MPQ5836

55V, 7A, Integrated Smart Diode with -60V Reverse Protection AEC-Q100 Qualified

PRELIMINARY SPECIFICATIONS SUBJECT TO CHANGE

DESCRIPTION

The MPQ5836 is an integrated smart diode designed to provide a compact solution for 50W to 170W ECU systems with the most simplified external circuity.

The device's 2µA standby current makes it ideal for battery-powered applications. The MPQ5836 integrates a 20mΩ N-MOSFET and an internal charge pump, which supports the nominal load up to 7A continuous current and makes the device minimize the power loss between input and output. The ultra-fast transient response ensures the part to rectify AC frequency up to 100kHz.

Besides the reverse polarity protection and reverse pulse protection, the MPQ5836 also provides multiple diagnostics during fault conditions such as under voltage (UV), over voltage (OV), over current (OC), as well as over temperature (OT).

With an extreme low under voltage lockdown (UVLO) threshold, the device provides a wide operation range to meet the harsh startup conditions defined in ISO16750. The device can support cold crank voltage down to 0V.

The MPQ5836 is available in a QFN-21 (3mm x 4mm) package.

FEATURES

- Built to Handle Tough Automotive Transients and AEC-Q100 Requirement
  - 5V-55V Startup Voltage
  - -60V Reverse Polarity Voltage
  - Load Dump Up to 60V
  - Cold Crank Down to 0V
  - Rectifies AC Frequency Up to 100kHz
  - Fast On with +300mV Forward Drop
  - Fast Off with -8mV Forward Drop
  - Strong Gate Drive Ability: 120mA Pull-Up and 2600mA Pull-Down
  - AEC-Q100 Grade-1

FEATURES *(continued)*

- Extends Vehicle Battery Life
  - Low Quiescent Current in Standby (2µA)
  - Low Quiescent Current in Steady State (80µA)
- Reduces Board Size
  - Integrated 20mΩ N-MOSFET and Charge-pump
  - QFN-21 (3mm x 4mm) Package
- Robust Protection and Diagnostic
  - Input Voltage Monitor and UV/OV Indicator
  - Input Voltage Sensing
  - An Independent Voltage Monitor and UV Indicator
  - Selectable OV/UV Thresholds
  - Over Current Diagnostics
  - Over Temperature Diagnostics
  - Fault Reporting
- Additional Features
  - 1.8V, 3.3V and 5V Logic Compatible
  - Available in Wettable Flank
- Functional Safety System Design Capable
  - MPSafe™ Compatible-Functional Safety Supporting Document Available

MPSafe™ Fusa Compatible

APPLICATIONS

- Automotive System Protection
- Automotive ADAS System
- Automotive Infotainment Systems
- Industrial Equipment
- Battery Powered Systems

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TYPICAL APPLICATION

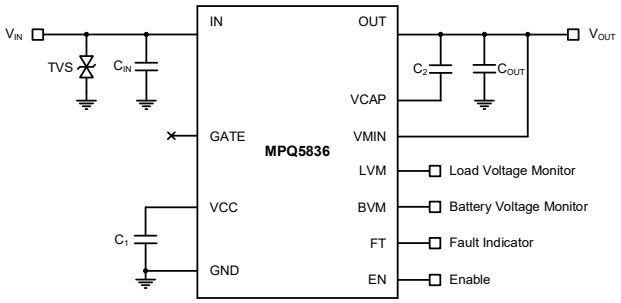
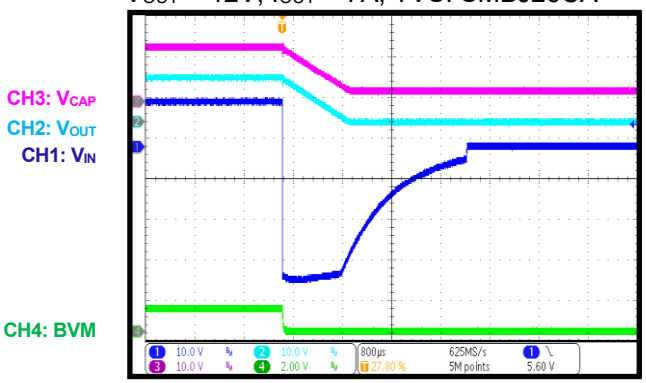


Figure 1: 12V Automotive Battery Application

Negative Pulse

V_{OUT} = 12V, I_{OUT} = 7A, TVS: SMBJ26CA



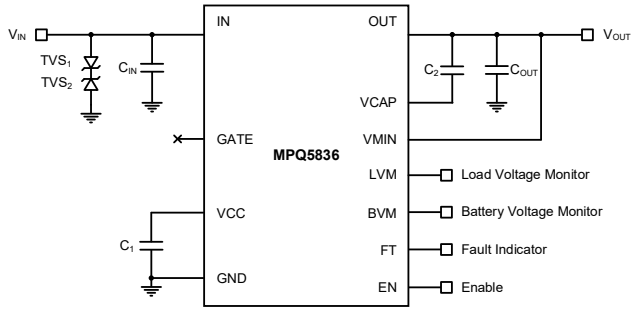
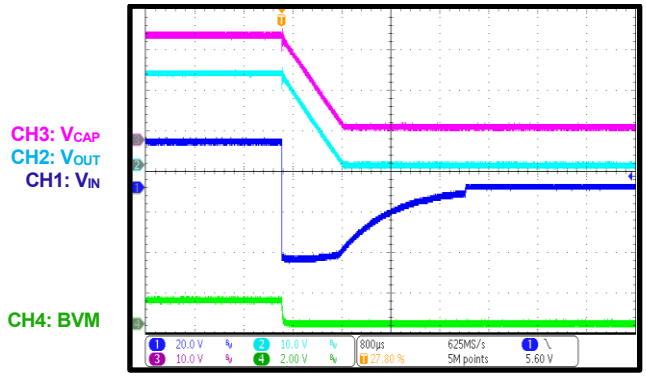


Figure 2: 24V Automotive Battery Application

Negative Pulse

V_{OUT} = 24V, I_{OUT} = 7A, TVS: SMBJ36A+ SMBJ26A



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