

## USB Charger Adapter Emulator with QC2.0/3.0 Fast Controller Function

### FEATURES

The UC2611 is a fast charge protocol controller for HiSilicon Fast Charging Protocol (FCP) and Qualcomm® Quick Charge™ 2.0/3.0 (QC 2.0/3.0) USB interface. The device can fast charging FCP or QC 2.0/3.0 powered device (PD). The protocol feature monitors USB D+/D- data line voltage or D- data line transmission and automatically adjusts output voltage of power bank and wall adaptor to optimize charge time.

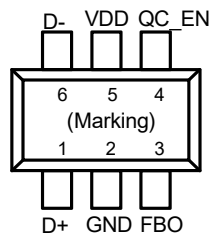
UC2611 can support not only USB BC compliant devices, but also Apple / Samsung / HUAWEI devices and automatically detects whether a connected powered device is QC 2.0/3.0 or FCP capable before enabling output voltage adjustment. If a PD not compliant to QC 2.0/3.0 or FCP is detected the UC2611 disables output voltage adjustment to ensure safe operation with legacy 5 V only USB PDs.

The UC2611 is available in a space-saving SOT-23-6 package

### APPLICATIONS

- Mobile Power Supply

### UC2611 SOT23-6 PACKAGE



- USB Wall Adapter
- Travel Charger
- In-Car Charger

### DESCRIPTION

- Support HiSilicon Fast Charging Protocol (FCP) for Output Voltage and Current Communication
- Support Qualcomm® Quick Charge™ 2.0/3.0
- Class A : 3.6V up to 12V Output Voltage
- Automatic Selection FCP and QC2.0/3.0 Protocols
- Supports USB DCP Shorting D+ Line to D- Line per USB Battery Charging Specification, Revision 1.2
- Meets Chinese Telecommunication Industrial Standard YD/T 1591-2009
- Supports USB DCP Applying 2.7V on D+ Line and 2.7V on D- Line
- Supports USB DCP Applying 1.2V on D+ and D- Lines
- SOT-23-6 Package

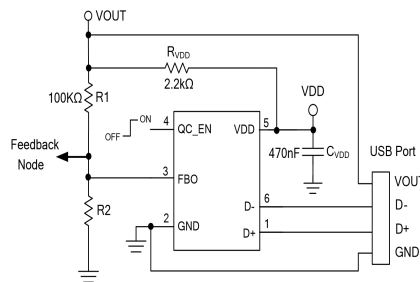


Figure 2. Typical Application Schematic

### ORDERING INFORMATION

Part Number	Package Type	Package Qty	Op Temp(°C)
UC2611	SOT23-6	3000	-40~125

**USB Charger Adapter Emulator with QC2.0/3.0 Fast Controller Function**
**Functional Pin Description**

Pin Name	Pin No. (SOT-23-6)	Pin Function
D+	1	USB D+ data line input pin. Recommended this pin connect without resistors(open) or with a resistor higher than 1M $\Omega$ connect to GND.
GND	2	Ground pin.
FBO	3	Feedback output pin. Current Sink/Source FB Node.
QC_EN	4	QC_Enable: High-Z with QC2.0/3.0 and FCP function; logic low disable QC2.0/3.0 and FCP function.
VDD	5	Power supply input pin.
D-	6	USB D- data line input pin.

**ABSOLUTE MAXIMUM RATINGS (1)**

Over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		MIN	MAX	UNIT
supply voltage range	IN	-0.3	6.5	V
Input voltage range	All other pins voltage	-0.3	6.5	
	DP, DM		2	
Operating Junction Temperature	TJ	-40	125	°C
Storage Temperature Range	Tstg	-65	150	
ESD rating, Human Body Model (HBM)	IN, DP, DM, QC_EN, FBO		5	KV

(1) 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.

**THERMAL CHARACTERISTICS**

over operating free-air temperature range (unless otherwise noted)

THERMAL METRIC			UNIT
$\theta_{JA}$	Package thermal impedance <sup>(1)</sup>	180	°C/W

(1) The package thermal impedance is calculated in accordance with JESD 51-7.

