MAX20438

Ultra-High-Efficiency, Low-Voltage Buck Converter

General Description

The MAX20438 is an ultra-high-efficiency switching regulator that delivers up to 12A load current from 0.5V to 1.2V. The IC operates from 2.5V to 5.5V, making it ideal for on-board, point-of-load (PoL) and post regulation applications. The total output error is less than ±1.0% over load, line, and temperature.

The MAX20438 features adaptive on-time with a switching frequency of 2.1MHz or 4.2MHz. High-frequency operation allows for small-size, all-ceramic capacitor design.

The low-resistance, on-chip switches ensure high efficiency at heavy loads while minimizing critical inductances, making the layout a much simpler task with respect to discrete solutions.

The device features the MAXQ® power architecture which provides precision transient performance and phase margin. This allows obtaining the maximum power, performance, and precision from the converter over a very wide range of configurations.

The output voltage is preset at the factory to allow customers to achieve ±1% output-voltage accuracy without using expensive 0.1% resistors. The device offers factory-programmable soft-start and $\overline{\text{RESET}}$ times.

The device includes overtemperature shutdown and overcurrent limiting. The MAX20438 is designed to operate in the -40°C to +125°C ambient temperature range.

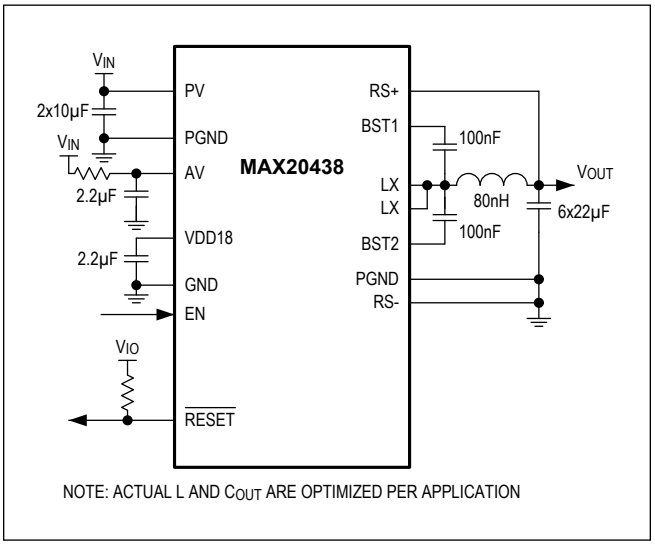
Applications

- Secondary Regulator for SoC/MCU Supply
- PoL and Post-Regulation Applications

Benefits and Features

- High Feature Set in Ultra-Small Footprint
  - High-Efficiency DC-DC Converter
  - Up to 12A Output Current
  - 2.5V to 5.5V Operating Supply Voltage
  - Optional Factory-Preset Output Voltage
  - 2.1MHz/4.2MHz Options
  - Enable Input
  - $\overline{\text{RESET}}$ Output
  - Spread-Spectrum Option
  - Adaptive On-Time
  - 3mm x 3.5mm FCQFN
- High Precision
  - 107%/93% OV/UV Monitor
  - ±2% OV/UV Accuracy
  - ±1% Output Voltage Accuracy
  - Excellent Load Transient Performance
  - Differential Remote Sense
  - PWM and SKIP Mode Operation
  - MAXQ Power Architecture
- Ultra-High Efficiency
  - Up to 93% Efficiency 5V to 1V
- -40°C to +125°C Operating Temperature Range
- AEC-Q100 Qualified

Simplified Block Diagram



NOTE: ACTUAL L AND C_{OUT} ARE OPTIMIZED PER APPLICATION

Visit Web Support to complete the nondisclosure agreement (NDA) required to receive additional product information.

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***Ordering Information** appears at end of data sheet.*

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