

## Features

- D+/D- DCP Mode per USB Battery Charging Specification 1.2
- D+/D- Short Mode per Telecommunication Industry Standard YD/T1591-2009 (Chinese)
- Supports non-BC1.2 Charging Modes by Automatic Selection
  - D+/D- Option for Apple Device
  - D+/D- Option for Samsung Device
- Operating Voltage Range: 4.5V to 5.5V
- Power Consumption
  - 5uA When VDD<POR threshold
  - 180uA When VDD>POR threshold
- Lead(Pb)-Free, Halogen-Free, SOT23-5 Package
- 8kV HBM ESD Rating on D+/D- Pins

## Applications

- Power bank
- USB Ports (Hosts and Hubs)
- MID OTG Port
- Wall Charging Adapters

## General Description

The FT302 is the USB dedicated charging controller IC, which is fully compatible with BC1.2 and other non-BC1.2 standards like YT/D1591-2009, Apple charging specification (for i-Pad &i-Phones) and specs from Samsung Galaxy family.

The IC is used to facilitate charging procedure when most of the mainstream handheld devices are detected.

The FT302 is suitable for all the charger products using USB interface like power bank, wall adapter and even MID device with OTG function. The IC is provided with enhanced ESD protection up to +/-8kV with application on D+/D- Pins.

FT302 is available in tiny SOT23-5 package.

## Order Information

Name	Operation Temperature	Package	Package Mark
FT302	-30°C to 80°C	SOT23-5	8302

## Function Block Diagram

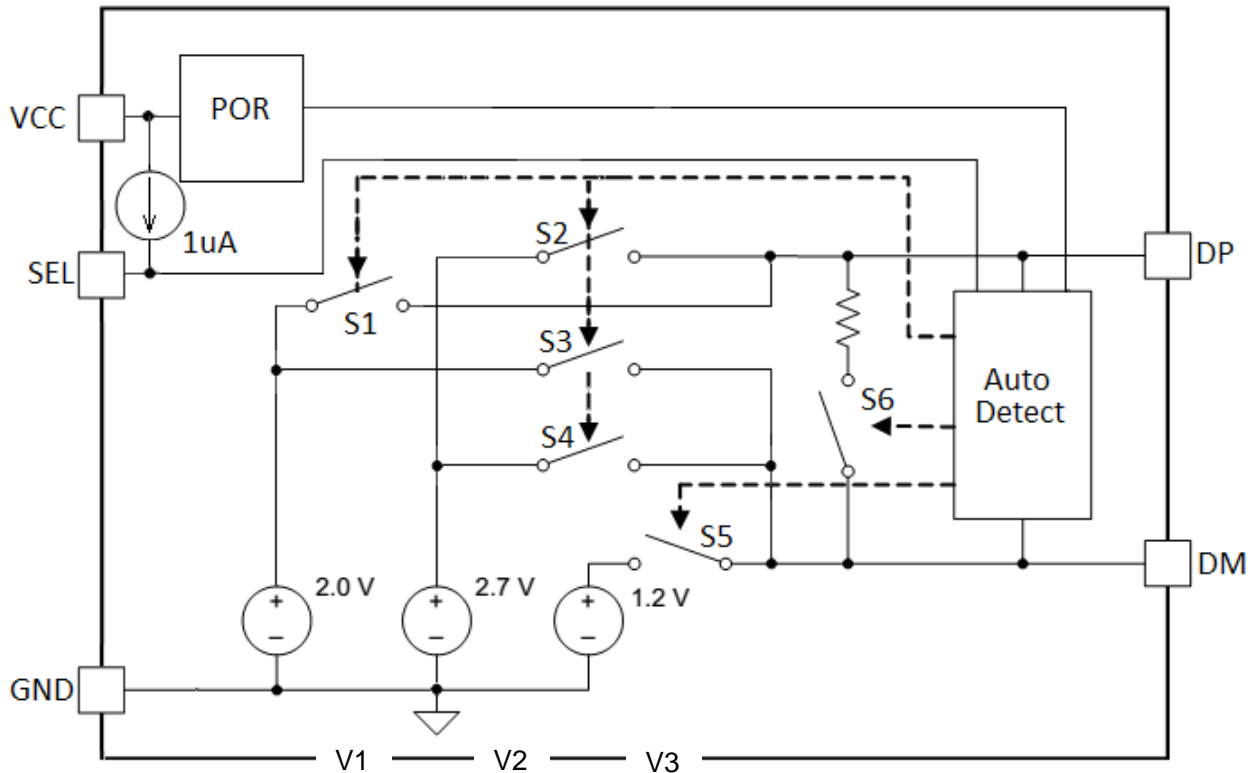


Fig1. Block diagram

## Absolute Maximum Ratings

Voltage on VCC Pin Relative to GND	.....GND-0.3 toGND+6V
Voltage on SEL Pin Relative to GND	.....GND-0.3 to VCC+0.3V
Voltage on DP DM Relative to GND	.....GND-0.3 to VCC+0.3V
Operating Temperature Range	.....-30°C to80°C
Junction Temperature	.....150°C
Store Temperature Range	.....-55°C to 125°C

