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USB Compatible High Efficiency Power Manager and Charger for 1-Cell Lithium Iron Phosphate Batteries

MILPITAS, CA – July 28, 2010 – Linear Technology Corporation introduces the [LTC4098-3.6](#), an autonomous high efficiency power manager, ideal diode controller and battery charger for 1-cell Lithium Iron Phosphate (LiFePO₄) batteries used in portable devices such as industrial meters, media players, digital cameras, PDAs, personal navigators, and especially high peak-power and safety critical equipment. The LTC4098-3.6's switching topology features PowerPath™ control, which seamlessly manages power distribution from multiple sources, including 5V wall adapter, USB and a LiFePO₄ battery, while preferentially providing power to the system load. For automotive and other high voltage applications, the LTC4098-3.6 can interface with a Linear Technology external switching regulator to provide a high efficiency high voltage power path. The onboard switching regulator can automatically limit its input current for USB compatibility. Both the low voltage input and the high voltage interface feature Bat-Track™ optimized charging to provide maximum power to the application and reduced heat in high power density applications with input supplies from 5V to as high as 38V (60V absolute maximum).

The LTC4098-3.6 provides an overvoltage protection (OVP) circuit up to 66V on the low voltage input, requiring only an external NFET/resistor combination thereby preventing damage caused by accidental application of high voltage. The LTC4098-3.6's "instant-on" operation ensures system load power at plug-in, even with a fully discharged battery. Its onboard ideal diode guarantees that ample power is always available to V_{OUT} even if there is insufficient power at the input. The LTC4098-3.6's ideal diode controller can be used to drive the gate of an optional PFET, reducing impedance to the battery to 30mOhm or less.

The LTC4098-3.6's full-featured single-cell LiFePO₄ battery charger has a preset 3.6V charge voltage with high accuracy of 0.5%. Charge current of 1.5A is available when wall powered, but when connected to a USB power supply, the device allows the load current to

exceed the current drawn from the USB port, while conforming to USB load specifications. For fast charging, the IC's switching input stage converts nearly all of the 2.5W available from USB to system current, enabling up to 700mA from a 500mA limited USB port. Further, the charger includes thermal limiting, automatic recharge, stand-alone operation with automatic charge termination and fixed 1-hour safety timer, bad battery cell detection and a thermistor input for 0°C to 60°C temperature-qualified charging. An additional feature of the IC is a suspend LDO that helps to prevent battery drain when a device is connected to a suspended USB port.

The LTC4098-3.6 is housed in a low-profile (0.75mm) 20-pin 3mm x 4mm QFN package and is guaranteed for operation from -40°C to 85°C. 1,000-piece pricing starts at \$2.65 each. For more information, visit www.linear.com/4098.


Photo Caption: High Efficiency USB Power Manager & Battery Charger for LiFePO₄

Summary of Features: LTC4098-3.6

- Switching Regulator with Bat-Track™ Adaptive Output Control Makes Optimal Use of Limited Power Available from USB Port to Charge Battery & Power Application
- Charge Control Algorithm Specifically Designed for LiFePO₄
- Overvoltage Protection Guards Against Damage
- Bat-Track External Step-Down Switching Regulator Control Maximizes Efficiency from Automotive, Firewire & Other High Voltage Sources (up to 38V Continuous, 60V Transient)
- 180mOhm Internal Ideal Diode Plus External Ideal Diode Controller Seamlessly Provide Low Loss PowerPath™ when Input Power is Limited or Unavailable
- Preset 3.6V Charge Voltage with 0.5% Accuracy
- Instant-On Operation with Discharged Battery
- Full Featured Li-Ion/Polymer Battery Charger
- 1.5A Maximum Charge Current with Thermal Limiting from Wall Adapter
- 700mA Maximum Load Current from USB Port
- 2A Maximum Input Current Limit from Internal Switching Regulator
- Low Profile (0.75mm) 20-Lead 3mm x 4mm 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.

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