

USB Dedicated Charging Port Controller

1. Features

- Support Apple Devices charging:
 - Apple 2.4A: DP = 2.7V, DM = 2.7V
 - Apple 2.0A (circuit reverse DP, DM): DP = 2.0V, DM = 2.7V
 - Apple 1.0A: DP = 2.0V, DM = 2.7V
 - SEL pin configure maximum current allotment
- Support Samsung 2.0A: DP = 1.2V, DM = 1.2V
- Support BC1.2: DP short to DM automatically
- Support auto-detect and auto-switching charging standards
- Very low power consumption $I_Q = 66\mu A$ (Typ.)
- Working voltage: 3V~5.5V
- Package: SOT23-5

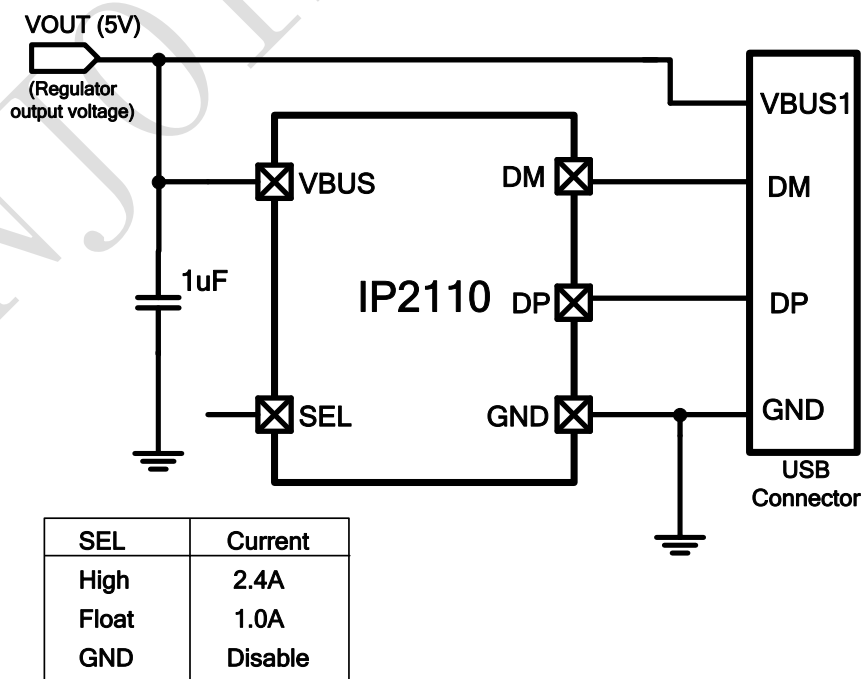
2. Description

IP2110 is a low-cost dedicated charging Physical Layer IC dedicated for USB ports, which supports Apple 2.4A/2.0A/1.0A, Samsung 2.0A and BC1.2. An auto-detect feature monitors USB data line voltage, and automatically provides the correct electrical signatures on the data lines to charge compliant devices. SEL pin used to configure the maximum allotment current.

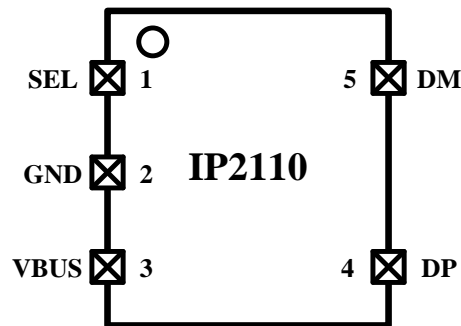
3. Application

- USB power output ports for AC adapters, Power Bank, Car chargers
- Battery chargers for smart phones, tablets, netbooks, digital cameras, and Bluetooth accessories

4. Typical Application Schematic



5. PIN Description



Pin Name	Pin No.	Pin Description
SEL	1	Configure the maximum Current allowed to apply for: <ul style="list-style-type: none"> High: Apple 2.4A Float: Apple 1.0A GND: Disable (DP, DM do not work, in high-z state)
GND	2	Ground
VBUS	3	Power supply input, connect with 1uF capacitor to GND
DP	4	Connect to USB DP data line
DM	5	Connect to USB DM data line

