

HL7015

4.5A I²C Controlled USB/Adaptor Li-ion Battery Charger with Power Path and 2.1A OTG Boost

Description

HL7015 is a fully integrated switch-mode Li-ion battery charger with power MOSFET, power path management, I²C interface and USB On-The-Go (OTG) boost function. It can be used with single cell or multiple-cell in parallel Li-ion and Li-polymer batteries in a wide range of cellphones, smart phones, tablets, power banks and other portable devices. Its switch-mode operation and low-resistance power path maximize charging, discharging and boost efficiency, reduce battery charging time and extend battery life during the discharging phase.

This device supports a wide range of input sources, including standard USB host port, USB charging port and high-power AC-DC adapter. To set the default input current limit, the HL7015 detects the input source following the USB battery charging spec 1.2. It supports an input operating voltage from 3.9V to 14V, and can power up the system rail without a battery. It can automatically adjust to the maximum power output of the input source via the input dynamic power management control (INDPM).

HL7015 manages the complete charging cycle of a Li-ion battery autonomously with or without the presence of an I²C host. It detects the battery voltage and automatically charges the battery in four phases: trickle charge, pre-conditioning, constant current and constant voltage. It automatically terminates charging when the battery is full and re-starts a charging cycle if the battery voltage falls below the recharge threshold. For a short-circuit protected

battery, it can reactivate the battery by providing a float voltage to the battery terminal before charging starts. Its I²C interface provides maximum programmability for charging parameters and system-level communication. When the I²C host is not present, a built-in watchdog timer stops charging after the timer expires to assure safety battery operation.



HL7015 PRODUCT BRIEF

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A built-in low-resistance power path management system enables instant power-up of the system rail when an input source is plugged in, even with a shorted battery or no battery. When a valid battery is present, it provides battery assistant mode during charging when the system load exceeds the capacity of the input source.

The USB OTG boost function provides a programmable 4.55V~5.5V or 9V boost output at VIN port from the battery, and supports up to 2.1A of current.

HL7015 integrates comprehensive protections mechanism to ensure safe operation of the

battery, including battery temperature monitoring via negative temperature coefficient (NTC) thermistor, charging safety timer, over-voltage and under-voltage detection. The device also provides output over-current protection, and regulates its on-chip junction temperature (T_{J_REG}) to be no more than 120°C by regulating its charging current.

HL7015 is available in a 24-pin 4mm x 4mm QFN package.

