



News Release | www.linear.com

Monolithic Linear USB Battery Charger with High Efficiency Dual Synchronous Buck Converters

MILPITAS, CA – June 7, 2007 – Linear Technology Corporation announces the LTC3559, an efficient, multi-function power management solution for handheld applications. The LTC3559 integrates a standalone Li-Ion/Polymer battery charger and two high efficiency synchronous buck regulators, and is offered in a low-profile 3mm x 3mm DFN package. The linear battery charger can deliver up to 950mA charge current from a wall adapter supply, or up to 500mA charge current from a USB supply. It contains a high degree of USB functionality, including 20%/100% full-scale charge current setting, a SUSP pin for shutdown/enable, and 4 different indication states on the /CHRG pin. Standalone autonomous operation simplifies design, eliminating the need for an external microprocessor for charge termination. The final battery float voltage is accurate to $\pm 0.4\%$. The charger's patented thermal regulation scheme maximizes the charge rate without the risk of overheating, while the NTC input allows temperature-qualified charging. To preserve battery energy, the LTC3559 draws $< 3\mu\text{A}$ from the battery in suspend mode. The charger is compatible with inputs up to 5.5V (7V absolute maximum transient for added robustness).

The LTC3559's integrated synchronous buck regulators feature 100% duty cycle operation and are capable of delivering output currents up to 400mA each, with programmable output voltages as low as 0.8V. The internal low $R_{\text{DS(ON)}}$ switches enable efficiencies as high as 90%, maximizing battery run time. In addition, Burst Mode[®] operation optimizes efficiency at light loads with a quiescent current of only 35 μA ($< 1\mu\text{A}$ in shutdown). Using a constant frequency current mode architecture, the buck regulators operate from an input voltage range of 2.5V to 5.5V. The high 2.25MHz switching frequency allows the utilization of tiny low cost capacitors and inductors less than 1mm in height. Furthermore, the regulators are stable with ceramic output capacitors, achieving very low output voltage ripple.

The LTC3559 is available from stock in a compact low-profile (0.75mm) 3mm x 3mm QFN-16 package. Pricing starts at \$2.15 each for 1,000-piece quantities.

Photo Caption: Multi-Function Linear Charger + Dual Sync Buck

Summary of Features: LTC3559

- Complete Multi-Function PMIC: Linear Charger & Two Buck Regulators
- Charge Current Programmable up to 950mA from Wall Adapter Input
- Charges Directly from a USB Port with 20%/100% Current Select
- No External MOSFET, Sense Resistor or Blocking Diodes Needed
- Thermal Regulation Maximizes Charging Rate without Overheating
- Preset Battery Float Voltage with $\pm 0.4\%$ Accuracy
- Standalone Autonomous Operation
- Charge Status Output with Multiple Indication States
- High Efficiency Dual Synchronous Buck Regulators
- Buck Converter Adjustable Output Voltage Range: 0.8V - V_{BAT}
- Buck Converter Output Currents: 400mA each
- 2.25MHz Constant Frequency Operation
- Thermally-Enhanced, Low Profile (0.75mm) 16-Lead 3mm x 3mm QFN Package

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, 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. For more information, visit www.linear.com

LT, LTC, LTM, Burst Mode and  are registered trademarks of Linear Technology Corp.

Press Contacts:

John Hamburger, Director Marketing Communications
jhamburger@linear.com
Tel 408-432-1900 ext 2419

Doug Dickinson, Media Relations Manager
ddickinson@linear.com

408-432-1900 ext 2233