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SUPPORTING INTELLIGENT POWER DISTRIBUTION AND PROGRAMMABLE POWER SUPPLY(PPS)

Richtek USB Power Delivery solutions makes multi-port chargers more powerful and easier to use

A Type-C and Type-A dual port charger makes charging easier. With a dual charger, you won't need to bring two chargers for both your laptop and mobile phone when on the go. The adaptors should be easy to carry and compact in size without chunky AC wire cables for plugging into wall plugs. The common adaptor design in the market is to use a single transformer to achieve compact designs. However, current main steam design could only deliver 30 watts for type-C port and 18 watts for fast charging from type-A port. A laptop usually requires at least 45W power to operate normally. Additionally, it is also a challenge to meet the latest programmable power supply(PPS) specification in 3.3V-21V and 20mV/step for a type-C port.

Richtek with its innovative design has been able to satisfy this challenge by delivering up to 48W total power. Our smart USB PD power solution with PPS on type-C port automatically adjust power distribution based on different scenarios. When the type-C port is used for powering a laptop, the other port will automatically reduce the power delivery to avoid over-heating and avoid exceeding total power consumption.

We have launched the total power solution: RT7752(PWM controller), RT7207K (USB PD controller with synchronous

rectification) and RT7880 (USB type-C PD and Buck-Boost controller) for type-C and type-A dual port 48W chargers. It supports up to 45W when only using a type-C port and complies with 3.3V-16V PPS in 20mV/step and +/- 150mA constant current. When both type-A port and type-C port work at the same time, the maximum power from a type-C port will be regulated down to 30W to avoid over-heating.

Anther common design in dual transformers is for 60W multi-port desktop chargers(1 type-C port and 4 type-A ports).The type-C output supports 30W output. The total power from 4 type-A ports is 45W which means 12W(5V/2.4A) from each type-A port.

Richtek also offers another power solution: RT7752, RT7207K, and RT9742 for a 60W multi-port desktop chargers. The single type-C port can support up to 45W output. The output power from the type-C port will be automatically adjusted while working together with type-A ports in order to maintain the total output power in 65W and meet safety regulations.

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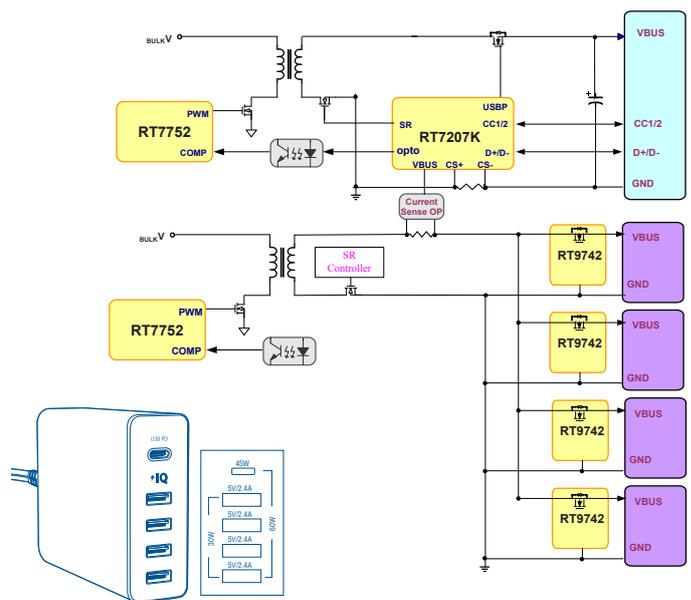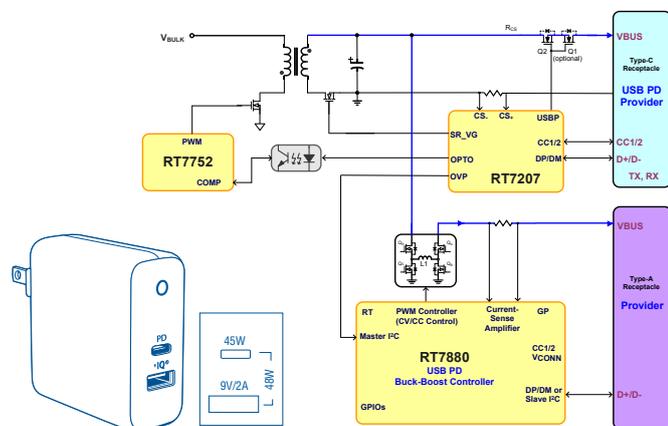
RT7752 Key Features

