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## Integrated USB TYPEC/PD2.0/PD3.0 Protocol Fast charging protocol IC for USB TYPEC input ports

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### 1. Features

- **Supports USB TYPEC/PD2.0/PD3.0 fast charging protocol with USB TYPEC input port**
  - Automatically detects the insertion and unplugging of USB TYPEC devices
- **Integrated USB Power Delivery (PD2.0/PD3.0) protocol**
  - Integrated Hardware Bidirectional Marker Coding (BMC)
  - Integrated Physical Layer Protocol
  - Integrated hardware CRC
  - Integration of PD2.0/PD3.0 UFP protocol
  - Supports PD protocol Hardreset
- **Power management**
  - Support 5~20V power NMOS switch control
  - **IP2710**: SEL configurable PD protocol requests a maximum voltage of 20V, 15V, or 5V
  - **IP2710\_MAX12** (custom model): SEL configurable PD protocol requests a maximum voltage of 12V, 9V, or 5V
- **VBUS soft startup is supported**
- **Operating voltage range: 3 V~25V**
- **Encapsulation SSOP10**

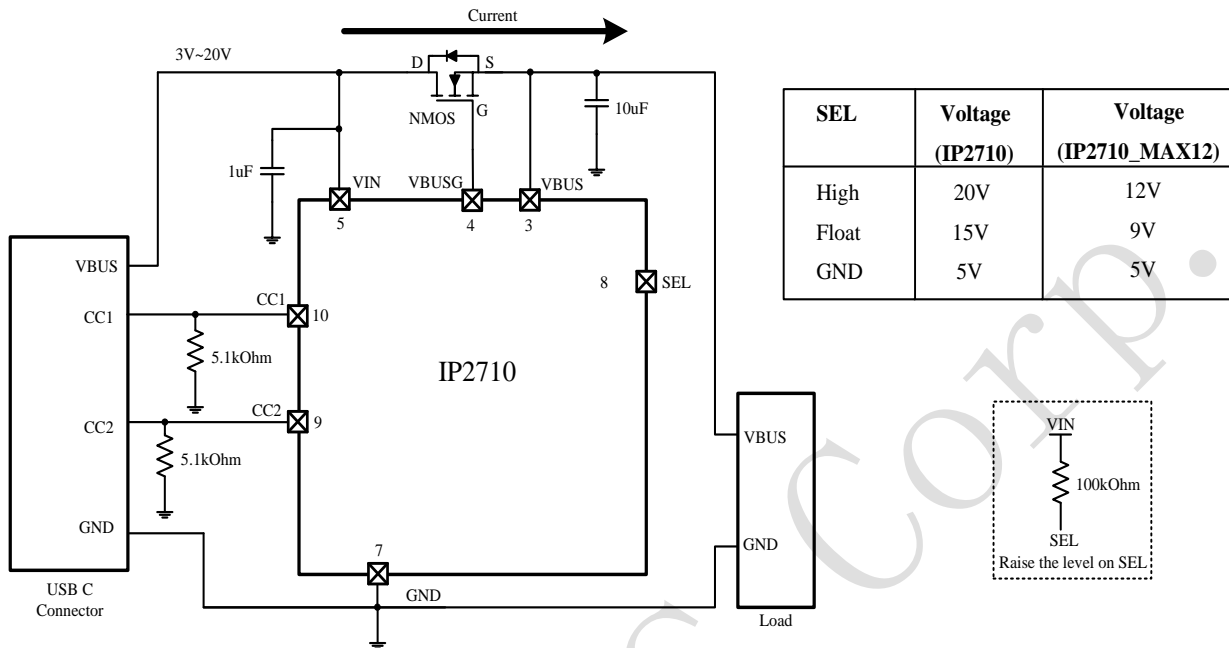
### 2. Description

IP2710 is a protocol IC integrating USB TYPEC input port PD fast charging, supporting USB TYPEC/PD2.0/PD3.0, supporting automatic detection of USB TYPEC device insertion and unplugging, integrating hardware PD protocol module, automatically analyzing PD protocol package, obtaining voltage capability, and requesting corresponding voltage accordingly.

