



# MPC5643L 3-phase PMSM Development Kit

## MTRCKTDPS5643L

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The MTRCKTDPS5643L motor control development kit is ideal for applications requiring two PMSM motors, like active suspension or electric powertrain. The kit is designed to enable rapid prototyping and evaluation of the motor control application without having to wait for the final hardware design. The kit includes a 32-bit NXP® [MPC5643L](#) based controller board and the 3-phase low-voltage power stage board.

An integral part of the automotive motor control development kit is the application software which provides a complete reference implementation of the PMSM motor control application and also takes advantage of the Automotive Math and Motor Control Library Set.

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## Resolver Driver and Interface

The diagram illustrates the architecture of a Resolver Driver and Interface system, centered around the MPC5643L microcontroller.

**MPC5643L Microcontroller:**

- Tracking Observer Algorithm Software:** Processes Sine and Cosine samples to perform Tracking Observer Computation, outputting Position, Speed, and # Revolutions.
- Cross Triggering Unit:** Manages synchronization between the ADC and the Timer.
- ADC (Analog-to-Digital Converter):** Receives signals from the Resolver Physical Layer.
- Timer:** Provides synchronization signals to the ADC and the Resolver Physical Layer.
- PWM (Pulse Width Modulation):** Outputs control signals to the 3-Phase Low-Voltage Power Stage.

**Resolver Physical Layer:**

- Differential Amplifier + Filter:** Processes 3.3 V signals from the Resolver.
- Resolver Ref. Driver:** Generates a reference signal for the Resolver, outputting a current  $I_{ref}$  of 20-100 mA.
- Resolver:** Receives  $U_{ref}$  and GND signals, and outputs position signals  $U_{cos}$  and  $U_{sin}$ .

**3-Phase Low-Voltage Power Stage:**

- Powered by a 12 Vdc supply.
- Receives PWM signals from the MPC5643L.
- Outputs three phase currents ( $I_a$ ,  $I_b$ ,  $I_c$ ) and a  $U_{Dc}$  bus signal.

**Motor:**

- Connected to the 3-Phase Low-Voltage Power Stage.
- Outputs position signals  $U_{cos}$  and  $U_{sin}$ .

View additional information for [MPC5643L 3-phase PMSM Development Kit](#).

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

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