

2A Synchronous Step-Down DC/DC Converter Delivers 93% Efficiency at 2MHz and Operates from 3.0V to 42V Inputs

Description

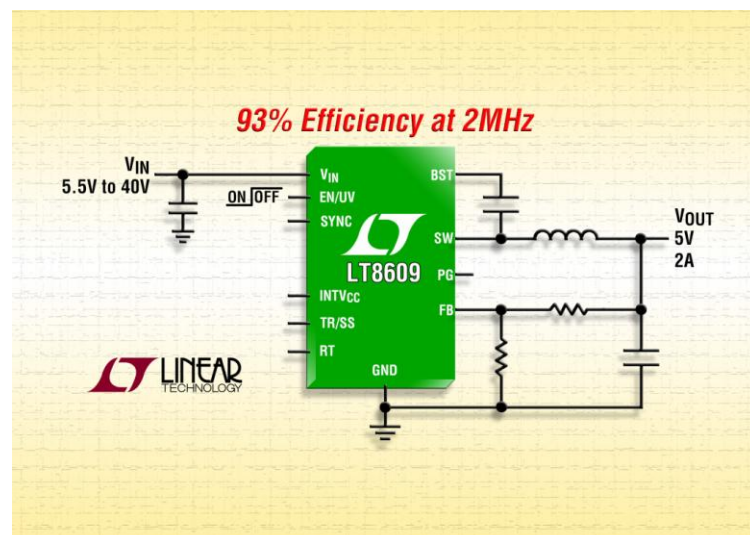
The LT8609, a 2A, 42V input synchronous step-down switching regulator. A unique synchronous rectification topology delivers 93% efficiency while switching at 2MHz enabling designers to avoid critical noise-sensitive frequency bands, such as AM radio, while providing a highly compact solution footprint. Burst Mode® operation keeps quiescent current under 2.5µA in no-load standby conditions, making it ideal for always-on systems. The LT8609's 3.0V to 42V input voltage range makes it ideal for automotive applications which must regulate through cold-crank and stop-start scenarios with minimum input voltages as low as 3.0V and load dump transients in excess of 40V. Its internal 3.5A switches can deliver up to 2A of continuous output current with peak load currents of 3A.

The LT8609 maintains a minimum dropout voltage of only 200mV (at 1A) under all conditions, enabling it to excel in scenarios such as automotive cold-crank. Spread spectrum frequency modulation and special design techniques offer low-EMI operation to minimize noise concerns in automotive and industrial environments. Furthermore, a fast minimum on-time of only 45ns enables 2MHz constant frequency switching from a 16V input to a 1.5V output. The LT8609's 10-lead thermally enhanced MSOP package and high switching frequency keeps external inductors and capacitors small, providing a compact, thermally efficient footprint.

The LT8609 utilizes internal top and bottom high efficiency power switches with the necessary boost diode, oscillator, control and logic circuitry integrated into a single die. Low ripple Burst Mode operation maintains high efficiency at low output currents while keeping output ripple below 10mV_{PK-PK}. Unique design techniques and a new high speed process enable high efficiency over a wide input voltage range, and the LT8609's current-mode topology enables fast transient response and excellent loop stability. Other features include internal compensation, a power good flag, output soft start/tracking and thermal protection.

Features:

- Wide Input Voltage Range: 3.0V to 42V
- Ultralow Quiescent Current Burst Mode® Operation:
 - <2.5µA I_Q Regulating 12V_{IN} to 3.3V_{OUT}
 - Output Ripple <10mV_{P-P}
- High Efficiency 2MHz Synchronous Operation:
 - >93% Efficiency at 1A, 5V_{OUT} from 12V_{IN}
 - 2A Maximum Continuous Output, 3A Peak Transient Output
- Fast Minimum Switch-On Time: 45ns
- Adjustable and Synchronizable: 200kHz to 2.2MHz
- Spread Spectrum Frequency Modulation for Low EMI
- Allows Use of Small Inductors
- Low Dropout
- Peak Current Mode Operation
- Accurate 1V Enable Pin Threshold
- Internal Compensation
- Output Soft-Start and Tracking
- Small 10-Lead MSOP Package



Applications:

- General Purpose Step Down
- Low EMI Step Down