USB Type-A fast charging protocol intelligent management chip

Product Features

- Compatible with common USB Type-A fast charging protocols, BC1.2 ， Apple 2.4A，QC2.0/QC3.0/QC3.0+，FCP，SCP，HISCP，Low voltage direct charging, etc.
- Support dynamic shutdown of fast charging output
- VIN withstand voltage 36V, D ± withstand voltage 22V
- Internal integration of LDO
- Internal integrated FB voltage divider resistor
- Package：SOT23-6

Product Overview

The FS158L (abbreviated as FSFA series) chip is selectively compatible with mainstream charging protocols. The chip can intelligently recognize the type of phone inserted and select the most suitable protocol to meet the needs of the phone.

The D ± of the USB Type-A port is connected to the FSFA chip. After the phone is inserted into the USB Type-A port, according to the agreements of various protocols, the phone and FSFA will start to recognize each other. Once the recognition is successful, FSFA can respond to the phone's request.

The VIN withstand voltage of FS158L is as high as 36V, and the D ± withstand voltage is as high as 22V, which improves the reliability of the system.

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

FS158L uses SOT23-6 packaging.

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Application field

- Travel Charge
- Wall filling
- Socket
- Other USB Type-A power output devices

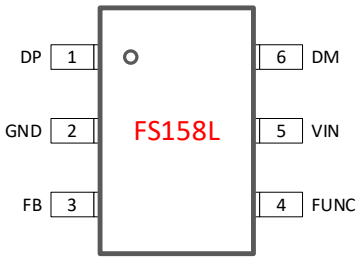
Order information

Part No	Package	Pcs/Reel
FS158LA	SOT23-6	3000
FS158LC	SOT23-6	3000
FS158LD	SOT23-6	3000
FS158LE	SOT23-6	3000

Note: Please refer to the "Device Selection" section for details

V1.0(202509)

Chip packaging and pin definition



SOT23-6

Pic 1. Pin definition

Table 1. FS158L Pin function description

FS158L	Name of the pin	Description
1	DP	USB DP, DP connected to USB Type-A port
2	GND	Chip ground, connected to system ground
3	FB	FB feedback, connecting to the VFB of the DC-DC
4	FUNC	Enable fast charging Suspended: maximum 13.2V 180K: Maximum 20V 68K: Maximum 10.2V Grounding: Shielded fast charging
5	VIN	Chip power supply
6	DM	USB DM, DM connected to USB Type-A port

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Extreme operating range

Table 2. Maximum operating range

Parameter	Value
VIN	-0.3V~36V
D±	-0.3V~22V
FUNC	-0.3V~8V
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	2.9V~20V
D±	0V~3.3V
FUNC	0V~3.3V
Working temperature range	-40°~105°
Working current	<2mA

Device Configuration

The identification method for the FS158L series is FS158LX.
X represents compatible protocols, commonly defined in the table below.

Table 4. Named X Values

X value	Agreement
A	BC1.2APPLE2.4A,QC2.0/QC3.0/QC3.0+,AFC,FCP, others
C	BC1.2APPLE2.4A,QC2.0/QC3.0/QC3.0+,AFC,FCP,SCP,HISCP,Low-voltage direct charging, others
D	BC1.2APPLE2.4A,QC2.0/QC3.0/QC3.0+,AFC,FCP,SCP,HISCP,High-voltage direct charging, others
E	BC1.2APPLE2.4A,QC2.0/QC3.0/QC3.0+,AFC,FCP,SCP,HISCP,High voltage direct charging, TECNO,others

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Pin definition and instructions

VIN

The voltage resistance of VIN can reach up to 36V and can be directly connected to the power system. At the same time, the VIN is externally connected to the ground with a capacitor. The capacitance size is 1uF.

DP and DM

DP/M is connected to the USB Type-A port, and both pins can withstand a voltage of 22V.