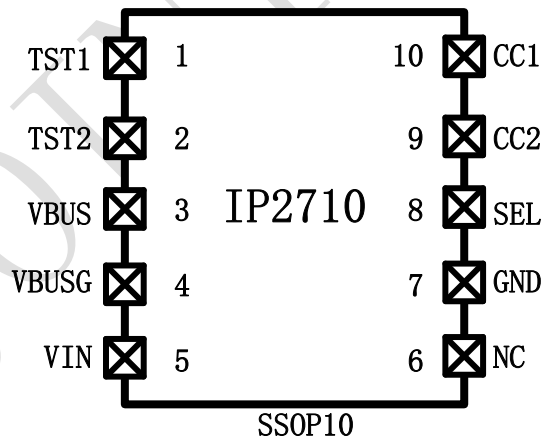
### 3. Applications

- USB TYPEC power input interface, mobile power supply, mobile phone, wireless charging base, VR box, uav, etc.

## 4. Typical Application Schematic



## 5. PIN Description



Pin No.	Pin Name	Description
1,2	TST1/TST2	Reserve PIN , float
3	VBUS	It is connected to the Source of the extranet NMOS
4	VBUSG	The gate connected to the extranodal NMOS tube controls the switch of the extranodal tube, thus controlling the switch of the power path
5	VIN	Power input pin, add 1uF capacitance to ground, connect with expanding NMOS Drain
6	NC	Reserve PIN , float

7	GND	Ground
8	SEL	SEL can be independently configured with IP2710 and IP2710_MAX12 voltage. Refer to the chapter "SEL Pins" for details
9	CC2	Connect CC2 pin of USB Type-C
10	CC1	Connect CC1 pin of USB Type-C

## 6. Absolute Maximum Ratings

Parameters	Symbol	Value	Unit
VIN Input Voltage Range	VIN	-0.3 ~ 30	V
CC1, CC2 Input Voltage Range	V <sub>CC1</sub> , V <sub>CC2</sub>	-0.3 ~ 30	V
Other Pins Input Voltage Range		-0.3 ~ 10	V
Junction Temperature Range	T <sub>J</sub>	-40 ~ 150	°C
Storage Temperature Range	T <sub>stg</sub>	-60 ~ 150	°C
Lead Temperature Range (Soldering, 10sec)	T <sub>s</sub>	260	°C
Operating temperature range	T <sub>A</sub>	-40~120	°C
Package Thermal Resistance	θ <sub>JA</sub>	90	°C/W
Package Thermal Resistance	θ <sub>JC</sub>	39	°C/W
Human Body Model (HBM)	ESD	2	KV

\*Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device.

These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

## 7. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input Voltage	VIN	3		25	V
Ambient Temperature	T <sub>A</sub>	-40		85	°C

\* Devices' performance cannot be guaranteed when working beyond those Recommended Operating Conditions.

## 8. Electrical Characteristics

Unless otherwise specified, T<sub>A</sub> = 25°C, 4.5V ≤ V<sub>CC</sub> ≤ 5.5V

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
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Input Voltage	VIN	Supplied directly	3		25	V
Input UVLO Threshold	UVLO	VIN Falling	2.5		2.9	V
Quiescent Current	I <sub>Q</sub>	CC float	120		145	uA
		CC connect	1		1.5	mA
Startup Time	T <sub>s</sub>		20	37	50	us
VBUS soft startup time	T <sub>v</sub>		3.5		4.5	ms
SEL input high level voltage threshold	V <sub>SELH</sub>		2.5			V
SEL input low level voltage threshold	V <sub>SELL</sub>				0.3	V
SEL default output voltage	V <sub>SELO</sub>		1.35	1.5	1.65	V
CC1/CC2 connection detects voltage threshold	V <sub>CC1_TH</sub> / V <sub>CC2_TH</sub>		0.25		2.04	V

## 9. Function Description

### USB TYPEC/PD protocol

IP2710 is a protocol IC integrating USB TYPEC input port PD fast charging, supporting USB TYPEC/PD2.0/PD3.0, supporting automatic detection of USB TYPEC device insertion and unplugging, integrating hardware PD protocol module, automatically analyzing PD protocol package, obtaining voltage capability, and requesting corresponding voltage accordingly.

- Port mode: Sink (Device)
- Automatically detects the insertion and unplugging of USB TYPEC devices
- Bidirectional Marker Coding protocol for integrated hardware
- Integration of physical layer protocols
- Integrated PD state machine
- Supports PD protocol Hardreset

### SEL pin

SEL pin is used to configure the maximum voltage allowed for IP2710 request. When SEL is raised to high level V<sub>SELH</sub>, the maximum voltage for IP2710 support protocol request is 20V. When SEL pins float, the maximum voltage of IP2710 support protocol requests is 15V. When SEL connects GND, IP2710 closes fast charge protocol and only requests 5V voltage.

