



## **High Efficiency USB Power Manager & Li-Ion Battery Charger Delivers 700mA to System Load from USB and OV Protection**

MILPITAS, CA – January 21, 2008 – Linear Technology Corporation introduces the LTC4098, an autonomous high efficiency power manager, ideal diode controller and battery charger for portable USB powered devices such as media players, digital cameras, PDAs, personal navigators and smart phones. The LTC4098's switching topology features PowerPath™ control which seamlessly manages power flow between a wall adapter or USB port and the device's Li-Ion/Polymer battery while preferentially providing power to the system load. For automotive, Firewire, or other high-voltage applications, the LTC4098 provides Bat-Track™ control of a Linear Technology companion switching regulator up to 38V operating input (60V transient), maximizing battery charger efficiency, minimizing heat dissipation, and providing for a seamless transition between USB and higher voltage power sources.

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

The LTC4098's full-featured single-cell Li-Ion/Polymer battery charger 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 the USB port to system current, enabling up to 700mA from a 500mA limited USB port. There is also 1.5A charge current available when wall powered. Further, the charger includes thermal limiting, automatic recharge, stand-alone operation with automatic charge

termination and fixed duration safety timer, low voltage trickle charging, bad battery cell detection and a thermistor input for temperature-qualified charging. An additional feature of the IC is a suspend LDO that prevents battery drain when a device is connected to a suspended USB port.

The LTC4098 is housed in an ultra-thin (0.55mm) 20-pin 3mm x 4mm QFN package and is guaranteed for operation from -40°C to 85°C. 1,000-piece pricing starts at TBD each. 1,000-piece pricing starts at \$2.50 each.


**Photo Caption:** High Efficiency USB Power Manager and Battery Charger with OVP

### Summary of Features: LTC4098

- Switching Regulator with Bat-Track Adaptive Output Control Makes Optimal Use of Limited Power Available from USB Port to Charge Battery and Power Application
- Overvoltage Protection Guards Against Damage (up to 66V)
- Bat-Track External Step-Down Switching Regulator Control Maximizes Efficiency from Automotive, Firewire and 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
- Full Featured Li-Ion/Polymer Battery Charger
- 1.5A Maximum Charge Current with Thermal Limiting from Wall Adapter
- 700mA Maximum Current Available to System Load from a 500mA USB Port
- Slew Control Reduces Switching EMI
- Ultra-Thin (0.55mm) 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. For more information, visit [www.linear.com](http://www.linear.com).

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