

## USB Dedicated Charging Port Controller for Fast Charging Protocol and QC 2.0/3.0

### Description

The FP6600Q 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 Quick Charge 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.

FP6600Q can support not only USB BC compliant devices, but also Apple / Samsung devices and automatically detects whether a connected powered device is Quick Charge 2.0/3.0 or FCP capable before enabling output voltage adjustment. If a PD not compliant to Quick Charge 2.0/3.0 is detected the FP6600Q disables output voltage adjustment to ensure safe operation with legacy 5 V only USB PDs.

The FP6600Q is available in a space-saving SOP-8.

### Features

- Support HiSilicon Fast Charging Protocol (FCP) for output voltage and current communication.
- Support Qualcomm® Quick Charge™ 2.0/3.0
  - Class A : 5V/9V/12V Output Voltage.
  - Class B : 5V/9V/12V/20V Output Voltage.
- Automatic Selection FCP and 2.0/3.0 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
- Output overvoltage protection
- Over-temperature protection
- Distant shutdown protection
- SOP-8 Pb-Free Package

### Applications

- Wall-Adapter, Smart Phones, Tablets, Netbooks
- Mobile / Tablet Power Bank
- Car Charger
- USB Power Output Ports

### Pin Assignments

#### SO Package(SOP-8)

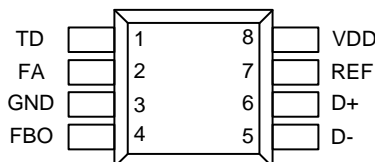



Figure 1. Pin Assignment of FP6600Q

### Ordering Information

FP6600Q  Package Type  
SO: SOP-8



**深圳市百盛新纪元半导体有限公司**

**SHENZHEN BAISHENG ELECTRONIC CO.,LTD**

锂电池IC

移动电源IC

LED驱动IC

电源管理IC

LDO、DCDC

升压IC、降压IC

监控IC、复位IC

车充、旅充IC

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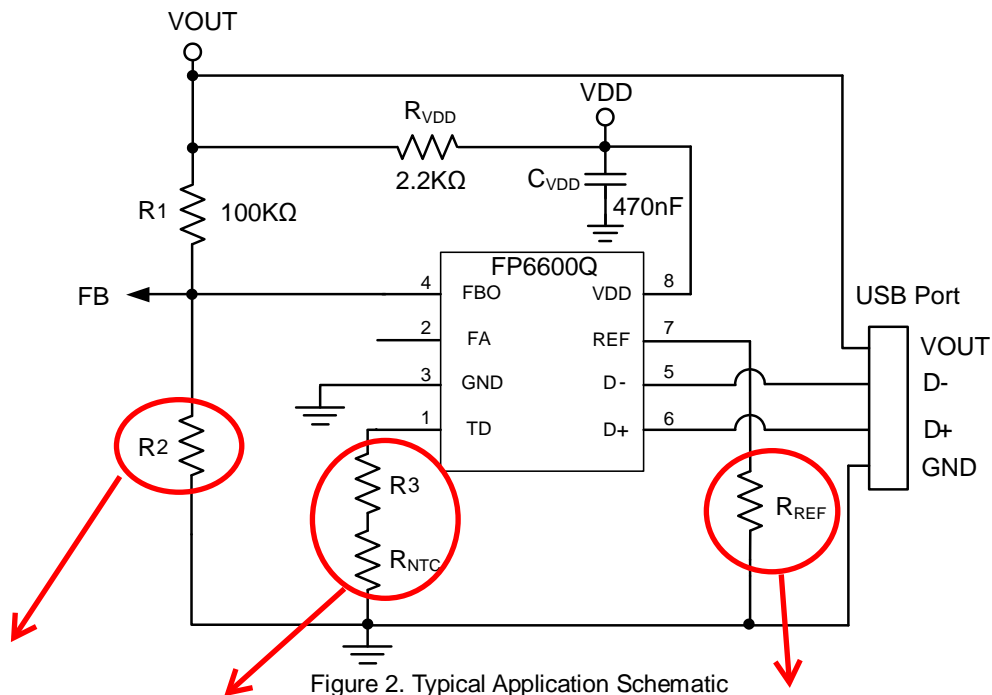
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## Typical Application Circuit

