

**Programmable Switching Li+ Battery Charger with USB/AC Input, CurrentPath™ Manager, TurboCharge™ Mode\*, AICL\*, USB On-The-Go and JISC8714/JEITA Support**
**FEATURES & APPLICATIONS**

- Efficient battery charging eliminates heat issues
- Charge current: up to 2.5A (see SMB346 for 1.25A solution)
- Automatic Input Current Limit for universal USB/AC/DC adapter compatibility\* (patent granted)
- Optional automatic power source detection per latest USB charging specification 1.1/1.2
- USB or AC input with automatic input selection and programmable input current limiting (USB2.0/3.0 compliant)
- Up to 750mA charging output from 500mA USB port or 2500mA from AC adapter using proprietary “TurboCharge™ Mode” (patent granted)
- Input/output CurrentPath™ control allows system operation with deeply discharged/missing battery – no start-up delay
- USB OTG and HDMI/MHL power support (up to 750mA @ +5V)
- Float voltage and charge current compensation for JEITA and JISC 8714 support
- 3MHz switching allows tiny external components
- +4.35 to +6.2V operating input voltage range
- +20V input rating (non-operating) with over-voltage protection
- Digital programming of all major parameters via I<sup>2</sup>C interface
  - Pre-charge voltage, float voltage
  - Input/pre-charge/fast charge/term. current
  - Battery temperature limits, safety timers
- Comprehensive protection features
  - Status/fault indicator
  - Battery/IC thermal protection
  - Short circuit/UV/OV protection
  - Charge termination safety timers
- Tiny CSP packages

**Applications**

- Portable Media Players
- Smartphones
- Digital camcorders/still cameras
- Handheld GPS
- MID Devices

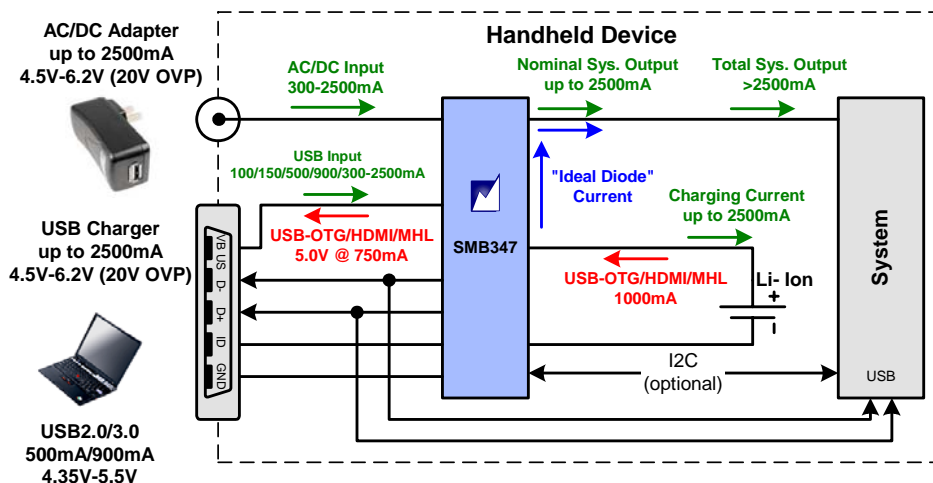
**INTRODUCTION**

The SMB347 is a programmable single-cell lithium-ion/lithium-polymer battery chargers designed for a variety of portable applications. The device provides a simple and efficient way to charge high-capacity Li-Ion batteries and power the system via a USB or AC adapter input. Unlike conventional charging devices, the SMB347's high-efficiency switch-mode operation eliminates the low charge current and thermal problems of conventional linear solutions. In addition, the switching architecture in conjunction with programmability enables dramatically faster charging from current limited inputs such as USB.

The SMB347 can switch between USB mode and AC Adapter mode and works seamlessly in conjunction with a USB controller. Charge current and input current limits for both USB and AC can be set up to 2.5A. Also the SMB347 can manage two outputs independently: battery charging and system power. This allows immediate system operation even under missing/deeply discharged battery conditions. The SMB347 also supports USB On-the-Go devices by providing the required USB-OTG +5V and up to 750mA power supply using the Li-Ion battery as a source. The USB-ACA standard is also supported.

Charge control includes input current limit (supporting USB2.0 and USB3.0), trickle charge, pre-charge, constant current/constant voltage, float voltage and termination/safety settings that are fully programmable via a serial I<sup>2</sup>C/SMBus and stored in non-volatile memory making the device truly a flexible solution. Fast charge current level can be set via I<sup>2</sup>C (limited by the input current settings). An Enable (EN) pin is also provided for suspending charging and/or sleep mode. Built-in reverse-current blocking prevents inadvertent cell discharge.

The SMB347 also offers a wide variety of features that protect the battery pack as well as the charger and input circuitry: over-current, under/over-voltage, safety timers, float voltage and charge current / float voltage compensation and thermal protection. Status can be monitored via the serial port for charge state and fault conditions. In addition, the STAT output can be used to signal charge status. The operating voltage is specified from +4.35V to +6.2V with +20V non-operating input tolerance. The SMB347 is available in an ultra-compact CSP package and is rated over the -30C to +85C temperature range.

**SYSTEM APPLICATION**

**Figure 1 – Using the SMB347 to charge a single cell Li+ battery from USB or AC Adapter power sources**

\*Patent Granted or Pending