



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

Features

- ◆ Integrated 5V/3A High Efficiency Boost Charger
 - Support 2-3S Li-on Battery
 - Default 2A Input Current
 - Support Micro USB Input 5V/2.4A, 9V/1.2A
 - Support 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 3.2V-12V High Efficiency Buck Output Regulator
 - Support QC2.0/3.0/4.0 Compatible Device
 - Support Dual 5V/2.4A Ports
 - Support 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
 - Support Power IQ™ Operation
- ◆ Typical Quiescent Current: <50uA
- ◆ Built-in Multi-Channel 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

- Laptop, Tablet, Power Bank
- UAV, POS, BT Stereo, E-Cigarette and E-Tools

Order Information

Part Number	HL7061FN01	HL7061FN02	HL7061FN03
VBUS Current Limit (Default)	500mA	2100mA	1900mA
IPRECHG (Default)	400mA	400mA	400mA
ITERM (Default)	200mA	200mA	200mA
VBATLOWV(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

For other default output voltage and maximum load current options, contact a Halo Micro sales representative.

Typical Application Diagram

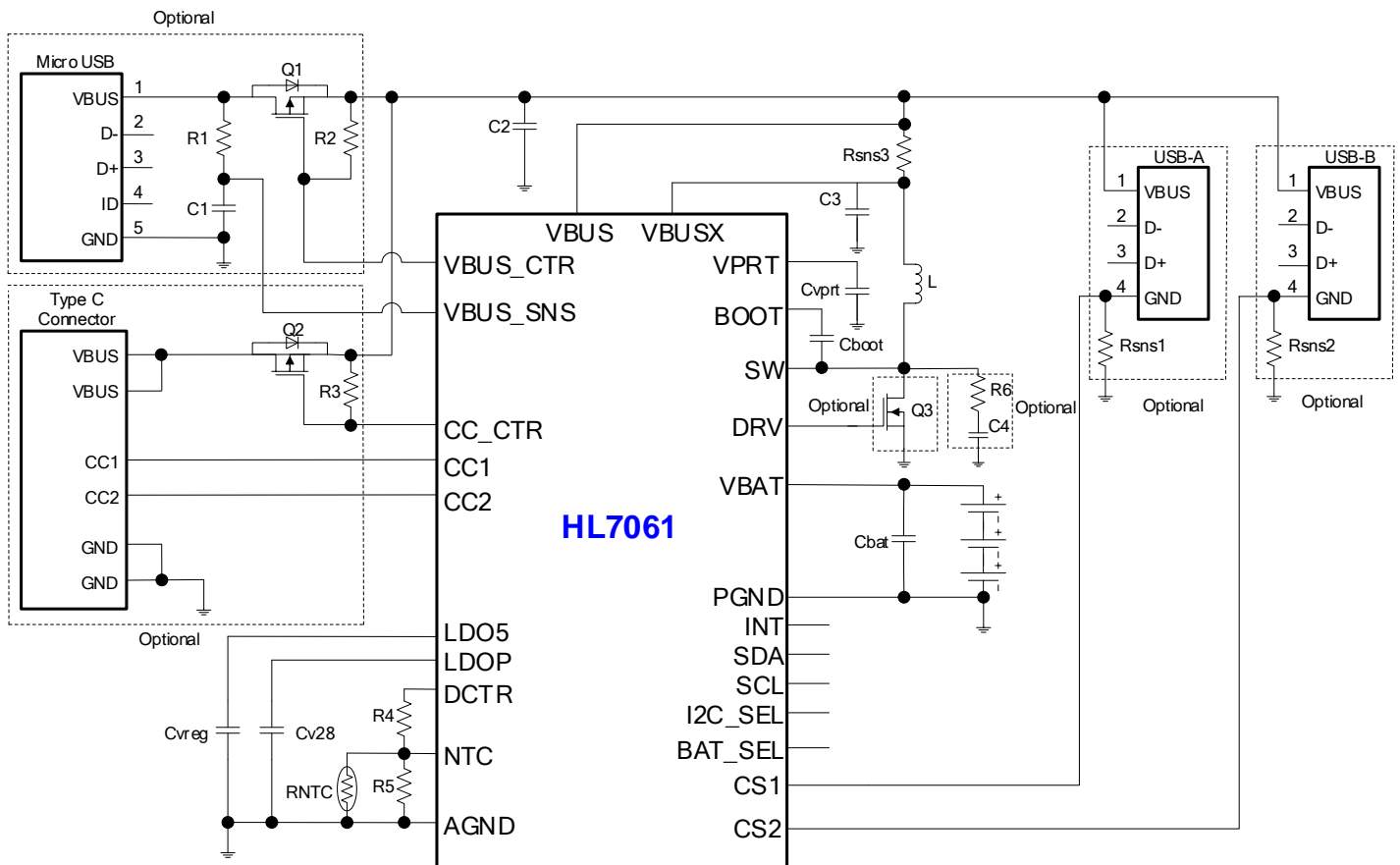


Figure 1 HL7061 Typical Application Diagrams

Component	Part Number	Value	Size	Vendor
L	See Table2	2.2uH	2520	See Table2
C1	C0805C106K5NAC	10nF/50V	0805	KEMET
C2	C3225X5R1E685K	6.8μF/25V	1210	TDK

C3	C2012X5R1H225K	2.2 μ F/50V	0805	TDK
C4	C2012X7R1H102K	1nF/50V	0805	TDK
Cvprt	C0805C106K8PACTU	10 μ F/10V	0805	KEMET
Cboot	C0603X5R1C104K	100nF/16V	0603	TDK
Cvreg	C2012X5R0J225K	2.2 μ F/6.3V	0805	TDK
Cv28	C2012X5R0J225K	2.2 μ F/6.3V	0805	TDK
Cbat	C0805C106K8PACTU	10 μ F/10V	0805	KEMET
R1	-	10K,1/8W	-	-
R2	-	10K,1/8W	-	-
R3	-	10K,1/8W	-	-
R4	-	2.27K,1/10W	-	-
R5	-	6.86K,1/10W	-	-
RNTC	-	10K	-	-
R6	-	0 Ω	-	-
Rsns1	ERJ8BWFR010V	10m Ω ,1%	1206	PANASONIC
Rsns2	ERJ8BWFR010V	10m Ω ,1%	1206	PANASONIC
Rsns3	ERJ8BWFR010V	10m Ω ,1%	1206	PANASONIC
Q1	-	TBD	-	-
Q2	-	TBD	-	-
Q3	-	TBD	-	-

Table 1.Recommended External Component List

Manufacturer	Part Number	L (μ H)	DCR(m Ω)	$I_{MAXDC}^{(1)}$	Component Dimension		
					L (mm)	W (mm)	H (mm)
MURATA	DFE252012F-2R2M	2.2	82	3.3	2.5	2.0	1.2

Table 1 Recommended Inductors

Notes:

1. I_{MAXDC} is the smaller current to produce 40°C temperature rise or 30% effective inductance reduction.

Description

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, 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. 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}).

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 3.2V~8V (2S battery) or 3.2~12V (3S battery) output at VUSB port from the battery, and supports up to 3.4A of current 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.

HL7061's bi-directional power port VUSB can be connected to more than one USB ports. In this case, 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 is shown in Figure 1.

This port can also be connected to more than one output USB ports like USB_A and USB_B. In this case, HL7061 automatically detects the presence of load connected to either port, and start the buck operation automatically. This is also shown in Figure 1.

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 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.

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

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