USB Charging Port Controller

RH7901A

Specification

Revision 1.2 2016-12-01

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1.DESCRIPTION

RH7901A is USB dedicated charging port controller with automatic host charger identification circuitry for USB dedicated chargers. An auto-detect feature monitors USB data line voltage, and automatically provides the correct electrical signatures on the data lines to charge compliant devices . RH7901A allows powered devices to draw current as much as using as the original adapter.

Applications：

- Power Bank
- Wall Adapter and Travel Adapter
- Car Charger
- Other USB Charger

2.FEATURES

- Operating Voltage Range：4.5V～5.5V
- Single USB Port Controller
- Supports most of the USB Battery Charging Specification world-wide including：
  - Apple charging spec
  - Specs for Samsung Galaxy family
  - USB Battery Charging Specification, Revision 1.2 (BC1.2)
  - Chinese Telecommunication Industry Standard YD/T 1593-2009
- Reliable Power-On Reset and Low Voltage Reset
- Package：SOT23-5

3.PIN CONFIGURATION AND DESCRIPTION

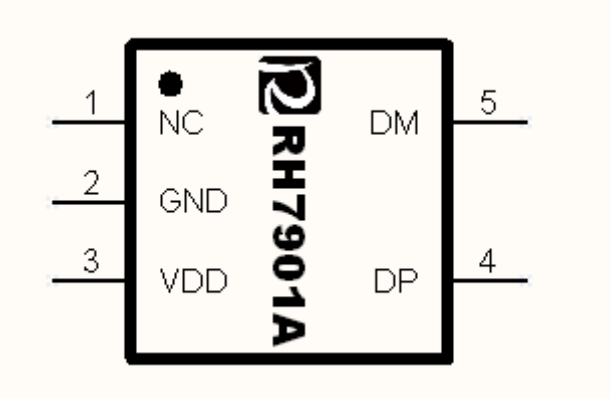


Figure 1. Pin Configuration

Table 1. Product Information

No.	Device	Package	Number Of Controller	Max Power for Apple Products (1*)
1	**RH7901A**	SOT23-5	1	12W（Divider3）

NOTES:1*:5W、10W、12W is just arm at Apple product;and the DividerX Mode of Apple product is compatible with DividerX-1 Mode.

Table 2. Pin Description

Pin	*RH7901A*	I/O	Description
NC	1	-	
GND	2	P	Ground connection
VDD	3	P	Power supply
DP	4	I/O	Connect to USB Port DP
DM	5	I/O	Connect to USB Port DM

I：CMOS Input　　O：Push-pull CMOS Output

I/O：CMOS Input/Output　　P：Power/Ground

4.ORDERING INFORMATION

Table 3. Ordering Information

Device	Package type	SPQ	Marking
RH7901A	**SOT23-5**	Tape and Reel / 3000 units	RH7901A X Wxxxx

5.FUNCTIONAL DESCRIPTION

5.1 Dedicated Charging Schemes

Table 4. Dedicated Charging Schemes

NO	TYPE	USB D+	USB D-	Max Power	7901A
1	**Divider 3**(1*)	2.7	2.7	12W	√
2	**D+/D- 1.2V**	1.2	1.2		√
3	**BC1.2 DCP**	short	short		√
4	**CTIS YD/T 1591-2009**	short	short		√

NOTES：1*: Divider3 Mode is compatible with Divider1 and Divider2.Divider2 Mode is compatible with Divider1 .

5.2 Divider Mode Selection

Divider Mode settings for Apple devices：

For 12-W USB Charger,the device have the same electrical signatures on the data lines,Pin CB need to connected to the ground.

