USB Type-C PD3.0 Fast charging protocol intelligent management chip

Product Features

- Be compatible with various of USB Type-A port Fast charge protocol, can intelligently identify the protocol of mobile phone, including: (BC1.2), (Apple2.4A), (QC2.0 Class A), (QC3.0 Class A/B), (FCP), (SCP), (AFC), (low voltage direct charge), etc.
- Be compatible with various USB Type-C protocols, including Type-C protocol, Type-C PD2.0, Type-C PD3.0, Type-C PD3.0 PPS, etc.
- The maximum output current is optional
- The chip has passed the USB Association PD3.0 certification, **TID：5249**
- D± BV is 13V
- CC BV is 30V
- Adjustable voltage accuracy 20mV/step
- Voltage regulation range of the VBUS is 3~**20V**
- Pin setting refer to Type-C PD PDO
- Customization refer to Type-C PD PDO
- Package：SSOP10

Product Overview

FS8611B belongs to FASTSOC FSFC series, the chip selectively compatible with the mainstream charging protocols. The chip intelligently identifies the type of Mobile and selects the most appropriate protocol for the mobile needs.

The D± and CC Break down voltage of the chip are higher than 15V and 27V, with high reliability.

FS8611B has a minimum power supply of 3V and a maximum power supply of 21V, which can adapt to the output voltage of various fast charging protocols.

FS8611B gives the user the choice of common Type-C PDO settings. Users can select different system settings by configuring the external resistor of the FUNC pin according to the application needs.

FS8611B use SSOP10 package。

Application field

- Charger
- Car charging
- Portable power source
- USB panel
- USB HUB
- Other USB Type-C power output devices

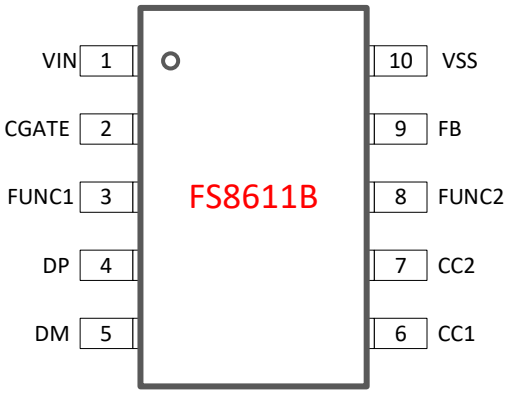
Order information

Part No	Package	Pcs/Reel
FS8611B-XYZPA	SSOP10	4000

comment：XYZ is selected according to specific function, refer to "device selection

V1.3(202412)

Chip packaging and pin definition



SSOP10

Pic 1. Pin definition

Table 1. FS8611B-XYZPA Pin function description

FS8611B	Name of the pin	Description
1	VIN	Power Input, connected to the output of a power supply system
2	CGATE	Control the Voltage of CVBUS in Type-C port, control PMOSFET This pin can be suspended
3	FUNC1	Connect an external resistor, Set the PDO of Type -C
4	DP	Connect the USB type-C DP pin
5	DM	Connect the USB Type-C DM pin
6	CC1	Connect the USB Type-C CC1 pin
7	CC2	Connect the USB Type-C CC2 pin
8	FUNC2	Connect an external resistor, Set the PDO of Type -C
9	FB	External compensation network
10	VSS	Chip ground, connected to the system ground

Extreme operating range

Table 2. Maximum operating range

Parameter	Value
CGATE	-0.3V~30V
CC1, CC2	-0.3V~30V
DP, DM	-0.3V~13V
FB，VIN	-0.3V~5.5V
ESD（HBM）	±4KV

The maximum operating range listed in the table above, if the limit is exceeded, the chip may be permanently damaged. Users should try to avoid it.

Normal operating range

Table 3. Normal operating range

Parameter	Value
VIN	3V~5.6V
D±	0V~3.3V
FUNC, FB	0V~3.3V
Operating temperature range	-40°~105°
Working current	<1mA

Device Configuration

FSFC series IC have plenty of configuration options that include several broad categories: protocol type, declared power and voltage, list as following.

