

MAX25249/MAX25249B

Four-Output Mini PMICs for Camera Applications

General Description

The MAX25249/MAX25249B are high-efficiency, four-output PMICs that integrate three DC-DC converters and a high-PSRR LDO, with OV/UV monitoring on all outputs. OUT1 is a 1A high-voltage synchronous step-down converter operating from power over coax or car battery. OUT2 and OUT3 low-voltage synchronous step-down converters operate from OUT1 and provide a 0.8V to 3.9875V output voltage range. OUT2 can deliver 1.2A for high-megapixel cameras and high-speed serializers. OUT3 can deliver 1.2A to power the secondary rails of the imager, serializer, and MCU. OUT4 is a low-voltage, low-noise, high-PSRR LDO for imager power. All buck converters achieve $\pm 1.5\%$ output voltage accuracy over load, line, and temperature range. Overvoltage and undervoltage faults are monitored with $\pm 1.3\%$ accuracy around the set voltage, and errors are communicated through $\overline{\text{RESET}}$.

The devices feature a 2.2MHz fixed-frequency PWM mode for better noise immunity and load-transient response. The high-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- $R_{\text{DS(ON)}}$ switches improve efficiency at heavy loads and make layout simpler than discrete solutions.

Sequencing through the use of EN23 and EN4 pins and factory-settable output voltages increases flexibility for different image sensors and configurations. Other features include soft-start, overcurrent, and overtemperature protections. The MAX25249/MAX25249B are compliant with ASIL B ratings and are specified for operation over the -40°C to $+125^{\circ}\text{C}$ automotive temperature range.

Applications

- Surround-View Cameras
- Rear-View Cameras

Benefits and Features

- Multiple Functions for Small Size
 - 1A Synchronous High-Voltage Buck Converter
 - Input Voltage Range 5V to 36V
 - 3V to 4V in 50mV Steps
 - 5V Fixed Output Voltage
 - Two Synchronous Low-Voltage Buck Converters
 - OUT2 and OUT3 Provide up to 1.2A
 - 0.8V to 3.9875V in 12.5mV Steps
 - LDO for Camera Sensor; 50dB at 1kHz
 - 2.2MHz Operation
 - $\overline{\text{RESET}}$ Output – Push-Pull or Open-Drain
- High Precision
 - $\pm 1.5\%$ Output Voltage Accuracy
 - $\pm 1.3\%$ OV/UV Monitoring Accuracy
- Diagnostics and Features
 - ASIL B Compliant
 - Redundant Reference
- Robust for the Automotive Environment
 - Current-Mode, Forced-PWM Operation
 - Overtemperature and Short-Circuit Protection
 - 3.5mm x 3.5mm, 20-Pin TQFN
 - -40°C to $+125^{\circ}\text{C}$ Grade 1 Automotive Temperature Range
 - AEC-Q100 Qualified

Simplified Block Diagram