When the maximum voltage supported by SRC is less than the maximum voltage requested by IP2710, IP2710 requests the maximum voltage supported by SRC. When the maximum voltage supported by SRC is greater than the maximum voltage supported by IP2710, IP2710 will request the maximum voltage supported by SRC and less than or equal to the maximum voltage supported by IP2710.

The customized IP2710\_MAX12 configuration SEL can set the requested maximum voltage to 12V, 9V or 5V, respectively.

\* SEL high level can be achieved by connecting to VIN via 100K resistor. SEL does not support switching after power on. SEL level should be determined before POWER on IP2710.

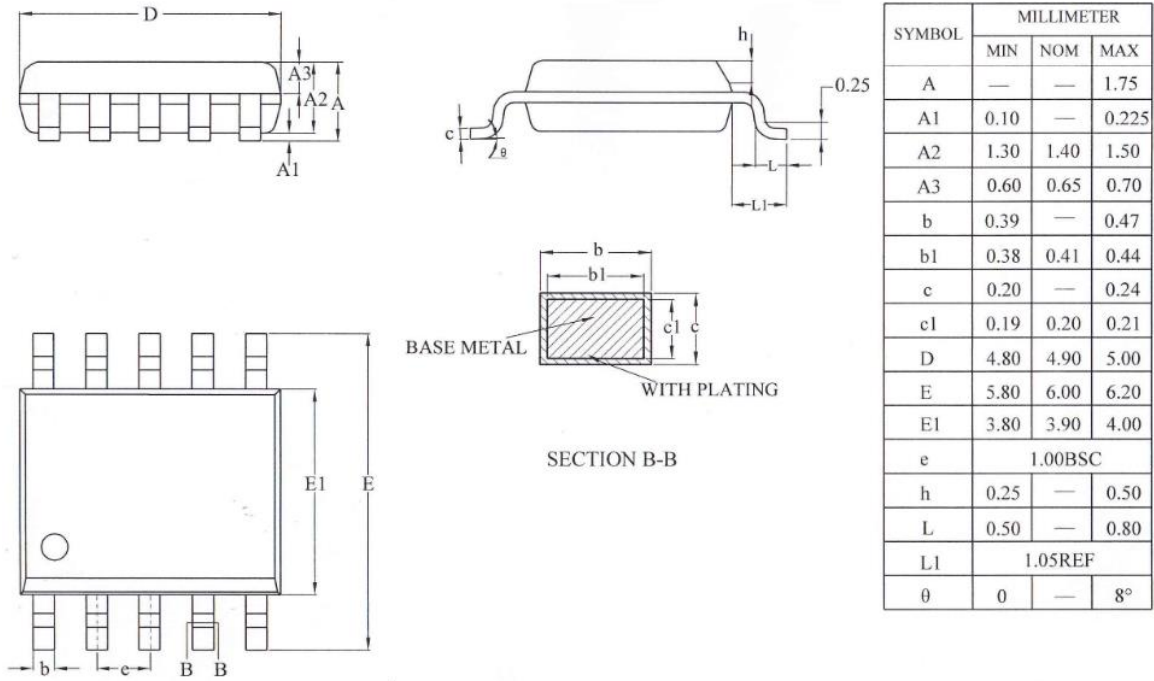
SEL	IP2710 Voltage	IP2710_MAX12 Voltage
High $V_{SELH}$	20V	12V
Float	15V	9V
GND	5V	5V

## Power path control

IP2710 supports the external NMOS power tube control. The Gate end of the NMOS tube is controlled through the VBUSG pin, so as to control the power path opening/closing. The power tube is opened after the CC connection is established, and the power tube is closed after the CC connection is disconnected.

\* NMOS power transistors with  $V_{ds}$  voltage withstand voltage above 30V are recommended.

## 10.Package



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	—	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	—	0.47
b1	0.38	0.41	0.44
c	0.20	—	0.24
c1	0.19	0.20	0.21
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.00BSC		
h	0.25	—	0.50
L	0.50	—	0.80
L1	1.05REF		
θ	0	—	8°

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