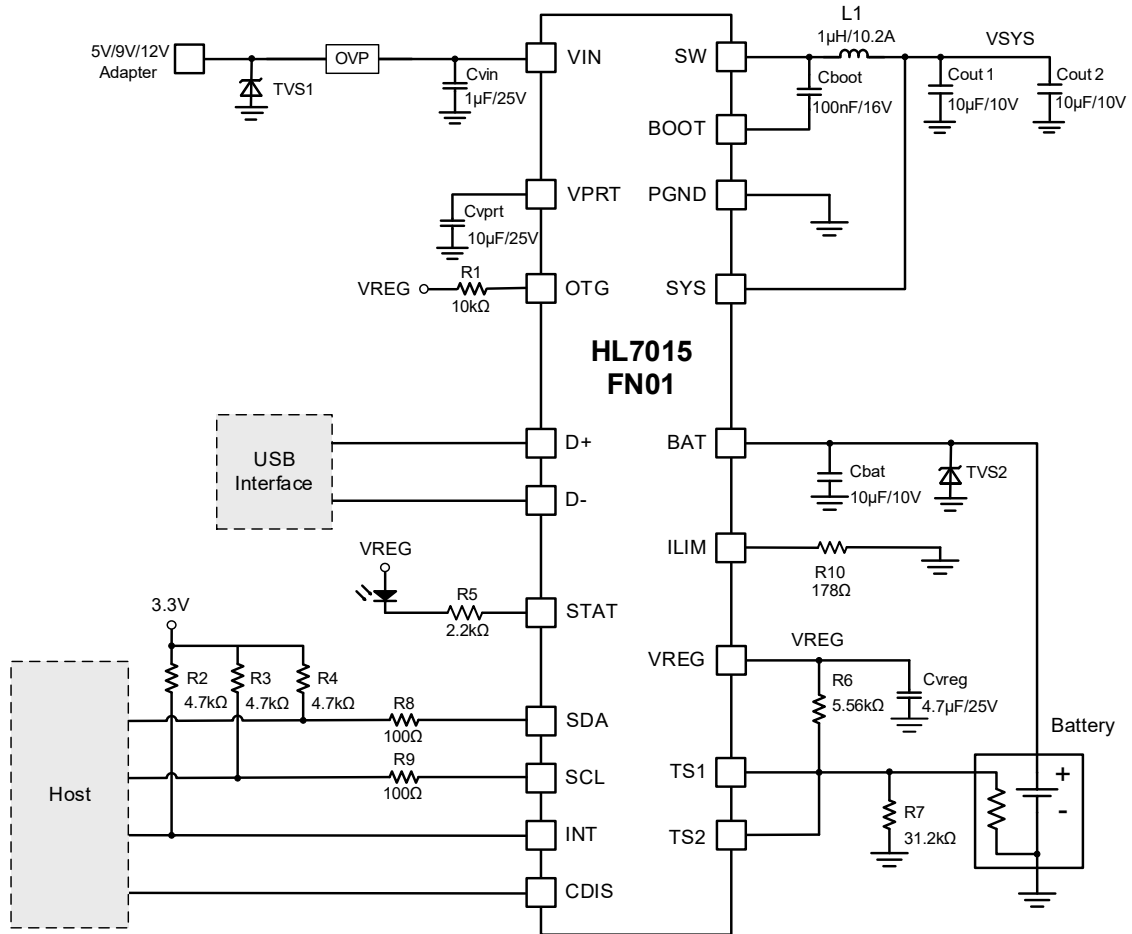
Features

- 20V Input Voltage Tolerance, 3.9V–14V Operating Voltage Range
- High Efficiency 4.5A Switch Mode Charger
 - 92% Charge Efficiency at 2 A
- USB-compliant/Adapter Charger
 - USB1.0/2.0/3.0 Compliant Input Current Limit
 - 0.1-4.5A Programmable Input Current Limit
- Autonomous Preconditioning/CC/CV Charge Control, Termination and Recharge
- 1.5MHz Synchronous PWM Converter for Small 1uH Inductor
- USB OTG Boost Programmable Vout: 4.55 V- 5.5 V or 9V Max Iout: 2.1A @4.55V-5.5V
 - 90% Efficiency at 1.5A
 - Hiccup Mode Over-Current Protection for Reliable Capacitive Load Start-up
- Power Path Management
 - Instant System On with No Battery or Deeply Discharged Battery
 - Ideal Diode Operation in Battery Assistant Mode
- Full Range Programmable Charge Parameter through I²C Compatible Interface
- Accuracy (0°~125°C)
 - ±1% Charge Voltage Regulation
 - ±10% Charge Current Regulation
 - ±10% Input Current Regulation
 - ±2% Output Regulation in Boost Mode
- High Integration
 - Dynamic Power Path Management
 - Synchronous Switching MOSFET
 - Integrated Current Sensing
 - Bootstrap Diode
 - Internal Loop Compensation
- Comprehensive Protection
 - Safety Timer with Reset Control
 - Thermal Regulation and Shutdown
 - Input & Output Over-Voltage Protection
 - Output Over Current Protection
 - Reverse Battery Leakage Protection
- Charge Status Output for LED or Host Processor
- Shipping Mode and Low Battery Leakage Current
- 4mm X 4mm QFN-24 Package

Applications

- Tablet PC
- Smart Phone
- Power Bank
- Portable Media Player
- Power Bank for Smartphone, Tablet

Typical Application Diagram



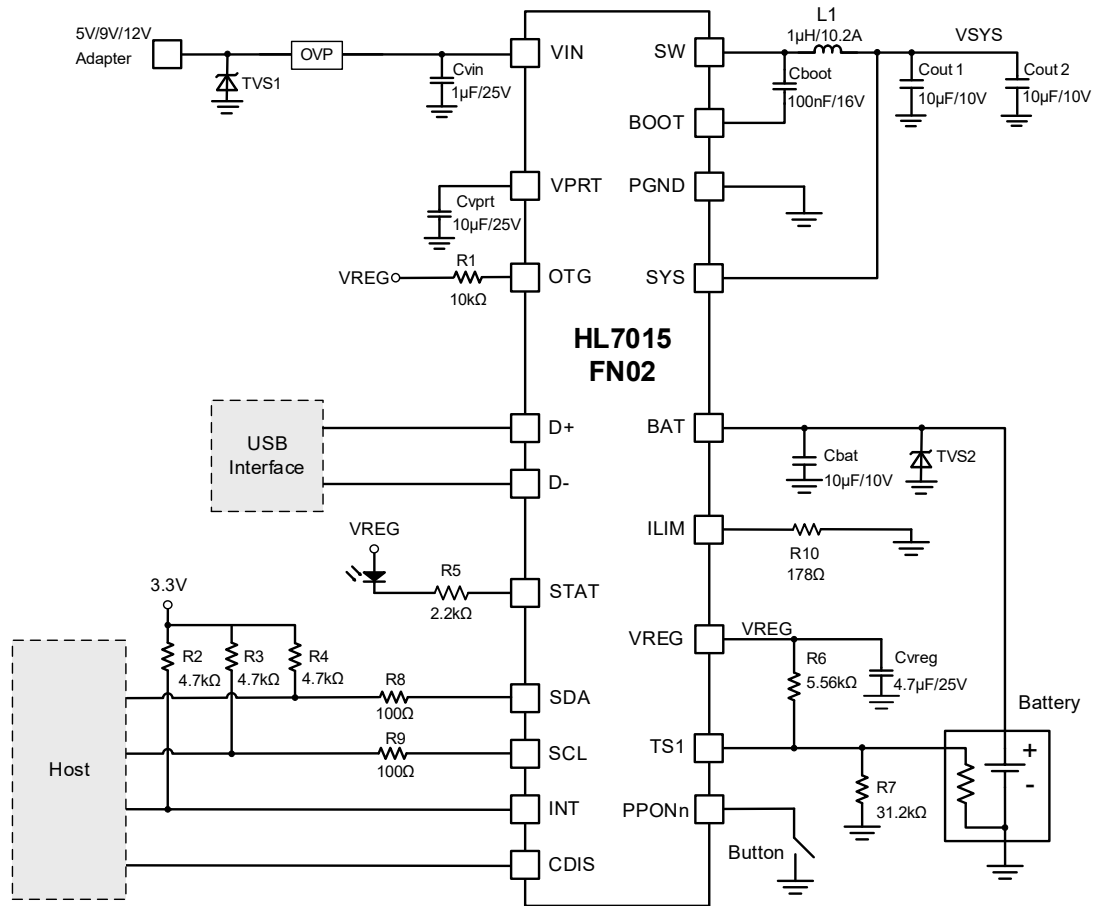


Figure 1. Typical Application Diagram

Order Information

Part Number	Package	Remark
HL7015FN01	QFN-24 4mm x 4mm	With TS2 Pin
HL7015FN02	QFN-24 4mm x 4mm	With PPONn Pin

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