ISL88739B

Hybrid Power Boost (HPB) Battery Charger with SMBus Interface

FN8955
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The ISL88739B is a highly versatile battery charger configurable as a Hybrid Power Boost (HPB) charger, supporting 2-, 3-, or 4-cell batteries. The configuration allows the battery to work with the adapter to supply the system load when it exceeds the adapter capability, referred to as Turbo mode. The HPB charger configuration reverse-boosts battery energy to the system bus to help the adapter provide the system power in Turbo mode.

The ISL88739B uses N-channel MOSFETs (NFETs) for all the switches to achieve the best performance and lowest BOM cost. The internal charge pump can turn on all the NFETs quickly or slowly, depending on the circumstance or the need. The ability to quickly turn on NFETs prevents system bus voltage drop when the battery is suddenly removed in Turbo mode or in Battery Learn mode.

The ISL88739B provides many protection features including a 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 ISL88739B provides a high accuracy adapter current monitor, battery current monitor, and system power monitor outputs. Several configurable current-sense resistor value options provide maximum flexibility for working with high and low power systems, to achieve the best trade-off of current sensing accuracy vs power loss.

The ISL88739B uses the Renesas 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.

Features

- Configurable as an HPB charger
- Compliant with Intel PROCHOT# and PSYS requirements
- Adapter current monitor and battery discharging current monitor
- Uses NFET for all switches
  - Supports battery removal 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
  - Sudden battery removal support in Turbo mode
- 16 switching frequency options from 350kHz to 1MHz
- Low quiescent current
- SMBus and auto-increment I^{2}C compatible
- Renesas 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)

Applications

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

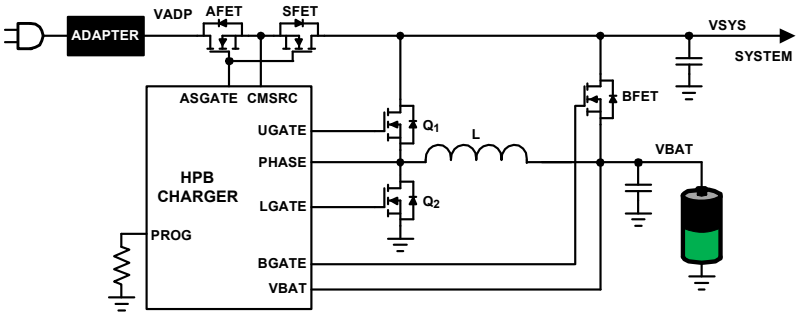

Figure 1. HPB Charger Configuration

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