

Automotive
motor control
development
solutions

3-Phase PMSM Development Kit with MPC5744P MCU

The MTRCKTSPS5744P development kit demonstrates the advantages of the NXP® MPC5744P MCU for motor control applications with a three-phase permanent magnet synchronous motor (PMSM) and resolver position sensor.

OVERVIEW

The MTRCKTSPS5744P development kit serves as an example of a motor control design using the NXP family of automotive motor control MCUs based on a 32-bit embedded Power Architecture® technology optimized for a full range of automotive applications.

KEY FEATURES

- ▶ **MPC5744P MCU**—32-bit NXP MCU suitable for ISO 26262 ASIL-D and IEC61508 SIL2/3 safety applications
- ▶ **Low-voltage power stage**—three-phase power stage with SMARTMOS® MC33937A FET pre-driver
- ▶ **System-level Functional Safety**—With MPC5744P MCU and FS65 System Basis Chip
- ▶ **Motor control algorithm**—torque and speed field-oriented (vector) control with resolver sensor
- ▶ **Math and motor control library set**—control algorithm built on blocks of precompiled software library

TARGET APPLICATIONS

- ▶ Braking and stability control
- ▶ Electric power steering
- ▶ Active suspension
- ▶ Hybrid electric vehicles
- ▶ Transmissions and gearbox



ENABLEMENT TOOLS

Development hardware

- ▶ MPC5744P controller board (MPC5744PMCBUM) with JTAG® and NEXUS debug interface
- ▶ Low-voltage three-phase H-bridge power stage
- ▶ Three-phase 24 V PMSM

Runtime software

- ▶ Speed FOC PMSM example software
- ▶ Example software in S32DS IDE for PPC
- ▶ FreeMASTER project part of software package
- ▶ MCAT tool 1.0 available

SUCCESS STORIES

- ▶ Capability to drive a wide range of electric motors thanks to tightly interconnected motor control peripherals, IPs
- ▶ Designed to meet the functional safety requirements

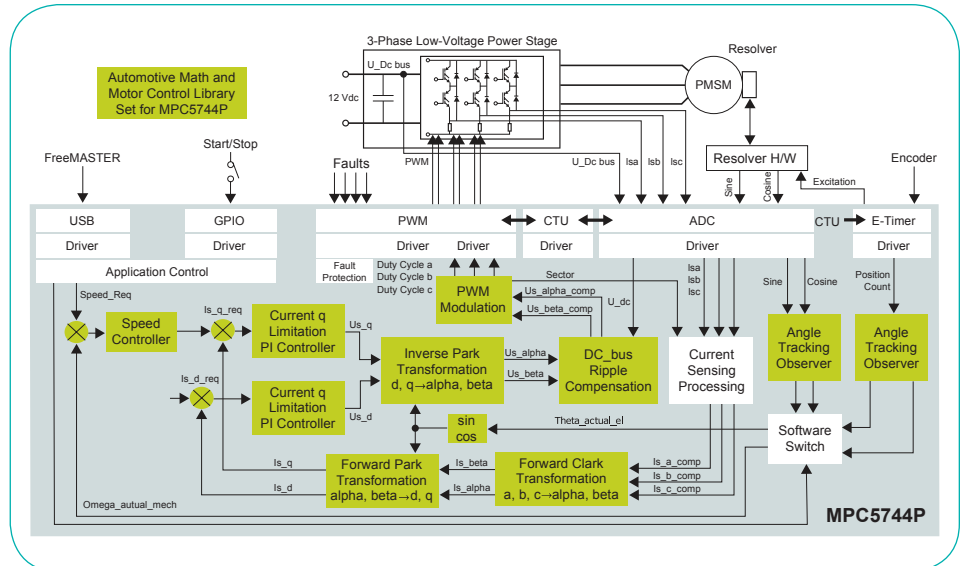
ORDERABLE SAMPLES

Part Number	Motor	Sensor
MTRCKTSP5744P	PMSM	Resolver

3-PHASE BLDC DEVELOPMENT KIT WITH S32K144

Flash	2.5 MB	PWM	2 x FlexPWM
RAM	384 KB	Timers	3 x eTimer (6-ch.) 1 x PIT (4-ch.)
Core	2 x e200z4 cores, delayed lock step	ADC	4 x 12 bit (16-ch.)
Speed	up to 200 MHz	Trigger Unit	2 x CTU
Package	257 MAPBGA	Comms	2 x SCI, 4 x SPI
Temp	+150 °C Tj	Position Fbc	Resolver, encoder
Clock	16 MHz – int. 40 MHz – ext.	BEMF Fbc	YES

MOTOR CONTROL ALGORITHM CONCEPT



3-PHASE PMSM DEVELOPMENT KIT WITH MPC5744P