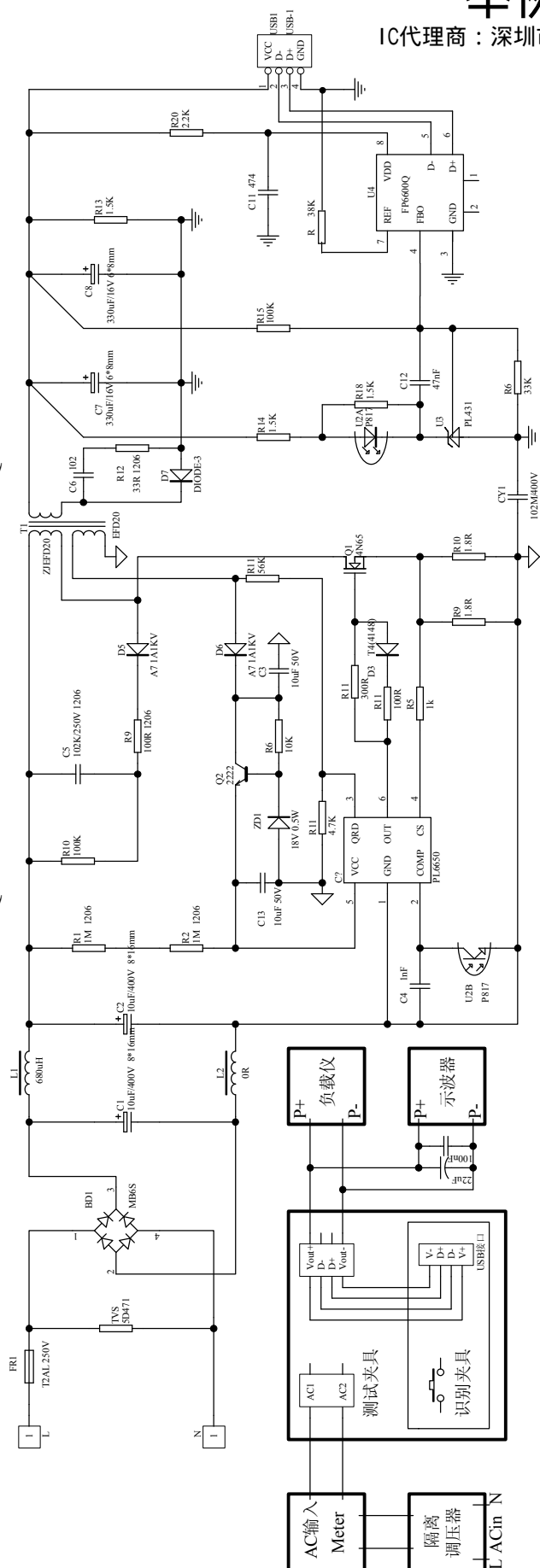


设计指导 : <http://www.szparkson.net/product/214.html>

### Output Voltage Lookup Table(QC 2.0/3.0)

D+	D-	Output Voltage
3.3V	3.3V	20V
0.6V	0.6V	12V
3.3V	0.6V	9V
0.6V	3.3V	Continuous mode
0.6V	High-Z	5V (Default)

