

USB Type-C PD3.2 Fast charging protocol intelligent management chip

Product Features

- Compatible with multiple types of USB Type-C protocols, including TypeC protocol, TypeC PD2.0, TypeC PD3.0, TypeC PD3.2, and other protocols.
- The maximum current of the adapted system is optional
- VBUS voltage regulation range 3.3V~21V
- VIN withstand voltage up to 36V, CC withstand voltage up to 30V
- Support Discharge
- Internal integration of LDO
- Integrated OPTO output, connected to optocoupler
- Support common TypeC PD PDO pin settings
- Package: SOT23-6

Product Overview

FS213A belongs to the Fast Chip Micro FSFC series, and the chip is selectively compatible with mainstream charging protocols. The chip can intelligently identify the type of phone inserted and select the most suitable protocol to meet the fast charging needs of the phone.

The voltage regulation range of FS213A is from a minimum of 3.3V to a maximum of 21V, suitable for output voltages of various fast charging protocols.

The voltage resistance of VIN is as high as 36V, greatly improving reliability.

CC withstand voltage up to 30V.

Internally integrated with LDO, low loss during high-voltage output, chip power supply can be directly connected to the power supply.

FS213A comes with a built-in discharge.

FS213A is packaged in SOT23-6.

Application field

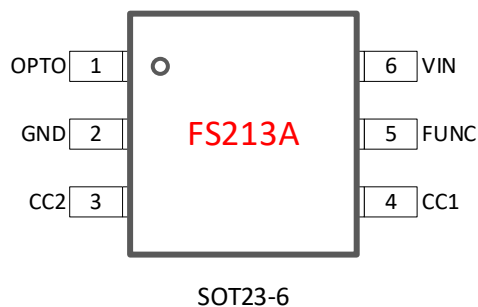
- Travel Charge
- USB panel
- USB socket
- Other USB Type-C power output devices

Order information

Part No	Package	Pcs/Reel
FS213AL	SOT23-6	3000
FS213AH	SOT23-6	3000



Chip packaging and pin definition



Pic 1. Pin definition

Table 1. FS213A Pin function description

FS213A	Name of the pin	Description
1	OPTO	OPTO feedback, connect to the optocoupler
2	GND	Chip ground, connected to the system ground
3	CC2	Connect the USB Type-C CC2 pin
4	CC1	Connect the USB Type-C CC1 pin
5	FUNC	This foot can be suspended in the air. At the same time, external resistors can be connected to set PDO
6	VIN	Chip power supply, usually connected to the output of the power system through a resistor



Extreme operating range

Table 2. Maximum operating range

Parameter	Value
FUNC	-0.3V~8V
CC1, CC2	-0.3V~30V
VIN	-0.3V~36V
ESD (HBM)	±2KV

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	3.3V~21V
FUNC, CC1, CC2	0V~3.3V
Operating temperature range	-40°~105°
Static power consumption, Iq	<1.2mA@5V

Device Configuration

The FSFC series chips have a wide range of configuration options, including several major categories: protocol types, declared power and voltage capabilities. Please introduce them separately below.

Declared power and voltage

Chips offer 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 FUNC.

The FSFC series provides dedicated FUNC pins, which allow users to set partial PDOs by connecting an external resistor to ground, enhancing the flexibility of chip applications.

FS213AL and FS213AH, the difference is described in the FUNC pin introduction.



Pin definition and instructions

VIN

VIN can withstand voltage up to 36V and can be directly connected to a power source.

CC1 and CC2

CC1/2 is connected to CC1/CC2 in the Type-C port, and the CC withstand voltage is as high as 30V, providing reliability. The CC pin is responsible for PD communication, and the quality of communication signals depends on factors such as wire resistance, board resistance, and the actual charging current of the phone. If it exceeds the protocol specifications (refer to the PD protocol specifications for details), it may cause PD communication failure. Suggest choosing wires with lower internal resistance and conducting thorough testing.

FUNC

FUNC external resistors can choose different PDO and system characteristics, as shown in the table below. It is recommended to use 1% accuracy resistors. **Note: For analog MOS functionality, when using a DC-DC power supply, ensure that the selected DC-DC converter supports a minimum output voltage $\leq 2.5V$ (it is recommended to leave a 10% margin). If using AC-DC power supply, it is recommended to use a dual winding transformer design.**

FS213AL

Table 4. FUNC pin functions.