- Optimized for Adaptive Output Power
  - → Wide VDD Range : 10V to 40V
  - → Adaptive Output Over-Voltage Protection
  - → Adaptive Over-Current Protection
  - → Adaptive Loop Gain Control for Loop Stability
- < 50mW in 5V Standby Mode for Power Saving
- SmartJitter™ Technology for low EMI emission
- Comprehensive Protection
  - → Bulk-Capacitor Brown-In and Brown-Out Protection
  - → VDD Over-Voltage Protection
  - → Output Over-Voltage and Under-Voltage Protection
  - → External Over-Temperature Protection
  - → Secondary Rectifier Short-Circuit Protection
  - → Programmable Line Compensation
- SOT-23-6 package

RT7207K Key Features

- Protocols Support USB PD 3.0 and PPS specifications (TID:1061016)
- Support D+/D- Fast Charge Communication Protocol Function
- Built-in Synchronous Rectifier Driver and Controller
- Built-in Charge Pump for a Wide VDD Operation Range of 3V to 22V
- Built-in Shunt Regulator for Constant-Voltage and Constant-Current Control
- Programmable Cable Compensation
- BLD Pin for Quick Discharge of Output Capacitor
- Vbus Pin for Vbus Voltage Detection and Vbus Capacitor Fast Voltage Discharge
- USBP Pin for Direct Drive of External Blocking N-MOSFET
- Comprehensive Protection
  - → Adaptive Output Over-Voltage Protection
  - → Adaptive Under-Voltage Protection
  - → CC1/CC2/D+/D- Over-Voltage Protection
  - → Firmware-Programmable Over-Current Protection
  - → Firmware-Programmable Over-Temperature Protection
- QFN4x4-24L Package

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RT7880 Key Features

- Built-in 32bit ARM Cortex™ M0 MCU
- Support USB PD 3.0 PPS and various mainstream fast charging and direct charging communication protocols
- Integrated PWM Buck-Boost controller with programmable switching frequency (200kHz to 600kHz)
- Built-in constant voltage and constant current control circuit for high resolution (20mV/step; 50mA/step), and for highly accurate constant voltage (+/-5%) and constant current (+/-150mA) control
- 4V-36V wide input voltage range and 3V-21V output voltage range
- Built-in Charge Pump for driving cost-effective N-MOSFETs as the power channel control
- Support power up to 100 watts (20V/5A)

- Built-in VBUS fast discharge circuit
- Support CC1, CC2, D+,D- I²C(Master),and I²C(Slave) interfaces
- Support up to 10 GPIOs
- Comprehensive and programmable protection settings including over-voltage, over-current, over-temperature, under-voltage, and short-circuit protections which can be set to automatic recovery, latch-up, or hysteresis mode
- The embedded MTP memory allows the RT7880's firmware to be updated by an EC (Embedded Controller) or AP (Application Processor) through the I²C slave interface
- WQFN-40L 5x5 Package

TOOLS AND SUPPORT

We also provide product design tools and documents to accelerate your design process, and support any quality-related requirements. Please contact us for more information.

AVAILABILITY, PACKAGING AND PRICING

The RT7752, RT7207K and RT7880 products are now available through the Richtek regional offices and authorized distributors. Please contact us for pricing.

FIND OUT MORE ABOUT RICHTEK USB PD SOLUTIONS

Richtek is continuously expanding the power management solutions for various USB Type-C with Power Delivery applications, from Type-C power adapter, Car charger, Display, Power Bank, Cable ID to full function Dual Role Power applications such as Smart Phones.

For more information, please see the application note "Introduction to Richtek USB Type-C Power Delivery Solutions". You can also find other Richtek USB PD solution on the application page and the list of USB PD products on the product page. If you would like to have more information on the USB Type-C PD samples and design kits, please contact your nearest Richtek sales office.

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