*Click **here** to ask an associate for production status of specific part numbers.*

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.

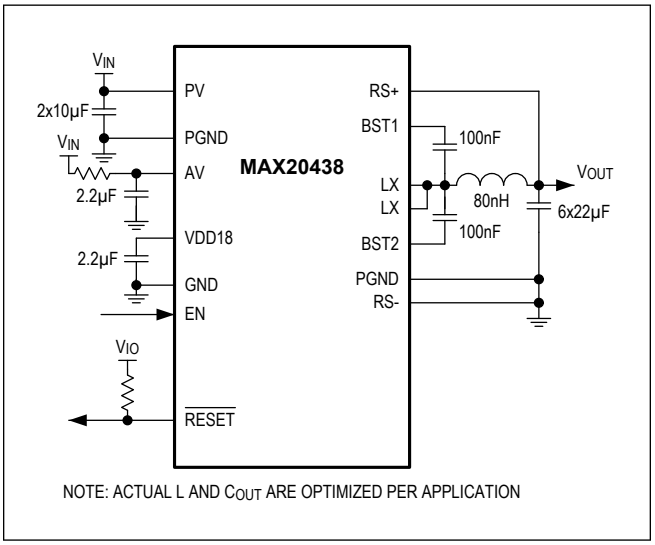
Applications

- 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

MAXQ is a registered trademark of Maxim Integrated Products, Inc.

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

19-101606; Rev 1; 2/24

© 2024 Analog Devices, Inc. All rights reserved. Trademarks and registered trademarks are the property of their respective owners.

One Analog Way, Wilmington, MA 01887 U.S.A. | Tel: 781.329.4700 | © 2024 Analog Devices, Inc. All rights reserved.

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.