

描述

ECP5701 是一款電力輸送 (PD)SINK 控制 IC。ECP5701 可以從符合Type-C PD協議適配器電源請求最大或指定電壓。

當 ECP5701 連接到 TYPE-C PD電源設備時，PD 通信協議將被觸發並自動啟動。依照 ECP5701設定的電壓,通過PD 協議從PD適配器取得使用者需要的Vbus電壓。

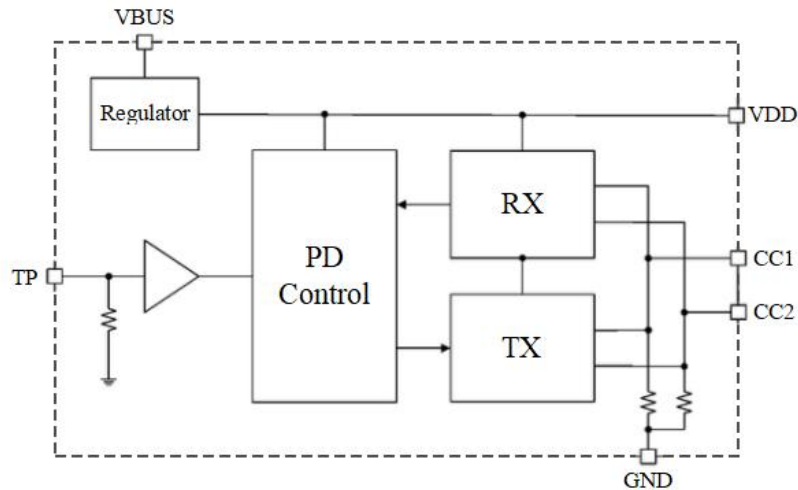
特性

- ◆ 工作電壓範圍 : 3V~28V
- ◆ 符合 USB Type-C 規範 1.3 版
- ◆ 符合 USB PD2.0 及 PD3.0 通訊協議,可識別 7 組電壓
- ◆ 封裝型態 : SOT23-6L

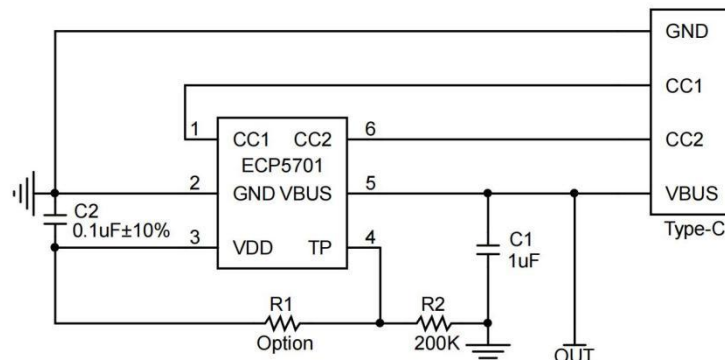
應用

- ◆ 音響
- ◆ 機頂盒
- ◆ 網通產品
- ◆ 家電
- ◆ 照明

原理框圖



典型應用



絕對最大額定參數

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	V _{BUS}		0		28	V
CC1 CC2 Voltage	VCC1 VCC2		-0.3		28	V
VDD TP Voltage	V _{VDD} V _{TP}		-0.3		3.3	V
Thermal Resistance	θ_{JA}	SOT23-6L			220	°C/W
Allowable Power Dissipation	PD	SOT23-6L TA \leq +25° C			455	mW
Operation Temperature	T _{OP}		-25		+85	°C
Storage Temperature	T _{ST}	SOT23-6L	-40		+150	°C
Lead Temperature		soldering time 10sec			+260	°C

DC 電特性

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input Voltage Range	V _{BUS}		3		20	V
VDD Regulator		V _{BUS} = 5V		3.3		V
Operation Current		V _{BUS} = 5V		1.28		mA
Option Voltage(\leq 20V)(Max)		V _{BUS} = 5V		0		V
Option Voltage(\leq 15V)		V _{BUS} = 5V		3/8* VDD		V
Option Voltage(\leq 12V)		V _{BUS} = 5V		5/8* VDD		V
Option Voltage(\leq 9V)		V _{BUS} = 5V		7/8* VDD		V

