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ISL95520

SMBus Interface Hybrid Power Boost (HPB) and Narrow VDC (NVDC) Configurations Combo Battery Charger

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Key Differences in Family

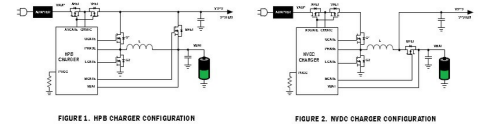| Part Number	Charging Current WOCP Function	SMBus Register Accept Any Command	ACIN Threshold	Data Sh
ISL95520	No	No	2.6V	ISL95520
ISL95521	Yes	Yes	2V	ISL95521

TYPICAL DIAGRAM   🔍 ENLARGE

FIGURE 1. HPB CHARGER CONFIGURATION   FIGURE 2. NVDC CHARGER CONFIGURATION

Sample   Purchase

Key Features

- Configurable as HPB charger or NVDC charger
- Compliant with Intel PROCHOT# and PSYS requirements
- Adapter current monitor and battery discharging current monitor
- Uses NFET for all the switches
  - Supports removal of battery during battery learn mode
  - Actively controlled inrush current to prevent FET damage
- SMBus programmable settings and high accuracy
- Comprehensive protection features include
  - PROCHOT# indicator for system low voltage, adapter overcurrent, battery overcurrent or system overheating
  - Hardware-based adapter-current and battery-current limits
  - Supports sudden removal of battery in system Turbo mode
- 16 switching frequency options from 350kHz to 1MHz
- Low quiescent current
- Intersil Robust Ripple Regulator (R3™) modulation scheme provides excellent light load efficiency and fast dynamic response
- 32 Ld 4x4mm^2 QFN package
- Pb-free (RoHS compliant)

Description

The ISL95520 is a highly versatile combo battery charger configurable for operating as either a Hybrid Power Boost (HPB) charger or a Narrow VDC (NVDC) charger, supporting 2-, 3- or 4-cell batteries. Both configurations allow the battery to work with the adapter together to supply the system load when it exceeds the adapter capability, referred to as system Turbo mode. HPB charger configuration reverse-boosts battery energy to system bus in order to help the adapter provide the system power in Turbo mode.

NVDC charger configuration quickly turns on BGATE to enable the battery to help adapter provide the system power in Turbo mode. The ISL95520 uses N-channel MOSFETs (NFETs) for all the switches to achieve the best performance and lowest BOM cost. The internal charge pump is capable of turning on all the NFETs fast or slow depending on the circumstance or the need. The ability to quickly turn on NFETs prevents system bus voltage drop when battery is suddenly removed in Turbo mode or in battery learn mode.

The ISL95520 provides many protection features including PROCHOT# indicator for system low voltage, adapter overcurrent, battery overcurrent or overheating, with an array of SMBus programmable parameters for maximum flexibility. It also features hardware based adapter current limit and battery-current limit in addition to SMBus programmable limits.

The ISL95520 provides high accuracy adapter current monitor, battery current monitor and system power monitor outputs. To provide maximum flexibility for working with high power and low power systems, it provides several configurable current-sense resistor value options to achieve the best trade-off of current sensing accuracy vs power loss.

The ISL95520 uses Intersil patented Robust Ripple Regulator (R3™) modulation scheme to provide excellent light load efficiency and fast dynamic response. It is available in a 32 Ld 4x4mm^2 QFN package.

Applications

- Devices with rechargeable 2-, 3- or 4-cell batteries

Parameters	ISL95520	Alternatives		
		ISL95521	ISL95521A	ISL88738
V$_{IN}$ (min) (V)	4.75	4.75	4.75	3.2
V$_{IN}$ (max) (V)	25	25	25	23.4
Input Current Limit Accuracy (%)	±2	±2	±2	
Battery Charge Voltage (V)	2-4 cell battery, 16mV step	2-4 cell battery, 16mV step	2-4 cell battery, 16mV step	3 to 18.304 in 8mV Steps
Charging Voltage Accuracy Max (%)	±0.75	±0.75	±0.75	±0.5
Battery Charge Voltage Adjust (%)	16mV steps	16mV steps	16mV steps	8mV steps
Charge Current Limit Accuracy (%)	±2	±2	±2	±2
Trickle Charge Current Limit Accuracy (%)	256mA, 128mA or 64mA	256mA, 128mA or 64mA	256mA, 128mA or 64mA	64mA, 128mA, 256mA, or 512mA
Automatic Trickle Charge Typ (V)	Set by user	Set by user	Set by user	
Battery Leakage Current Max (µA)	245uA	245uA	245uA	
Automatic Power Source Selection	Yes	Yes	Yes	Yes
DC Adapter Detection	Yes	Yes	Yes	Yes
Topology	R3 modulator	R3 modulator	R3 modulator	R3 modulator
Switching Frequency (typ) (kHz)	350 to 1000	350 to 1000	350 to 1000	733 or 1000
Audible Noise	No	No	No	No
Thermal Shutdown (°C)	155 °C	155 °C	155 °C	150 °C
Battery Chemistry	Multi-Cell Li+/Polymer	Multi-Cell Li+/Polymer	Multi-Cell Li+/Polymer	Multi-Cell Li+/Polymer

Devices

Part Number	Package Type	Weight(g)	Pins	MSL Rating	Peak Temp (°C)	RoHS Status
ISL95520HRZ	32 Ld QFN	0.05	32	3	260	RoHS COMPLIANT Details
ISL95520HRZ-T	32 Ld QFN T+R	0.05	32	3	260	RoHS COMPLIANT Details