

HL7132

Dual-Phase 30W Charge Pump (CP) Direct Charger

Overview

The HL7132 is a low voltage 2:1 fast direct charger for 1 cell Li-ion and Li-polymer batteries. The device integrates a dual phase switched capacitor converter and reverse blocking MOSFET (QRB FET). The HL7132 has 97.11% efficiency at 4.5V output and 5A current with 1x22 μ F flying capacitor per phase.

The switched capacitor converter architecture and the integrated FETs in device are optimized to enable 50% duty cycle operation under charge pump (CP) mode. The 2:1 CP mode allows output voltage (VOUT) to be around half of the input voltage (VIN) and output current to double the input current, reducing input power cable loss and limiting temperature rise in application. The dual-phase architecture reduces input capacitance requirements and input voltage ripple.

The HL7132 provides CC (Constant Current) and CV (Constant Voltage) regulations through controlling the QRB FET for safe charging operation. The CC regulation is controlled through a closed loop of input current sensing or battery current sensing. The CV regulation is controlled through a closed loop of battery voltage sensing. In addition, the HL7132 also supports thermal regulation loop in case the CV/CC regulation causes overheating device.

The HL7132 has all the necessary protections to ensure the safe operation. The device includes OTP (Over-Temperature Protection), VIN UVP (Under-Voltage Protection) / OVP (Over-Voltage Protection), IIN OCP (Over-Current Protection) / UCP (Under-Current Protection), VOUT OVP / UVP, VBAT OVP, IBAT OCP, PMID to VOUT OV/UV, C_{FLY} SCP (Short Circuit Protection), VIN SCP, VOUT SCP, QRB RCP (Reverse-Current Protection) and watchdog timer.

Besides all the protections above, the HL7132 also features 10-bit ADC that can offer VIN, IIN, VOUT, VBAT, IBAT, VTS, TDIE information to system for optimizing charging control.

The HL7132 is available in a 42-bump WLCSP package with 2.95mm x 2.6mm size.

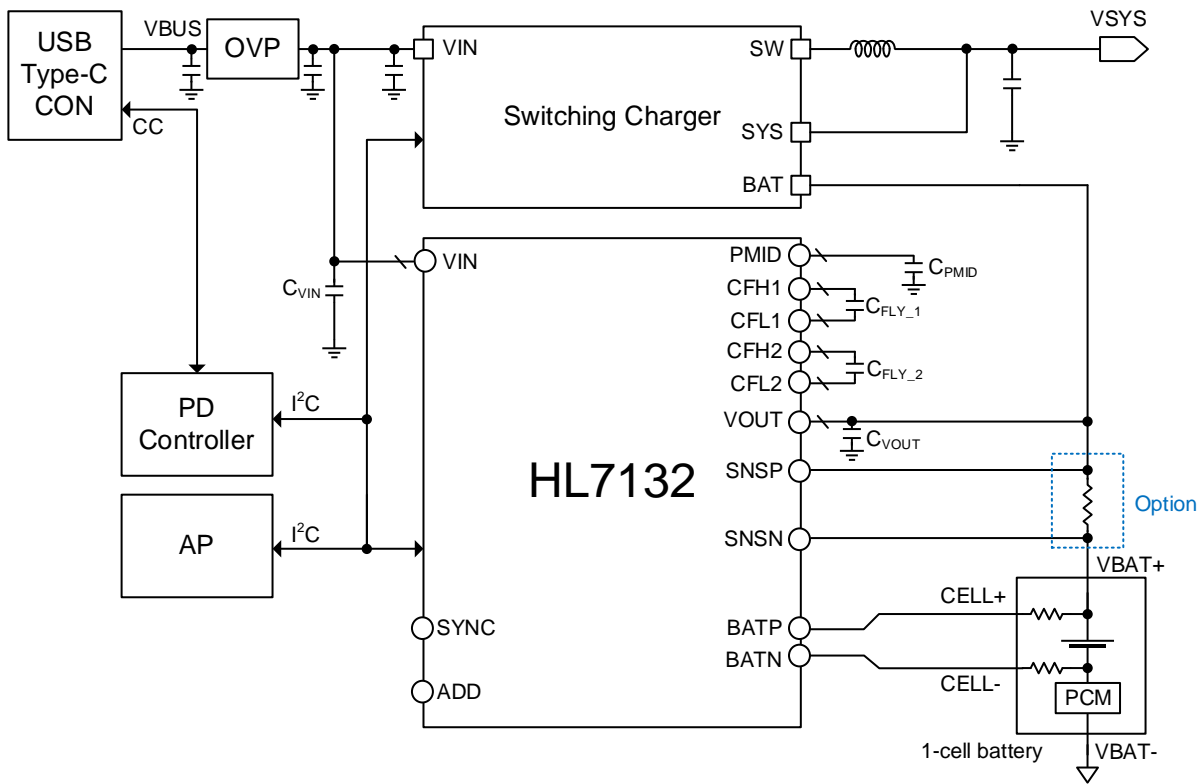
Features

- 20V AMR on VIN pin
- 5.5V to 11.7V Operational VIN voltage
- 5.5V Max operational output voltage
- Dual phase switched capacitor architecture
 - Optimized for 50% duty
- Charge pump mode (CP mode)
 - Continuous 6A output
- Regulation loops for charging operation through QRB FET control
 - Input current regulation (I_{IN_REG})
 - Battery voltage regulation (V_{VBAT_REG})
 - Battery current regulation (I_{BAT_REG})
 - Thermal regulation (T_{DIE_REG})
- 97.11% Efficiency for VOUT=4.5V_5A with 1x22 μ F Per phase and f_{sw} = 700kHz
- Selectable switching frequency from 500kHz to 1.6MHz
- Integrated 10-bit ADC
 - Input voltage (VIN)
 - Output voltage (VOUT)
 - Battery voltage (VBAT)
 - Input current (IIN)
 - Battery current (IBAT)
 - TS input voltage (VTS)
 - Die temperature (TDIE)
- Protections
 - Over die temperature protection
 - VIN over/under voltage protection
 - Voltage tracking protection
 - Input over/under current protection
 - VOUT over voltage protection
 - VBAT over voltage protection
 - IBAT over current protection
 - VOUT short circuit protection
 - VIN short circuit protection
 - C_{FLY} short circuit protection
- 2.95mm x 2.6mm 42-bump WLCSP

Applications

- Smartphones
- Tablet PCs
- Mobile IoT Devices

Simplified Application Diagram



Ordering Information

| Part Number | Package | Remark |
|-------------|------------------------------|--------|
| HL7132WL01 | 42-Bump WLCSP 2.95mm x 2.6mm | |

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