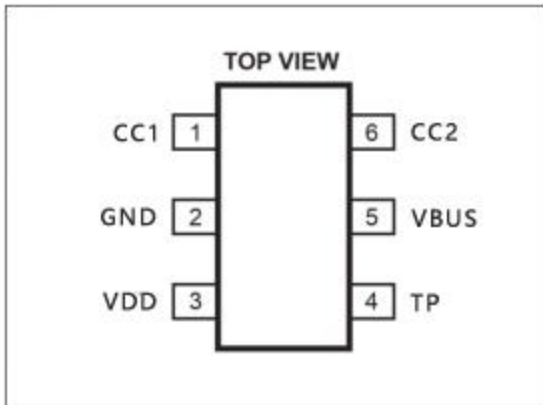
PD 電特性

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Pull-down resistance through each C_CC pin when in a disconnect state	RD_CC		4.85	5.1	5.35	kΩ
Threshold Voltage of the pull-down FET in series with RD during dead battery	VTH_DB		0.5	0.9	1.2	V
PD data bit rate	PD_BITRATE		270	300	330	mA
Unit interval (1/PD_BITRATE)	UI		3.03	3.33	3.7	V
Capacitance for a cable plug (each plug on a cable may have up to 25 pF to this value)	CCBLPLUG				25	pF
Cable characteristic impedance	ZCABLE		32		65	Ω
Receiver capacitance. Capacitance looking into C_CCn pin when in receiver mode	CRECEIVER		70		120	pF
TX Transmit Peak Voltage	VTXP		1.14	1.2	1.26	V
TX output impedance. Source output impedance at the Nyquist frequency of USB2.0 low speed (750kHz) while the source is driving the C_CCn line	ZDRIVER		33		75	Ω
Rise Time. 10% to 90% amplitude points, minimum is under an unloaded condition. Maximum set by TX mask	TRISE		300			ns
Fall Time. 90% to 10% amplitude points, minimum is under an unloaded condition. Maximum set by TX mask	TFALL		300			ns
Rx Receive Rising Input threshold	VRXTR		605	630	655	mV
Rx Receive Falling Input threshold	VRXTF		450	470	490	mV
Receiver input impedance	ZBMCRX		10			mΩ
Rx bandwidth limiting filter. Time constant of a single pole filter to limit broadband noise ingress	TRXFILTER		100			ns

絲印特性

型號	封裝	絲印
ECP5701	SOT23-6L	PAXX

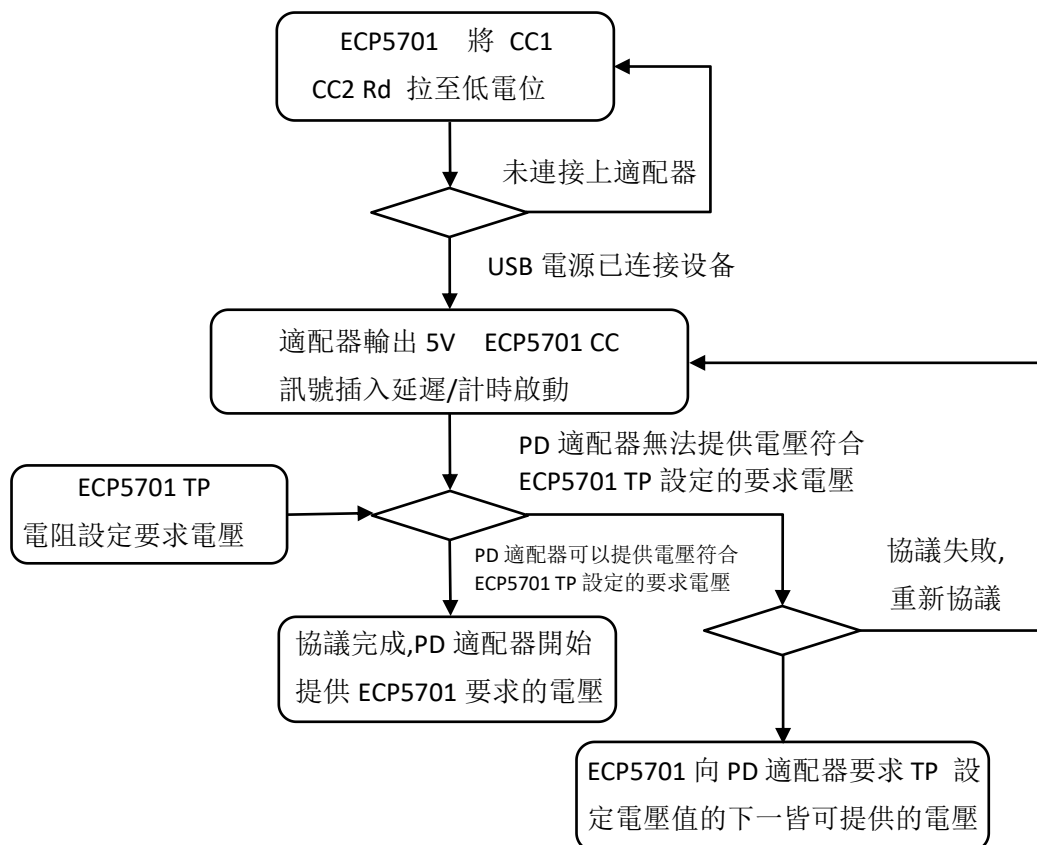
腳位參數



Pin#	Name	Description
1	CC1	PD CC1 pin
2	GND	Ground pin
3	VDD	Regulator output
4	TP	Test and option pin
5	VBUS	PD VBUS input pin
6	CC2	PD CC2 pin

