

**Support TYPE-A and PD Double ports Controller**

**Feature**

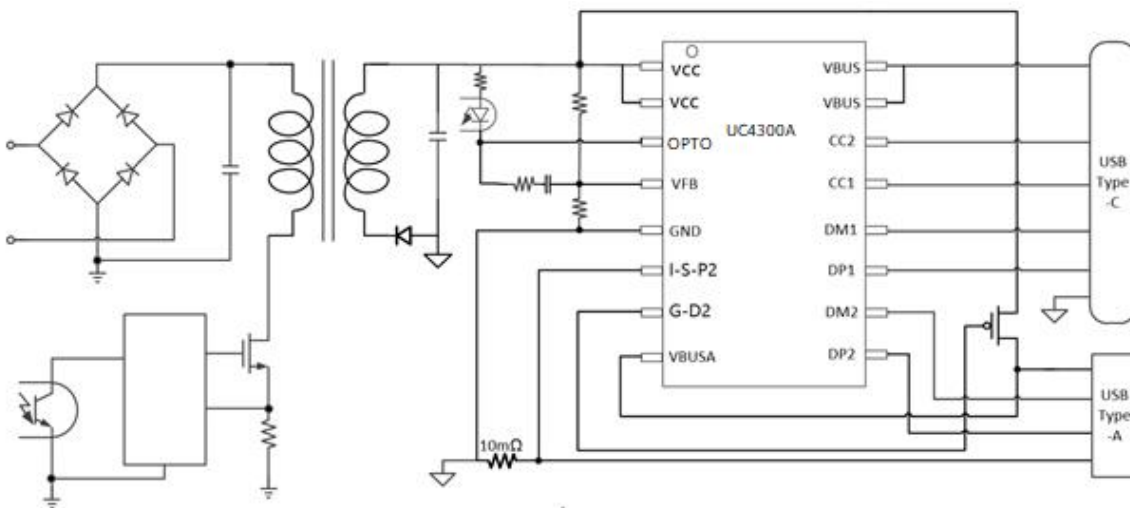
- Support USB type-C protocol
- Configure as DFP (source)
- Broadcast 3A /1.5A current
- Support USB power delivery (PD) 2.0 and 3.0 and PPS protocol
- Integrated PD layered
- communication protocol
- PDO configurable: 5V, 9V, 12V, 15V,
- Apdo configurable: 5V prog, 9V prog,
- Support quick charge 3.0 /2.0 protocol
- Configurable Xiaomi 27W charge Turbo
- Support Huawei FCP / SCP protocol
- Support Samsung AFC protocol
- Support USB BC1.2 DCP
- Support apple 2.4A charging
- specification
- Integrated constant voltage (CV) compensation loop
- Integrated VBUS channel low impedance power switch
- built in VBUS discharge function
- Support line loss compensation function

- Support USB type-A and type-C dual port operation mode
  - fast charging when port A or port C works independently
  - when the A port is connected to the apple charging cable but not connected to the apple mobile phone, the C port still has fast charging
  - when there are equipment access to port A and port C at the same time, it works at 5V
- Safety
  - the type-A port is controlled by the switch at the power end to avoid the leakage caused by the short circuit
  - overvoltage / undervoltage protection
  - over current protection
  - Over temperature protection
- CC1 / CC2 / DP / DM overvoltage protection
- ESD characteristics ± 4KV
- Package: TSSOP-16

**Application**

- AC-DC adapter
- USB Adapter

**Application Circuit**



## Support TYPE-A and PD Double ports Controller

### DESCRIPTION

UC4300A is A multi-functional USB dual port controller integrating USB type-C, USB power delivery (PD) 2.0/3.0 and PPS, QC3.0/2.0 class B fast charging protocol, Huawei FCP / SCP fast charging protocol, Samsung AFC fast charging protocol, BC1.2 DCP and Apple device 2.4A charging specification, Provide complete type-C and type-A dual port charging solutions for AC-DC adapter, mobile power supply, car charger and other equipment.

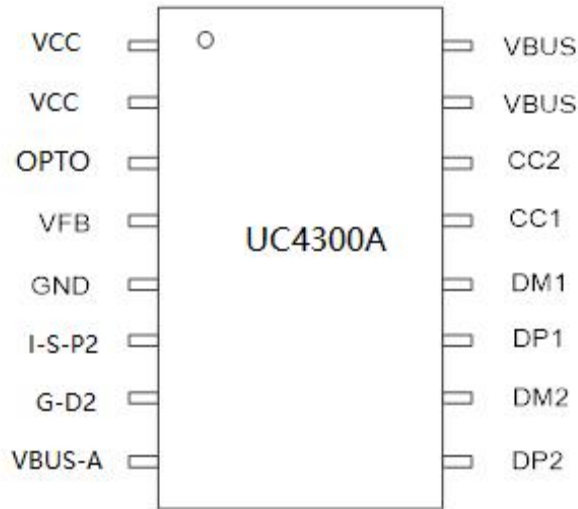
The built-in type-C protocol of UC4300A can support the type-C device to be inserted into the Automatic wake-up system, identify the plug forward and reverse, and realize the connection. The integrated type-C PD3.0 protocol supports bi-directional mark coding (BMC), integrates the physical layer protocol and protocol engine of hardware, and does not need software to participate in encoding and decoding.