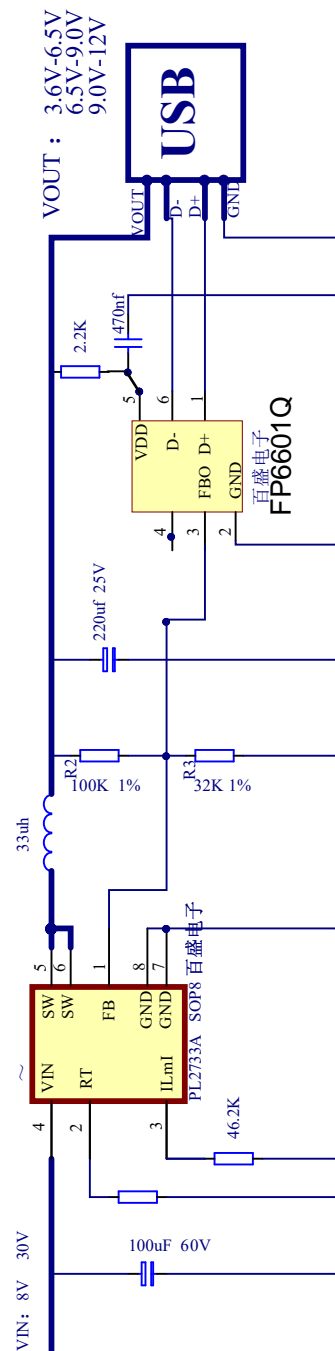
## QC3.0 PL6650 + FP6600Q 原理图



### 举例原理图：

IC代理商：深圳市百盛新纪元半导体有限公司 (2A)

**PPL2733A+FP6601Q QC3.0 车载充电器**



## Functional Pin Description

Pin Name	Pin No. (SOP-8)	Pin Function
TD	1	Connect external temperature sensor (NTC resistor).
FA	2	If any fault (OVP,OTP,DSP) occur then FAP pin source current.
GND	3	Ground Pin.
FBO	4	Feedback output. Current Sink/Source FB Node.
D-	5	USB D- data line input
D+	6	USB D+ data line input. Recommended this pin connect without resistors(open) or with a resistor higher than 1M $\Omega$ connect to GND.
REF	7	Through connect resistor provides output voltage selection.( $R_{REF} > 33K$ or REF pin logic high select Class A and $R_{REF} < 15K$ or REF pin logic low select Class B.)
VDD	8	Power Supply Input Pin.

