

HL7005D

1.7A Li-Ion Battery Switching Charger with Integrated OTG Boost

Overview

The HL7005D is a compact, flexible, high-efficiency, USB compliant switch-mode charge management device for single cell Li-ion and Li-polymer battery used in a wide range of portable applications. The charge parameters can be programmed through I²C interface. The HL7005D integrates a synchronous PWM controller, power MOSFET, input current sensing, high-accuracy current and voltage regulation, and charge termination function into a tiny CSP package.

The HL7005D provides a complete automatic three-phase battery charging control: trickle charge, constant-current charge (CC), and constant voltage charge (CV) until the battery reaches the charge termination voltage. The input current is automatically limited to the value set by the host. Charging is terminated based on the battery voltage and a user selectable minimum current level. A safety timer with reset control provides a safety backup for I²C interface. During normal operation, the IC automatically restarts the charge cycle if battery voltage falls below an internal threshold and automatically enters a sleep mode or a high impedance mode when input supply is not correctly connected. The charge status can be reported to the host through the I²C interface.

During the charging process, the IC monitors its junction temperature (T_J) and reduces the charge current once T_J increases to about 120°C. To support USB OTG device, the HL7005D can provide VBUS (5.0V) by boosting the battery voltage.

The HL7005D is available in a 20-pin WLCSP package.

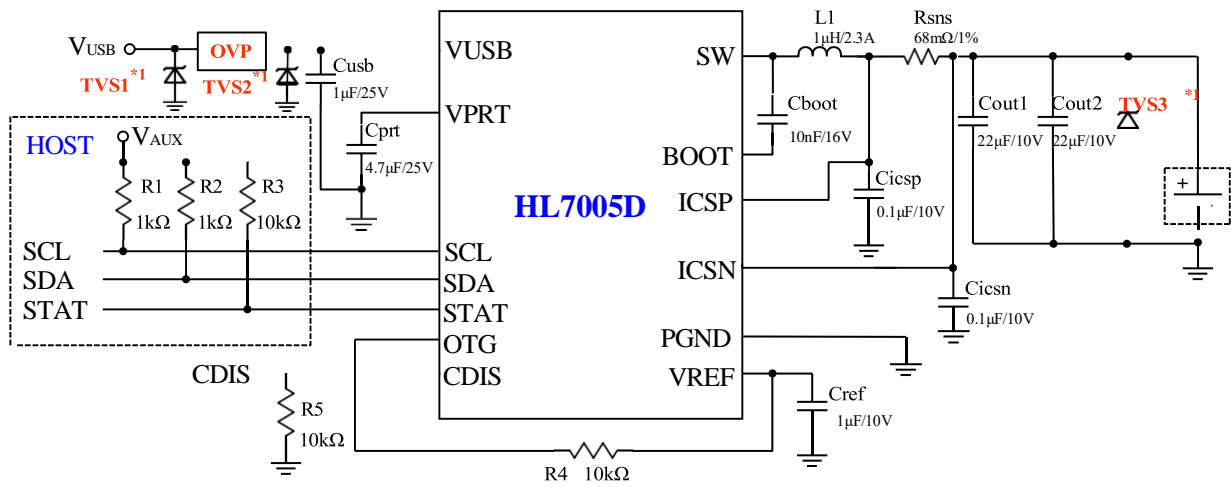
Features

- Fully automatic and efficient charge management for a large capacity lithium battery
 - Automatic conditioning, CC/CV charge control, termination, and recharge
 - 550-1450mA programmable charge current
 - Support 1.7A charge current using 56mΩ sensing resistor
 - 3MHz Synchronous PWM, 1μH low profile inductor
 - Input current regulation accuracy: ±5% (100mA and 500mA)
 - Charge voltage regulation accuracy:
 - -0.25% to 0.41% (25°C)
 - ±1% (0°C to 85°C)
 - ±2% (0°C to 125°C)
 - 20V Input voltage tolerance, 6.3V max operating voltage
 - Input voltage based dynamic power management (VIN DPM)
 - Optional 32s/30 minutes safety timer with reset control
 - Power up without battery
- Automatic adapter fault detection
- High impedance mode with low power consumption
- Comprehensive protections
 - Reverse battery leakage protection
 - Thermal regulation and shutdown
 - Input & output over-voltage protection
- Built-in input current and input voltage limit
- Integrated power MOSFET with max. 1.7A charge current
- Automatic charge and USB compliant start sequence
- Full range programmable charge parameter through I²C compatible interface
 - Input current limit threshold
 - Input voltage DPM threshold
 - Charge termination current
 - Charge termination voltage
 - Charge termination enable
 - Support 3.4MHz I²C HS mode
- USB OTG boost
 - Input voltage range from battery: 2.5-4.5V
 - 5.0V/700mA (V_{BAT} ≥ 3.0V)
- 1.72mm x 1.99mm WLCSP package

Applications

- Smartphones
- MP3 Players
- Tablet PCs

Simplified Application Diagram



Ordering Information

Part Number	HL7005D	
Default Charge Termination Voltage	4.20V	
Maximum Charge Current	1.7A	
OTG Mode Maximum Output Current	700mA	
I ² C Address	6AH	
Pre-charge Current	500mA	325mA
IC_INFO (Vendor Code)	010	010
IC_INFO (REV)	010	011
30min Safety Timer and 32s Watch-Dog Timer	Yes	
Package	WLCSP	
Packing Method	Tape and Reel	
Marking Information	HL7005DH	HL7005DW

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