

## USB Dedicated Charging Port Controller

### FEATURES

- Supports USB DCP Shorting D+ Line to D- Line per USB Battery Charging Specification, Revision 1.2 (BC1.2)
- Supports Shorted Mode (Shorting D+ Line to D-Line) per Chinese Telecommunication Industry Standard YD/T 1591-2009
- Supports USB DCP Applying 2.7 V on D+ Line and 2.7V on D- line
- Supports USB DCP Applying 1.2 V on D+ and D- Lines
- Automatically Switch D+ and D- Lines Connections for an Attached Device
- Single USB Port Controller(TMI9130D)
- Dual USB Port Controller(TMI9130C)
- Operating Range: 4.5 V to 5.5 V
- Available in SOT23-6 Package

### GENERAL DESCRIPTION

The TMI9130C/D devices are USB dedicated charging port (DCP) controllers. An auto-detect feature monitors USB data line voltage, and automatically provides the correct electrical signatures on the data lines to charge compliant devices among the following dedicated charging schemes:

1. Divider 1 DCP, required to apply 2.7 V and 2.7 V on the D+ and D- Lines respectively (TMI9130C,TMI9130D)
2. BC1.2 DCP, required to short the D+ Line to the D- Line
3. Chinese Telecom Standard YD/T 1591-2009 Shorted Mode, required to short the D+ Line to the D- Line
4. 1.2 V on both D+ and D- Lines

### APPLICATIONS

- Vehicle USB Power Chargers
- AC-DC Adapters with USB Ports
- Other USB Chargers

### TYPICAL APPLICATION

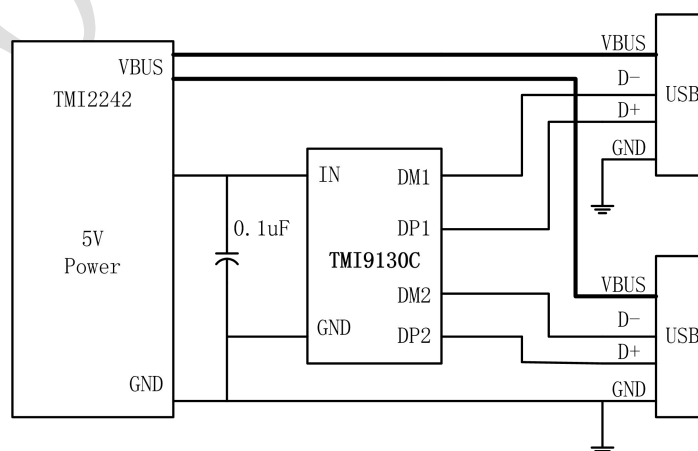
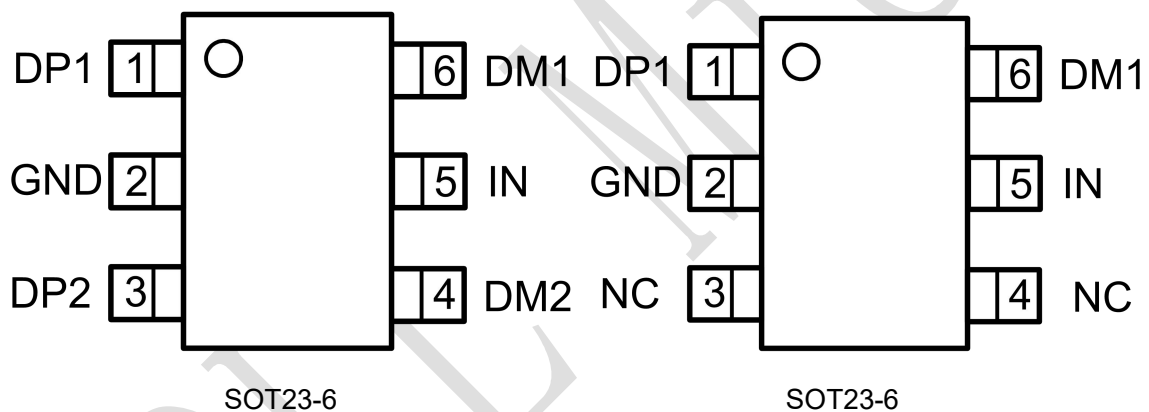


