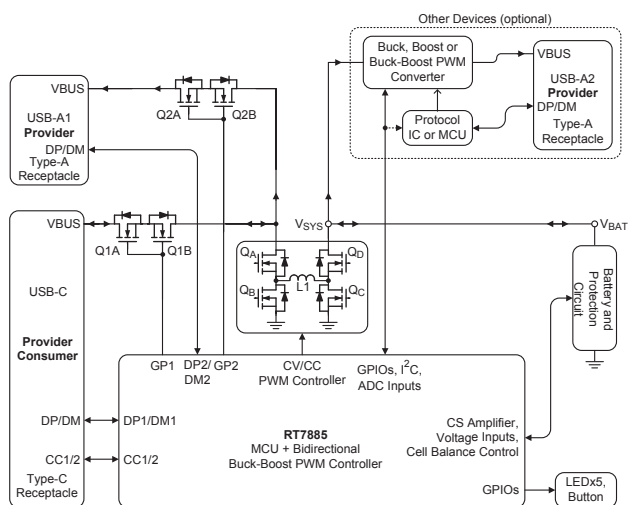


RICHTEK

INTEGRATED PD AND BI-DIRECTIONAL BUCK-BOOST CONTROLLER FOR POWER BANK APPLICATIONS

The implementation of the USB Type-C interface and PD protocol enables power bank applications to charge and to deliver power through a single port. This results in the requirement for bi-directional power conversion between the Type-C port and batteries. One conventional solution is to implement two different power devices for each direction of power conversion.

Richtek has developed the RT7885, the industry-leading highly integrated USB PD and bi-directional Buck-Boost controller, which means a simplified design for power bank applications. The key aspect of this solution is to reduce the BOM cost while maintaining high performance. The diagram below shows its application circuit.

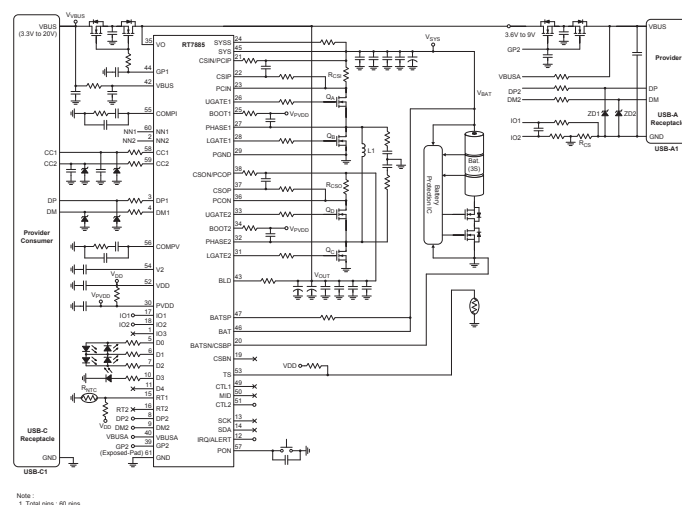


As shown in the diagram, Q_A , Q_B , Q_C , Q_D switches and L1 inductor are key components for the bi-directional Buck-Boost controller. Q_{1A} and Q_{1B} switches are the external output blocking MOSFETs between the output of the PWM converter and the USB Type-C VBUS terminal.

The integrated bi-directional Buck-Boost controller controls the operation modes of Q_A , Q_B , Q_C , Q_D switches to complete the power conversion between the Type-C port and batteries

for the source and sink dual role capability: When the external power supply is connected, the batteries are automatically charged. When the external load is connected, the batteries delivery power with complete protection functions. The RT7885 supports 2-4 series lithium-ion/lithium polymer batteries, providing cell balance control for 2 series batteries. Additionally, the RT7885 can directly control one Type-A port for most existing devices. Any extra Type-A ports can still be controlled by the RT7885, but it will require external voltage converters and interface controllers.

The RT7885 supports various communication protocols including USB Type-C CC1/2 port for PD, and D+/D- port for other proprietary protocols. The built-in ARM Cortex™-M0 MCU has programmable control to facilitate various functions of communication protocol, protections and customized requirements. The high flexibility makes the RT7885 the best solution for power bank applications. Please see below for the application circuit of the RT7885 applied to 1 Type-C port and 1 Type-A port reference design.



Note:
1. Total pins: 60 pins

For more information, please check the [RT7885 product page](#) or [contact us](#).