

## USB Type-C PD Fast charging protocol intelligent trigger chip

### Product Features

- Be compatible with Type-C PD3.0 protocol
- The maximum output voltage is optional
- Automatic identification of charger fast charging protocol features
- Voltage required for automatic triggering
- Support Emarker mode
- Package: SOT23-5

### Product Overview

FS312A automatically shakes hands with the charging device according to the voltage set by the peripheral circuit, such as 5V, 9V, 12V, 15V, and 20V, and completes the application for the voltage setting.

The FS312A supports the TypeC PD3.0 protocol. It can automatically complete the handshake with the charger and complete the selection of the set voltage according to the protocol priority.

If the set voltage is not found for FS312A, other voltages can be selected according to the setting.

**FS312AE** supports analog Emarker mode, which is suitable for wire application.

FS312A provides SOT23-5 package.

### Application field

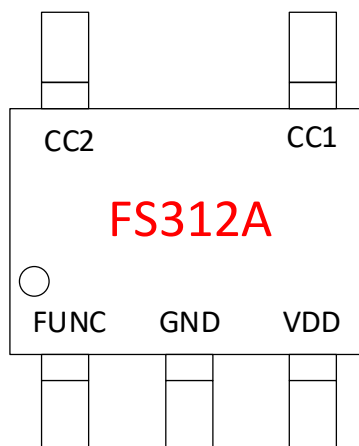
- Wireless charger
- Bluetooth speaker
- On-board equipment
- Energy storage power supply
- Industrial testing
- Other USB Type-C power output devices

### Order information

Part No	Package	Pcs/Reel
FS312A	SOT23-5	3000
FS312AE	SOT23-5	3000



## Chip packaging and pin definition



SOT23-5

图 1. 引脚定义

Table 1. FS312A Pin function description

FS312A	Name of the pin	Description
1	FUNC	Connect an external resistor, prefabricated trigger voltage
2	GND	Ground
3	VDD	Power supply
4	CC1	Connect the USB Type-C CC1 pin
5	CC2	Connect the USB Type-C CC2 pin



## Extreme operating range

Table 2. Maximum working range

Parameter	value
VDD	-0.3V~5.8V
CC1, CC2	-0.3V~6V
FUNC	-0.3V~6V

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
VDD	2.9V~5.3V
CC1, CC2	0V~5.5V
FUNC	0V~5.5V
Operating temperature range	-40°~105°

## Device Configuration

The FS312A supports PD with a maximum setting of 20V.  
To support PD3.1 (28V/36V/48V), please select FS312B series.



## Pin definition and instructions

### VDD

The VDD supplies power to the chip, supporting a minimum of 2.9V and a maximum of 5.3V.

The 3.3K resistor can be directly connected to the VBUS of USB port, or external LDO.

Table 5. Selection of Supply Resistance Corresponding to the Highest Voltage Deceived

Deception maximum voltage	Power supply resistance value/package
≤12V	1K/0603
15V	2K/0603
20V	3.3K/0603

### FUNC

FUNC pin functions are shown in the following table.

Table 6. FUNC Pin function

FUNC external resistance	Set application voltage
No Connection	5V
200K	9V
120K	12V
51K	15V
Ground	20V

### CC1 and CC2

CC1 and CC2 are connected to Type-C interface.

If the Type-C base is connected, both CC1 and CC2 need to connect to the Type-C interface.

If Type-C male header is connected, you only need to select one CC to connect to the Type-C interface ,and the other CC pin is suspended.

If FS312AE is selected, any CC is connected to Type-C interface, and the other CC is connected to 1K to ground.

See application example for specific connection method.

## Application example

The typical application of FS312A is shown in the figure below. The chip power supply is taken from the output of the power supply system.

In order to improve the impact resistance of CC, TVS and 220R ( $\pm 5\%$ , 0603) current limiting resistor are added to the CC pin. Add TVS on VIN feet.

TVS specifications are recommended: 5V

If the Type-C bus is connected, the connection method is as follows: CC1 or CC2 of the chip can be connected with any CC1 or CC2 of the bus.

