



Triple Output, Buck/Buck/Boost Synchronous DC/DC Controller Targets Automotive Start/Stop Systems

MILPITAS, CA – March 29, 2010 – Linear Technology Corporation introduces the LTC3859, a triple output (buck, buck, boost), low quiescent current synchronous DC/DC controller that maintains all output voltages in regulation during automotive cold crank conditions. A 12V car 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 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.

The LTC3859 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 at 0% duty cycle (synchronous switch ON) to pass through the input voltage when required to 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%. In addition, the LTC3859 can be configured for Burst Mode[®] operation, which reduces quiescent current to less than 55uA per channel (80uA for all three on) in sleep mode, a useful feature in preserving battery run times. The powerful 1.1Ohm onboard all N-channel gate drivers minimize MOSFET switching losses and allow an output current of more than 10 amps

per channel, only limited 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 LTC3859's constant frequency current mode architecture allows for a selectable frequency from 50kHz to 900kHz or it can be synchronized to an external clock with its internal phased-lock loop (PLL) from 75kHz to 850kHz.

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 LTC3859 is available in the 38-lead SSOP or a 38-pin 5mm x 7mm QFN package. The LTC3859E versions operate from -40°C to 85°C , with 1000-piece price starting at \$4.95 each. The LTC3859I industrial grade version operates from -40°C to 125°C , with 1,000-piece pricing starting at \$5.47 each. Both versions are available from stock. For more information, visit www.linear.com.

Photo Caption: Triple Output Buck/Buck/Boost DC/DC Controller

Summary of Features: LTC3859

- All Outputs Remain in Regulation During Engine Restart
- Wide Input Voltage Range from 4.5V to 38V During Start-Up, Down to 2.5V after Start-Up
- Low 55uA Quiescent Current with One Channel On
- Boost Output Voltage Up to 60V
- Buck Output Voltage Range: 0.8V to 24V
- Up to 95% Efficiency
- Powerful On-Board All N-Channel Gate Drivers
- R_{SENSE} or DCR Current Sensing
- Power Up/Down Tracking & Sequencing
- Fixed Programmable Operating Frequency from 50kHz to 900kHz
- Synchronizable with Phased-Lock Loop (PLL) from 75kHz to 850kHz
- $\pm 1\%$ V_{REF} Accuracy over a -40°C to 125°C Operating Temp Range
- Current Mode Control

About Linear Technology

Linear Technology Corporation, a manufacturer of high performance linear integrated circuits, was founded in 1981, became a public company in 1986 and joined the S&P 500 index of major public companies in 2000. Linear Technology products include high performance amplifiers, comparators, voltage references, monolithic filters, linear regulators, DC-DC converters, battery chargers, data converters, communications interface circuits, RF signal conditioning circuits, uModule® products, and many other analog functions. Applications for Linear Technology's high performance circuits include telecommunications, cellular telephones, networking products such as optical switches, notebook and desktop computers, computer peripherals, video/multimedia, industrial instrumentation, security monitoring devices, high-end consumer products such as digital cameras and MP3 players, complex medical devices, automotive electronics, factory automation, process control, and military and space systems.

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