## Block Diagram

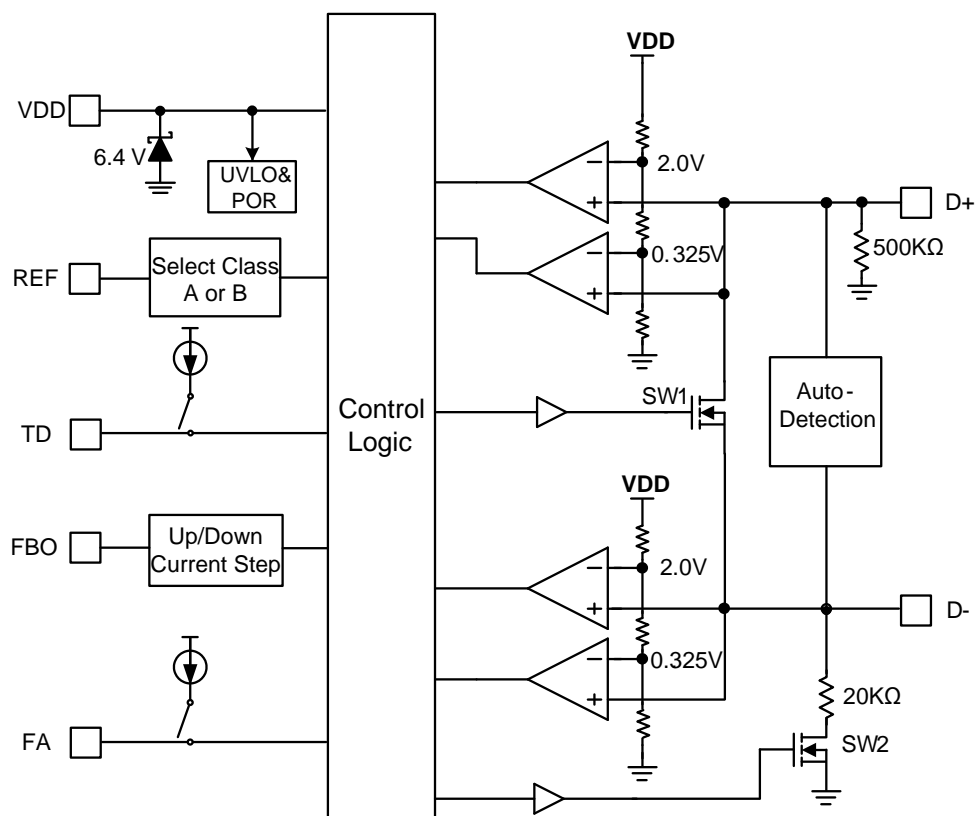


Figure 3. Block Diagram of FP6600Q

## Absolute Maximum Ratings

- Input Supply Voltage VDD ----- -0.3V to +6.5V
- All Other Pins Voltage ----- -0.3V to +6.5V
- Maximum Junction Temperature ( $T_J$ )----- +150°C
- Storage Temperature ( $T_S$ )----- -65°C to +150°C
- Lead Temperature (Soldering, 10sec.) ----- +260°C
- Power Dissipation @  $T_A=25^\circ\text{C}$ , ( $P_D$ )
  - SOP-8 ----- 1.39W
- Package Thermal Resistance, ( $\theta_{JA}$ ):
  - SOP-8----- 90°C/W
- Package Thermal Resistance, ( $\theta_{JC}$ ):
  - SOP-8----- 39°C/W

Note1 : Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

## Recommended Operating Conditions

- Input Supply Voltage (VDD)----- 3.2V ~ 6.4V
- Operation Temperature Range ( $T_{OPR}$ ) ----- -40°C to +85°C

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

## Electrical Characteristics

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	
Input Power							
VDD Input Voltage Range	V <sub>DD</sub>		3.2		6.4	V	
Input UVLO Threshold	V <sub>UVLO(VTH)</sub>	V <sub>DD</sub> Falling	2.5		2.9	V	
VDD Supply Current		V <sub>DD</sub> =5V, Measure V <sub>DD</sub> ,		200		μA	
VDD Shunt Voltage	V <sub>DD(SHUNT)</sub>	I <sub>VDD</sub> = 3mA	5.9	6.4	6.8	V	
High Voltage Dedicated Charging Port (HVDCP)							
Data Detect Voltage	V <sub>DAT(REF)</sub>		0.25	0.325	0.4	V	
Output voltage selection reference	V <sub>SEL_REF</sub>		1.8	2.0	2.2	V	
D+ High Glitch Filter Time	T <sub>GLITCH(BC)-D+_H</sub>		1000	1250	1500	ms	
D- Low Glitch Filter Time	T <sub>GLITCH(BC)-D-_L</sub>			1		ms	
Output Voltage Glitch Filter Time	T <sub>GLITCH(V)CHANGE</sub>		20	40	60	ms	
D- Pull-Down Resistance	R <sub>D-(DWN)</sub>			20		KΩ	
Continuous Mode Glitch Filter Time	T <sub>GLITCH-CON T-CHANGE</sub>		100		200	μs	
D+ Leakage Resistance	R <sub>DAT-LKG</sub>	V <sub>DD</sub> =3.2-6.4V,VD+=0.6-3.6V Switch SW1=Off	300	500	800	KΩ	
Switch SW1 on-resistance	R <sub>DS_ON,N1</sub>	V <sub>DD</sub> =5V,SW1= 200μA			40	Ω	
Up/Down Current Step	I <sub>UP</sub> , I <sub>DOWN</sub>	I <sub>UP</sub> = 40μA (9V), 70μA (12V), I <sub>DOWN</sub> = 14μA (3.6V)		2		μA	
DCP 1.2V Charging Mode							
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	
Apple 2.4A Mode							
D+_2.7V/D-_2.7V line output voltage			2.57	2.7	2.84	V	
D+_2.7V/D-_2.7V line output Impedance				33.6		KΩ	
Protection							
Over Voltage Protection Threshold Voltage		QC 2.0 Mode	I <sub>UP</sub> = 0 (5V)	1.42	1.52	1.62	V
			I <sub>UP</sub> = 40μA (9V)	1.58	1.72	1.86	
			I <sub>UP</sub> = 70μA (12V)	1.72	1.87	2.02	
			I <sub>UP</sub> = 150μA(20V)	2.1	2.28	2.46	