When one of the type-C and type-A ports is connected to the device, the type-C or type-A port can realize independent fast charging function. When both type-C and type-A are connected to the device, UC4300A will reduce the output voltage to 5V to supply power to the device. In particular, when the type-A port is always connected to the apple charging cable but not connected to the Apple phone, the type-C port still has the fast charging function. When used as A charger, the charging line is often connected to the charger. UC4300A perfectly solves the problem of fast charging when type-A and type-C port are connected with charging line. UC4300A built in A variety of protection mechanisms to ensure the safety of the equipment: including dynamic overvoltage / under voltage / overcurrent protection (the protection point can be adjusted according to the proportion of the working voltage / current requested by the equipment); start monitoring (the port voltage will be monitored before VBUS output). UC4300A integrates 25m  $\Omega$  VBUS channel power switch and internal discharge channel, which saves peripheral devices and can quickly turn off output and restore to safe state in case of error.

UC4300A is packaged in TSSOP16.

Support TYPE-A and PD Double ports Controller

**Pin function**



PIN	NAME	Description
1/2	VCC	Source INPUT
3	OPTO	OPTO coupler driver
4	VFB	Voltage adjust feedback connection
5	GND	GND
6	I-S-P2	Type-A port, current sense port
7	G-D2	Type-A port, PMOS Switch driver
8	VBUS-A	Type-A port, output VCC
9	DP2	Type-A Port DP
10	DM2	Type-A Port DM
11	DP1	Type-C Port DP
12	DM1	Type-C Port DM
13	CC1	Type-C Port CC1
14	CC2	Type-C Port CC2
15/16	VBUS	VBUS output

## Support TYPE-A and PD Double ports Controller

### Order Information

name	PDO And APDO Configuration	mark	package
UC4300A	High power Output PDO : 5V/3A, 9V/3A, 12V/2.25A, Low power output PDO : 5V/2A	UC4300A	TSSOP16

Mark information:

Line 1, UC4300A: Chip mark

Line 2, XXXXX: Lot Number

### Available function

	QC3.0	FCP/SCP	AFC	PD3.0	PPS	A+C
UC4300A	Y	Y	Y	Y	Y	Y

**Support TYPE-A and PD Double ports Controller**

## Specifications

### Absolute Maximum Ratings

Parameter		Min	Max	Unit
Broken Voltage(VS to GND)	VIN, VCC, PS, CC, VBUS, OPTO, DP, DM	-0.3	24	V
	The others Pin	-0.3	6	V
Operating Junction Temperature Range		-40	150	°C
Storage Temperature		-65	150	°C

(1)Absolute maximum ratings are stress limits beyond which damage to the device may happen.

### ESD feature

Symbol	Parameter	Value	Unit
V <sub>ESD</sub>	HBM	±4000	V

### Recommended operating conditions

Parameter		Min	Type	Max	Unit
VCC	Input voltage	3.6		15	V
C <sub>VBUS</sub>	Discharge limitation resistor	2.2		10	μF
C <sub>VCC</sub>	VAUX Capacitor	4.7	10		μF
R <sub>FBUP</sub>	VBUS Capacitor		100		kΩ
T <sub>A</sub>	System voltage divider resistor	-40		85	°C

### Package thermal Data

Symbol	Parameter	Value	Unit
R <sub>θJA</sub>	Max Junction-to-Ambient Thermal Resistance <sup>(1)</sup>	100	°C/W
R <sub>θJctop</sub>	Max Junction-to-Case Thermal Resistance	36	
R <sub>θJB</sub>	Thermal resistance between junction and plate temperature	45	

## Support TYPE-A and PD Double ports Controller

### ELECTRICAL CHARACTERISTICS

(T<sub>J</sub>= 25°C, 5V≤VCC≤12V , unless otherwise specified)

