

RAA489000

Buck-Boost Configurable Battery Charger with USB Power Delivery and USB Type-C® Port Controller Interface (TCPCI)

The RAA489000 is a digitally configurable buck-boost battery charger with USB-C® Port Controller (TCPC). The battery charging function supports Narrow Voltage Direct Charging (NVDC) and USB Power Delivery (PD) programmable power supply output supplies. The TCPC controller integrates TCPC PHY, CC-Logic, and VCONN switches. All RAA489000 blocks connected to the adapter/USB pin (CC1, CC2, VBUS) are protected from input overvoltage events up to 28V. The back-to-back NFET driver and VBUS self-discharge control further simplify the USB PD designs. The RAA489000 supports reverse buck, boost, or buck-boost operation to the adapter/USB port from 2- to 4-cell batteries to allow configurations to support USB PD output for Programmable Power Supply (PPS) ports. Thanks to the on-chip TCPC and Renesas advanced R3™ Technology, RAA489000 is fully compliant with USB PD Sink Fast Role Swap (FRS) spec by monitoring CC line and bringing VBUS voltage back to a safe range rapidly. The RAA489000 has dual SMBus/I²C ports supporting simultaneous direct charger function programming and CC line traffic through TCPCI when operating with a USB-C Port Manager (TCPM) such as the Renesas R9A02G015 to form a complete USB PD compliant solution for single-port or multi-port applications. The RAA489000 battery charger supports all NFETs solution and supports system power from the adapter, battery, or a combination of both. The on-chip ADC monitors the charging input voltage/current, battery voltage, charging/discharging current, and the battery temperature. For Intel™ IMVP compliant systems, the RAA489000 includes PROCHOT#.

Features

- Buck-Boost NVDC charger for 2-, 3-, or 4-cell Li-ion batteries using all NFET transistors
- USB-C Port Controller (TCPC) with integrated TCPC PHY, CC-Logic
- Dual SMBus/I²C ports for charger programming and CC line traffic
- Internal 500mΩ VCONN MUX for up to 1.6A
- Input voltage range: 3.9V to 23.4V (no dead zone)
- System/battery output voltage: 3.9V to 18.304V
- 28V protection for CC1/CC2/VBUS
- Adapter Crash Prevention with adapter current and battery current regulation
- PROCHOT#, IMVP compliant
- Internal 8-bit ADC for charger operation telemetry
- Software configurable for DFP, UFP, or DRP
- USB-C PD Sink Fast Role Swap (FRS) and PPS support
- Pass-Through-Mode (PTM) in forward direction
- Battery Ship Mode - IC ultra-low power state
- Supports JEITA compliance autonomous charge
- Dynamic Voltage Compensation (DVC) support for multi-port charging applications
- USB Power Delivery (PD) 3.0 and Programmable Power Supply (PPS) Certified
- 5x5 40 Ld QFN package
- UL 2367, IEC 62368-1: File No. E520109

Applications

- Multi-cell tablets, notebooks, ultrabook, power bank
- Multi-Port USB-C applications with batteries

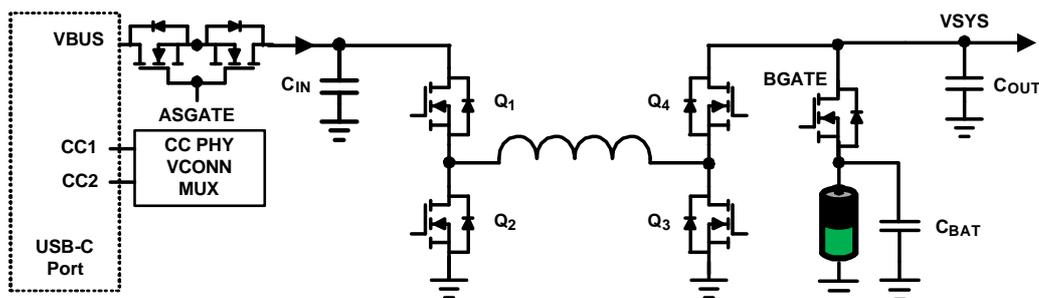


Figure 1. Typical Application

1. Revision History

Revision	Date	Description
1.0	Apr 8, 2021	Initial release.

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