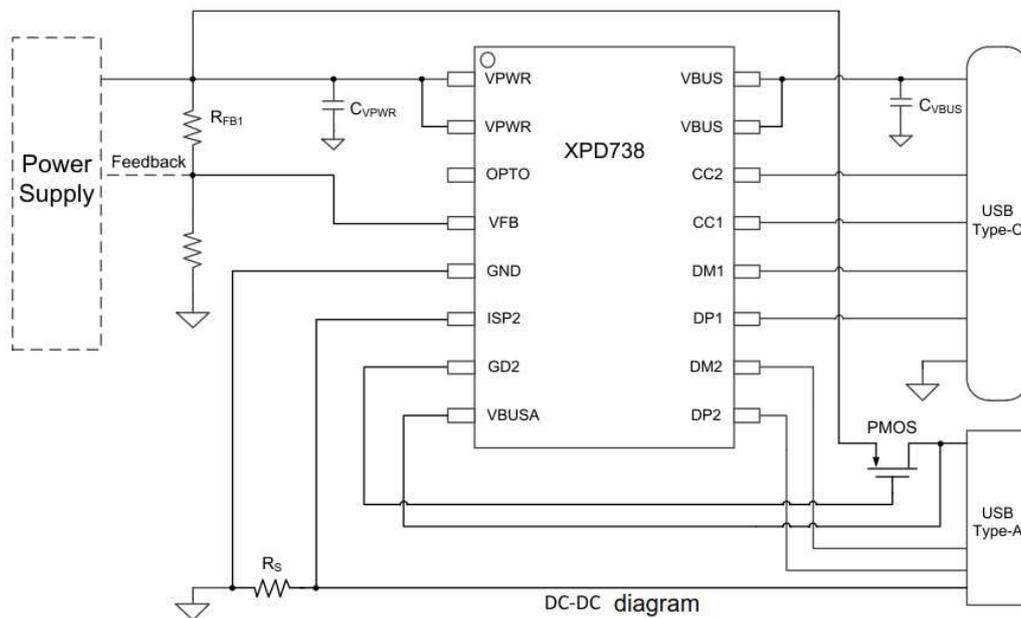
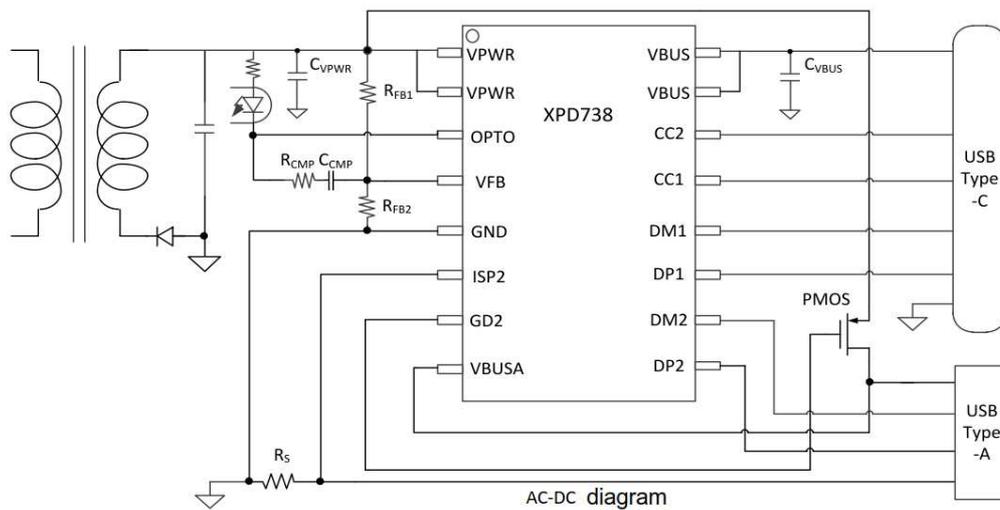


# Technique Support

## Futina Type C+Type A USB Charging

Futina's XPD738 USB model is a multifunctional USB charger with Type-C and Type-A port that integrates USB Type-C、USB Power Delivery (PD) 2.0/3.0 and PPS、QC3.0+/QC3.0/QC2.0 fast charge protocol, HUAWEI FCP/SCP/HVSCP fast charge protocol, SAMSUNG AFC fast charge protocol, BC1.2 DCP and APPLE 2.4A charging specifications.