FUNC

Suspended: maximum 13.2V
180K: Maximum 20V
68K: Maximum 10.2V
Grounding: Shielded fast charging

FB

The internal integrated feedback resistors eliminate the need for users to externally connect pull-up and pull-down resistors. By default, VFB = 1V.
If the VFB value of the used DC-DC is lower than 1V, external pull-up and pull-down resistors need to be connected; please contact our company for specific wiring.

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Application example

The typical application of FS158L is shown in the figure on the right.
FB connects to DCDC's FB, note that a power chip with VFB=1V is needed.

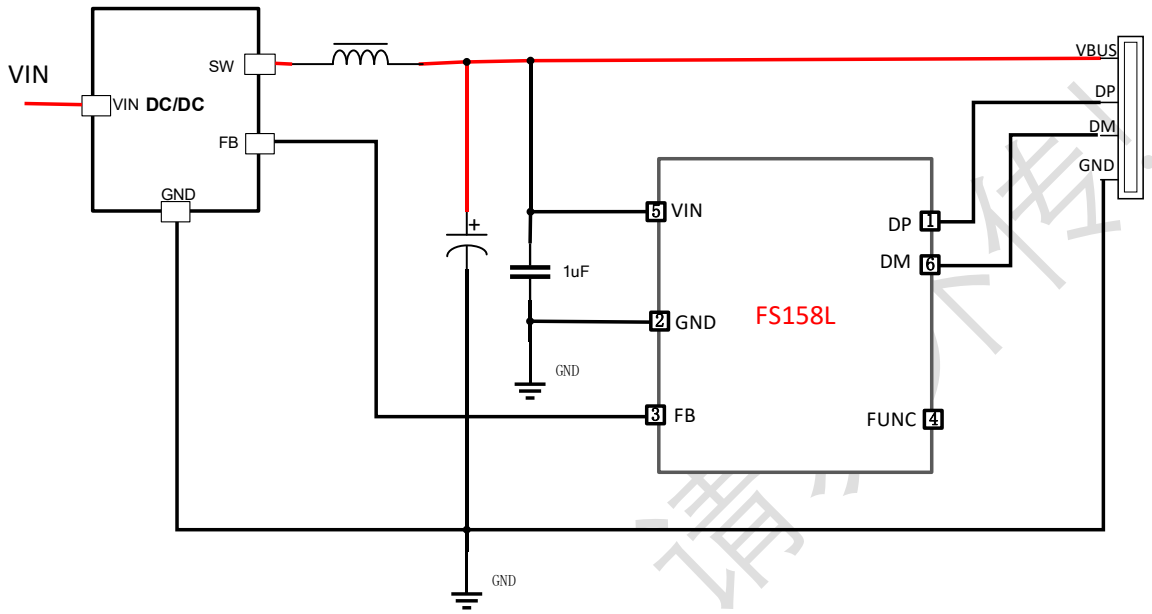


Figure 2. Application diagram

To better support the new VIVO phone, it is recommended to use the following circuit, adding a compensation capacitor of 2.2nF to 6.8nF between VBUS and FB.