Protocol type

The FSFC series is compatible with various protocols of port A and port C. FASTSOC will provide commonly used chip types for users to choose, but users can still customize the type of agreement, Please contact the sales for details.

Table 4. List of compatible protocol types

Port A protocol								Port C protocol				
Apple 2.4A	BC1.2	QC2.0	QC3.0	FCP	AFC	SCP	Low voltage charging	TypeC	PD2	PD3	PPS	QC4

Note:

1. FS8611B does not have constant current function. If you need this function, you can choose FS8612 or FS8612B.
2. FS8611B supports other A/C port agreements, please consult with sales and distributors for details.

Declared power and voltage

The chip provides a variety of power and voltage options for customers to choose from. Users can set different power and PDO according to the support list through the FUNC1 and FUNC2 pins. For PDO that is not listed in the support list, it can be customized for users.

The FSFC series provides a dedicated FUNC pin, which allows users to set some PDO through an external resistor to ground, improving the application flexibility of the chip. **Compared to the default setting value of the chip, the setting made by the FUNC pin always has the highest priority.**

Device selection

The identification mode of the FS8612C series is FS8611B-XYZPA.

X represents the common definitions of compatible protocol types, as shown in the table below

Table 5. Named X Values

X value	Maximum voltage supported
L	12V
H	20V

Y represents the default PDO setting when the FUNC1/2 pin is suspended, which users can choose based on actual situations. Due to space limitations, it is not fully listed in the manual. Please consult sales for more information.

Table 6. Y Values

Example of Y value	**PDO when FUNC feet are suspended**
18W9V	18W，Up to 9V. Namely: 5V/3A, 9V/2A
36W12V	36W，Up to 12V. Namely:5V/3A，9V/3A，12V/3A

Z is used for protocol selection supported by the chip, as shown in the table below

Table 7. Named Z Values

Z value	Protocol supported by the chip
A	BC1.2 Apple2.4A
B	BC1.2 Apple2.4A QC
C	BC1.2 Apple2.4A QC AFC FCP SCP
other	Contact sales channels

Pin definition and instructions

VIN

VIN supplies power to the chip and requires an external 750 Ω resistor to be pulled up to VBUS.
For applications within 12V, you can choose a 0603/0805 resistor, and for applications with 20V, it is recommended to choose a 1206 resistor.
The capacitor uses 0.47uF.

FUNC1/2

The external resistors of FUNC1 and FUNC2 pins can be selected for different PDO and system characteristics, as shown in the table below. It is recommended to use a 100K Ω resistor with 1% accuracy.
Due to space limitations, please contact your sales or agent to obtain an appendix for this form.

DP and DM

DP and DM breaking down voltage (BV) is greater than 12V, which improves the stability of system insertion and removal.

CC1 and CC2

CC1 and CC2 Connect to CC1 and CC2 in the Type-C port. CC1 and CC2 BV is above 30V, which improves the stability of system insertion and removal.

CGATE

External PMOS is connected to control the channel switch between VDD and CVBUS.
FS8611B , this foot position can be suspended.

FB

As a FB application, the FB is connected to the power supply system and used to control the VBUS voltage of the USB. After the mobile phone and FSFC negotiate the protocol through D±/CC and the required voltage, FSFC initiates voltage regulation through FB. The Voltage regulating accuracy of FB is 20mV, and the voltage regulating speed is 200mV / 500us. Assume that FB is connected with an external resistor R1 to VBUS and an external resistor R2 to ground. The usual calculation formula is as follows,

$$R_2 = \frac{R_1 V_{FB}}{V_{VBUS} - V_{FB}}$$

For instance,

V_{VBUS} take 5V

V_{FB} can be found in the manual of the power IC, for example, take 0.8V

The typical value of R_1 is 100 KΩ. The precision must meet system requirements, for example, 1%

So we can figure out R2.

The power system can be AC/DC, and for better feedback, it is recommended to use 432 instead of 431.

Application example

The typical application of FS8611B is shown in the right figure, where the chip is powered by the output of the power supply.

FB external power supply system.

FUNC external resistor for function setting.

CGATE controls CVBUS output through PMOS.