Figure 1. Basic Application Circuit

## ABSOLUTE MAXIMUM RATINGS

Parameter	Value	Unit
Input Supply Voltage	-0.3~7	V
DP1, DP2 output voltage, DM1, DM2 output voltage	-0.3~5.8	V
DP1, DP2 input voltage, DM1, DM2 input voltage	-0.3~5.8	V
Junction Temperature	150	°C
Storage Temperature Range	-65~150	°C
Lead Temperature	260	°C

## PIN CONFIGURATION



**Top Mark: TMI9130C:T24CXX (T24C: Device Code, XX: Inside Code)**  
**TMI9130D:T24DXX (T24D: Device Code, XX: Inside Code)**

Part Number	Package	Top mark	Quantity/ Reel
TMI9130C/D	SOT23-6	T24C/DXX	3000

**PIN FUNCTIONS**

Pin	Name		Function
	TMI9130C	TMI9130D	
1	DP1	DP1	Connected to the D+ line of USB connector, provide the correct voltage with attached portable equipment for DCP detection.
2	GND	GND	Ground connection
3	DP2	NC	Connected to the D+ line of USB connector, provide the correct voltage with attached portable equipment for DCP detection.
4	DM2	NC	Connected to the D- line of USB connector, provide the correct voltage with attached portable equipment for DCP detection.
5	IN	IN	Power supply. Connect a ceramic capacitor with a value of 0.1- $\mu$ F or greater from the IN pin to GND as close to the device as possible.
6	DM1	DM1	Connected to the D-line of USB connector, provide the correct voltage with attached portable equipment for DCP detection.

**DEVICE OPTIONS**

Device	Number Of Controller	Charging Schemes (DCP_Auto)			1.2-V Mode (D+/D- Shorted And Bias To 1.2 V)	BC1.2 And YD/T 1591-2009 Mode (D+/D- Shorter)
		Divide1 (D+/D- = 2 V/2.7 V)	Divide2 (D+/D- = 2.7 V/2 V)	Divider3 (D+/D- = 2.7 V/2.7 V)		
TMI9130C	Dual	No	No	Yes	Yes	Yes
TMI9130D	Single	No	No	Yes	Yes	Yes

**ESD RATINGS**

Items	Description	Value	Unit
V <sub>ESD</sub>	Human Body Model for all pins	$\pm$ 6000	V

**JEDEC specification JS-001**

## RECOMMENDED OPERATING CONDITIONS

Items	Description	Min	Max	Unit
Voltage Range	IN	4.5	5.5	V
TA	Operating Temperature Range	-40	85	°C