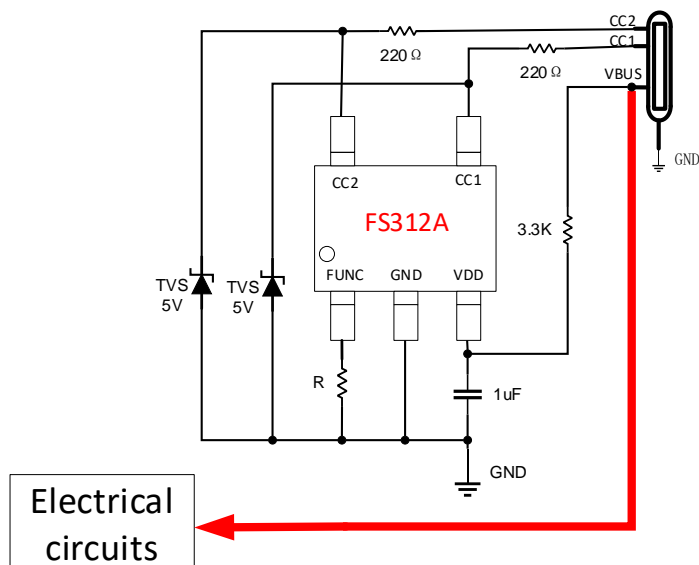


Figure 2. Application diagram

If the Type-C male is connected, the connection method is as follows: select any CC1 or CC2 to connect with CC1 or CC2 in the male, and the other CC is suspended.

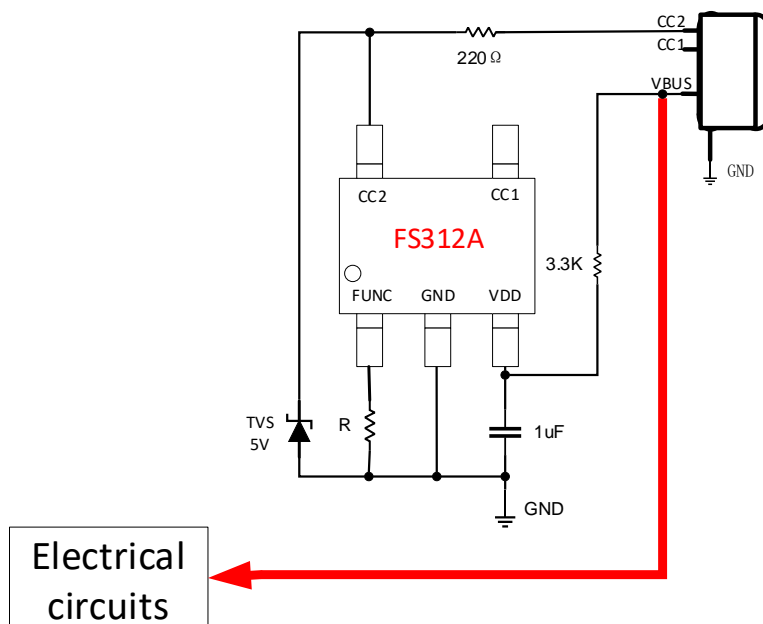


Figure 3. Application diagram



If the Type-C male is connected, the emaker function needs to be simulated at the same time. The connection method is as follows: select any CC1 or CC2 to connect with CC1 or CC2 in the male. The other CC in the male is connected with 1K resistance to the ground. Note that FS312AE needs to be selected at this time.

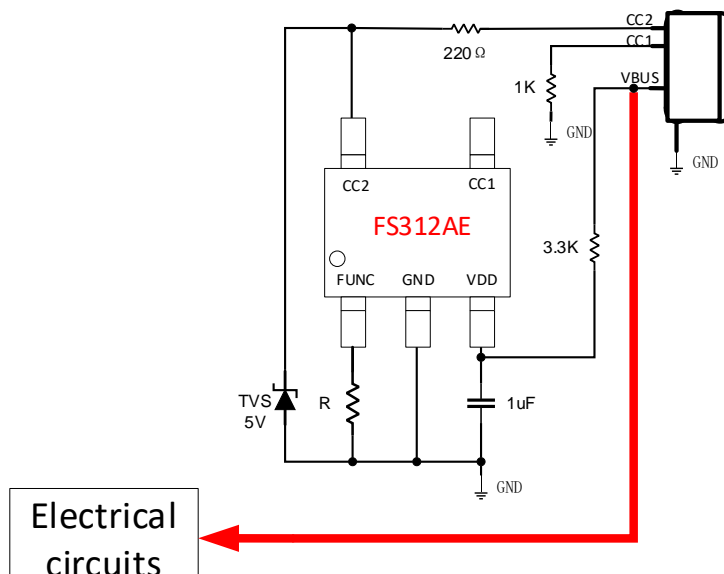


Figure 4. Application diagram

If using FS312AE to lure 20V voltage and starting with a load of 5A, it is recommended to add a PMOS between the power circuit and TYPE-C to enhance the reliability of the circuit.