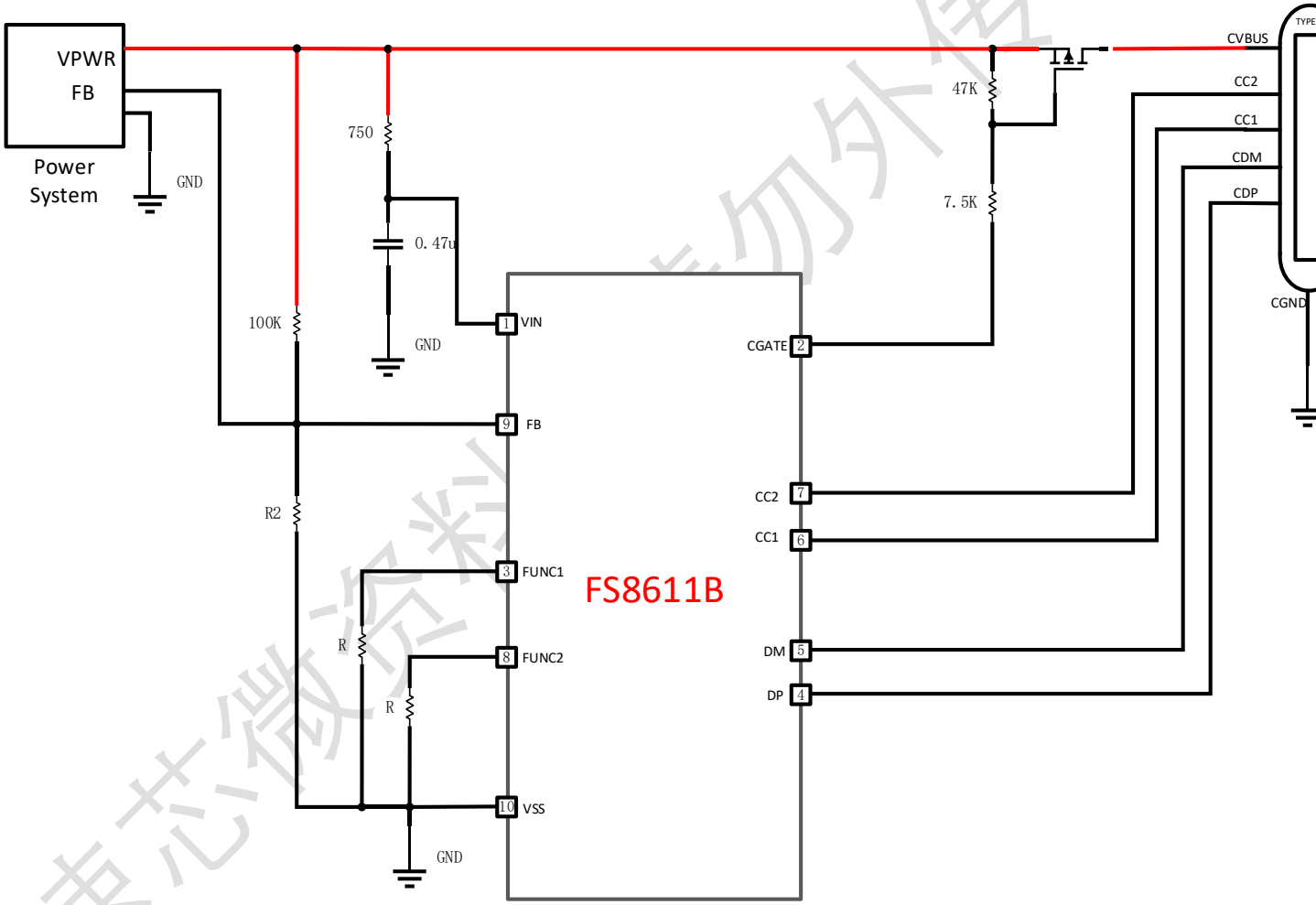


Figure 2. Application diagram

In low-cost applications, external MOSFETs can be removed, as shown in the following figure.