**USB Charger Adapter Emulator with QC2.0/3.0 Fast Controller Function**
**RECOMMENDED OPERATING CONDITIONS**

PARAMETER		MIN	MAX	UNIT
VIN	Input voltage of IN	3.2	6.4	V
TJ	Operating Junction Temperature	-40	125	°C

**ELECTRICAL CHARACTERISTICS**

(VDD=5V, TA=25°C and the recommended supply voltage range, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Input Power</b>						
VDD Input Voltage Range	VDD		3.2		6.4	V
Input UVLO Threshold	VUVLO(VTH)	VDD Falling	2.5		2.9	V
VDD Supply Current		VDD =5V, Measure VDD		200		μA
VDD Shunt Voltage	VDD(SHUNT)	IVDD = 3mA	5.9	6.4	6.8	V
<b>High Voltage Dedicated Charging Port (H VDCP)</b>						
Data Detect Voltage	VDAT(REF)		0.25	0.325	0.4	V
Output Voltage Selection Reference	VSEL_REF		1.8	2.0	2.2	V
D+ High Glitch Filter Time	T GLITCH(BC)D+_H		1000	1250	1500	ms
D- Low Glitch Filter Time	T GLITCH(BC)- D-_L			1		ms
Output Voltage Glitch Filter Time	T GLITCH(V) CHANGE		20	40	60	ms
D- Pull-Down Resistance	RD-(DWN)			20		kΩ
Continuous Mode Glitch Filter Time <sup>(Note 4)</sup>	TGLITCH-CON T-CHANGE		100		200	μs
D+ Leakage Resistance	RDAT-LKG	VDD =3.2-6.4V, VD+=0.6-3.6V Switch SW1=Off	300	500	800	kΩ
Switch SW1 On-Resistance	RDS_ON_N1	VDD =5V, SW1= 200μA			40	Ω
Up/Down Current Step	IUP, IDOWN	IUP = 40μA (9V), 70μA (12V), IDOWN = 14μA (3.6V)		2		μA
<b>DCP 1.2V Charging Mode</b>						
D+_1.2V/D-_1.2V Line Output Voltage			1.08	1.2	1.32	V
D+_1.2V/D-_1.2V Line Output Impedance				100		kΩ

**USB Charger Adapter Emulator with QC2.0/3.0 Fast Controller Function**
**Apple 2.4A Mode**

D+ <sub>2.7V</sub> /D- <sub>2.7V</sub> Line Output Voltage			2.54	2.7	2.86	V
D+ <sub>2.7V</sub> /D- <sub>2.7V</sub> Line Output Impedance				33.6		kΩ

**D- SECTION (FCP)**

D- FCP Tx Valid Output High	VTX-VOH		2.55		3.6	V
D- FCP Tx Valid Output Low	VTX-VOL				0.3	V
D- FCP Rx Valid Output High	VRX-VIH		1.4		3.6	V
D- FCP Rx Valid Output Low	VRX-VIL				1.0	V

**Electrical Characteristics (Continued)**

(VDD=5V, T<sub>A</sub>=25°C and the recommended supply voltage range, unless otherwise specified.)

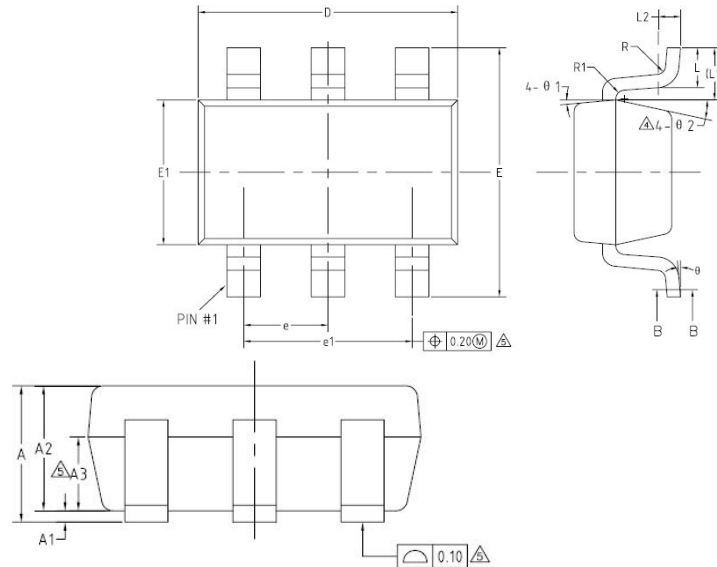
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
D- Output Pull-Low Resistance (FCP) <sup>(Note 4)</sup>	R <sub>PD</sub>		400	500	600	Ω
Unit Interval For FCP PHY Communication	UI	f <sub>CLK</sub> = 125kHz	144	160	180	μs

Note 4: Not production tested.

USB Charger Adapter Emulator with QC2.0/3.0 Fast Controller Function

**PACKAGE INFORMATION**

SOT23-6



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	—	—	1.25
A1	0	—	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	—	0.50
b1	0.36	0.38	0.45
c	0.14	—	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.10	—	—
R1	0.10	—	0.20
$\theta$	0°	—	8°
$\theta 1$	3°	5°	7°
$\theta 2$	6°	—	14°