

***LTC News for Immediate Release***

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**USB Power Manager & 36V<sub>IN</sub> Battery Charger in  
Compact 18mm<sup>2</sup> Package**

MILPITAS, CA – May 3, 2006 – Linear Technology Corporation introduces the LTC4089 and LTC4089-5, each featuring an autonomous power manager, ideal diode controller and standalone high-voltage switching battery charger for portable USB devices. For high efficiency charging, their switching topology accommodates various inputs, including high voltage power sources up to 36V (40V max) such as 12V AC-DC wall adapters, FireWire ports or automotive batteries. In addition, they accept low-voltage power sources such as 5V wall adapters or USB inputs and single-cell Li-Ion/Li-Polymer batteries. The LTC4089/-5 features PowerPath™ control that provides power to the USB peripheral device and charges the peripheral's single-cell Lithium battery from the USB bus or a wall adapter power supply and also allows for instant-on operation even with a depleted or missing battery. To comply with USB current limit specifications, the LTC4089/-5 automatically reduces battery charge current as the system load current increases. To ensure that a fully charged battery remains topped off when the bus is connected, the IC directs power to the load through the USB bus rather than extracting power from the battery. Once all power sources are removed, current flows from the battery to the load through an internal 200mOhm low loss ideal diode, minimizing voltage drop and power dissipation. Onboard circuitry is provided to drive an optional external PFET to reduce the overall ideal diode impedance below 50mOhm if required by the application, providing higher efficiency operation.

The LTC4089's switching regulator features Bat-Track™ adaptive output control which greatly improves the efficiency of its 1.2A-capable battery charger as the switching regulator's output voltage automatically tracks the battery voltage. The LTC4089-5 provides a fixed 5V output from the high-voltage input to charge single-cell Li-Ion/Li-Polymer batteries. The battery charger's float voltage is preset at 4.2V with guaranteed 1.0% accuracy from 0°C to 85°C. Charge current is easily programmed using a single resistor. For battery pre-conditioning and qualification, fully discharged cells are automatically trickle charged at 10% of the programmed current until the cell voltage exceeds 2.9V. Total charge time for charge termination is programmed by an external capacitor, and a C/10 charge current detection output is provided. Additional functions include thermal regulation, an NTC thermistor input for temperature-qualified charging, automatic recharging of the battery, reverse current blocking, and under-voltage lockout.

(more...)

The LTC4089/-5 is housed in a low-profile (0.75mm) tiny 22-pin 6mm x 3mm DFN package, and is guaranteed for operation from -40°C to 85°C. 1,000-piece pricing starts at \$2.95 each.

**Photo Caption:** USB Power Manager and High Voltage Switching Li-Ion Charger

### Summary of Features: LTC4089 and LTC4089-5

- Single-IC USB Power Manager, Ideal Diode Controller & High Voltage Battery Charger
- Seamless Transition Between Input Power Sources: Li-Ion Battery, USB, and High Voltage 6V-36V (40V max) External Supply
- Standalone High Efficiency 1.2A Battery Charger
- Bat-Track Adaptive Output Control (LTC4089)
- Fixed 5V Output (LTC4089-5)
- 200mOhm Internal Ideal Diode plus Optional External Ideal Diode Controller Provides Low-Loss Power Path when External Supply/USB not Present
- Load Dependent Charging from USB Input Guarantees Current Compliance
- Thermal Regulation Maximizes Charge Rate and Prevents Overheating
- Selectable 100% or 20% Current Limit (500mA/100mA) from USB Input
- Preset 4.2V Charge Voltage with 0.8% Initial Accuracy
- Timer Termination with C/10 Charge Current Detection Output
- NTC Thermistor Input for Temperature Qualified Charging
- Compact, Low Profile (0.75mm) 6mm x 3mm DFN-22 Package

### Company Background

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](http://www.linear.com)

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