

Programmable Linear Battery Chargers with CurrentPath™ and Automatic USB Power Source Detection
Preliminary Information
FEATURES & APPLICATIONS

- World's smallest programmable 1A linear charger with CurrentPath™
- Optional automatic power source detection per latest USB charging specification 1.1
- Automatic Input Current Limit * (patent granted)
- Supports JIS8714 and JEITA standards
- Up to 1A charge current
- Up to 1.5A input current limit
- 4.35 to 6.2V input voltage range (20V input tolerance)
- Low reverse leakage current
- Digital programming of all major parameters via I²C interface and lockable OTP memory (patent granted)
 - Battery voltage set point
 - Pre-charge, fast charge, termination current
 - Pre- to fast-charge voltage threshold
 - Temperature limits
 - Charge safety timers
 - Automatic restart threshold
- Fault/Status and Adapter Present indicators
- Low-battery voltage detector
- System current supplement via battery
- Wide range of protection features
 - Thermal regulation with programmable thresholds
 - Battery pack thermal monitor
 - Input/output over-voltage lockout
- Small QFN and CSP packages

Applications

- Bluetooth & Stereo Headsets
- Noise Cancellation Headphones
- MP3 Players
- Wireless Handsets
- Digital Still Cameras

INTRODUCTION

The SMB23x Family is a programmable single-cell lithium-ion/lithium-polymer battery charger for a variety of portable applications. The device provides a simple way to charge Li-Ion or Li-Polymer batteries via a USB port or an AC port. Furthermore, the SMB23x Family can power the system while independently charging the battery. Unlike conventional devices, the SMB23x Family's very small package and high level of configurability simplify design in a wide range of handheld equipment.

The SMB23x Family offers the option to automatically detect a dedicated wall or a host/hub charger via the D+/D- USB lines, making it fully compatible with USB battery charging specification 1.1. The SMB23x Family also allows charge current or float voltage level to be adjusted based on battery pack temperature, supporting the latest safety standards.

Charge control includes qualification, trickle-charge, pre-charge, constant current/constant voltage, and termination/safety settings that are fully programmable via a serial I2C/SMBus making the device truly a flexible solution. Pre-charge, fast charge and termination current levels can be set via I2C commands. The SUSP pin is used for turning off the entire IC's operation and for entering USB suspend mode while the EN input can be used for enabling/disabling battery charging.

The SMB23x Family offers a wide variety of features that protect the battery pack as well as the charger and input circuitry: over-current, under/over-voltage and thermal protection. Ultra-precise, 1% accurate, float voltage control improves battery capacity utilization. Status can be monitored via the serial port for charge state and fault conditions. In addition, two LED driver output can be used to signal charge status and the presence of an adapter. As a protection mechanism, junction temperature is regulated to approximately 100°C or 120°C, to prevent IC over-heating and ensure reliable operation, while charging the battery cell as fast as possible.

The SMB23x Family is available in space-saving QFN and CSP packages with lead-free pins/balls and is rated over the -30°C to +85°C temperature range.

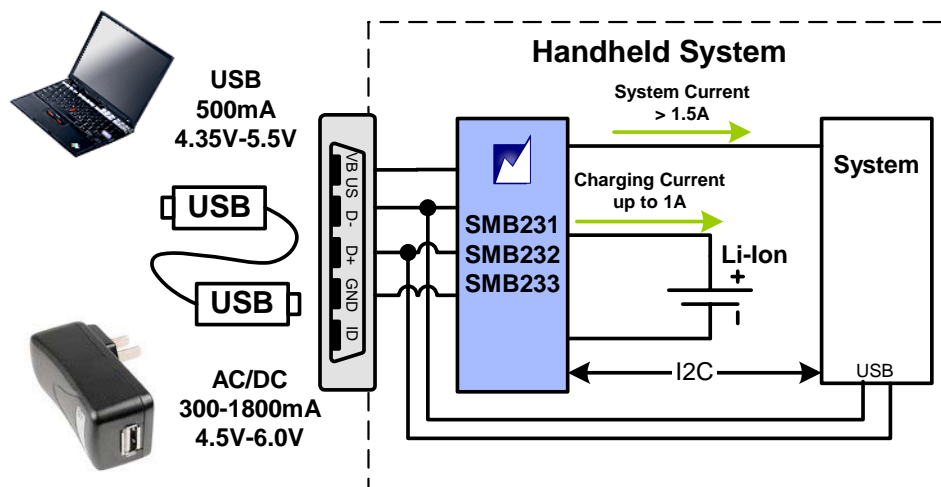
SIMPLIFIED APPLICATIONS DRAWING


Figure 1 – Applications block diagram featuring the SMB23x Family programmable linear battery charger.