

MAX20419

High-Efficiency, 3-Output, Low-Voltage DC-DC Converter

Small Automotive PMIC for ADAS Applications Requiring ASIL



NDA Required. [Request Full Data Sheet](#)

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.

Key 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 Active-Low RESET_ Outputs
 - High-Precision Performance
 - $\pm 1.9\%$ Output-Voltage Accuracy (OUT1) and
 - $\pm 1.4\%$ Output-Voltage Accuracy (OUT2, OUT3)

- ±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 Active Low-RESET1–RESET3
 - 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 °C to +125 °C Automotive Temperature Range

Applications/Uses

- ADAS
- Infotainment
- SOC Power

➤ [See parametric specs for Multifunction PMICs \(85\)](#)

Part Number	Primary Topology	Monitor/Control Features	DC-DC/Power Features	V _{IN} (V)		V _{OUT} (V)		Max. I _{OUT} (A)	Oper. Freq. (kHz)	Package/Pins	Budgetary Price		
				min	max	min	max						
MAX20419	Step-Down	Output OVP	Avg. Current Mode Control	3	5.5	0.8	3.8	3.6	2000	TQFN-CU/24			
		Output UVP							2200				
	Step-Up	Reset Output							Current Limit				
	Step-Up/Down											Fixed Freq./PWM	
													Internal Switch

➤ [See parametric specs for Step-Down/Up Switching Regulators \(30\)](#)

Part Number	V _{OUT1} (V)	V _{OUT1} (V)	V _{OUT1} Tolerance (±%)	I _{OUT1} (A)	I _{OUT1} (A)	Switch Type	Synchronous Switching	Power Good Signal	Alternate Topology	Package/Pins
	min	max		max	max					
MAX20419	0.8	5.3	2	0.8	3	Internal	Yes	Yes	Step-Down Step-Up	See Data Sheet