FASTSOC

FS212E

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 35V, CC withstand voltage up to 23V
- Support Discharge
- Internal integration of LDO
- Integrated OPTO output, connected to optocoupler through resistor
- Support common Typec PD PDO pin settings
- Package：SOT23-6

Product Overview

FS212E 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 FS212E 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 35V, greatly improving reliability.

CC withstand voltage up to 23V.

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

FS212E comes with a built-in discharge.
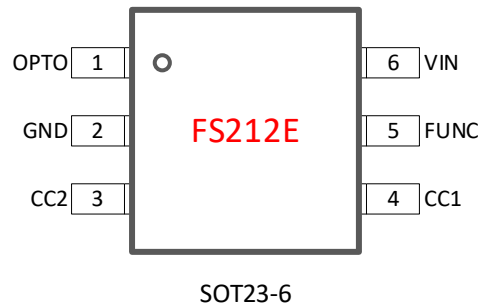
FS212E is packaged in SOT23-6.

Application field

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

Order information

Part No	Package	Pcs/Reel
FS212EL	SOT23-6	3000
FS212EH	SOT23-6	3000

V1.3(202412)

Chip packaging and pin definition

SOT23-6

Pic 1. Pin definition

Table 1. FS212E Pin function description

FS212E	Name of the pin	Description
1	OPTO	OPTO feedback, connect an external resistor of 1K or less 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~5.5V
CC1, CC2	-0.3V~23V
VIN	-0.3V~35V
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°
Working current	<2mA

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.

FS212EL and FS212EH, the difference is described in the FUNC pin introduction.

Pin definition and instructions

VIN

VIN can withstand voltage up to 35V and can be directly connected to a power source.
VIN requires an external capacitor to ensure strong and stable power supply capability. It is recommended to use a 1uF capacitor.、

CC1 and CC2

CC1/2 is connected to CC1/CC2 in the Type-C port, and the CC withstand voltage is as high as 23V, 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

The external resistor of the FUNC pin can choose different PDOs and system characteristics, as shown in the table below. It is recommended to use resistors with a precision of 1%.

FS212EL

Table 4. FUNC pin functions.

Example of FUNC value	PDO
18K	20W，5V/3A，9V/2.22A
39K	15W，5V/2.4A，9V/1.67A
75K	20W，5V/3A，9V/2.22A，12V/1.67A
150K	20W，5V/3A，9V/2.22A，12V/1.67A，3.3~5.9V/3A，3.3~11V/1.8A
300K	25W，5V/3A，9V/2.77A，3.3~5.9V/3A，3.3~11V/2.75A
620K	15W，5V/2.4A，9V/1.67A，3.3~5.9V/3A，3.3~11V/2.75A
1M	25W，5V/3A，9V/2.77A，5~5.9V/3A，5~11V/2.75A
Suspended or 2M	25W，5V/3A，9V/2.77A，12V/2.1A，3.3~5.9V/3A，3.3~11V/2.75A

FS212EH

Table 5. FUNC pin functions

Example of FUNC value	PDO
18K	20W，5V/2.4A，9V/2.22A，12V/1.67A，3.3~5.9V/3A，3.3~11V/4.5A
39K	20W，5V/3A，9V/2.22A，3.3~5.9V/3A，3.3~11V/4.5A
75K	25W，5V/3A，9V/2.77A，5~5.9V/3A，5~11V/4.5A
150K	45W，5V/3A，9V/3A，15V/3A，20V/2.25A，3.3~11V/5A，3.3~16V/3A，3.3~21V/2.25A
300K	15W，5V/2.4A，9V/1.67A，3.3~5.9V/3A，3.3~11V/4.5A
620K	30W，5V/3A，9V/3A，12V/2.5A，15V/2A，20V/1.5A，3.3~5.9V/3A，3.3~11V/3A
1M	65W，5V/3A，9V/3A，15V/3A，20V/3.25A，5~11V/5A，5~16V/3A，5~21V/2.25A
Suspended or 2M	25W，5V/3A，9V/2.77A，12V/2.1A，3.3~5.9V/3A，3.3~11V/4.5A

OPTO

FB Connect a resistor of 1K or less in series to the optocoupler.

The resistance is selected according to the power system, such as 1K Ω.

