

HL7061

5V/3A 2/3S Li-Ion Battery Charger with 5.4A Buck Output

Overview

The HL7061 is a fully integrated boost mode 2/3S Li-ion battery charger with integrated power MOSFET, I²C interface and buck-discharge function. It can be used with 2-3 series Li-ion and Li-polymer batteries in a wide range of laptops, tablets, power banks, and other portable devices. Its switch-mode operation and low-resistance power path maximize charging, discharging, and buck efficiency. It also reduces battery charging time and extends battery life during a 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. It supports an input operating voltage from 3.9V to 14V. It can automatically adjust to the maximum power output of the input source via the input dynamic power management control (VUSB DPM).

The HL7061 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 safe battery operation.

The integrated buck regulator provides a programmable 3.2-8V (2S battery) or 3.2-12V (3S battery) output at VUSB port from the battery, and supports current up to 3.4A with internal MOSFETs or up to 5.4A with an optional external MOSFET. Its output voltage can be adjusted at minimum 10mV steps to accommodate applications like USB3.1 Type-C direct-charge.

The HL7061's bi-directional power port VUSB can be connected to more than one USB ports. In this case, the HL7061 automatically detects the presence of external power supply on these ports and turn on the corresponding external MOSFET for proper charging or discharging function.

This port can also be connected to more than one output USB ports like USB_A and USB_B. In this case, the HL7061 automatically detects the presence of load connected to ports and starts the buck operation automatically.

The HL7061 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 detections. The device also provides output over-current protection and regulates its on-chip junction temperature (TJ_REG) to be no more than 120°C by regulating its charging current.

The HL7061 is available in a 28-pin 4mmx4mm QFN package.