Example of FUNC value	PDO
18K	20W,5V/3A,9V/1.8A,12V/1.67A,5-9V/1.6A
39K	18W,5V/3A,9V/2A,12V/1.5A,3.3-5.9V/3A,3.3-11V/2A
75K	20W,5V/3A,9V/2.22A
150K	20W,5V/3A,9V/2.22A,12V/1.67A,3.3-5.9V/3A,3.3-11V/2A
300K (Can simulate external MOS)	20W,5V/3A,9V/2.22A,12V/1.67A,3.3-5.9V/3A,3.3-11V/2.75A
620K	30W,5V/3A,9V/3A,12V/2.5A
820K	25W,5V/3A,9V/2.77A,3.3~5.9V/3A,3.3~11V/2.75A
Suspended	20W,5V/3A,9V/2.22A,12V/1.67A,3.3~5.9V/3A,3.3~11V/1.8A

FS213AH

Table 5. FUNC pin functions

Example of FUNC value	PDO
18K	15W,5V/2.4A,9V/1.67A,3.3~5.9V/2.4A,3.3~11V/4.5A
39K	18W,5V/3A,9V/2A,12V/1.5A,3.3~5.9V/3A,3.3~11V/4.5A
75K (Can simulate external MOS)	20W,5V/3A,9V/2.22A,12V1.67A,3.3~5.9V/3A,3.3~11V/4.5A
150K	25W,5V/3A,9V/2.77A,3.3~5.9V/3A,3.3~11V/4.5A
300K	30W,5V/3A,9V/3A,12V/2.5A,3.3~5.9V/3A,3.3~11V/4.5A
620K (Reduce power in one minute)	25W,5V/3A,9V/2.77A,12V/2.08A,3.3~5.9V/3A,3.3~11V/2.75A One minute later:20W,5V/3A,9V/2.22A,12V/1.67A,3.3-5.9V/3A, 3.3-11V2A



820K	20W, 5V/3A, 9V/2.22A, 12V/1.67A
(Reduce power in one minute)	One minute later: 15W, 5V/2.4A, 9V/1.67A, 12V/1.25A
Suspended	45W, 5V/3A, 9V/3A, 15V/3A, 20V/2.25A, 3.3~11V/5A, 3.3~16V/3A, 3.3~21V/2.25A

OPTO

Connect to the optocoupler.

Application example

The typical application of FS213A is shown in the following figure.
Connect to the optocoupler.

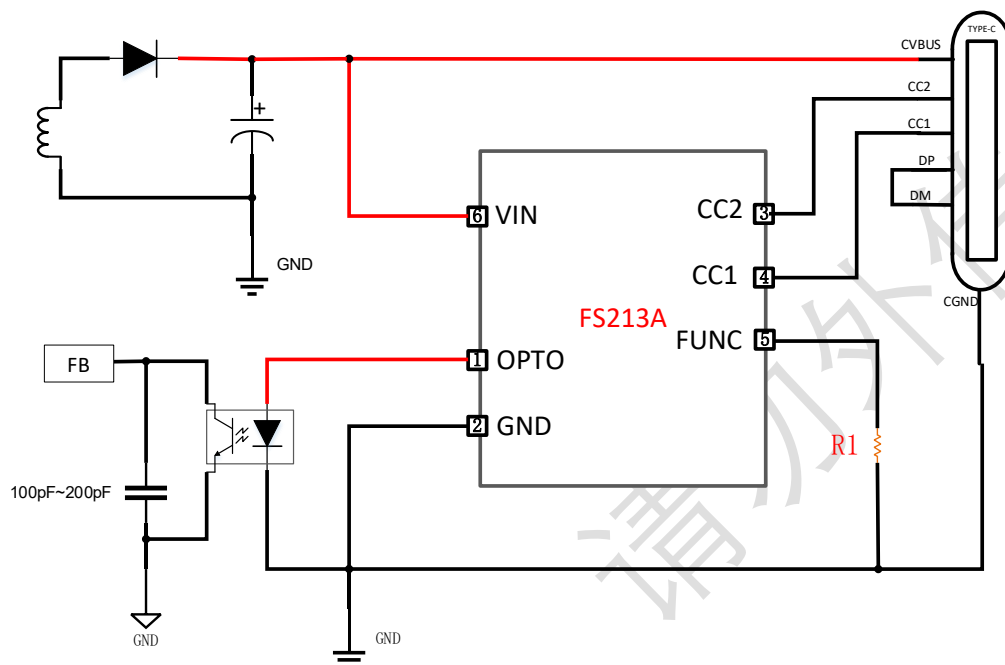


Figure 2. Application diagram

The application chart for simulating MOS is as follows.

Note: This application chart is only needed when using provincial MOS mode.

