Data Sheet

Type Description : USB Charger EnhanceIC

Product Name : EST5198B

Reversion : 2.0

Reversion Date : November 11, 2013

Page : 9 Pages

DESCRIPTIONS

The EST5198B is designed for USB dedicated charging port (DCP) controller.

The EST5198B can automatically detect and provide the correct signal on the D+ and D- data lines to the USB devices. The internal dedicated charging schemes can change the charging mode for the different USB device.

- BC1.2 DCP that short the D+ line to the D- line
- Apple divider DCP that apply specified voltage on the D+ and D- lines
- Samsung specification that apply specified voltage on the D+ and D- lines

The EST5198B set the USB interface data D+ and D- to the required condition then the handheld charging device will start to charge current as much as possible from the power source .

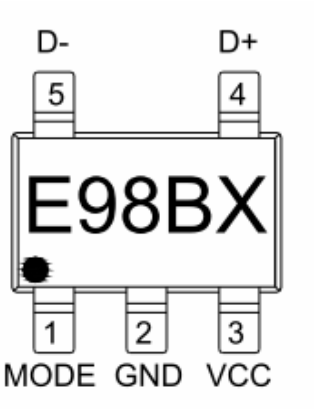
FEATURE

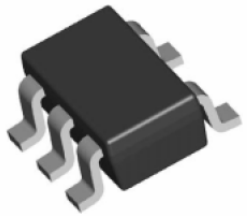
- Operating range: 4.5V to 5.5V
- Automatically switch data lines D+ and D- connections for the attached USB device
- Supports Samsung device charging mode
- Supports BC1.2 charging specification mode
- Supports selectable Apple 1A ,2A and 2.4A charging mode
- Supports most of mainstream USB device fast charging
- RoHS compliant and lead-free package
- SOT23-5 package

APPLICATION

- AC-DC wall adapter with USB port
- Vehicle USB power charger
- Other USB charger
- Power bank USB charger

PIN CONFIGURATION (TOP VIEW)





ORDERING INFORMATION

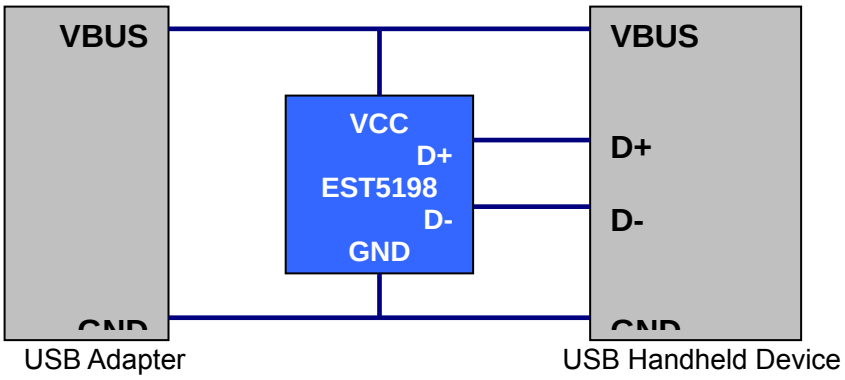
ORDER NUMBER	Package	Shipping	Top Marking
EST5198B	SOT-23-5L (Pb-free)	Tape Reel	E98BX

PIN INFORMATION

PIN DESCRIPTION

Pin	Symbol	Type	Function
1	MODE	Input	Internal default pull high Mode selection: 1A, 2A and 2.4A
2	GND	Ground	Ground
3	VCC	Power	Power
4	D＋	Bi-direction	USB positive data line
5	D－	Bi-direction	USB negative data line

REFERENCE APPLICATION CIRCUIT



REFERENCE APPLICATION KIT

ABSOLUTE MAXIMUN RATINGS

PARAMETER		MIN	MAX	UNITS
Supply Voltage	VCC	-0.3	7	V
Input / Output Voltage	MODE, D+, D−	-0.3	7	V
Operating Temperature Range	T_O	-20	+85	°C
Storage Temperature Range	T_S	-65	150	°C
ESD Protection Rating	Human Body Model (HBM)*NOTE1	±8 (Class-3B)		KV
	Machine Model (MM)*NOTE2	±200 (Class-M4)		V

Note1: Testing Facility:

- Testing Ambient Condition [Temperature: 25±5 ℃] [Humidity:55±10%]
- Reference Documents [MIL-STD-883H/Method 3015.8]
- Human Body Model Rating:

Class 0:	0V ~ 249V
Class 1A:	250V ~ 499V
Class 1B:	500V ~ 999V
Class 1C:	1000V ~ 1999V
Class 2:	2000V ~ 3999V
Class 3A:	4000V ~ 7999V
Class 3B:	8000V ~

Note2: Testing Facility:

- Testing Ambient Condition [Temperature: 25±5 ℃] [Humidity:55±10%]
- Reference Documents [AHSI/ESD S5.2-2009]
- Machine Model Rating

Class M1:	0V ~ 99V
Class M2:	100V ~ 199V
Class M3:	200V ~ 399V
Class M4:	400V ~

CAUTION

This integrated circuit has been designed carefully in the ESD protection ability. Failure to observe proper handling and installation procedures may cause damage. Recommend that all integrated circuits should be handled with appropriate precautions.