6.APPLICATION SCHEMATICS

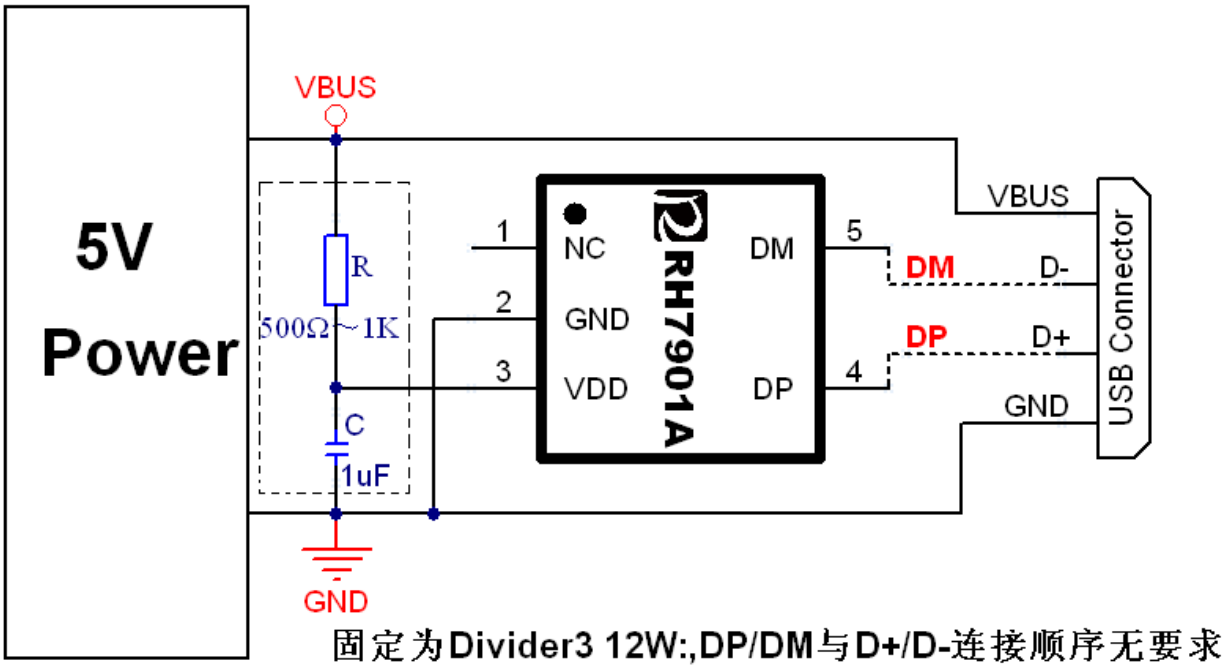


Figure 2. ***RH7901A*** Application Schematics

NOTES：

1. The resistor R is used to protect the IC from overshooting,and R=750ohm is recommended.
2. The capacitor C which can reduce power supply ripple is not necessary.

7.ELECTRICAL CHARACTERISTICS

7.1 Absolute Maximum Ratings

Table 5. Absolute Maximum Ratings

PARAMETER	SYMBOL	RANGE	UNITS
Operating Voltage	V_{DD}	-0.3～5.5	V
Input/Output Voltage	V_I / V_O	-0.5～V_{DD} +0.5	V
Operating Temperature Range	T_{OPR}	-20 ~ 85	℃
Storage Temperature Range	T_{STG}	-50 ~ 125	℃
ESD Protection(DP/DM,HBM)	V_{ESD}	>8000	V

