



# MPQ4385

36V, 25A Low EMI

Synchronous Step-Down Converters  
With ZDP™ AEC-Q100 Qualified

**PRELIMINARY SPECIFICATIONS SUBJECT TO CHANGE**

## DESCRIPTION

The MPQ4385 is a frequency programmable (200k to 2.5MHz) synchronous step-down switching regulator with integrated internal high-side and low-side power MOSFET. It provides a highly efficient 12A to 25A output with fixed frequency Zero-Delay PWM Control for an optimal transient response. The wide 3.3V to 36V input range accommodates a variety of step-down applications in the automotive environment. A 1.5μA shutdown mode quiescent current allows use in battery-powered applications.

High power conversion efficiency over a wide load range is achieved by scaling down the switching frequency at light load condition to reduce the switching and gate driving losses. An open drain power good signal indicates the output is within 95% to 105% of its nominal voltage.

Frequency fold-back helps prevent inductor current runaway during start-up. Thermal shutdown provides reliable, fault-tolerant operation. High-duty cycle and low drop-out mode are provided for the automotive cold crank condition. The MPQ4385 is available in TQFN-32 (5mmx6mm) package.

## FEATURES

- **Designed for Automotive Transients**
  - Input Voltage Range from 3.3V to 36V
  - Load Dump up to 42V
  - Low Dropout Mode with Soft Recovery
  - AEC-Q100 Grade 1
- **Highly Scalable Family**
  - 12A to 25A Output Current Versions in Pin-Compatible Family
  - Multi-Phase Capable up to 8-Phase
- **Designed for High Performance and Reduced Component Overhead**
  - ZDP™ Control for Extremely Fast Transient Response and Minimized External Capacitors
  - ±0.5% Output Accuracy, ±1% PG accuracy

- Fixed or Adjustable Output Voltage Options
- Fixed Output<sup>(1)</sup>: 0.8V, 1V, 1.2V, 1.8V, 2.5V, 3.3V, 3.8V, 5V
- Adjustable Output up to 12V
- Output Discharge from SWD
- 25ns Minimum On Time to allow high ratio conversion
- **High Efficiency for Increased Battery Life and Improved Thermals**
  - Standby Current 14μA
  - Advanced Asynchronous Mode (AAM) Increases Efficiency under Light Loads
  - Integrated Low Resistance High-Side and Low-Side MOSFETs (5.25mΩ/3.35mΩ)
  - Thin QFN package to facilitate top side cooling
- **Optimized for Low EMC/EMI**
  - 200kHz to 2.5MHz Programmable Frequency
  - Symmetric VIN Pinout Placement
  - Low Noise at High Frequency Band by Quiet-FET™ Advanced Switching Technology
  - Frequency Spread Spectrum Modulation
  - Synchronization to an External Clock
  - CISPR25 Class 5 Compliant
  - Mesh-Connect™ Package in TQFN-32 (5mmx6mm) with Wettable Flanks
- **Functional Safety System Design Capability**
  - MPSafe™-Compatible: Functional Safety Supporting Document Available



## APPLICATIONS

- Automotive High Power Pre-regulator
- Infotainment System
- ADAS Compute Modules
- Sensor Fusion

### Note:

1) Refer to ORDERING INFORMATION section for exact availability of each fixed output version. Additional output voltages may be available. Contact MPS for details.

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