

USB Dedicated Charging Port Controller with QC 2.0 Fast Charging Function

Description

The FP6601 is a fast charge protocol controller and follows Quick Charge 2.0 specification for smart power bank application. The protocol feature monitors USB D+/D- data line voltage, and automatically adjusts output voltage of power bank and wall adaptor to optimize charge time.

FP6601 is a high performance solution for fast-charging mechanism and it saves charging time. It supports the full output voltage range of either Class A.

FP6601 can support not only USB BC compliant devices, but also Apple / Samsung devices and automatically detects whether a connected powered device (PD) is Quick Charge 2.0 capable before enabling output voltage adjustment. If a PD not compliant to Quick Charge 2.0 is detected the FP6601 disables output voltage adjustment to ensure safe operation with legacy 5 V only USB PDs.

The FP6601 is available in a space-saving SOT-23-6 package.

Features

- Input Voltage Range from 4V to 6V.
- Fully Supports **Quick Charge 2.0 specification**:
Class A: 5V/9V/12V Output Voltage.
- 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
- Automatic selection of D+/D- mode for an attached device
- Complaint with Apple® and Samsung devices
- SOT-23-6 package.

Applications

- Wall-Adapter / Power Plugs, Outlets
- Mobile / Tablet Power Bank
- Car Charger
- USB Power Output Ports

Pin Assignments

S6 Package B (SOT-23-6)

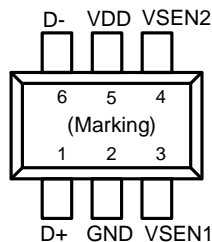


Figure 1. Pin Assignment of FP6601

S6 Package B (SOT-23-6)

Typical Application Circuit

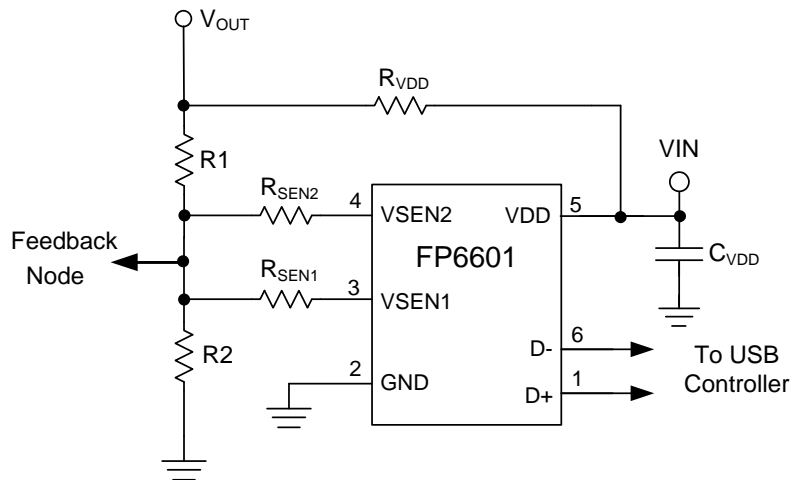


Figure 3. Class A Typical Application Schematic

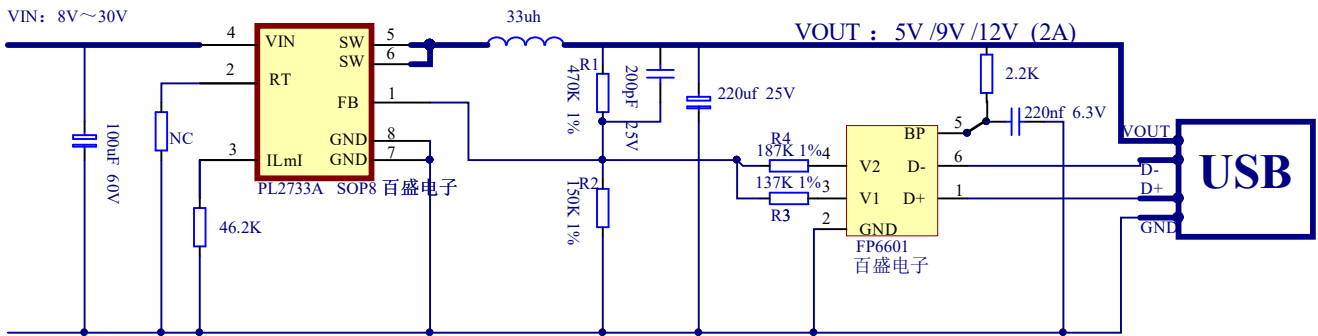
FP6601一级代理商：
深圳市百盛新纪元半导体有限公司

Output Voltage Lookup Table

D+	D-	Output Voltage	Internal Switch Setting		
			SW1	SW2	SW3
0.6V	0.6V	12V	0	0	1
3.3V	0.6V	9V	0	1	1
0.6V	GND	5V (Default)	1	1	1

