

## General Description

The MAX20419 is a high-efficiency, 3-output, low-voltage DC-DC converter IC. OUT1 boosts the input supply to 5V at up to 750mA, while two synchronous step-down converters operate from a 3.0V to 5.5V input voltage range and provide a 0.8V to 3.8V output voltage range at up to 3.6A. The boost converter achieves  $\pm 1.9\%$  and the buck converters achieve  $\pm 1.4\%$  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 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 is offered with factory-preset output voltages (see the [Ordering Information/Selector Guide](#) for available options). Other features include soft-start, overcurrent, and overtemperature protections. The MAX20419 also has several redundancy and diagnostic features for compatibility with ASIL-rated applications.

## Applications

- Advanced Driver-Assistance Systems (ADAS)
- Infotainment
- SoC Power

## Benefits and Features

- Multiple Functions for Small Size
  - Synchronous 750mA Boost Converter
  - Fixed at 5V Output
  - Dual Synchronous Buck Converters up to 3.6A
    - Factory Configurable from 0.8V to 3.8V in 25mV Steps
  - Programmable Windowed Watchdog
  - 3.0V to 5.5V Operating Supply Voltage
  - 2.2MHz Operation
  - Individual RESET<sub>1</sub> Outputs
  - High-Precision Performance
    - $\pm 1.9\%$  Output-Voltage Accuracy (OUT1) and  $\pm 1.4\%$  Output-Voltage Accuracy (OUT2, OUT3)
    - $\pm 1.3\%$  OV/UV Monitoring (OUT1–OUT3, PV)
    - Excellent Load-Transient Performance
- Diagnostics and Redundant Circuits
  - ASIL C Compliant
  - Redundant Reference
  - Fail Safe on Open Pins
  - Shorted Pin Detection on RESET<sub>1</sub>–RESET<sub>3</sub>
  - Input Overvoltage Detection
- Robust for the Automotive Environment
  - Current Mode, Forced-PWM, and Skip Operation
  - Overtemperature and Short-Circuit Protection
  - 24-Pin (4mm x 4mm) TQFN with Exposed Pad
  - $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  Automotive Temperature Range

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[Ordering Information/Selector Guide](#) appears at end of data sheet.

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## Typical Operating Circuit