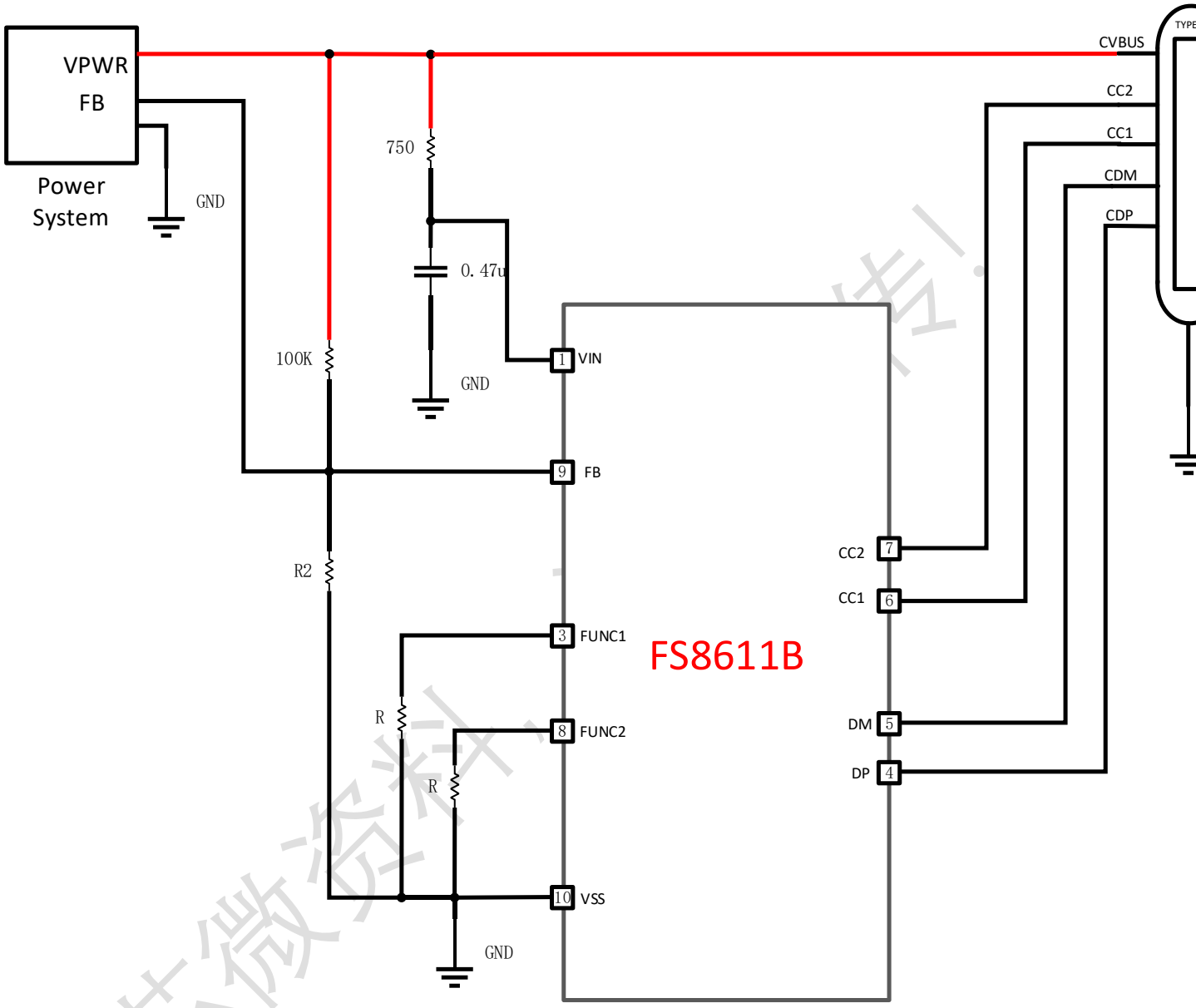
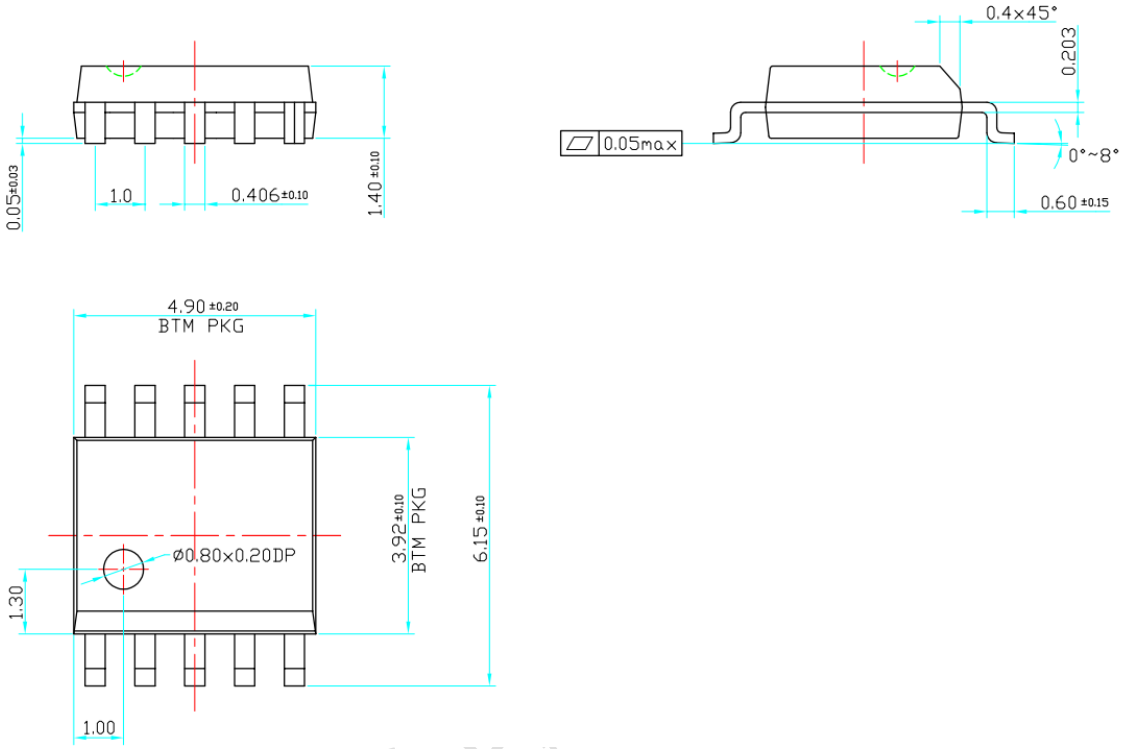


