

2.2MHz Sync Boost and Step-Down Converters with Programmable Watchdog

General Description

The MAX20413 is a high-efficiency, two-output, low-voltage DC-DC converter. OUT1 boosts the input supply up to 8.5V at up to 750mA, while a synchronous step-down converter operates from a 3.0V to 5.5V input voltage range and provides a 0.8V to 3.8V output voltage range at up to 3A. The boost converter achieves $\pm 2\%$ and the buck converter achieves $\pm 1.5\%$ output error over load, line, and temperature range.

The IC features a 2.2MHz fixed-frequency pulse-width modulation (PWM) mode for better noise immunity and load-transient response, and a pulse-frequency-modulation mode (skip) for increased efficiency during light-load operation. The 2.2MHz frequency operation allows for the use of all-ceramic capacitors and minimizes external components. The programmable spread-spectrum frequency modulation minimizes radiated electromagnetic emissions. Integrated low $R_{DS(ON)}$ switches improve efficiency at heavy loads, and make the layout a much simpler task with respect to discrete solutions.

The IC's step-down regulator can be configured with either a factory-preset or resistor-adjustable output voltage (see the *Ordering Information/Selector Guide* for options). Other features include soft-start, overcurrent, and overtemperature protections.

Benefits and Features

- Multiple Functions for Small Size
 - Synchronous 750mA Boost Converter
 - Fixed from 3.8V to 8.5V in 100mV Steps
 - Synchronous Buck Converter Up to 3A
 - Fixed from 0.8V to 3.8V in 25mV Steps
 - External Resistor-Adjustable
 - Programmable Windowed Watchdog
 - 3.0V to 5.5V Operating Supply Voltage
 - 2.2MHz Operation • Individual Channel $\overline{\text{RESET}}_1$ Outputs
 - High-Precision for ASIL Applications
 - $\pm 2\%$ Output-Voltage Accuracy (OUT1) and $\pm 1.5\%$ Output-Voltage Accuracy (OUT2)
 - $\pm 1.5\%$ Overvoltage/Undervoltage Monitoring Accuracy
 - Excellent Load-Transient Performance
- Diagnostics and Redundant Circuits
 - ASIL-C Compliant • Redundant Reference
 - Fail Safe on Open Pins
 - Shorted-Pin Detection on $\overline{\text{RESET}}_1/\overline{\text{RESET}}_2$
 - Input Overvoltage Detection
- Robust for the Automotive Environment
 - Current-Mode, Forced-PWM and Skip Operation
 - Overtemperature and Output Short-Circuit Protection
 - 4mm x 4mm 24-Pin TQFN with Exposed Pad
 - -40°C to $+125^\circ\text{C}$ Automotive Temperature Range

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

Rev. 1

DOCUMENT FEEDBACK

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