Monolithic Linear USB Battery Charger with High Efficiency Buck-Boost & Buck Converters

MILPITAS, CA – May 20, 2008 – Linear Technology Corporation announces the LTC3558, an efficient, multi-function power management solution for handheld applications. The LTC3558 integrates a stand-alone Li-Ion/Polymer battery charger and two high efficiency synchronous regulators – one buck-boost and one buck – and is offered in a compact low-profile 3mm x 3mm QFN 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 port. The LTC3558's stand-alone autonomous operation simplifies design, eliminating the need for an external microprocessor for charge termination. Both switching regulators are designed to operate over the Li-Ion/Polymer range of 2.7V to 4.2V while delivering output currents up to 400mA each.

The LTC3558's integrated synchronous buck regulator features 100% duty cycle operation, while the buck-boost regulator is capable of regulating its programmed output voltage (typically 3.3V) over the entire Li-Ion/Polymer operating range. The integrated low $R_{DS(ON)}$ switches enable efficiencies as high as 92%, maximizing battery run time. In addition, Burst Mode® operation optimizes efficiency at light loads with a quiescent current of only 20uA for the buck-boost and 35uA for the buck (<1uA in shutdown for each). 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 LTC3558's battery charger 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. The final battery float voltage is accurate to ±0.5%. 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 LTC3558 draws < 3uA from the battery in suspend mode. The charger is compatible with inputs up to 5.5V (7V absolute maximum transient for added robustness).

The LTC3558 is available from stock in a compact low-profile (0.75mm) 3mm x 3mm QFN-20 package. Pricing starts at $2.35 each for 1,000-piece quantities.

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

Summary of Features: LTC3558

- Complete Multi-Function PMIC: Linear Charger, Synchronous Buck-Boost & Buck Regulators

Battery Charger

- 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 ±0.5% Accuracy
- Standalone Autonomous Operation
- Charge Status Output with Multiple Indication States

Switching Regulators

- High Efficiency Synchronous Regulators: One Buck-Boost and One Buck
- Adjustable Output Voltage Range: Buck-Boost - 2.75V – 5.45V, Buck - Down to 0.8V
- Switching Regulator Output Currents: 400mA each
- 2.25MHz Constant Frequency Operation
- Thermally-Enhanced, Low Profile (0.75mm) 20-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, 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. For more information, visit www.linear.com.

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