7.2 DC/AC Characteristics

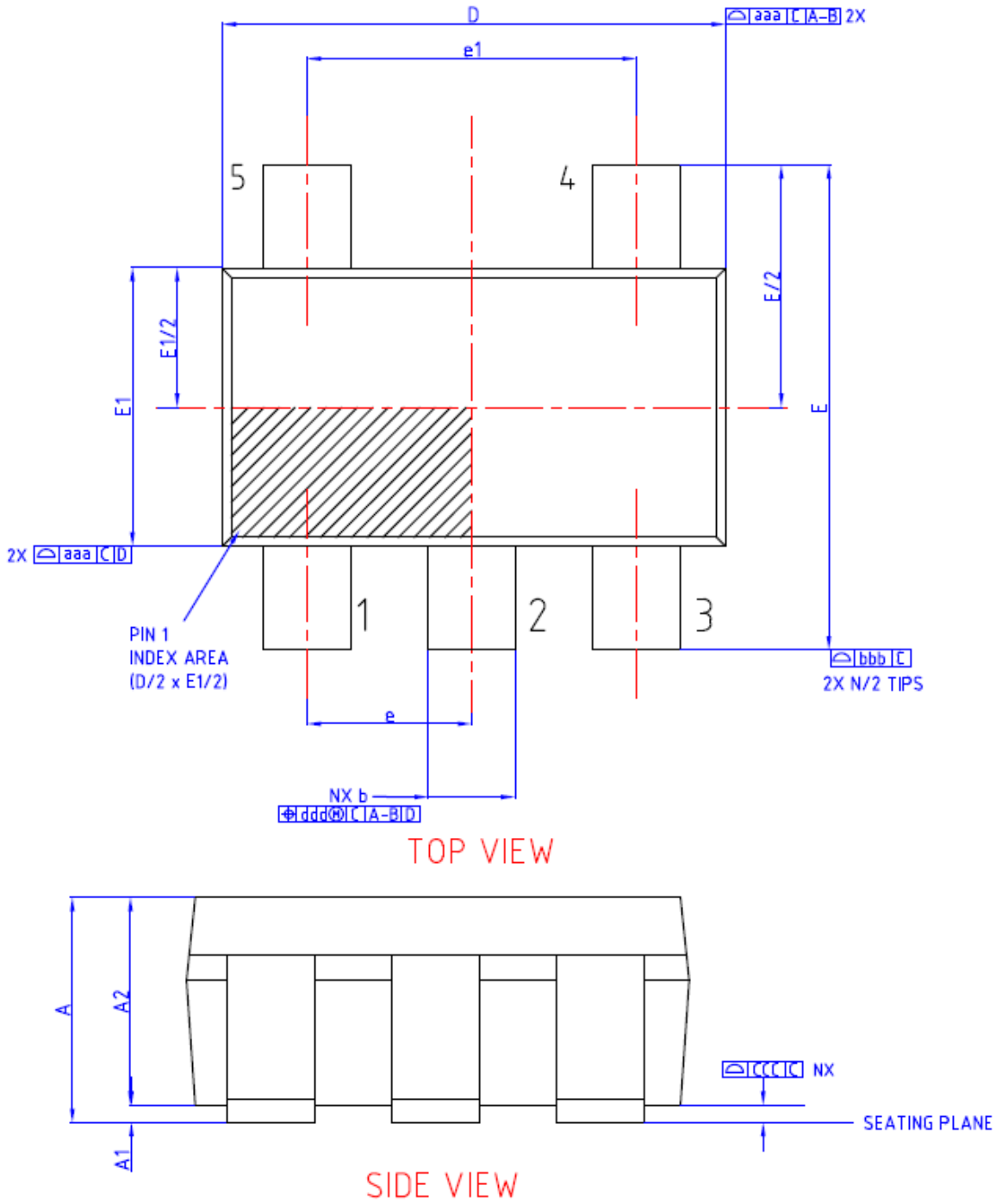
Table 6. Electrical Characteristics

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operating Voltage	V_{DD}		4.5	5.0	5.5	V
LVR Voltage	V_{LVR}			4.0		V
Supply Current	I_{DD}	Normal		140	225	uA
		LVR(1*)		55		uA
DP/DM Voltage	V_{DP}	DIVIDER3	2.48	2.7	2.96	V
	V_{DM}		2.48	2.7	2.96	V
	V_{DP}	SAMSUNG	1.1	1.2	1.34	V
	V_{DM}		1.1	1.2	1.34	V
V_{DD}=5.0V,operating temperature is 25℃, output without load(unless otherwise specified).						

NOTES：1*.The control function of USB charging port is disabled during LVR reset mode.