### Caution:

Stresses beyond "Absolute Maximum Ratings" condition may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

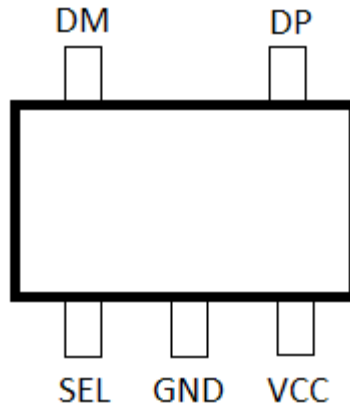
**Pin Arrangement and Description**


Fig2. Pin arrangement

Pin No.	Pin Name	Description
1	SEL	Work Mode Selection with 1uA pull up current
2	GND	Ground
3	VCC	Power
4	DP	USB positive data-channel to external USB device
5	DM	USB negative data-channel to external USB device

Table1. Pin description

**Electrical Characteristics Recommended DC Operating Conditions**

( $4.5 \leq VCC \leq 5.5$ ,  $T_A = -40 \sim 80^\circ\text{C}$ , unless otherwise specified.)

PARAMETER	SYMBOL	CONDITIONS	Min.	Typ.	Max.	UNITS
VCC Voltage			4.5		5.5	V
VCC POR Voltage	$V_{CC\_POR}$		3.5		3.9	V
	$V_{CC\_POR\_HYS}$			250		mV

Table2. Electrical Operating Parameters

**DC Electrical Characteristics**

( $4.5 \leq VDD \leq 5.5$ ,  $T_A = -40 \sim 80^\circ\text{C}$ , unless otherwise specified.)

PARAMETER	SYMBOL	CONDITIONS	Min.	Typ.	Max.	UNITS
DC Current Consumption	$I_{VCC}$			180	240	$\mu\text{A}$
Output Resistance on DP/DM pin	$R_{OUT}$	Output voltage=2.0		30		$\text{k}\Omega$
		Output voltage=2.7		23		$\text{k}\Omega$
Short Condition Resistance	$R_{DMDP}$			50		$\Omega$
SEL pull up current	$I_{SEL\_PU}$			1		$\mu\text{A}$

Table3. DC Electrical Characteristics

\* Actual charging current is programmed by the external resistor connected to the Ichg pin

## Function

FT302 is a specified USB charger controller IC for external device charging. FT302 integrated with intelligent USB detection circuits, can identify most of the handheld equipment in market, such as Apple, Samsung, HTC mobile phones and other USB supplied devices.

FT302 monitors the D+/D- voltage all the time, and automatically emulates the corresponding USB type for the attached device. Then, the attached device can employ a big current as MAX as 2.4A to charge itself.

FT302 only changes the D+/D- voltage to suitable value for different devices; it does not control the charging current loop. The actual charge current is

determined by the power supply and the charge management IC in attached device.

## SEL Pin

FT302 uses a SEL pin to choose the different Apple charge current.

Pull low through a resistor less than (or equal to) 1kΩ is for 1A option; Pull high or pull low through a resistor between 1MΩ and 2MΩ are all for 2.4A option.

SEL potential	Option
L ( $R < 1k\Omega$ )	1A
H ( $1M\Omega < R < 2M\Omega$ )	2.4A