Note: 1 represent the NMOS are OFF, 0 represent the NMOS are ON.

DC-DC快充QC2.0车载充电器



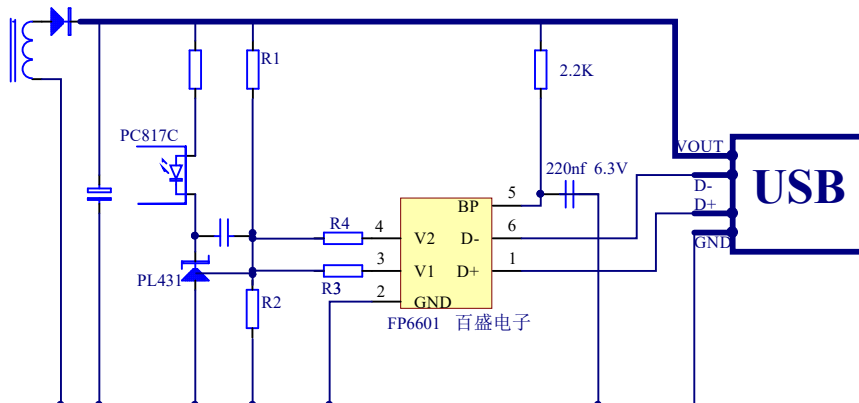
FP6601一级代理商：深圳市百盛新纪元半导体有限公司（百盛电子）

R1和R2是FB脚反馈电阻，R3/R4与R2是并联关系。

FP6601控制着3脚/4脚开关。
 输出5V时： 3脚/4脚不接地（悬空）；
 输出9V时： 3脚接地， 4脚不接地（悬空）；
 输出12V时： 3脚/4脚接。

FP6601一级代理商：
 深圳市百盛新纪元半导体有限公司
 价低，货稳定。

AC-DC充电器应用：



Functional Pin Description

Pin Name	Pin No. (SOT-23-6)	Pin Function
GND	2	Ground Pin.
VSEN1	3	Open Drain Output of output voltage adjustment switch. Active for 9V, 12V output setting.
VSEN2	4	Open Drain Output of output voltage adjustment switch. Active for 12V output setting.
D-	1	USB D- data line input
D+	6	USB D+ data line input
VDD	5	Power Supply Input Pin.