8.PACKAGE INFORMATION

8.1 SOT23-5



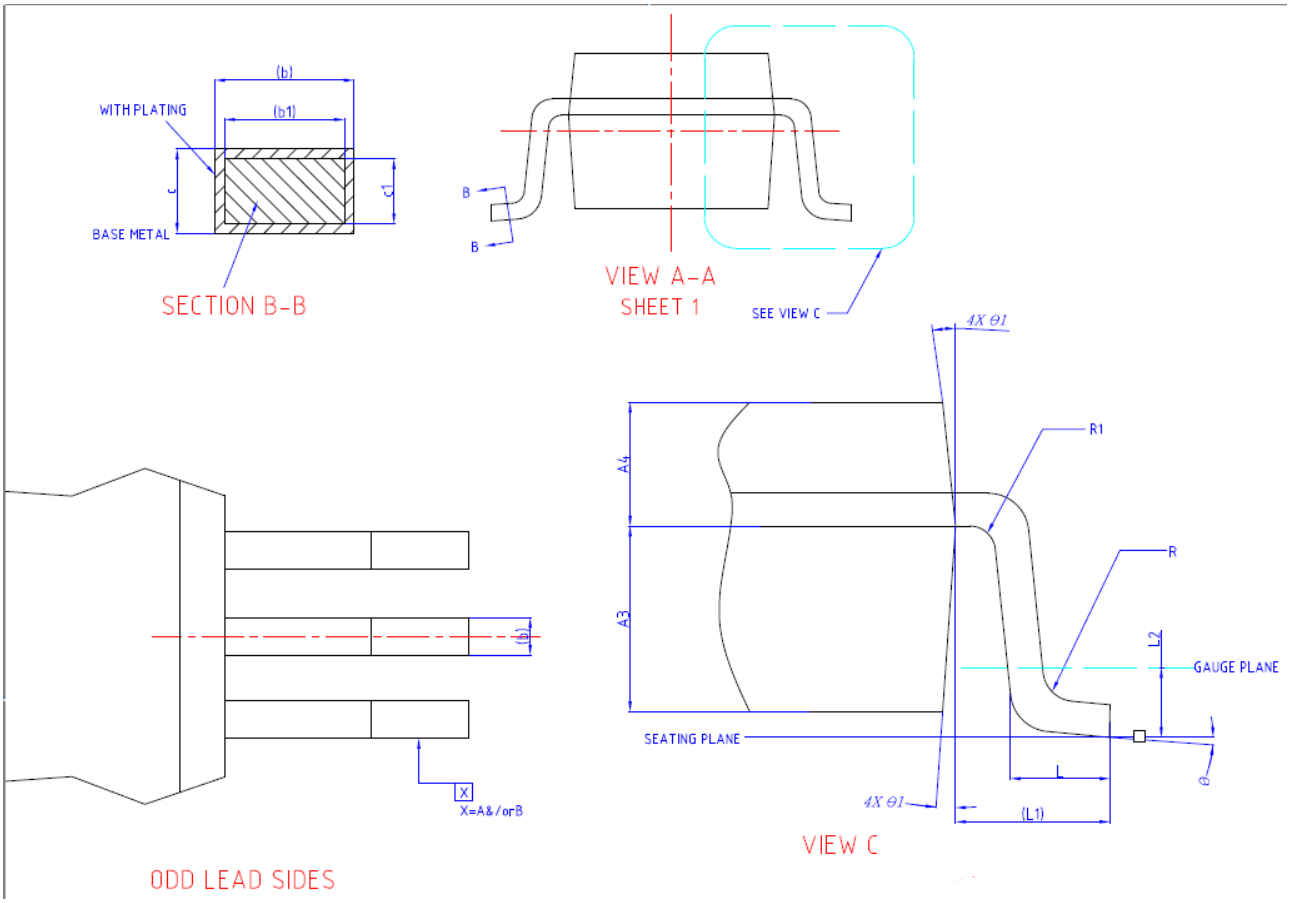


Figure 3. SOT23-5 Package

Table 7. SOT23-5 Package Dimensions

SYMBOL	UNIT(mm)			SYMBOL	UNIT(mm)		
	MIN	TYP	MAX		MIN	TYP	MAX
A	0.95	1.300	1.40	**e**	0.95BSC		
A1	0.05	0.10	0.15	**e1**	1.90BSC		
A2	0.90	1.20	1.25	**E**	2.60	2.80	3.00
A3	0.783BSC			**E1**	1.50	1.60	1.70
A4	0.417BSC			**L**	0.30	0.45	0.60
b	0.30	0.35	0.50	**L1**	0.60REF		
b1	0.30	0.40	0.45	**L2**	0.25BSC		
c	0.08	0.152	0.22	**θ**	0°	4°	8°
c1	0.08	0.13	0.20	**θ1**	5°	10°	15°
D	2.80	2.90	3.00				

NOTES：Please note that the specification is subject to change without notice.