## Application Circuits

Table4. SEL pin for different current option

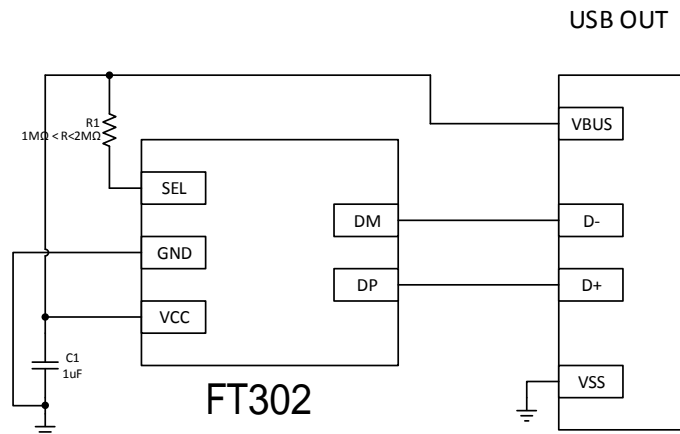


Fig3. 2.4A Configuration 1 / typical application circuits

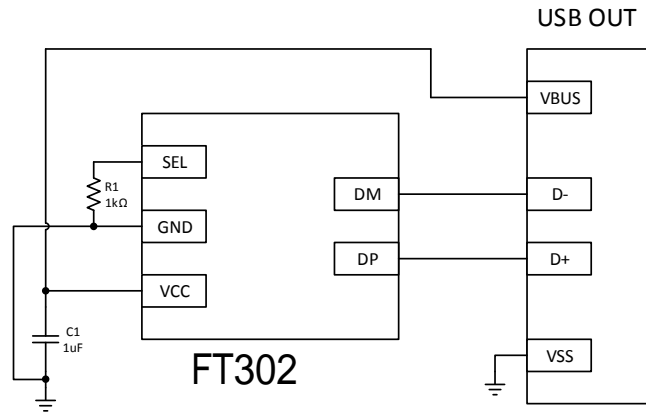


Fig4. 1A Configuration / typical application circuits

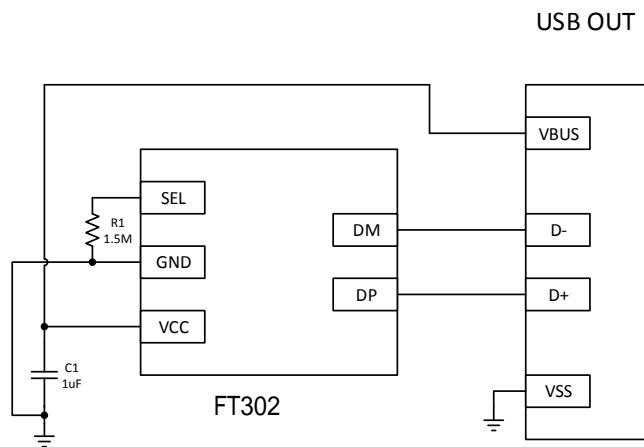
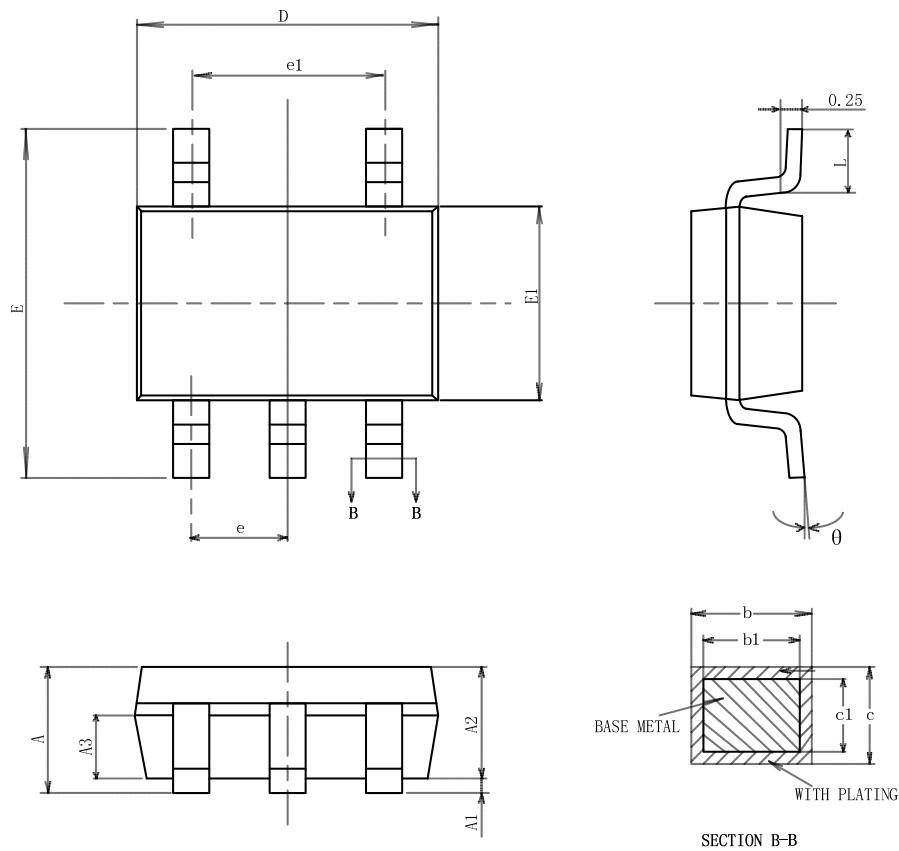


Fig5. 2.4A Configuration 2 / typical application circuits

## Package Information



SYMBOL	MILLIMETER		
	MIN	TYP	MAX
A	—	—	1.35
A1	0.04	—	0.15
A2	1.00	1.10	1.20
A3	0.55	0.65	0.75
b	0.38	—	0.48
b1	0.37	0.40	0.43
c	0.11	—	0.21
c1	0.10	0.13	0.16
D	2.72	2.92	3.12
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95BSC		
e1	1.90BSC		
L	0.30	—	0.60
$\theta$	0	—	8°
L/F size (mil)	47*47	—	46*64