



S32K344 Brushless Direct Current and Permanent Magnet Synchronous Motor Control Development Kit

MCSPTE1AK344

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The MCSPTE1AK344 is a development kit engineered for brushless direct current (BLDC) motor control, targeting heating, ventilation and air conditioning (HVAC) or electric pumps, and 3-phase permanent magnet synchronous motor (PMSM) control, targeting active suspension, electric powertrain, eTurbo or belt start generator.

Based on the 32-bit Arm® Cortex®-M7 S32K3 microcontroller and the GD3000 pre-driver, the MCSPTE1AK344 enables rapid prototyping and evaluation of BLDC and PMSM control applications without having to wait for the final hardware design.

The MCSPTE1AK344 application software leverages the Automotive Math and Motor Control Library (AMMCLib) set plus Real-Time Drivers (RTD) software package to provide a complete reference implementation for both 3-phase BLDC and PMSM motor control.

The RTD software allows building motor control applications for both AUTOSAR® and non-AUTOSAR environments.

The diagram illustrates the system architecture for the S32K344, showing the integration of various components for motor control:

- Real-Time Drivers for S32K3** and **Automotive Math and Motor Control Library Set for S32K3** provide the core control logic.
- FreeMASTER** is used for development and debugging via **LPUART**.
- Start/Stop** and **Fault** signals are managed through **SIUL** and **LPSPi**.
- The **3-Phase Low-Voltage Power Stage** is connected to a **U_Dc bus** and a **BLDC** motor.
- The **GD3000** microcontroller manages the power stage and provides **Udc_bus** and **Idc_bus** signals.
- RTD Drivers** are used for temperature monitoring, connected to **TRGMUX** and **BCTU**.
- ADC** and **TRGMUX** are used for signal processing, including **Bemf_a**, **Bemf_b**, **Bemf_c**, **Hall_a**, **Hall_b**, and **Hall_c**.
- Application Control** block manages the **Required Speed (RPM)** and **Required Current Limit**.
- Speed PI Controller** and **Current Limitation PI Controller** are used for closed-loop control.
- Speed, Current Calculation** block processes **Actual Speed (RPM)** and **Actual Motor Current**.
- Zero Cross Detection** block is used for sensorless motor control, providing **CMT Sector** and **Zero-Crossing Period** signals.
- Legend:**
 - Blue line: Sensorless
 - Orange line: Hall sensor

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View additional information for [S32K344 Brushless Direct Current and Permanent Magnet Synchronous Motor Control Development Kit](#).

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