Application example

he typical application of FS212E is shown in the following figure.
Connect a resistor of 1K or less in the OPTO string to the optocoupler.
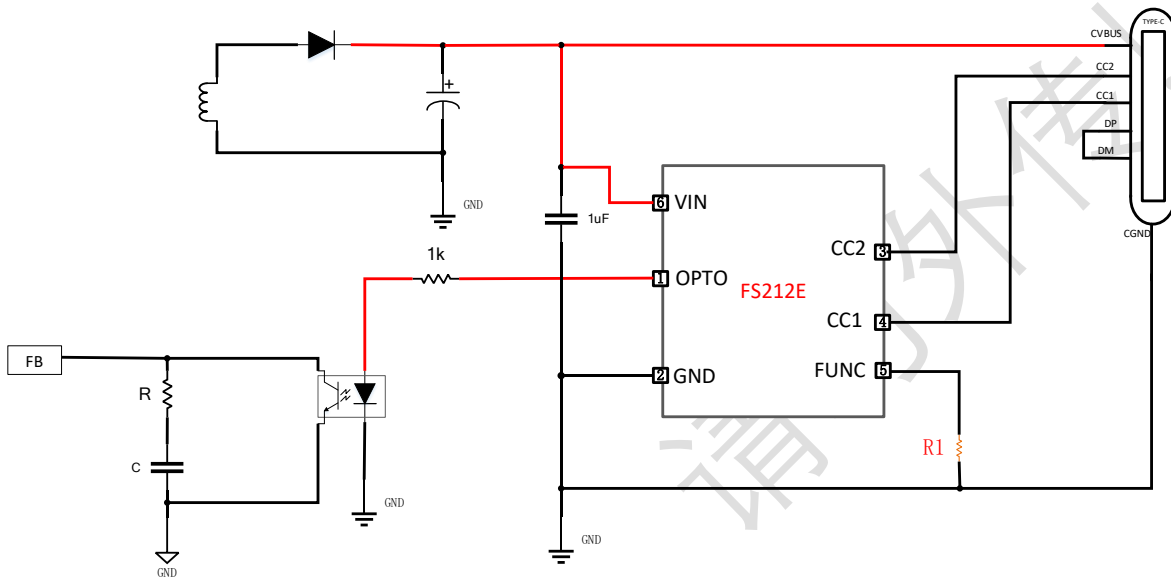**Application Structure 1:**

Figure 2. Application diagram

Scene compensation combination, users can try it out. The detailed master control type in the table can be obtained by following the Speedcore micro official account.

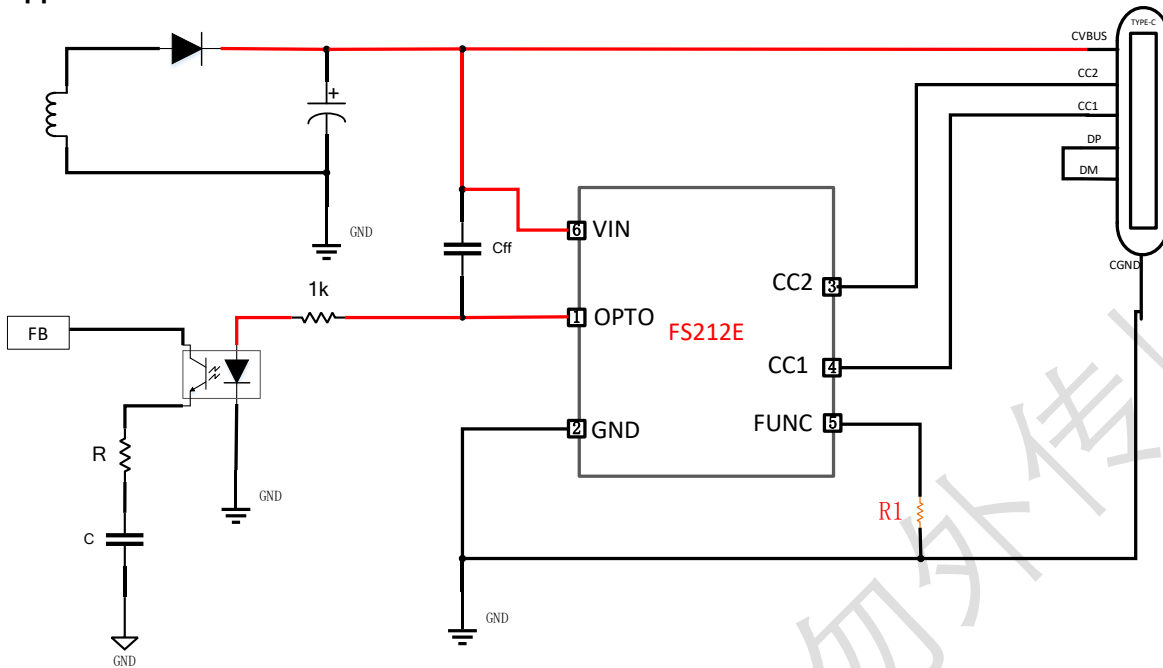| Main control type code (Follow the quick core micro official account for details)	Output capacitor	R	C
A/F	Solid CAP 470uF	1K	33nF
G	Solid CAP 470uF	1K	47nF
D	Solid CAP 470uF	0	4.7nF
E	Solid CAP 470uF	0	47nF
H	Solid CAP 470uF	0	10nF
B	Solid CAP 470uFx2	0	68nF
G	Solid CAP 470uFx2	750	100nF
A	E-Cap 680uF	1K	33nF
D	E-Cap 680uF	0	4.7nF
G	E-Cap 680uF	1K	47nF
H	E-Cap 680uF	0	10nF
B	E-Cap 1000uF	0	10nF
C	E-Cap 1000uF	NC	NC
E	E-Cap 1000uF	0	47nF
F	E-Cap 1000uF	0	100nF

