

National Semiconductor Introduces Miniature Battery Management and Protection ICs for Portable Systems

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National Semiconductor Corporation, the world leader in power management technology, today introduced two battery-charging products for portable electronics, a single-cell USB/AC charger, and a charge control and protection circuit for embedded Lithium-Ion and Lithium-Polymer batteries. Ideal for cellular phones, digital still cameras, MP3 players, personal digital assistants (PDAs) and handheld instrumentation, these tiny devices require few external components and support up to 1.2 amps of a full-rated current.

The LP3947 charge management system and LM3655 battery protection IC offer extensive battery over-voltage and over-current protection, battery pre-conditioning and one percent charger voltage accuracy. They are packaged in a small thermally enhanced LLP® (leadless leadframe) (LP3947) and a very small micro SMD (LM3655).

"The LP3947 and LM3655 broaden National's portfolio of battery management and protection ICs designed to enhance system performance for highly integrated mobile devices," said Gianluca Colli, director of integrated system products for National Semiconductor's Portable Power Products Group. "By leveraging our packaging expertise, we are also able to offer customers these solutions in the industry's smallest packages."

Key Technical Specifications of National's Charge

Management System

The LP3947 is a complete charge management system that safely charges and maintains a Li-Ion battery from either a USB power source or an AC adaptor. Using the USB power source, the LP3947 supports both low-power or high-power charging. Alternatively, the LP3947 can take a charge from the AC adaptor. For the USB power source or AC adaptor, the charge current, battery regulation voltage and end-of-charge (EOC) point can be selected via an I2C compatible interface.

The LP3947 also can operate on default values that are pre-programmed in manufacturing. The battery temperature is monitored continuously at the temperature sensor pin to safeguard against hazardous charging conditions. The charger also has under-voltage and over-voltage protection, as well as an internal 5.6-hour timer to protect the battery. The pass transistor and charge current-sensing resistor are all integrated inside the LP3947.

The LP3947 operates in four modes: pre-qualification, constant current, constant voltage and maintenance. There are two open drain outputs for status indication. An internal amplifier readily converts the charge current into a voltage. The charger also can operate as a linear regulator, providing a maximum of 1.2 amps to the load.

The LP3947 is packaged in a tiny, thermally enhanced 16-pin LLP® measuring 4 mm by 4 mm.

For more information on the LP3947 or to order samples and an evaluation board, visit www.national.com/pf/LP/LP3947.html. An application note for the evaluation board is also available by visiting the National Semiconductor Web site.

Key Technical Specifications of National's Battery Protection IC

The LM3655 provides complete charge control, discharge control and battery safety of a single Li-Ion cell. It supports battery charging by using a variety of power supply types including unregulated current-limited wall adapters, regulated wall adapters and vehicle power adapters. Charge current control is achieved using an external bipolar PNP power transistor.

The LM3655 provides effective and comprehensive discharge control functionality. The operating load current is supplied by the Li-Ion battery and passes through the LM3655. This allows the battery power to disconnect due to overload, short-circuit or low battery conditions. The LM3655 also offers extensive battery safety protection against over-voltage and over-current. The internal safety circuit is backed up by an identical circuit to provide safety redundancy.

The LM3655 requires minimal external components and is packaged in the industry's smallest micro SMD-25 bump, which measures 2.5 mm by 2.5 mm. The LP3655 is well-suited for embedded battery-powered systems including smart battery packs, PDAs and Bluetooth® wireless technology headsets.

For more information about the LM3655 or to order samples, visit www.national.com/pf/LM/LM3655.html

Pricing and Availability

Available now and priced in 1,000-unit quantities, the LP3947 is \$1.05 and the LM3655 is \$1.65. An evaluation board for the LP3947 is also available.

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