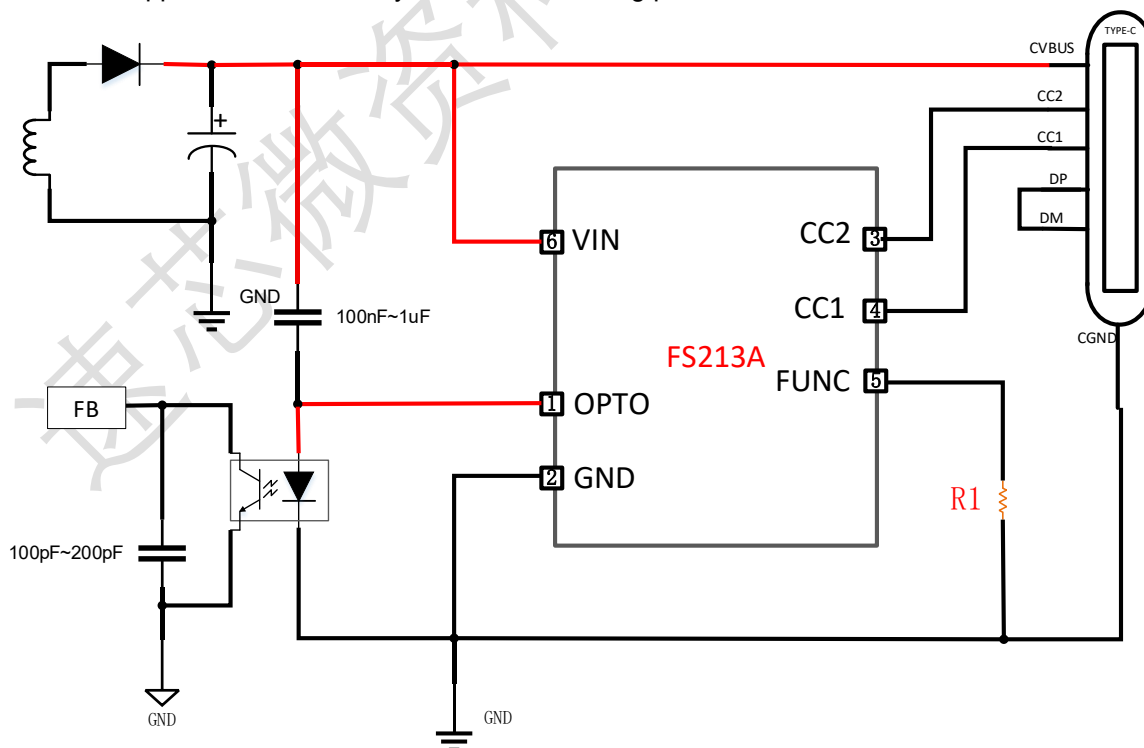
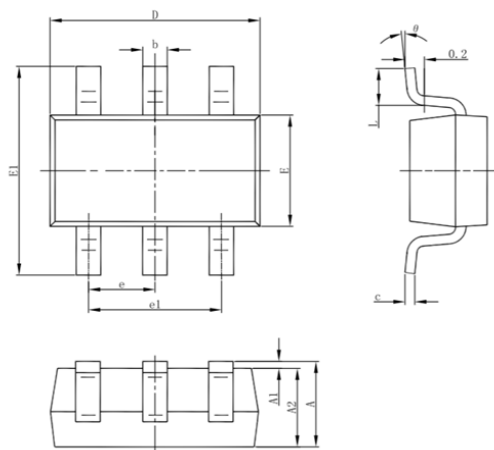


Figure 3. FS213A simulation MOS application diagram



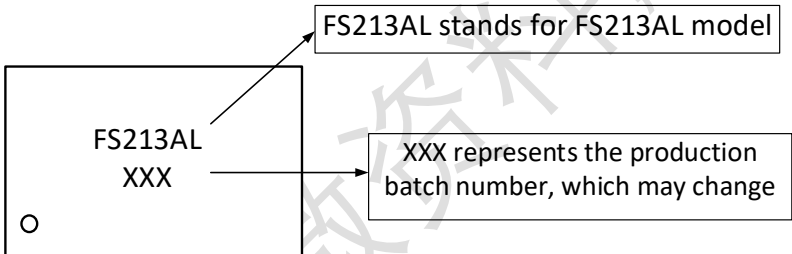
Package outline drawing

SOT23-6

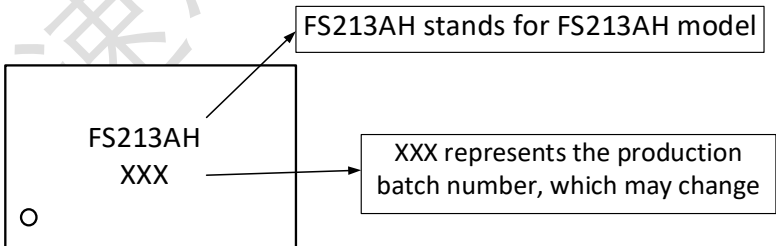


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Chip silk screen information



- 1. FS213AL model information: FS213AL, 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



- 1. FS213AH model information: FS213AH, 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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