<td>AC/DC</td>
<td>AC-DC Solutions: AC-DC Solutions</td>
</tr>
<tr>
<td></td>
<td>TEA19363LT: GreenChip SMPS Primary Side Control IC with QR/DCM Operation and Active x-Capacitor Discharge</td>
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<tr>
<td>Battery Charger</td>
<td>Battery Chargers: Battery Chargers</td>
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<tr>
<td></td>
<td>MC34671: 600 mA Single-Cell Li-Ion / Li-Polymer Battery Charger</td>
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<td>Security (EdgeLock Discrete)</td>
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<td>Authentication: IoT Secure Elements and Authenticators</td>
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<td></td>
<td>P3T2030xUK: I3C, I²C-Bus, 2.0 °C Accuracy, Digital Temperature Sensor</td>
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<tr>
<td></td>
<td>I3C/I²C Digital Temp. Sensors: I3C/I²C Digital Temperature Sensors</td>
</tr>
<tr>
<td>Full-Bridge</td>
<td>BLDC, H-Bridge, Stepper: BLDC, H-Bridge and Stepper Motor Drivers</td>
</tr>
<tr>
<td>Full-Bridge or Half-Bridge</td>
<td>BLDC, H-Bridge, Stepper: BLDC, H-Bridge and Stepper Motor Drivers</td>
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<tr>
<td></td>
<td>MC33926: H-Bridge, Brushed DC Motor Driver, 5-28 V, 5 A, 20 kHz</td>
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<tr>
<td></td>
<td>HB2000: SPI Programmable 10 A H-Bridge Brushed DC Motor Driver</td>
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<tr>
<td></td>
<td>BLDC, H-Bridge, Stepper: BLDC, H-Bridge and Stepper Motor Drivers</td>
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<tr>
<td>RTC</td>
<td>Real-Time Clocks: Real-Time Clocks</td>
</tr>
<tr>
<td>Wi-Fi</td>
<td>Wireless Connectivity: Wireless Connectivity</td>
</tr>
</tbody>
</table>

**Brushless DC Motor (BLDC) Control Block Diagram**

[Diagram of Brushless DC Motor (BLDC) Control Block Diagram with labeled components such as Voltage Regulator, ADC, PWM, Decoder, Power Stage Driver, FreeMaster Tool, Security (EdgeLock Discrete), Transceiver, and Hall Sensors. Diagram uses color coding: NXP Technology, Non NXP Technology, Optional Technology.]
## Recommended Products for Brushless DC Motor (BLDC) Control

### MCU/DSC
- MCX A14x/15x MCUs with Arm® Cortex® M33, Scalable Device Options, Low Power and Intelligent Peripherals
- MCX-N94X-N54X: MCX N94x/54x Highly Integrated Multicore MCUs with On-chip Accelerators, Intelligent Peripherals and Advanced Security
- S32M2: S32M2 Integrated Solution for 12V Motor Control
- KV Series Arm Cortex-M4/M0+/M7: KV Series: Real-Time Motor Control and Power Conversion MCUs Based on Arm® Cortex®-M0+/M4/M7
- KE Series Arm Cortex-M4/M0+: Kinetis® E Series: 5V, Robust Microcontrollers (MCUs) Based on Arm® Cortex®-M0+/M4 Core
- Digital Signal Controllers: Digital Signal Controllers
- LPC5500 Arm Cortex-M33: LPC5500 Series: Arm® Cortex®-M33 Based Microcontroller Series for Mass Market, Leveraging 40nm Embedded Flash Technology
- MCX Arm Cortex-M: MCX Industrial and IoT Microcontrollers
- S32K Auto General-Purpose MCUs: S32K Automotive General-Purpose Microcontrollers

### Power Stage 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
- GD3000: 3-Phase Brushless Motor Pre-Driver
- MC33937: 3-Phase Field Effect Transistor Pre-Driver

### Voltage regulator
- Power Management: Power Management

### Software
- FreeMASTER Run-Time Debugging Tool
- RTCESL: Real Time Control Embedded Software Motor Control and Power Conversion Libraries
- Model-Based Design Toolbox (MBDT)

### Transceiver
- CAN Transceivers: CAN Transceivers
- CAN with Flexible Data Rate: High Speed CAN with Flexible Data Rate (CAN FD)
- CAN Signal Improvement: CAN Signal Improvement Capability (SIC)
- Secure CAN Transceivers: Secure TJA115x CAN Transceiver Family

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

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**View our complete solution for Motor Drives.**

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

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