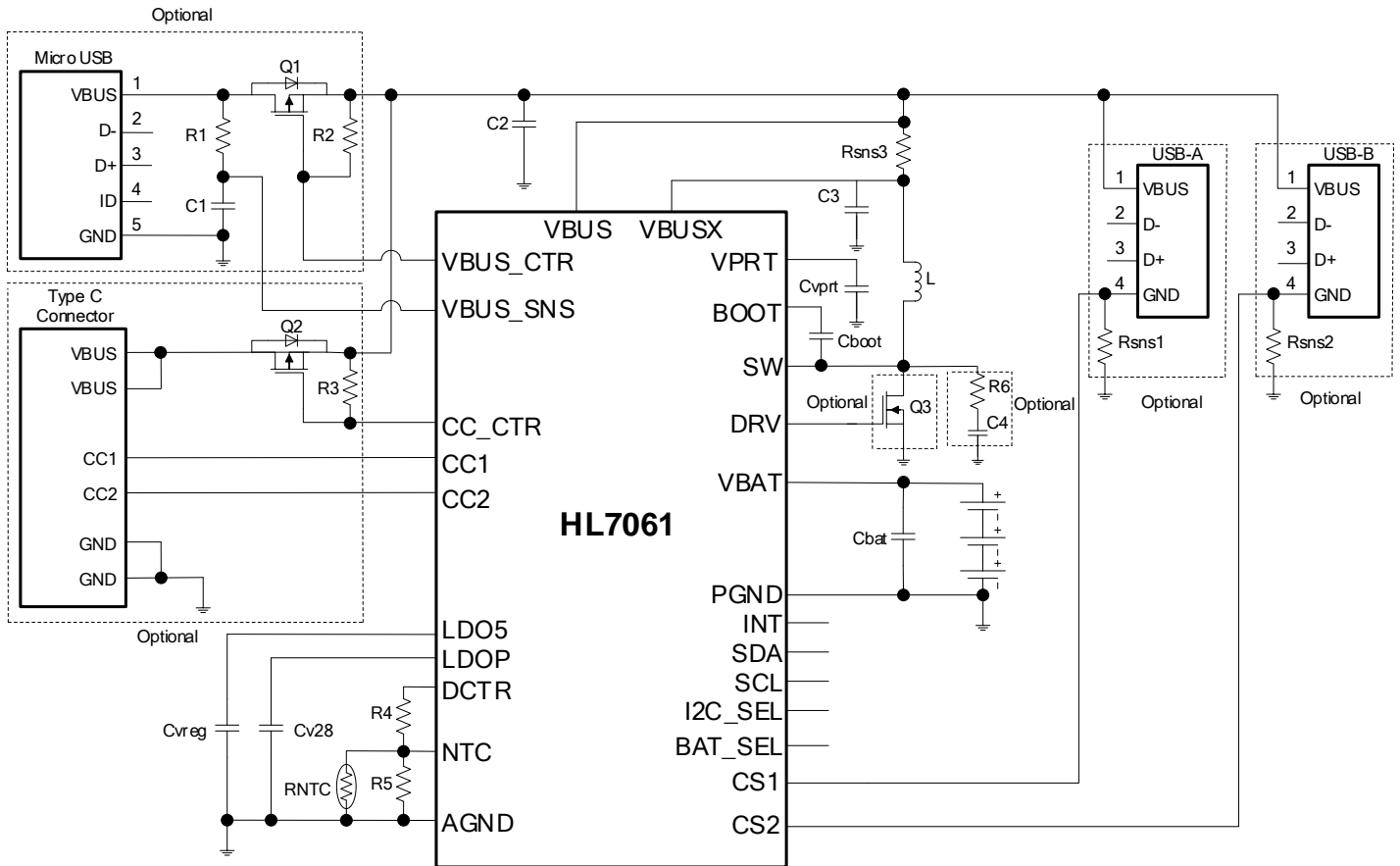
Features

- Integrated 5V/3A high efficiency boost charger
 - Supports 2-3S Li-ion battery
 - Default 2A input current
 - Supports Micro USB input 5V/2.4A, 9V/1.2A
 - Supports Type-C input 5V/3A
 - Automatic conditioning, trickle charging, CC/CV charge control, termination, and recharge
 - Input voltage and current based dynamic power management (VUSB DPM and IINDPM)
- Integrated 3.2-12V high efficiency buck output regulator
 - Supports QC 2.0/3.0/4.0 compatible device
 - Supports dual 5V/2.4A ports
 - Supports Type-C (5V/3A) and USB (5V/2.4A) in parallel operation
 - Default 5.15V output and up to 12V
 - Built-in output IR drop compensation
 - Automatic loading on/off detection
 - 5% Accurate output current limit
 - Hiccup and lock-out OCP
 - Supports power IQTM operation
- Typical quiescent current: < 50 μ A
- Built-in multi-channels ADC to monitor voltage and current
- JEITA compliant battery temperature detection and charge management
- 3.3V LDOP for MCU power supply
- Built-in multiple charging protocols
 - Type-C CC logic
- Full range programmable charge parameters through I²C interface
 - Input current limit
 - Input voltage DPM
 - Charge termination current
 - Charge termination voltage
 - Charge termination
- 500KHz Operation frequency and FPWM/APFM mode set by I²C
- Interrupt output (INT) to indicate IC operation status
- 4mm x 4mm QFN-28 package

Applications

- Laptops
- Tablets
- Power Banks
- UAV
- POS
- BT Stereos
- E-cigarette and E-tools

Simplified Application Diagram



Ordering Information

Part Number	HL7061FN01	HL7061FN02	HL7061FN03
VBUS current limit (Default)	500mA	2100mA	1900mA
IPRECHG (Default)	400mA	400mA	400mA
ITERM (Default)	200mA	200mA	200mA
VBA TLOWV (Default)	3.1V	2.9V	3.1V
Charge termination	Yes	No	Yes
Safety timer	Yes	No	Yes
Automatic load detection	Yes	No	Yes
LDOP default voltage	3.3V	3.3V	3.3V

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