ELECTRICAL CHARACTERISTICS (For VCC=5V and Tj=25°C)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
VCC					
Operating range, Vcc	-	4.5	-	5.5	V
Operating current, Icc	Vcc=5V	-	500	-	uA
MODE, D+, D−					
D+ output impedance	Vcc=5V	35	-	65	KΩ
D− output impedance	Vcc=5V	35	-	65	KΩ
MODE, D+, D−	-	0	-	Vcc,	V

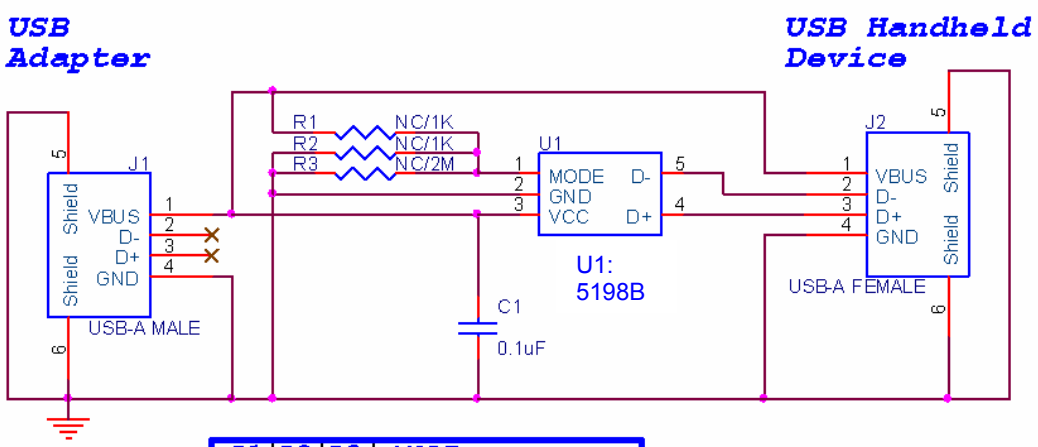
FUNCTION DESCRIPTION

1. The EST5198B is an USB dedicated charging port (DCP) controller. The built-in auto-detect function can monitors the voltage of D+ and D- data lines. To provide the correct voltage level on the D+ and D- data lines automatically, the compliant USB devices can be charged with the charging current as much as possible. That can reduce the charging time when use the EST5198B as the controller in the USB charge feature kit.

2. MODE truth table

MODE	Function
External pull-high with R1(1KΩ)	Apple 2A mode
External pull-down with R2(1KΩ)	Apple 1A mode
External pull-down with R3(2MΩ)	Apple 2.4A mode

Reference Application Circuit



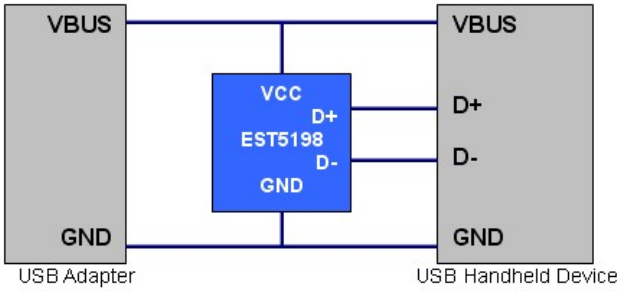
R1	R2	R3	MODE
1K	NC	NC	Apple 2A mode
NC	1K	NC	Apple 1A mode
NC	NC	2M	Apple 2.4A mode

Note: NC(No Connect / No Mount)

CAUTION:

When select the charge mode, please make sure the current ability of power source that can provide the desired continue current. Any maximum continue charging current must not exceed the limited of the maximum current rating of the power source, like wall adapter, vehicle USB charger, and other USB charger.

3. The EST5198B only control the voltage of D＋/ D－ lines on the USB port to support the auto-detect charging procedure and does not control the USB power (VBUS) operation. The remaining battery capacity in the compliant USB devices may affect the charging current. If the remaining battery capacity is low, the charging current may be high. Conversely the charging current may be low when the remaining battery capacity is high.

