# ISL88739

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

FN8839
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The ISL88739 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 the system bus 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 ISL88739 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 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 ISL88739 provides many protection features including the 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 ISL88739 provides a 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 ISL88739 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 4mmx4mm QFN package.

## Features

- Configurable as an HPB charger or NVDC charger
- Compliant with Intel PROCHOT# 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
- SMBus and auto-increment $I^2C$ compatible
- Robust Ripple Regulator (R3) modulation scheme provides excellent light-load efficiency and fast dynamic response
- 32 Ld 4mmx4mm QFN package
- Pb-free (RoHS compliant)

## Applications

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

## Related Literature

For a full list of related documents, visit our website:

- ISL88739 device page

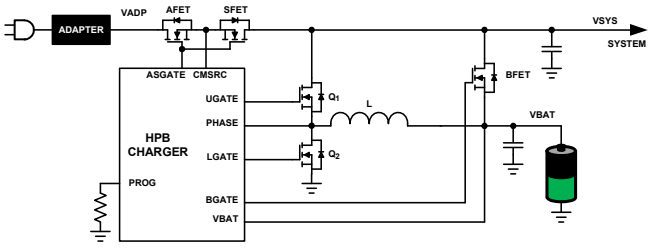



FIGURE 1. HPB CHARGER CONFIGURATION

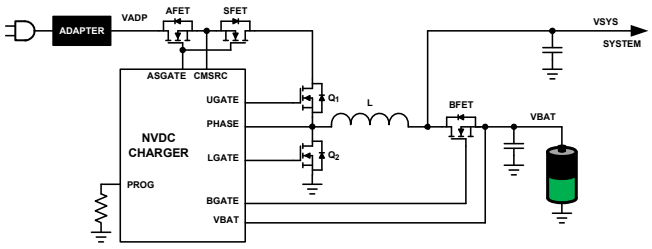



FIGURE 2. NVDC CHARGER CONFIGURATION

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