工作流程

ECP5701 與 PD 適配器電源設備連接後完成 PD 協議協商。下圖為 PD 連接協議流程。



電壓選擇說明

ECP5701 將從 PD 適配器電源要求 TP 設應之輸出電壓,若該 PD 適配器電源設備無 TP 設定要求之電壓選項,ECP5701 會自動轉換設定為該 PD 適配器電源可提供之下一階電壓選項。

選項	TP 電壓	PD適配器輸出電壓	說明
OPT1	初始值 (0V)	PD 適配器最大輸出電壓	向 PD 適配器要求最大電壓輸出
OPT2	$3/8 * VDD$	15V	PD 適配器要求 15V,或是 15V 以下最大電壓
OPT3	$5/8 * VDD$	12V	PD 適配器要求 12V,或是 12V 以下最大電壓
OPT4	$7/8 * VDD$	9V	PD 適配器要求 9V,或是 9V 以下最大電壓

下表顯示了 TP 電壓和請求電壓選擇。

V_{OUT} (V)	R1 (k Ω)	R2 (k Ω)
20	NC	200
15	330	200
12	120	200
9	30	200

ECP5701 的選項選擇用於保護連接的設備。下面的示例顯示所請求電壓的結果。

Source Power (W)	PD Source Supply					ECP5701 Request Voltage			
	Object 20V	Object 15V	Object 12V	Object 9V	Object 5V	Option1	Option2	Option3	Option4
60	√	√	√	√	√	20	15	12	9
45		√	√	√	√	15	15	12	9
30		√	√	√	√	15	15	12	9
30		√		√	√	15	15	9	9
15				√	√	9	9	9	9
	√				√	20	5	5	5
		√			√	15	15	5	5