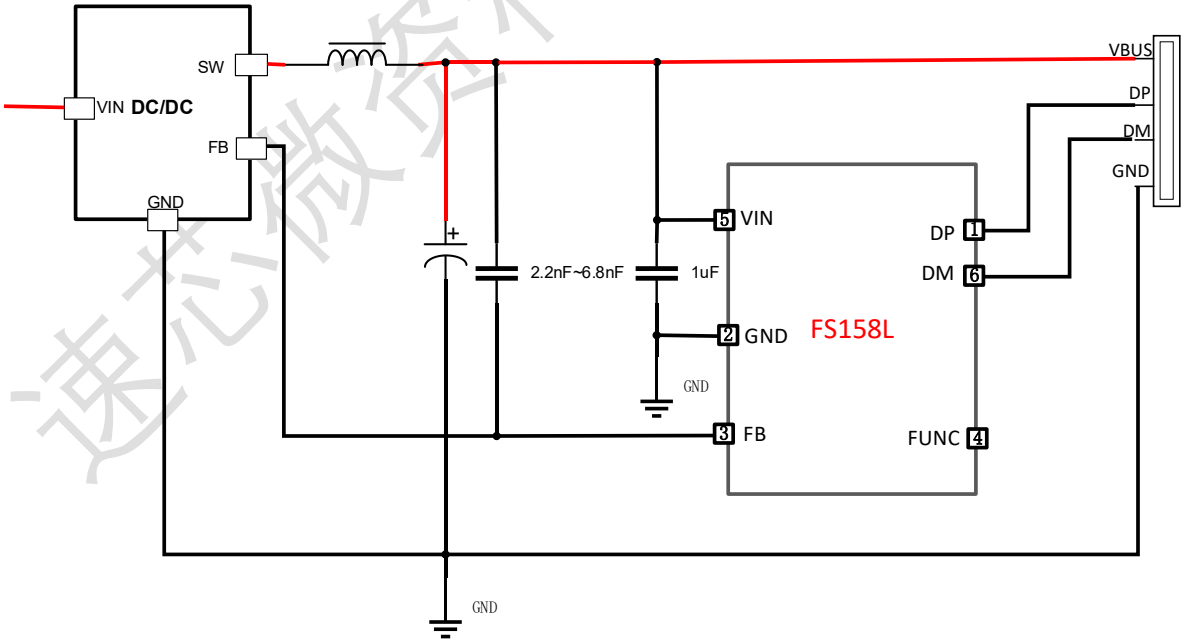
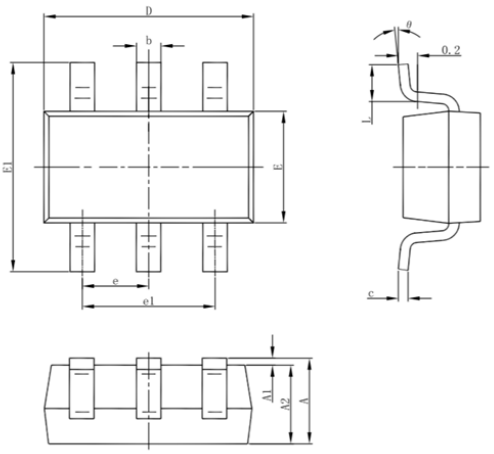


Figure 3. Application diagram

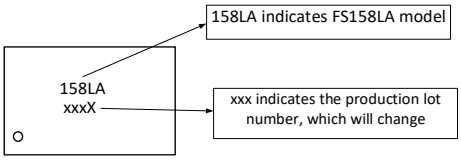
Package outline drawing

SOT23-6

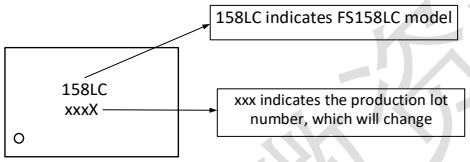


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

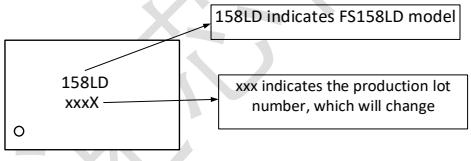
Chip silk screen information



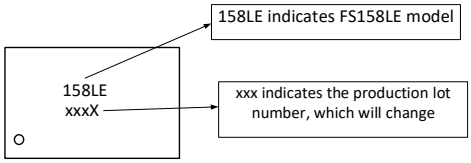
FS158LA model information: 158LA, fixed; The production batch number shortcode is to distinguish the batch number information each time, and it varies according to the production batch



FS158LC model information: 158LC, fixed; The production batch number shortcode is to distinguish the batch number information each time, and it varies according to the production batch



FS158LD model information: 158LD, fixed; The production batch number shortcode is to distinguish the batch number information each time, and it varies according to the production batch



FS158LE model information: 158LE, fixed; The production batch number shortcode is to distinguish the batch number information each time, and it varies according to the production batch

Company information and statement

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