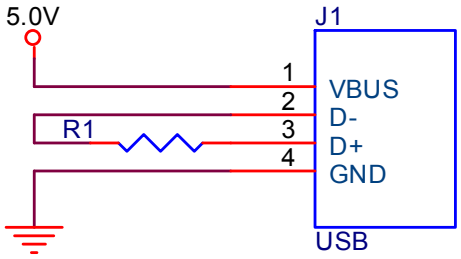


4. The EST5198B support most of the common protocols:
   - USB Battery Charging Specification, Revision 1.2(BC 1.2)
   - China Telecommunications Industry Standard YD/T 1591-2009
   - Specified Divider Mode
5. There are three types of charging ports defined to provide different current to the USB device.
   - Standard downstream port(SDP)
   - Charging downstream port(CDP)
   - Dedicated charging port(DCP)

   The BC1.2 specification defines the charging USB port that provides power for the portable device.
6. Dedicated Charging Port (DCP)

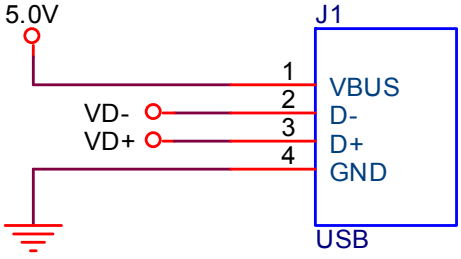
   The DCP is a downstream port on the device which generally allows portable devices with fast charge at their maximum rated current. A USB charger with DCP can be a wall adapter or vehicle power adapter. The electrical characteristics in the data D+ and D- data lines can identify the charging mode.
7. Short the D+ line to the D- line

   The USB BC1.2 Specification and the China Telecommunications Industry Standard YD/T 1501-2009 define the D+ and D- should be shorted. This is shown as below



8. Divider Mode

   There are some different charging schemes for the DCP mode. All of them have different voltage levels on the D+ line and D- line. This is shown as below

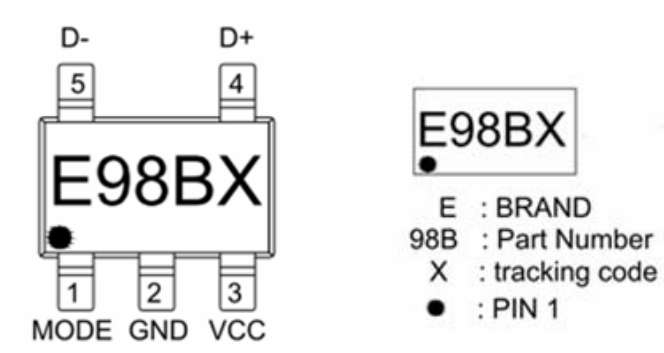


   The EST5198B can detect the D+ line and D- line voltages automatically and provide the correct signals on the D+ and D- pins for the different USB portable device to fast charge.

IMPORTANT NOTICE

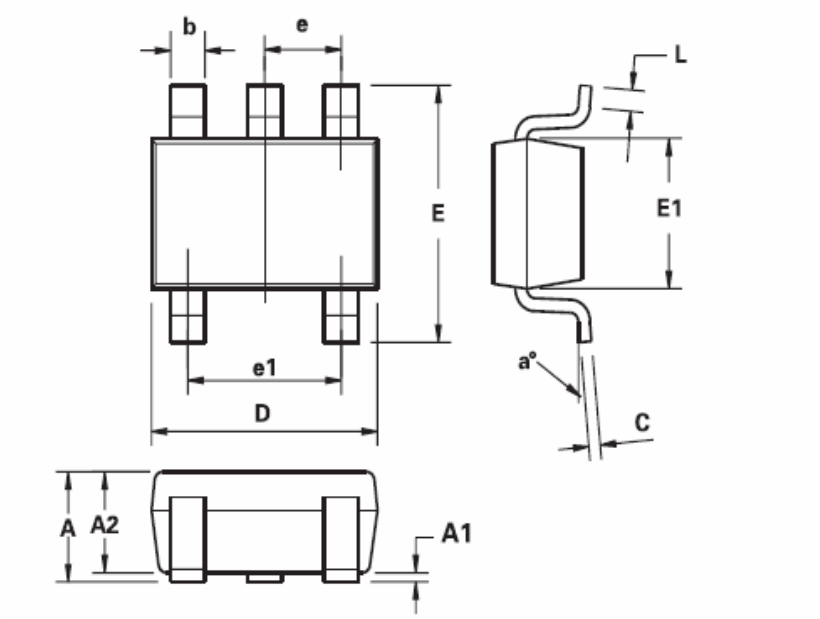
The products are not intended for use in life support appliances, devices, or systems. Use in such applications are expressly prohibited.