Parameter	Test conditions	MIN	TYP	MAX	UNIT	
<b>VCC, VBUS</b>						
V <sub>VCC_TH</sub>	VCC UVLO Threshold	Rising edge		3.3	V	
		Falling edge		2.9		
		Hysteresis		0.4		
I <sub>SUPP</sub>	Operating current	VCC=5V, VBUS=5V		2	mA	
<b>Voltage Protection (VBUS)</b>						
V <sub>FOVP</sub>	Fast OVP Threshold, always enabled	Ref to target voltage		+20%	V	
V <sub>SOVP</sub>	Slow OVP Threshold	Ref to target voltage		+15%	V	
V <sub>SUVP</sub>	VBUS UVP Threshold	Ref to target voltage		-22%	V	
<b>Switch MOSFET</b>						
R <sub>DSON</sub>				25	mΩ	
<b>Transmitter (CC1, CC2)</b>						
R <sub>TX</sub>	Output resistance	During transmission		50	Ω	
V <sub>TXHI</sub>	Transmit HIGH			1.15	V	
V <sub>TXLO</sub>	Transmit LOW		-75	75	mV	
t <sub>UI</sub>	Bit unit interval			3.3	us	
t <sub>BMC</sub>	Rise/fall time of BMC	R <sub>load</sub> =5.1k,C <sub>load</sub> =1nF	300		600	ns
<b>Receiver (CC1, CC2)</b>						
V <sub>RXHI</sub>	Receive HIGH		800	840	885	mV
V <sub>RXLO</sub>	Receive LOW		485	525	570	
I <sub>RP_SRC</sub>	CC1/CC2 Broadcasting current	3A DFP mode, 0 ≤ V <sub>CCX</sub> ≤ 2.5V	304	330	356	uA
		1.5A DFP mode, 0 ≤ V <sub>CCX</sub> ≤ 1.5V	166	180	194	uA
<b>OCP</b>						
V <sub>ITRIP</sub>		Ref to Power Capability(pd)		+30%		A
		USB-A				A
<b>OTP (internal)</b>						
T <sub>J1</sub>	Die temperature	Temperature rising edge	135	145	155	°C
		Hysteresis		20		°C

## Support TYPE-A and PD Double ports Controller

HVDCP interface (DP, DM)						
$V_{DAT(REF)}$	Data line detection voltage		0.25	0.325	0.4	V
$V_{SEL(REF)}$	Output voltage selection		1.8	2	2.2	V
$T_{GLITCH(DP)HIGH}$	D+ High level disturbance filtering time		1	1.25	1.5	s
$T_{GLITCH(DM)LOW}$	D- Low level disturbance filtering time			1		ms
$T_{GLITCH(V)CHANGE}$	Output voltage disturbance filtering time		20	40	60	ms
$T_{GLITCH(CONT)CHANGE}$	Disturbance filtering time in continuous mode		100	150	200	us
$R_{DAT(LKG)}$	D+ Leakage resistance		300	500	800	K $\Omega$
$R_{DM(DWN)}$	D- DroPD-outputwn resistance		14.25	19.53	24.5	K $\Omega$
$R_{ON(N1)}$	Switch N1 on resistance			40	100	$\Omega$
$V_{TH(PD)}$	Connection voltage threshold of receiving device		0.25	0.325	0.4	V
$T_{DPD}$	Connection detection and filtering time for receiving equipment		120	160	200	ms
$\Delta I_{T(UP)}$	Step size of current source when voltage rises	$R_{IREF}=100K\Omega$		2		uA
$\Delta I_{T(DO)}$	Step size of current source when voltage is reduced	$R_{IREF}=100K\Omega$		2		uA
Apple 2.4A Charge mode						
$V_{DAT(2.7V)}$	D+/D- voltage		2.57	2.7	2.84	V
$R_{DAT(2.7V)}$	D+/D- output impedance			15		K $\Omega$
FCP charge mode						
$V_{TX-VOH}$	D- FCP TX Valid High			2.7		V
$V_{TX-VOL}$	D- FCP TX Valid Low				0.3	V
$V_{RX-VIH}$	D- FCP RX Valid High			1.2		V
$V_{RX-VIL}$	D- FCP RX Valid High			0.9		V
Trise	FCP Pulse Rise Time	10% - 90%			2.5	us
Tfall	FCP Pulse Fall Time	90% - 10%			2.5	us

## Support TYPE-A and PD Double ports Controller

### Application information

#### VCC and VBUS

VCC is the input power of type-C and type-a ports. It is used as the power input of VBUS and the power supply pin of the chip to connect the output of ACDC or DCDC. It is recommended to connect GND to 2 ~ 10uF ceramic capacitor near VCC and VBUS pins.

#### OPTO

OPTO is used to Drive Optocoupler, with withstand voltage of more than 24V (see application diagram in Chapter 3).

#### VFB

VFB and OPTO form CV loop, which needs to be compensated. The reference at VFB is 1.24v, and the partial voltage resistance near VCC must be 100k, and the other is 33K (corresponding to VCC = 5V); the resistance accuracy affects the power supply accuracy, so it is recommended to use 1% accuracy resistance.