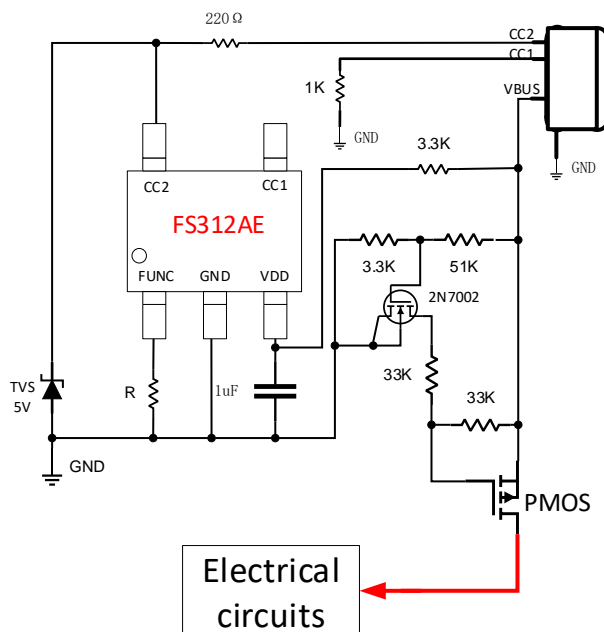
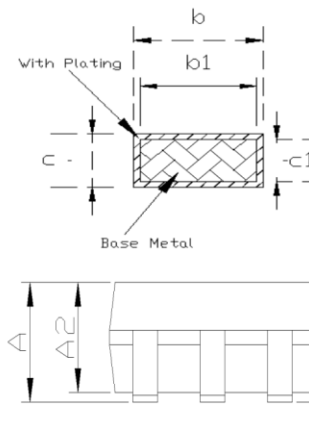
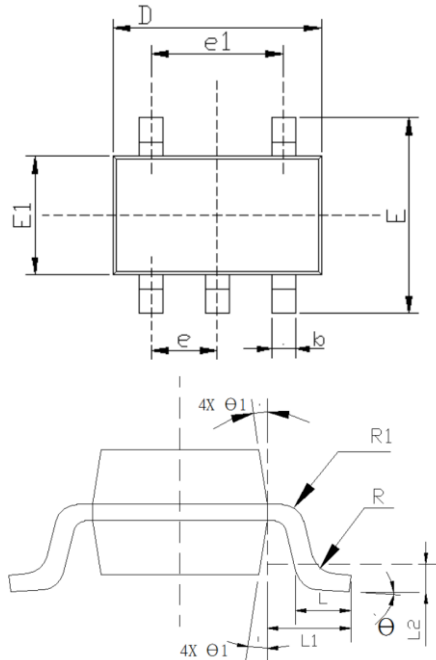


Figure 5. Application diagram



## Package outline drawing

## SOT23-5

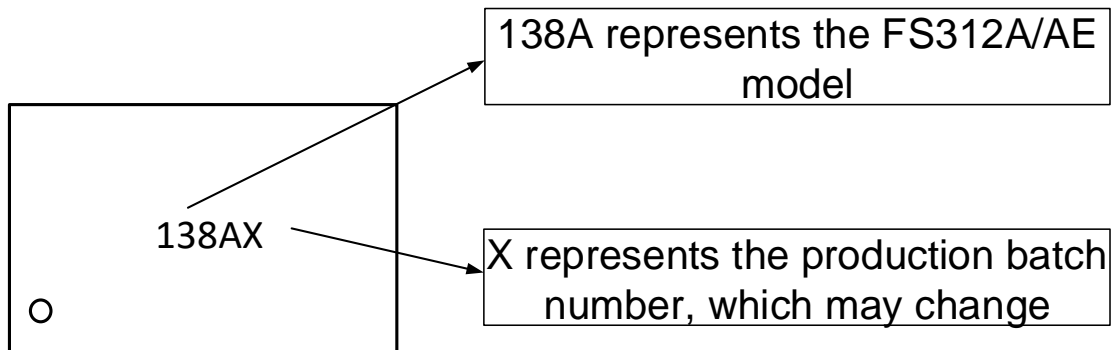


Common Dimensions (Units of Measure=Millimeter)			
SYMBOL	MINIMUM	NOMINAL	MAXIMUM
A	-	-	1.35
A1	0	-	0.15
A2	1.00	1.10	1.20
b	0.35	-	0.45
b1	0.32	-	0.38
c	0.14	-	0.20
c1	0.14	0.15	0.16
D	2.82	2.92	3.02
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.6 REF		
L2	0.25 REF		
R	0.10	-	-
R1	0.10	-	0.25
Θ	0°	4°	8°
Θ 1	5°	10°	15°

## NOTES:

1. ALL DIMENSIONS REFER TO JEDEC STANDARD MO-178
2. DIMENSION D DOES NOT INCLUDE MOLD FLASH
3. DIMENSION E1 DOES NOT INCLUDE MOLD FLASH
4. FLASH OR PROTRUSION SHALL NOT EXCEED 0.25mm PER SIDE.

## Screen printing instructions:



1. FS312A/AE model information: 138A, 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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