

# HL7132D

## Dual-Phase 30W Charge Pump Charger with 1:2 Reverse Boost mode

### Overview

The HL7132D is the low voltage fast direct charger for 1 cell Li-ion and Li-polymer batteries. The device integrates a dual phase switched capacitive converter, a reverse blocking MOSFET (QRB FET) and shows 97.37% efficiency at 4.5V output and 4A current with flying capacitor, 1x22 $\mu$ F, per phase at  $f_{sw}$ =1.1MHz.

The device features two different switching modes, 2:1 and 1:2 CP mode. The 2:1 CP mode allows the output voltage, VOUT, to be around half of the input voltage, VIN, and the output current to be double of the input current. In 1:2 CP mode, a voltage at VIN will be double of VOUT voltage.

The HL7132D provides CC (Constant Current) and CV (Constant Voltage) regulation through controlling the QRB FET for a safe charging operation in 2:1 CP mode. CC regulation is controlled through a close loop of the input current sensing or battery current sensing and CV regulation is controlled through a close loop of the battery voltage sensing. In addition, HL7132D also supports thermal regulation loop in case CV/CC loop causing device over-heat during regulation operating in 2:1 CP mode.

The HL7132D has all the necessary protections to ensure the safe operation. The device includes OTP (Over-Temperature Protection), VIN UVP (Under-Voltage Protection) in 2:1 CP mode/OVP (Over-Voltage Protection) in 2:1 CP mode, IIN OCP (Over-Current Protection) in both 2:1 and 1:2 CP mode/UCP (Under-Current Protection) in 2:1 CP mode, VOUT OVP/UVP in both 2:1 and 1:2 CP mode, VBAT OVP in 2:1 CP mode, IBAT OCP in both 2:1 and 1:2 CP mode, PMID to VOUT OV/UV Tracking in both 2:1 and 1:2 CP mode, C<sub>FLY</sub> SCP (Short Circuit Protection), VIN SCP, VOUT SCP, QRB RCP (Reverse-Current Protection) and Watchdog Timer. Besides all the protections above, HL7132D also features 10-bit ADC that offers VIN, IIN, VOUT, VBAT, IBAT, VTS, TDIE information to system for optimizing charging control.

### 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 both 2:1 and 1:2 mode
- 2:1 Charge Pump (CP) Mode
  - Continuous 6A output
- 1:2 Reverse Charge Pump (CP) Mode
  - Continuous 1.5A output
- Regulation loop for charging operation through QRB FET control in 2:1 CP Mode
  - Input current regulation (I<sub>IN\_REG</sub>)
  - Battery voltage regulation (V<sub>BAT\_REG</sub>)
  - Battery current regulation (I<sub>BAT\_REG</sub>)
  - Thermal regulation (T<sub>DIE\_REG</sub>)
- 97.37% Efficiency for VOUT=4.5V\_4A with 1x22 $\mu$ F per phase at  $f_{sw}$  = 1.1MHz
- Selectable switching frequency from 500kHz to 1.6MHz
- Integrated 10-bit ADC
  - Input voltage (VIN)
  - Output voltage (VOUT)
  - Battery voltage (VBAT)
  - Input current in bidirectional readback
  - Battery current (IBAT)
  - TS input voltage (VTS)
  - Die temperature (TDIE)
- Protections
  - VBAT over voltage protection in 2:1 CP mode
  - All the following protections in 2:1 and 1:2 CP mode
    - Over Die temperature protection
    - VIN Over/Under voltage protection
    - Voltage tracking protection
    - Input over current protection
    - VOUT over voltage protection
    - IBAT over current protection
    - VOUT short circuit protection
    - VIN short circuit protection
    - CFLY short circuit protection
    - NTC protection
- 2.95mm x 2.6mm 42-bump WLCSP
- 30-Bump, WLCSP 2.17mm x 2.57mm

## Applications

- Smartphones
- Tablet PC
- Mobile IOT Devices

## Simplified Application Diagram

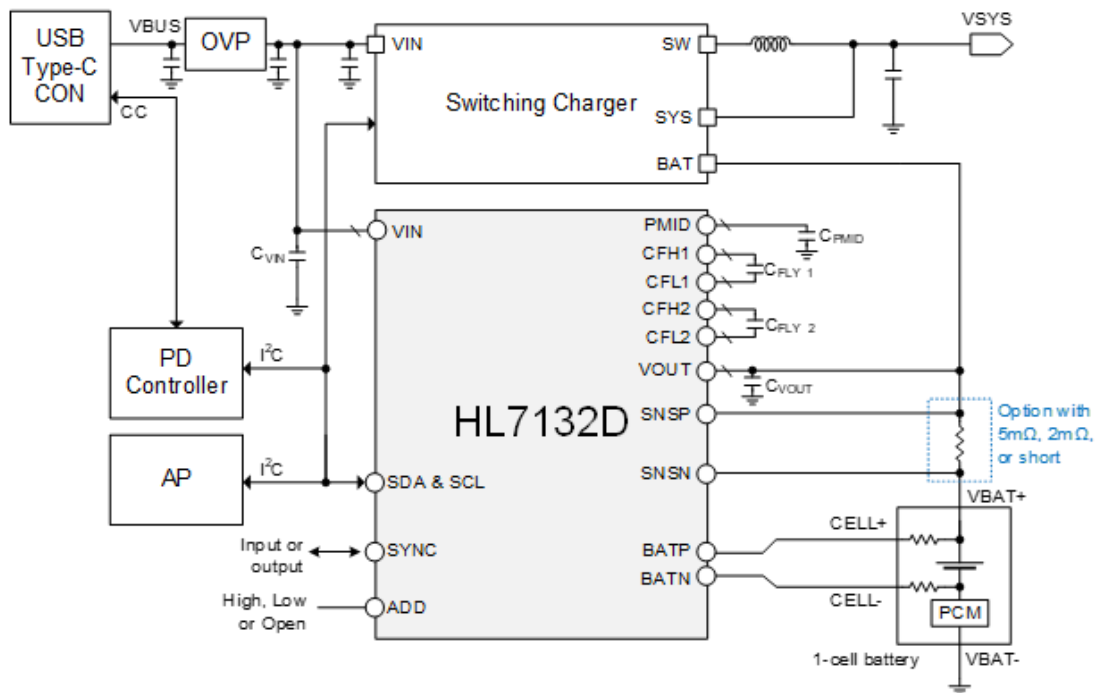


Figure 1. Simplified Application Diagram

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## Ordering Information

Part Number	Package	Remark
HL7132DWL01	42-Bump WLCSP 2.95mm x 2.6mm	

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