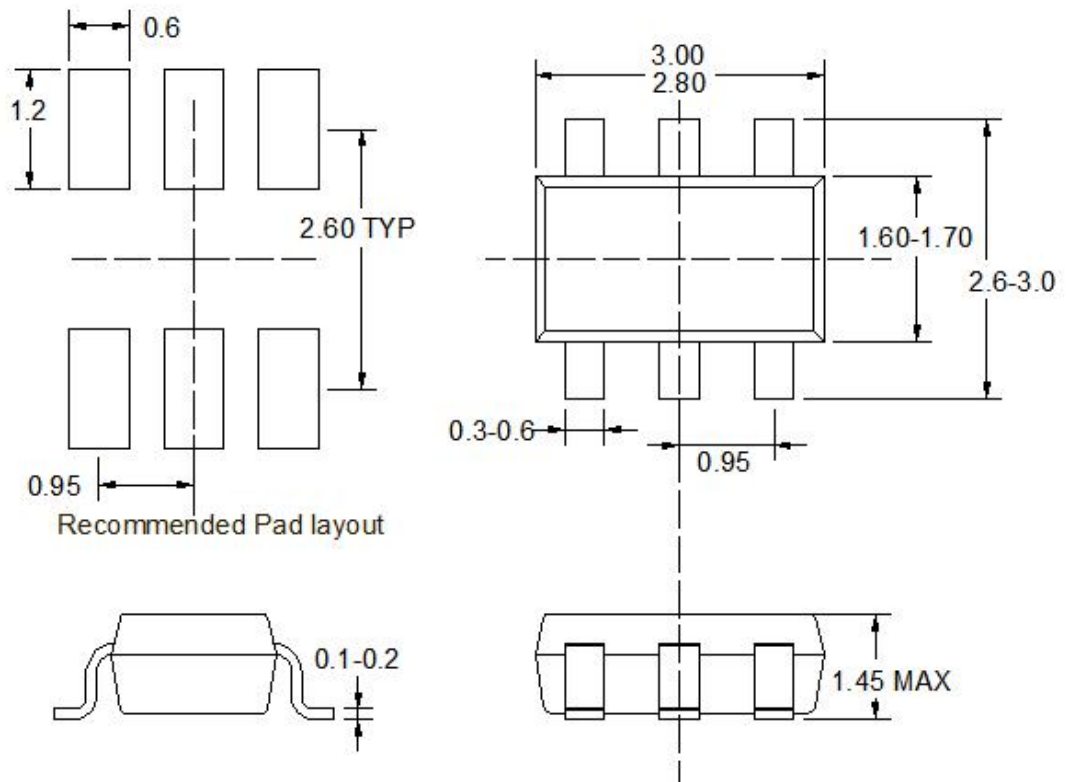
## ELECTRICAL CHARACTERISTICS

( $V_{IN}=5V$ ,  $T_A = 25^{\circ}C$ , unless otherwise noted.)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Under Voltage Lockout</b>						
IN rising UVLO threshold voltage	$V_{UVLO}$		3.9	4.1	4.3	V
UVLO Hysteresis				100		mV
<b>Supply Current</b>						
IN supply current	$I_{IN}$	$4.5 V \leq V_{IN} \leq 5.5 V$		155	200	uA
<b>BC 1.2 DCP Mode (Short Mode)</b>						
DP1 and DM1 shorting resistance	$R_{DPM\_SHORT1}$	$V_{DP1} = 0.8 V, I_{DM1} = 1 mA$		157	200	$\Omega$
Resistance between DP1/DM1 and GND	$R_{DCHG\_SHORT1}$	$V_{DP1} = 0.8 V$	350	656	1150	k $\Omega$
Voltage threshold on DP1 (under which the device goes back to divider mode)	$V_{DPL\_TH\_DETACH1}$		310	330	350	mV
DP1 Hysteresis	$V_{DPL\_TH\_DETACH\_HYS1}$			50		mV
DP2 and DM2 shorting resistance	$R_{DPM\_SHORT2}$	$V_{DP2} = 0.8V, I_{DM2} = 1 mA$		157	200	$\Omega$
Resistance between DP2/DM2 and GND	$R_{DCHG\_SHORT2}$	$V_{DP2} = 0.8 V$	350	656	1150	k $\Omega$
Voltage threshold on DP2 (under which the device goes back to divider mode)	$V_{DPL\_TH\_DETACH2}$		310	330	350	mV
DP2 Hysteresis	$V_{DPL\_TH\_DETACH\_HYS2}$			50		mV
<b>Divider Mode</b>						