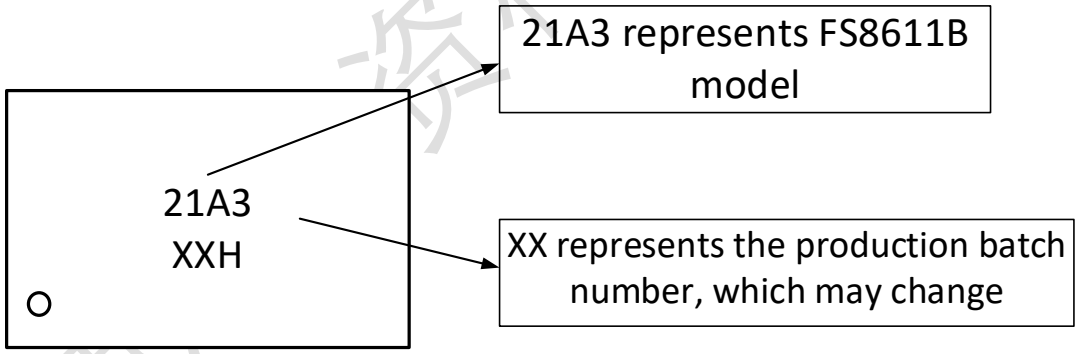
Figure 3. Application diagram

Package outline drawing

SSOP10



Screen printing instructions



1. FS8611B model information: 21A3, fixed and unchanged

2. The production batch number code is used to distinguish the batch number information each time, based on changes in the production batch

Company information and statement

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