6. IP Series Products List

Power Bank IC

IC Part No.	Charge /Discharge		Features							Package	
	Charge	Dis-charge	LED Num	Lighting	Keys	I2C	DCP	Type-C	QC Certificate	Package	Compa tibility
IP5303	1.0A	1.2A	1,2	√	√	-	-	-	-	eSOP8	PIN2PIN
IP5305	1.0A	1.2A	1,2,3,4	√	√	-	-	-	-	eSOP8	
IP5306	2.4A	2.1A	1,2,3,4	√	√	-	-	-	-	eSOP8	
IP5206	2A (Max)	1.5A	3,4,5	√	√	-	-	-	-	eSOP16	PIN2PIN
IP5108E	2.0A	1.0A	3,4,5	√	√	-	-	-	-	eSOP16	
IP5108	2.0A	2.0A	3,4,5	√	√	√	-	-	-	eSOP16	
IP5207	1.2A	1.2A	3,4,5	√	√	-	-	-	-	QFN24	PIN2PIN
IP5207T	1.2A	1.2A	1,2,3,4	√	√	√	√	-	-	QFN24	
IP5109	2.1A	2.1A	3,4,5	√	√	√	-	-	-	QFN24	
IP5209	2.4A	2.1A	3,4,5	√	√	√	√	-	-	QFN24	
IP5219	2.4A	2.1A	1,2,3,4	√	√	√	√	√	-	QFN24	
IP5310	3.1A	3.0A	1,2,3,4	√	√	√	√	√	-	QFN32	

IP5312	15W	3.6A	2,3,4,5	✓	✓	✓	✓	-	-	QFN32	
IP5318Q	18W	4.0A	2,3,4,5	✓	✓	✓	✓	-	✓	QFN40	PIN2 PIN
IP5318	18W	4.0A	2,3,4,5	✓	✓	✓	✓	✓	✓	QFN40	
IP5322	18W	4.0A	1,2,3,4	✓	✓	✓	✓	-	✓	QFN32	
IP5328	18W	4.0A	1,2,3,4	✓	✓	✓	✓	✓	✓	QFN40	

USB Charging Port Control IC

IC Part No.	Channel Num	Standards Supported											Package
		BC1.2 & APPLE	QC3.0 & QC2.0	FCP	SCP	AFC	SFCP	MTK PE+ 2.0&1.1	Type-C	NTC	QC Certificate	PD3.0	
IP2110	1	✓	-	-	-	-	-	-	-	-	-	-	SOT23-5
IP2111	1	✓	-	-	-	-	-	-	-	-	-	-	SOT23-6
IP2112	2	✓	-	-	-	-	-	-	-	-	-	-	SOT23-6
IP2161	1	✓	✓	-	-	-	✓	-	-	-	✓	-	SOT23-6
IP2163	1	✓	✓	✓	-	✓	✓	✓	-	✓	✓	-	SOP8
IP2701	1	✓	✓	✓	-	✓	✓	-	✓	-	-	-	SOP8
IP2703	1	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	DFN10
IP2705	1	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	DFN12
IP2707	2	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	QFN16
IP2716	1	✓	✓	✓	✓	✓	-	1.1	✓	-	✓	✓	QFN32

7. Absolute Maximum Ratings

Parameters	Symbol	Value	Unit
VBUS Input Voltage Range	VBUS	-0.3 ~ 7	V
DP, DM Input Voltage Range	V _{DP} , V _{DM}	-0.3 ~ 11	V
Junction Temperature Range	T _J	-40 ~ 150	°C
Storage Temperature Range	T _{stg}	-60 ~ 150	°C
Ambient Temperature Range	T _A	-40 ~ 150	°C
Human Body Model (HBM)	ESD	4	KV

*Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to Absolute Maximum Rated conditions for extended periods may affect device reliability.

*Voltages are referenced to GND unless otherwise noted.

8. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input Voltage	VBUS	3		5.5	V
Ambient Temperature	T _A	-40		85	°C

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

9. Electrical Characteristics

Unless otherwise specified, $T_A=25^{\circ}\text{C}$, $4.5\text{V} \leq V_{\text{BUS}} \leq 5.5\text{V}$

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Quiescent Current	I_Q	No load, $V_{\text{BUS}}=5\text{V}$	50	66	100	μA
Startup Time	T_S		8	10	12	ms
DP Voltage	V_{DP}	SEL= V_{SELH}		2.7		V
		SEL=Float		2.0		V
DM Voltage	V_{DM}	SEL= V_{SELH}		2.7		V
		SEL=Float		2.7		V
SEL Input High Voltage Range	V_{SELH}		3	5	5.5	V
SEL Default Output Voltage	V_{SELO}		1.35	1.5	1.65	V

10. Function Description

Charging Standards

IP2110 is a low-cost dedicated charging Physical Layer IC dedicated for charging applications where charging standards required to be negotiated between USB ports. IP2110 is needed at the host-side, when the attached portable client-side device negotiate the power allotment from the power source host-side.

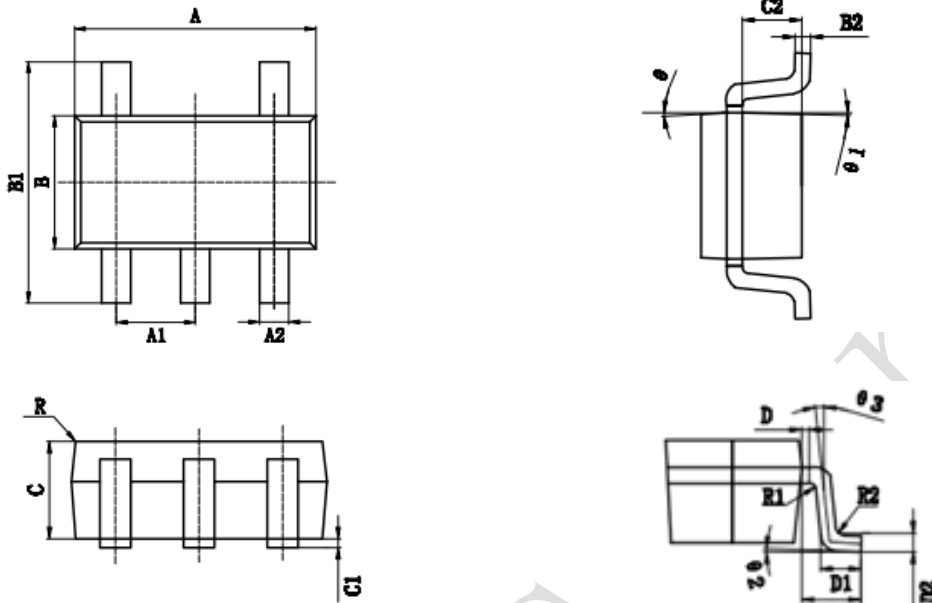
An auto-detect feature monitors USB data line voltage, and automatically provides the correct electrical signatures on the data lines to charge compliant devices. SEL pin used to configure the maximum allotment current. IP2110 supports Apple 2.4A/2.0A/1.0A, Samsung 2.0A and BC1.2. IP2110 is not in control of the charging power loop, the actual charging loop and charging current is determined by the host-side power source and the client-side USB port device.

SEL

SEL line is used to configure the maximum current allotment for Apple, when SEL line is pull up to high-voltage of V_{SELH} , the maximum current allotment is 2.4A; when SEL line is floating, the maximum current allotment is 1.0A. Reverse the DP, DM on PCB board, the maximum current allotment is 2.0A. when the SEL line is pull down to GND, IP2110 will not respond to any charging requirements, DP, DM are in high-z state.

SEL1	Voltage
High (V_{SELH})	2.4A
Float	1.0A
GND	Disable

11. Package



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.82		3.02
A1	0.90		1.00
A2	0.35		0.45
B	1.52		1.72
B1	2.80		3.00
B2	0.119		0.135
C	1.05		1.15
C1	0.03		0.13.
C2	0.60		0.70
D	0.03		0.13
D1	0.40		0.50
D2		0.254TYP	
D3	0.60		0.70
θ		9 ° TYP4	
θ1		10 ° TYP4	
θ2	0 °		8°
θ3		6 ° TYP	
R			0.2TYP
R1		0.08 TYP	
R2		0.08TYP	

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