DP1 output voltage	$V_{DP1\_2.7V}$	$V_{IN} = 5\text{ V}$	2.57	2.7	2.84	V
DM1 output voltage	$V_{DM1\_2V}$	$V_{IN} = 5\text{ V}$	2.57	2.7	2.84	V
DP1 output impedance	$R_{DP1\_PAD1}$	$I_{DP1} = -5\text{ }\mu\text{A}$	24	30	36	k $\Omega$
DM1 output impedance	$R_{DM1\_PAD1}$	$I_{DM1} = -5\text{ }\mu\text{A}$	24	30	36	k $\Omega$
DP2 output voltage	$V_{DP2\_2.7V}$	$V_{IN} = 5\text{ V}$	2.57	2.7	2.84	V
DM2 output voltage	$V_{DM2\_2V}$	$V_{IN} = 5\text{ V}$	2.57	2.7	2.84	V
DP2 output impedance	$R_{DP2\_PAD1}$	$I_{DP2} = -5\text{ }\mu\text{A}$	24	30	36	k $\Omega$
DM2 output impedance	$R_{DM2\_PAD1}$	$I_{DM2} = -5\text{ }\mu\text{A}$	24	30	36	k $\Omega$
<b>1.2 V / 1.2 V Mode</b>						
DP1 output voltage	$V_{DP1\_1.2V}$	$V_{IN} = 5\text{ V}$	1.12	1.2	1.28	V
DM1 output voltage	$V_{DM1\_1.2V}$	$V_{IN} = 5\text{ V}$	1.12	1.2	1.28	V
DP1 output impedance	$R_{DP1\_PAD2}$	$I_{DP1} = -5\text{ }\mu\text{A}$	80	100	130	k $\Omega$
DM1 output impedance	$R_{DM1\_PAD2}$	$I_{DM1} = -5\text{ }\mu\text{A}$	80	100	130	k $\Omega$
DP2 output voltage	$V_{DP2\_1.2V}$	$V_{IN} = 5\text{ V}$	1.12	1.2	1.28	V
DM2 output voltage	$V_{DM2\_1.2V}$	$V_{IN} = 5\text{ V}$	1.12	1.2	1.28	V
DP2 output impedance	$R_{DP2\_PAD2}$	$I_{DP2} = -5\text{ }\mu\text{A}$	80	100	130	k $\Omega$
DM2 output impedance	$R_{DM2\_PAD2}$	$I_{DM2} = -5\text{ }\mu\text{A}$	80	100	130	k $\Omega$

## PACKAGE INFORMATION



SOT23-6

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [USB Interface IC](#) category:*

*Click to view products by [TMI](#) manufacturer:*

Other Similar products are found below :

[TUSB1146RNQT](#) [TUSB1146IRNQT](#) [CY7C65210-24LTXI](#) [CY7C69356-48LTXC](#) [CYUSB2304-68LTXI](#) [CY7C65642-48AXCT](#) [CYPD2119-24LQXI](#) [USB2227-NU-11](#) [USB2251-NU-06](#) [USB3319C-GJ-TR](#) [USB3370B-EZK-TR](#) [USB5537B-4100AKZE](#) [USB3347-CP](#) [USB2230-NU-02](#) [USB2229-NU-02](#) [CG7648AM](#) [W83627HG-AW](#) [CY7C64225-28PVXCT](#) [CY7C65215A-32LTXI](#) [CYPD2120-24LQXI](#) [CYWB0164BB-BZXI](#) [CYWB0224ABS-BZXI](#) [CY7C65211A-24LTXI](#) [USB5807T-I/KD](#) [USB5742-I/2G](#) [USB3331E-GL-TR](#) [USB3321C-GL-TR](#) [USB1T1103MHX](#) [USB1T1103MPX](#) [USB5742/2G](#) [MAX3301EETJ+T](#) [CYPD2122-20FNXIT](#) [CYPD2122-24LQXIT](#) [LIF-UC120-SWG36ITR50](#) [MAX3456EETE+T](#) [LIF-UC120-CM36ITR50](#) [UPD360-C/6HX](#) [USB2228-NU-11](#) [UPD360-B/6HX](#) [PI3EQX7841ZDEX](#) [CYPD4225-40LQXI](#) [LAN7800-I/VSX](#) [UPD360T-B/6HX](#) [UPD360-A/6HX](#) [LAN7800/VSX](#) [MAX20037ATIB/V+](#) [MP5030CGQH-P](#) [USB7056/KDX](#) [STUSBCD01BJR](#) [CY7C65642-28LTXCT](#)