Working diagram:



XPD738's built-in Type-C protocol can support automatic wake-up when type-C devices are inserted, intelligently identify the positive and negative of

plugs, and realize connections. The XPD738 integrated PD protocol supports bidirectional token encoding (BMC), integrating the physical layer protocol and protocol engine of the hardware without the need for software to participate in codec.

When one of the types-C and Type-A ports is connected to the device, either the Type-C or Type-A ports can implement a separate fast-charging function. When both Type-C and Type-A are plugged into the device, the XPD738 reduces the output voltage to 5V to power the device. In particular, when the Type-A port has been connected to the Apple charging cable but not connected to the Apple mobile phone, the Type-C port still has a fast charging function. When used as a charger, the charging cable is often connected to the charger. The XPD738 perfectly solves the problem of fast charging when the Type-A and Type-C ports are connected to the charging cable application. In addition, the Type-A port full-off current threshold is as low as 10mA, which can support small-current charging of smart wearable devices.

The XPD738 dynamically regulates the voltage via the Sink/Source current which connected to AC-DC or DC-DC feedback pin. Whether it is starting or regulating the voltage, it has a soft-start function to achieve a smooth transition of voltage.

The XPD738 has a number of built-in protection mechanisms to ensure device safety: including dynamic overvoltage/undervoltage/overcurrent protection (the protection point can be adjusted proportionally to the operating voltage/current requested by the device), and monitoring (the port voltage is monitored for safe condition before the VBUS output).

The XPD738 integrates a 10mΩ VBUS power switch, integrated 10 mΩ current sense resistor, and includes dual VPWR and VBUS discharge paths to save peripherals and quickly shut down the output and return to a safe state in the event of an error.

## Knowledge Hub

### **What is ZigBee?**

Zigbee is an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power low-bandwidth needs, designed for small scale projects which need wireless connection. Therefore, Zigbee is a low-power,

low data rate, and close proximity (personal area) wireless ad hoc network.

The technology defined by the Zigbee specification is intended to be simpler and less expensive than other wireless personal area networks (WPANs), such as Bluetooth or more general wireless networking such as Wi-Fi. Applications include wireless light switches, home energy monitors, traffic management systems, and other consumer and industrial equipment that requires short-range low-rate wireless data transfer.

Features:

1. Low-power: In the low-power standby mode, 2 AAA dry batteries can support 1 node to work for 6 to 24 months, or even longer.
2. Low cost: By drastically simplifying the protocol (less than 1/10 of Bluetooth), the requirements for communication controllers are reduced, and according to predictive analysis, measured by the 8051 8-bit microcontroller, the full-function master node requires 32KB code, the sub-function node is as little as 4KB code, and ZigBee is free of protocol royalties. The price per chip is about \$2.
3. Low data rate: ZigBee operates at rates of 20 to 250 kbps and provides raw data throughput rates of 250 kbps (2.4 GHz), 40 kbps (915 MHz) and 20 kbps (868 MHz) respectively to meet the application needs of low-rate data transmission.
4. Close range: The transmission range is generally between 10 and 100m, and after increasing the transmission power, it can also be increased to 1 to 3km. This refers to the distance between neighboring nodes. If you relay through routing and inter-node communication, the transmission distance will be much farther.
5. Short latency: ZigBee's response speed is faster, generally only 15ms from sleep to working state, and only 30ms for node connections to enter the network, further saving power. In comparison, Bluetooth requires 3 to 10s and WiFi requires 3 s.
6. High capacity: ZigBee can adopt a star, flake and mesh network structure, with a master node managing several child nodes, up to a master node can manage 254 child nodes, and the master node can also be managed by the upper layer of network nodes, which can form a large network of up to 65,000 nodes.
7. High security: ZigBee offers three levels of security, including no security settings, the use of access control lists (Access Control List, ACL) to prevent unauthorized access to data, and symmetric passwords using the Advanced Encryption Standard (AES 128) for flexible determination of their security attributes.
8. License-free frequency bands. Use of Industrial Sciences Medical (ISM) Band, 915MHz (US), 868MHz (Europe), 2.4GHz (Global), .