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## **Switching Power Manager with USB On-The-Go & Overvoltage Protection plus Triple Sync Buck Regulators in 24mm<sup>2</sup>**

MILPITAS, CA – September 11, 2008 – Linear Technology Corporation announces the LTC3576, the newest member in a family of multifunction power management ICs for Li-Ion/Polymer battery-based applications including HDD-based media players, digital cameras, personal navigation devices, PDAs, smart phones and automotive-compatible portable electronics. The LTC3576 features a bidirectional switching power manager with input overvoltage protection and USB On-The-Go (OTG) functionality, a stand-alone battery charger, three high efficiency synchronous buck regulators, an ideal diode, I<sup>2</sup>C control, plus an always-on LDO, all in a compact, low-profile 4mm x 6mm QFN package.

The LTC3576's USB-compatible bidirectional switching regulator features programmable input current limits of 100mA and 500mA, as well as a 1A wall adapter input current limit. For fast charging, the LTC3576 converts nearly all of the 2.5W available from the USB port to charging current, enabling up to 700mA from a 500mA limited USB supply and up to 1.5A from a wall adapter. The bidirectional switching regulator can also take power from the battery to generate 5V and deliver up to 500mA for USB OTG applications without any additional components. The IC provides an overvoltage protection (OVP) control circuit that prevents damage to its input from the accidental application of voltages as high as 66V. The OVP circuit can protect the USB port even when the IC is providing power for USB OTG.

The LTC3576's PowerPath™ control with automatic load prioritization seamlessly manages power flow between a variety of input power sources such as a wall adapter or USB port and the Li-Ion/Polymer battery while preferentially providing power to the system load. The IC's "instant-ON" operation ensures system load power even with a discharged battery. An internal 180mOhm ideal diode plus optional external ideal diode controller provide a low loss power path from the battery to the load when input power is limited or unavailable.

The LTC3576 provides Bat-Track™ control of a companion Linear Technology switching regulator for efficient charging from high voltage inputs while minimizing heat

dissipation and providing a seamless transition between USB and the higher voltage power source. The LTC3576's stand-alone battery charger features autonomous operation that simplifies design and eliminates the need for an external microprocessor for charge termination. To preserve battery energy, the LTC3576 draws <30uA from the battery in suspend mode.

The LTC3576's three integrated synchronous buck regulators feature 100% duty cycle operation and are capable of delivering output currents of 1A/400mA/400mA, respectively, with adjustable output voltages down to 0.8V. The internal low  $R_{DS(ON)}$  switches enable efficiency as high as 94%, maximizing battery run time. In addition, Burst Mode<sup>®</sup> operation optimizes efficiency at light loads with a quiescent current of only 20uA per regulator (<1uA in shutdown). The high 2.25MHz switching frequency allows the use 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 LTC3576 is available from stock in a compact, low-profile (0.75mm) 4mm x 6mm 38-lead QFN package. Pricing starts at \$4.80 each for 1,000-piece quantities.

**Photo Caption:** Multifunction Switching Power Manager with USB OTG + Battery Charger + Triple Sync Buck + OVP + Always On LDO

### Summary of Features: LTC3576

- Complete Multifunction PMIC: Switching Power Manager with USB OTG & OVP, Li-Ion/Polymer Battery Charger, Three Synchronous Buck Regulators, External HV Buck Controller & LDO
- Thermally Enhanced, Low Profile (0.75mm) 38-Lead 4mm x 6mm QFN Package

#### POWER MANAGER & BATTERY CHARGER


- Bidirectional, USB-Compatible High Efficiency PowerPath Switching Regulator with Bat-Track
- Adaptive Output Control and USB OTG
- Overvoltage Protection Guards Against Damage from Inadvertent Application of High Voltage
- Bat-Track Control of External High Voltage Step-Down Switching Regulator
- "Instant-On" Operation with Discharged or Missing Battery
- Maximum Charge Current Programmable up to 1.5A from Wall Adapter, 700mA from USB Port
- 180mOhm Internal Ideal Diode Plus Optional External Ideal Diode Controller Provides Low Loss Power Path from Battery to Load

#### DC/DCs

- Three High Efficiency 2.25 MHz Synchronous Buck Regulators: 1A, 400mA, 400mA  $I_{OUT}$
- Buck Adjustable Output Voltage Range: 0.8V to  $V_{OUT}$
- Buck Burst Mode Operation with Low  $I_Q$ : 20uA per Regulator
- Always-On 3.3V/25mA LDO

## 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<sup>™</sup> 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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