TOP-SIDE MARKING LNFORMATION:



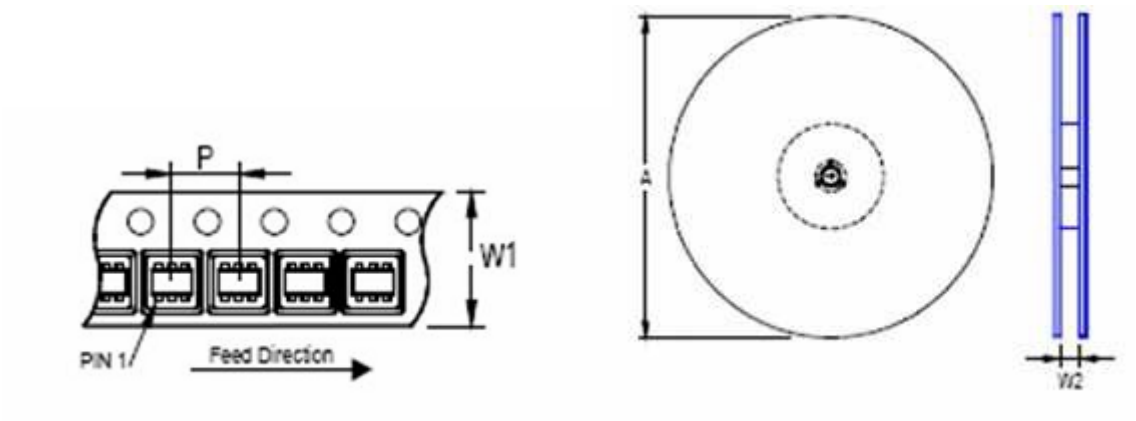
PACKAGE DIMENSIONS

SOT23-5



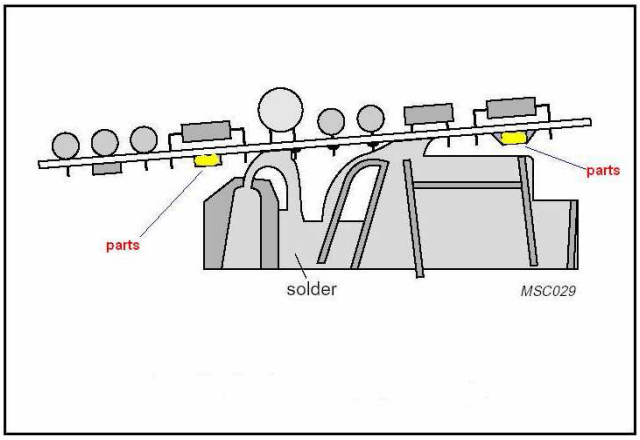
DIM	Millimeters	
	Min.	Max.
A	0.90	1.45
A1	0.00	0.15
A2	0.90	1.30
b	0.20	0.50
C	0.09	0.26
D	2.70	3.10
E	2.20	3.20
E1	1.30	1.80
e	0.95 REF	
e1	1.90 REF	
L	0.10	0.60
a°	0°	30°

TAPE REEL DATA

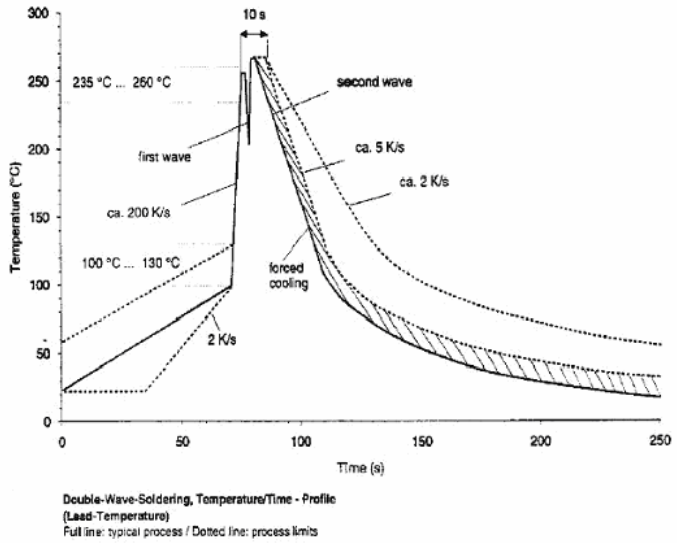


Package Type SOT-26	Tape Size (W1) (mm)	Pocket Pitch (P) (mm)	Reel Size (A) (mm)	Reel Width (W2) Min./Max. (mm)	Units Per Reel pcs.
6 Lead	8	4	180	8.4/9.9	3000

WAVE SOLDERING PROCESS



WAVE SOLDERING PROFILE



Double-Wave-Soldering, Temperature/Time - Profile
(Lead-Temperature)
Full line: typical process / Dotted line: process limits

Update History

Revision	Date	Update
1.0	May 06, 2012	Preliminary version
2.0	November 11, 2013	Further explanation about the mode selection

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