

Triple Output, Buck/Buck/Boost Synchronous DC/DC Controller Operates up to 2.25MHz in Automotive Start/Stop Systems with 28 μ A I_q

NORWOOD, MA – January 29, 2018 – [Analog Devices](#) announces the Power by Linear™ [LTC7815](#), a high frequency (up to 2.25MHz) triple output (buck, buck, boost), synchronous DC/DC controller that maintains all output voltages in regulation during automotive cold crank conditions. A 12V automotive battery can droop to less than 4 volts during engine restart or cold crank, causing reset of infotainment systems and other electronics that operate from 5 volts and higher. The high efficiency synchronous boost converter feeds the two step-down converters, avoiding output voltage dropout when the car battery voltage droops, a useful feature in automotive start/stop systems that shut off the engine at idle to save fuel. Alternatively, the buck controllers can be powered from the input for a general-purpose triple output controller.

- View the [LTC7815 product page](#), download data sheet, order samples and evaluation boards: www.linear.com/product/LTC7815

The LTC7815 operates from an input voltage of 4.5V to 38V during start-up and maintains operation down to 2.5V after start-up. The synchronous boost converter can produce output voltages up to 60V and can run with the synchronous switch fully ON at 100% duty cycle to pass through the input voltage when it is high to reduce noise and maximize efficiency. The two step-down converters can produce output voltages from 0.8V to 24V with the entire system achieving efficiency as high as 95%. Its low 45ns minimum on-time enables high step-down conversions while switching at 2MHz, avoiding critical noise-sensitive frequency bands such as AM radio and allows for smaller external components.

The LTC7815 can be configured for Burst Mode[®] operation, reducing quiescent current to 28 μ A per channel (38 μ A for all three on) while regulating the output voltage at no load, a useful feature for preserving battery run times in always-on systems. The powerful 1.1 Ω onboard all N-channel MOSFET gate drivers minimize switching losses and provide output current of more than 10 amps per channel, limited only by external components. Furthermore, the output current for each converter is sensed by monitoring the voltage drop across the inductor (DCR) or by using a separate sense resistor. The LTC7815's constant frequency current mode architecture enables a selectable frequency from 320kHz to 2.25MHz or it can be synchronized to an external clock over the same range.

Additional features include an onboard LDO for IC power and gate drive, output voltage tracking or adjustable soft-start, a power good signal and an external V_{CC} input. The reference voltage accuracy is $\pm 1\%$ over a -40°C to 125°C operating temperature range.

The LTC7815 is available in a 38-lead 5mm x 7mm QFN package. Two temperature grades are available, with operation from -40 to 125°C for the extended and industrial grades and a high temperature automotive range of -40°C to 150°C . For more information, visit www.linear.com/product/LTC7815.

Summary of Features: LTC7815

- Dual Buck Plus Single Boost Synchronous Controllers
- Wide V_{IN} Range from 4.5V to 38V During Start-Up, Down to 2.5V After Start-Up
- Low 28 μ A Quiescent Current at No Load
- Boost Output Voltage up to 60V
- 100% Duty Cycle Capability for Boost Synchronous MOSFET
- Buck V_{OUT} Range: 0.8V to 24V
- Fixed Operating Frequency from 320kHz to 2.25MHz
- Synchronizable from 320kHz to 2.25MHz
- Up to 95% Efficiency
- Powerful Onboard All N-Channel MOSFET Gate Drivers
- R_{SENSE} or DCR Current Sensing
- Output Voltage Tracking or Adjustable Soft-Start

Pricing & Availability

Product	Production Availability	Price Each Per 1,000	Package
LTC7815	Now	Starts at \$4.35	5mm x 7mm QFN

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Contacts:

John Hamburger
Analog Devices, Inc.
john.hamburger@analog.com
Tel: 408-432-1900 ext 2419

Doug Dickinson
Analog Devices, Inc.
douglas.dickinson@analog.com
Tel: 408-432-1900 ext 2233