Application Structure 2:

Figure 3. Application diagram

Scene compensation combination, users can try it out. The detailed master control type in the table can be obtained by following the Speedcore micro official account.

Main control type code (Follow the quick core micro official account for details)	Output capacitor	Cff	R	C
A	Solid CAP 470uF	10uF	NC	NC
B	Solid CAP 680uF	10uF	510	100nF
C	Solid CAP 470uF	10uF	1K	68nF
B	E-Cap 1000uF	10uF	750	100nF
C	E-Cap 680uF	10uF	1K	68nF

Package outline drawing

SOT23-6
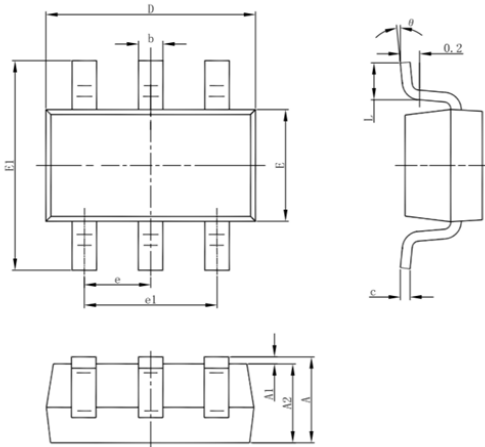
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
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

D4EL stands for FS212EL model

D4ELXXX

XXX represents the production batch number, which may change
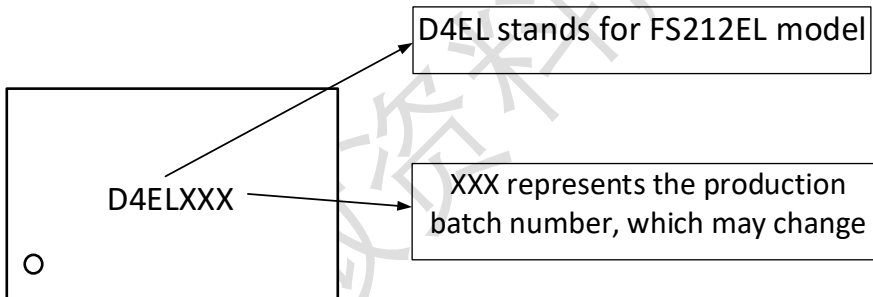
1. FS212EL model information: D4EL, fixed and unchanged

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

D4EH stands for FS212EH model

D4EHXXX

XXX represents the production batch number, which may change
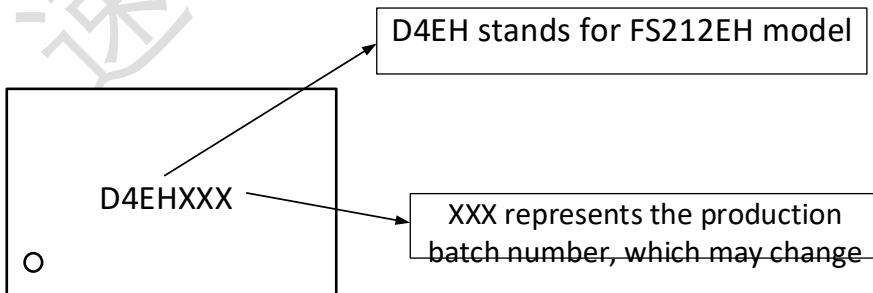
1. FS212EH model information: D4EH, fixed and unchanged

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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