典型應用電路

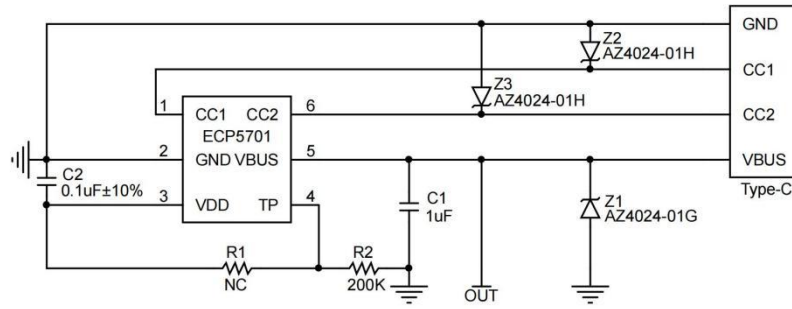


圖 1: 20V 典型應用電路輸出

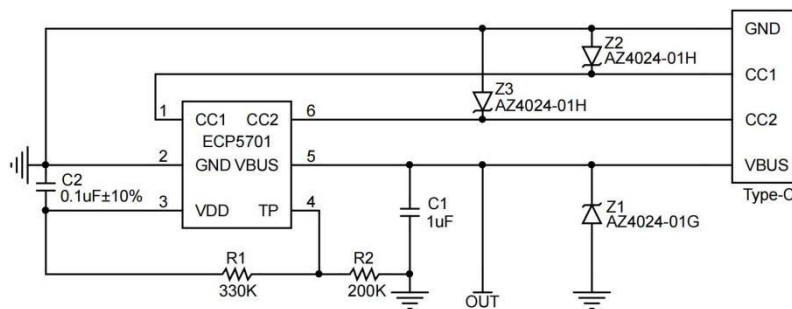


圖 2: 15V 典型應用電路輸出

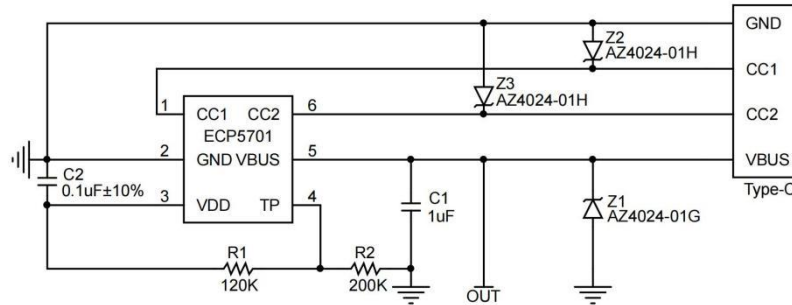


圖 3: 12V 典型應用電路輸出

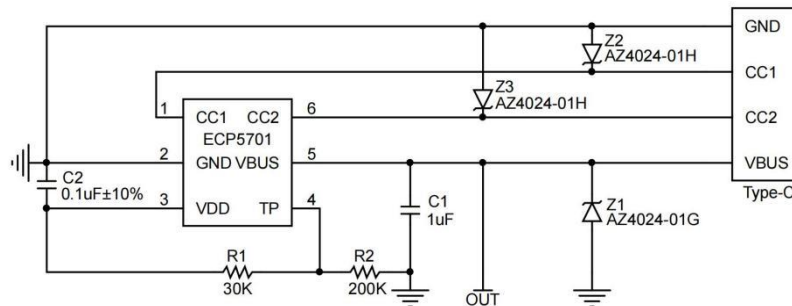
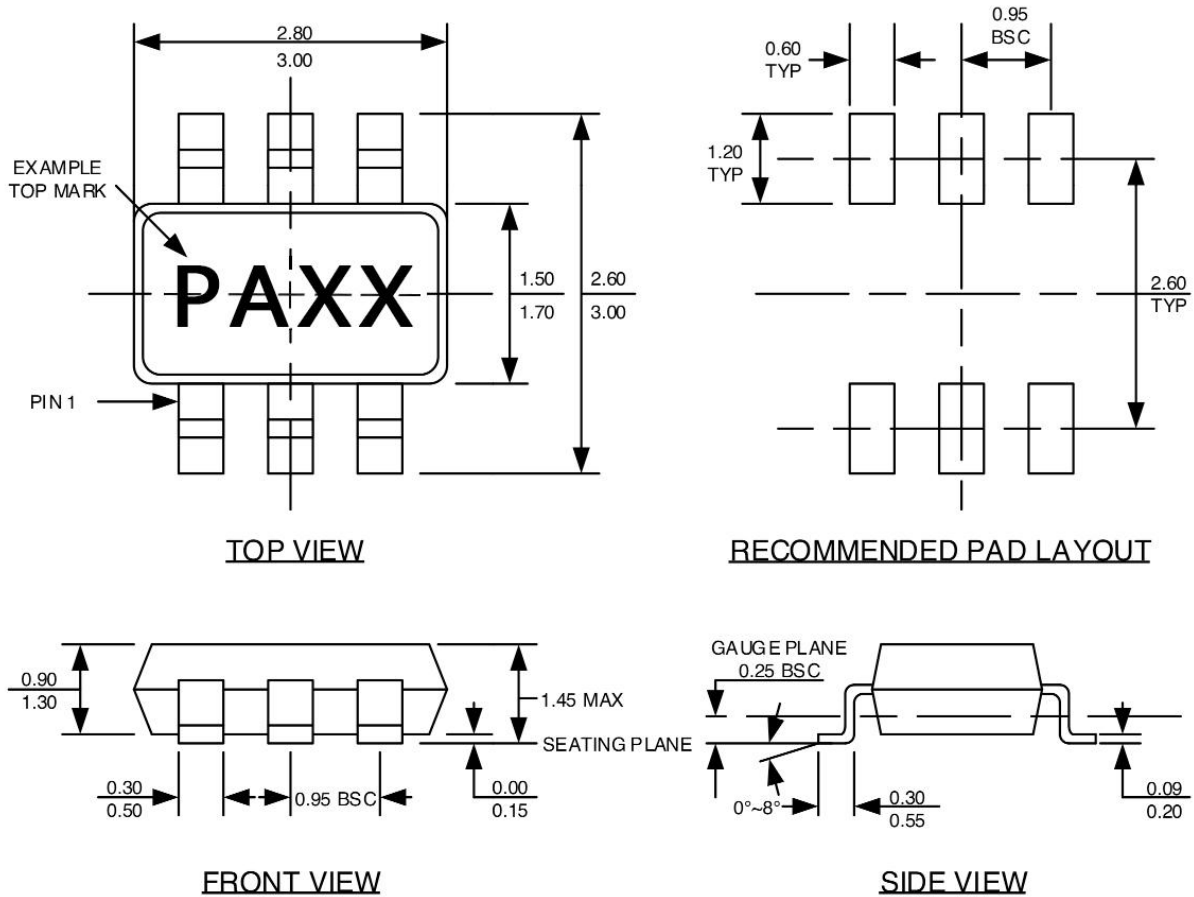


圖 4: 9V 典型應用電路輸出

Note: AZ4024 URL : <http://www.smartcube.com.tw> E-mail : johnny_h@smartcube.com.tw

封装参数

SOT23-6L



Note:

1. All dimensions are in millimeters.
2. Package length does not include mold flash, protrusion or gate burr.
3. Package width does not include flash or protrusion.
4. Lead coplanarity (bottom of leads after forming) shall be 0.10 millimeters max.
5. Pin 1 is lower left pin when reading top mark from left to right.