## Electrical Characteristics(Continued)

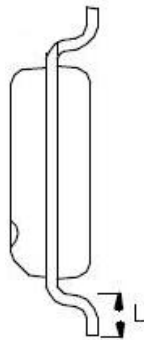
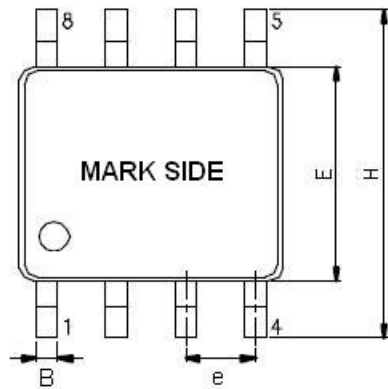
(VDD=5V, T<sub>A</sub>=25°C and the recommended supply voltage range, unless otherwise specified.)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Over Voltage Protection Threshold Voltage		QC 3.0 Continuous Mode	R <sub>REF</sub> > 33 KΩ or Logic High, Class A	1.72	1.87	2.02	V
			R <sub>REF</sub> < 15 KΩ or Logic Low, Class B	2.1	2.28	2.46	
Over Voltage Detection Deglitch Time					60		μs
Over Voltage Detection Blanking Time				500			ms
Over Temperature Threshold				1.1	1.2	1.3	V
Over Temperature Deglitch Time					1		ms
Temperature Monitor Current Source				80		120	μA
Temperature Monitor On Time				10		13	ms
Protection Current Source				90	130	170	μA
D- SECTION (FCP)							
D- FCP Tx Valid Output High	V <sub>TX-VOH</sub>			2.55		3.6	V
D- FCP Tx Valid Output Low	V <sub>TX-VOL</sub>					0.3	V
D- FCP Rx Valid Output High	V <sub>RX-VIH</sub>			1.4		3.6	V
D- FCP Rx Valid Output Low	V <sub>RX-VIL</sub>					1.0	V
D- Output Pull-Low Resistance (FCP)	R <sub>PD</sub>			400	500	600	Ω
Unit Interval For FCP PHY communication	UI	f <sub>CLK</sub> = 125KHz		144	160	176	μs

Note : Not production tested.

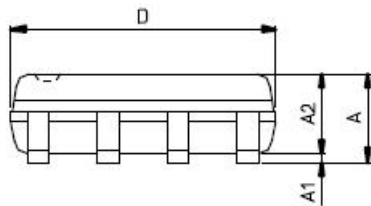
## Outline Information

SOP-8 Package (Unit: mm)

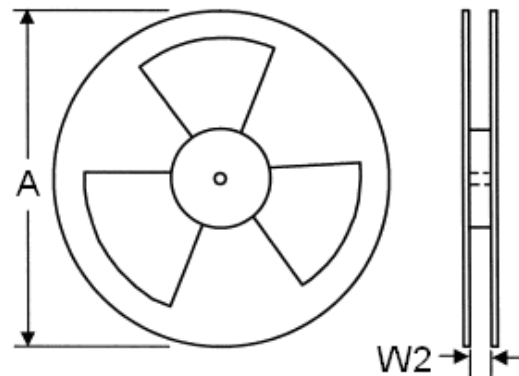
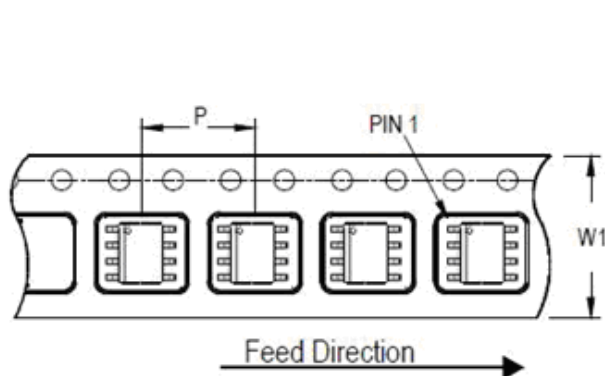


SYMBOLS UNIT	DIMENSION IN MILLIMETER	
	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
A2	1.25	1.50
B	0.31	0.51
D	4.80	5.00
E	3.80	4.00
e	1.20	1.34
H	5.80	6.20
L	0.40	1.27

Note : Followed from JEDEC MO-012-E



## Carrier dimensions



Tape Size (W1) mm	Pocket Pitch (P) mm	Reel Size (A)		Reel Width (W2) mm	Empty Cavity Length mm	Units per Reel
		in	mm			
12	8	13	330	12.4	400~1000	2,500

### Life Support Policy

Fitipower's products are not authorized for use as critical components in life support devices or other medical systems.