Brief Description

The ZSPM4121 battery management load switch can be used to protect a battery from excessive discharge. It actively monitors the battery voltage and disconnects the battery from the load if the battery drops below a set voltage threshold. When the input battery voltage reaches 500mV above the set voltage threshold, the load switch turns on and connects the battery to the load. The 500mV hysteresis between the Off Mode and the On Mode prevents intermittent operation.

The voltage threshold (V_{THRESH}) can be programmed at manufacturing to a customer-selected set point in the voltage range of 1.2V to 4.2V in 100mV increments to support a wide range of applications in consumer, medical, portable, and industrial applications.

This device has ultra-low quiescent current, which makes it ideal for battery-powered applications. Typical quiescent current is 100pA in the Off Mode and 70nA in the On Mode.

The ZSPM4121 includes a slew rate control P-channel load switch, over-current protection, and an open-drain power indicator pin (NPG). The slew-rate controlled turn-on characteristic prevents inrush current and voltage droop on the voltage. The over-current limit protects the device in case of an overload, short-circuit, or ground fault event.

Benefits

- Best-in-class ultra-low quiescent current in Off Mode: 100pA (typical)
- Ultra-low quiescent current in On Mode: 70nA (typical)
- Accurate on/off voltage threshold
- Low Rds(on): 175mΩ (typical) @ 5V

Features

- Threshold voltage options of 1.2V to 4.2V in 100mV steps (factory programmed)
- Wide input voltage range: 1.2V to 5.5V
- Supervisory over-current limit shutdown: (3A)
- Low drop-out disconnect from VCC to loads
- Controlled turn-on slew rate
- 500mV Off Mode to On Mode hysteresis

Related IDT Smart Power Products

- ZSPM4141 Ultra-Low-Power Linear Regulator

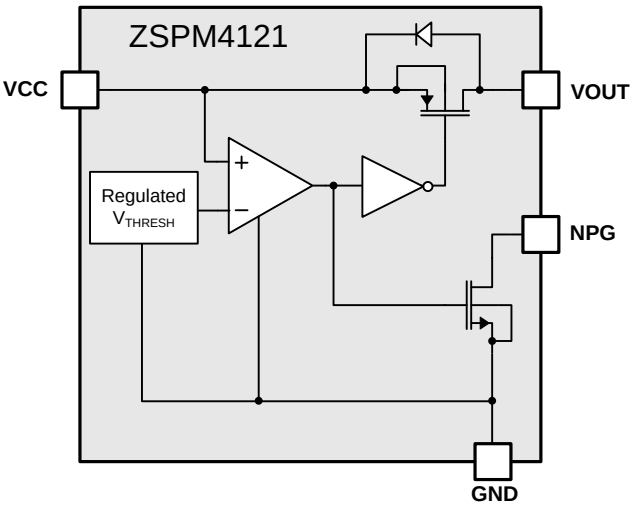
Available Support

- Evaluation Kit
- Support Documentation

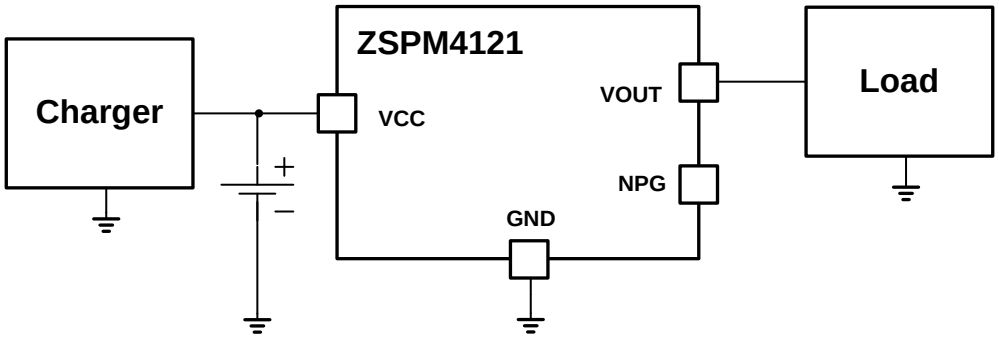
Physical Characteristics

- Package: 8-pin DFN (2mm x 2mm)

ZSPM4121 Block Diagram



Typical Application Circuit



Typical Applications

- Portable batteries
- Industrial
- Medical
- Smart cards
- RFID

Ordering Information

Ordering Code*	Description	Package
ZSPM4121AI1*W*17	ZSPM4121 Under-Voltage Load Switch—V_{THRESH} factory set to 1.7V	8-pin DFN / 7” Reel (2500)
ZSPM4121AI1*W*21	ZSPM4121 Under-Voltage Load Switch—V_{THRESH} factory set to 2.1V	8-pin DFN / 7” Reel (2500)
ZSPM4121AI1*W*23	ZSPM4121 Under-Voltage Load Switch—V_{THRESH} factory set to 2.3V	8-pin DFN / 7” Reel (2500)
ZSPM4121AI1*W*24	ZSPM4121 Under-Voltage Load Switch—V_{THRESH} factory set to 2.4V	8-pin DFN / 7” Reel (2500)
ZSPM4121AI1*W*25	ZSPM4121 Under-Voltage Load Switch—V_{THRESH} factory set to 2.5V	8-pin DFN / 7” Reel (2500)
ZSPM4121AI1*W*26	ZSPM4121 Under-Voltage Load Switch—V_{THRESH} factory set to 2.6V	8-pin DFN / 7” Reel (2500)
ZSPM4121AI1*W*28	ZSPM4121 Under-Voltage Load Switch—V_{THRESH} factory set to 2.8V	8-pin DFN / 7” Reel (2500)
ZSPM4121AI1*W*30	ZSPM4121 Under-Voltage Load Switch—V_{THRESH} factory set to 3.0V	8-pin DFN / 7” Reel (2500)
ZSPM4121KIT	ZSPM4121 Evaluation Kit	

* For a 13” reel (3300 parts), replace the W in the ordering code with an R. Custom V_{THRESH} values are also available: 1.2V to 4.2V (typical) in 100mV increments.

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