Dual-Mode Battery Charge ICs Enable Simultaneous USB PD And Wireless Charging

ROHM's BD99954GW/MWV dual-input boost-buck charging ICs support one to four battery cells for notebook PCs, smartphones, and power banks that use the latest charging technologies such as wireless and USB Power Delivery (USBPD). These chips generate a charging voltage from 3.07 to 19.2 V for one to four cells through boost-buck control for USBPD (Fig. 1). According to the company, these devices feature the industry's first dual-input charging system that automatically switches charging operation without an MCU using an original built-in charging adapter function. And support is provided for both USBPD and USB BC 1.2. This facilitates configuration of dual-mode systems capable of simultaneous charging via USBPD, wirelessly, or from an ac adapter.

A growing number of portable devices, including notebook PCs, are adopting the USB Type-C PD standard that can charge up to 100 W, providing a common charging platform. At the same time wireless charging is gaining traction, increasing the demand to support both charging methods. However, in order to deliver a wide power supply range required by USBPD, a boost function must be added to the system to charge two-cell (~8.4-V) batteries from conventional 5-V chargers. Also, enabling two different charging methods to operate at the same time requires mounting charge ICs along with peripheral components as well as an MCU to control charge switching, presenting a significant barrier to introduction.

In response, combining its USBPD IC with proprietary semiconductor technologies allowed ROHM to meet these needs and develop dual-input charging ICs that support both USBPD and wireless protocols in a single package.

To support the two predominant charging methods for the latest portable devices, ROHM developed a two-input charging system. A built-in charging adapter discrimination function enables automatic switching between modes without an MCU. This eliminates the need to mount and adjust external peripheral components such as transistors and resistors typically necessary for each charging system (for charge path switching and backflow prevention), significantly reducing both mounting area and design load (see Fig. 2).

These chips also support the latest USBPD standards through boost-buck control. Step-up/down control makes it possible to generate the charging voltages necessary for USBPD operation (5 V to 20 V). For example, when charging a two-cell battery (~8.4 V), boost-buck control enables stepdown operation from 20 V to 8.4 V as well as stepup from 5 V to 8.4 V. In addition, compliance with the popular USB BC1.2 and USBPD standards provides support for both conventional USB and the newest USB PD charging protocols. Additional specifications are listed in the table.

Available now, the BD99954GW is priced at $3.14/unit in quantities of 1000 pcs. The BD99954MWV is also available now. An eval board, the BD99954MWV-EVK-101 is also available offered, priced at $175/unit. For more information, see http://www.rohm.com/web/global/support/battery-charger.

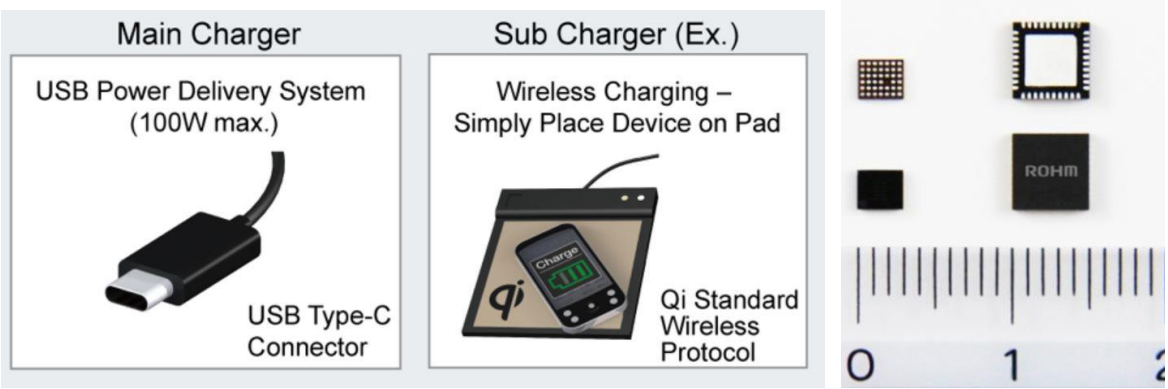

Fig. 1. The BD99954GW/MWV dual-input boost-buck charging ICs generate a charging voltage for one to four cells through boost-buck control for USB Power Delivery. They also support USB BC 1.2. This facilitates configuration of dual-mode systems capable of simultaneous charging via USBPD, wirelessly, or from an ac adapter.

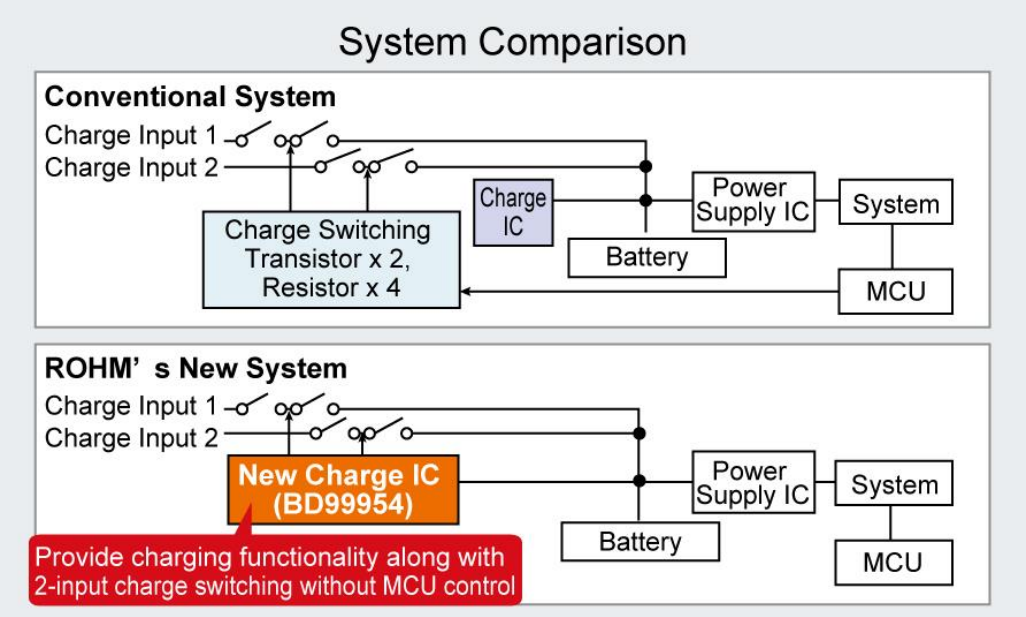

Fig. 2. In ROHM's two-input charging system, a built-in charging adapter discrimination function enables automatic switching between modes without an MCU. This eliminates the need to mount and adjust external peripheral components such as transistors and resistors typically necessary for each charging system.

Table. Key specifications of the BD99954GW and BD99954MWV.

Part No.	No. of Inputs	Supply Voltage Range	Charge Voltage Range	Switching Frequency	Operating Temp. Range	Package
BD99954GW	2ch	3.8 to 25V	3.07 to 19.2V	600 to 1200KHz	-30 to 85°C	UCSP55M3C 2.6mm x 3.0mmx 0.62mm
BD99954MWV						UQFN040V5050 5.0mm x 5.0mm x 1.0mm