#### Current Sense

UC4300A has two sets of current detection circuits, corresponding to port C and port A respectively. Port C current detection is completely built-in, and the default protection point is 130% of PDO current; port A current protection points are 2.8/3.2/3.6/4a optional (use 10m  $\Omega$  to detect resistance). The detection resistance of 10m  $\Omega$  needs to be connected by Kelvin, one end is ISP2, the other end is the GND of the chip.

#### Line loss compensation

UC4300A can increase the output voltage in proportion according to the load current (60 / 90 / 120mV /A optional), and can also offset the output voltage in A fixed way (- 150mV ~ + 400mV).

#### Multi-port Applications

UC4300A can realize fast charging in single port application, and it will return to 5V charging when A + C works at the same time; moreover, it can realize whether the apple cable or mobile phone is connected to port A through special technology to avoid affecting the quick charging of port C when there is only apple cable in port a.

### Safety characteristics

#### Withstand voltage

In order to avoid chip damage caused by CC / DP / DM pin and power short circuit, the withstand voltage of these ports can reach more than 24V.

#### OVP/OCP/UVP

The chip OVP/OCP/UVP threshold will be adjusted according to the voltage selected by the device to protect the device security to the maximum extent.

#### OTP

When the chip junction temperature reaches 145 °C, the output will be closed, and when it drops to 125 °C, it will be released.

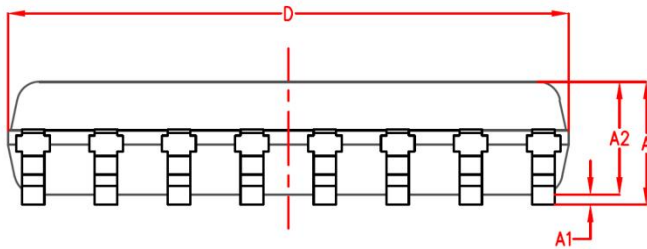
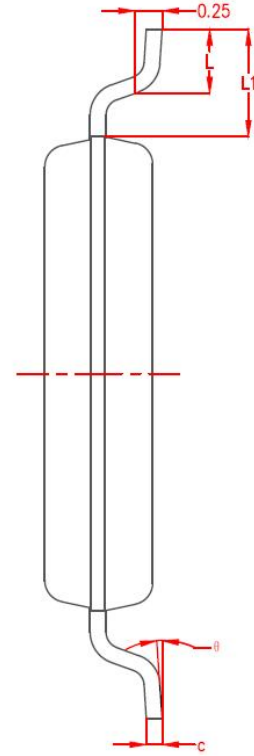
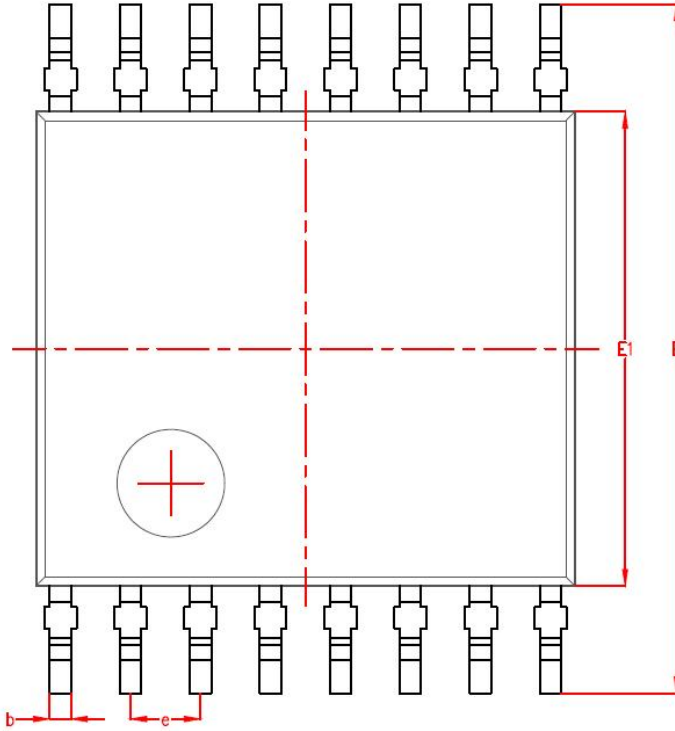
#### Discharge

UC4300A has built-in energy discharge channel, which can open the discharge power energy under specific circumstances.



Support TYPE-A and PD Double ports Controller

**Package Information**



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	-	1.09	1.19
A1	0.02	-	0.15
A2	0.95	1.00	1.05
b	0.14	0.22	0.30
c	0.08	0.13	0.18
D	4.90	5.00	5.10
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
e	0.65BSC		
L	0.50	0.60	0.70
L1	1.05BSC		
θ	0°	4°	8°