Block Diagram

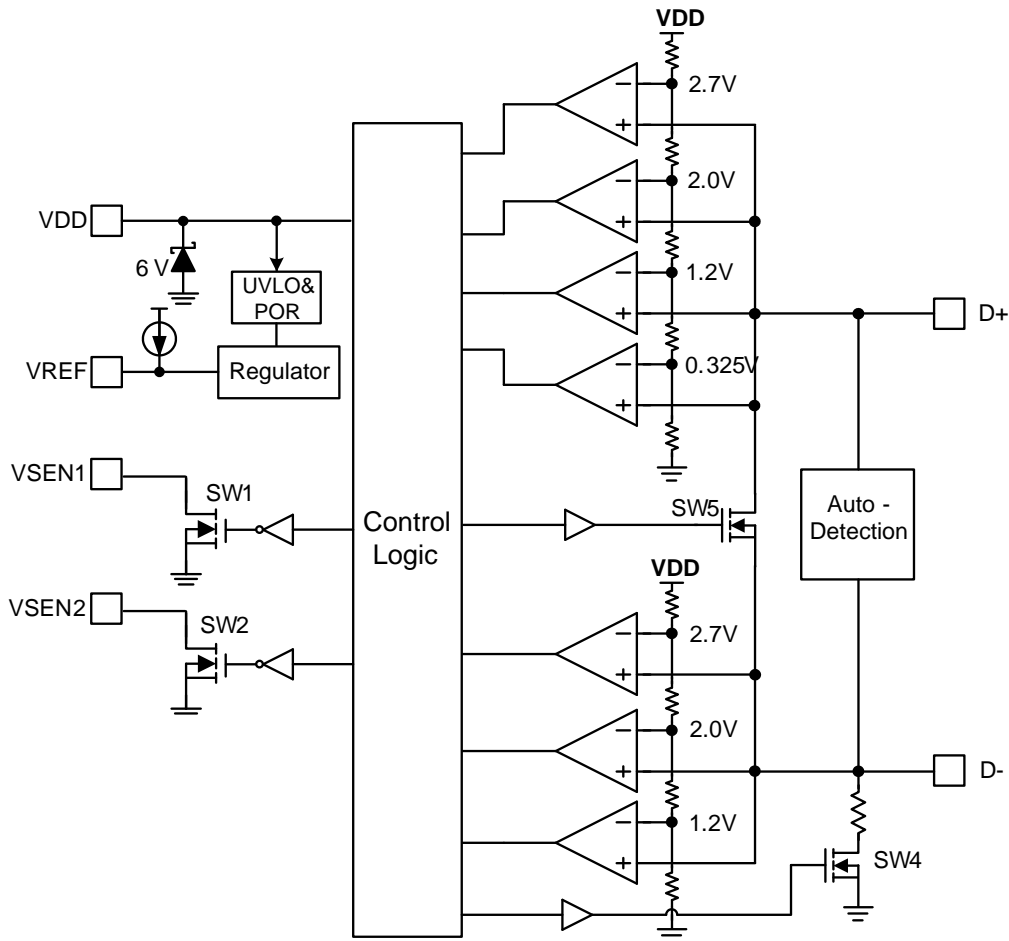


Figure 3. Block Diagram of FP6601



Absolute Maximum Ratings

- Input Supply Voltage VDD ----- - 0.3V to + 8V
- All Other Pins Voltage ----- - 0.3V to + 8V
- 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°C, (P_D)
 - SOT-23-6----- 0.4W
- Package Thermal Resistance, (θ_{JA}):
 - SOT-23-6----- 250°C/W
- Package Thermal Resistance, (θ_{JC}):
 - SOT-23-6----- 110°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)----- 4V ~ 6V
- 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_A=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 _{DD}		4		6	V
Input UVLO Threshold	V _{UVLO(VTH)}	V _{DD} Rising	2.0		3.9	V
VDD Supply Current		VDD=5V, Measure V _{DD} , SW1 = SW2 = SW3 = Off		200		μA
VDD Shunt Voltage	V _{DD(SHUNT)}			TBD		V
Reference Voltage Output	V _R		1.18	1.23	1.28	V
High Voltage Dedicated Charging Port (HVDCP)						
Data Detect Voltage	V _{DAT(REF)}		0.25	0.325	0.4	V
Output voltage selection reference	V _{SEL_REF}		1.8	2.0	2.2	V
Data Lines Short-Circuit Delay	T _{DAT(SHORT)}	V _{OUT} ≥ 0.8 V		10	20	ms
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	R _{D-(DWN)}			20		KΩ
Switch SW1 on-resistance	R _{D_S_ON_N1}	SW1 = 200μA			300	Ω
Switch SW2 on-resistance	R _{D_S_ON_N2}	SW2 = 200μA			300	Ω
Switch SW5 on-resistance	R _{D_S_ON_N5}	SW5 = 200μA			40	Ω
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

Note : Not production tested.

Application Information

Function Description

The FP6601 is a USB Dedicated Charging Port Controller can fast charge most of the handheld devices. It can be like the original charging adapter. The FP6601 can support BC1.2 , Apple Divider mode, Samsung Device.

The FP6601 is a low cost USB high voltage dedicated charging port interface IC for Quick Charge 2.0 specification. It also supports full output voltage range of Quick Charge 2.0 Class A.

Quick Charge 2.0 Interface

Power up D+/D- is supply 2.7V to Apple Device and then supply D+ short to D- into BC1.2. Set the output voltage level 5V. If D+ continuous above 0.325V and keep 1.25 seconds FP6601 into Quick Charge 2.0 operation mode.

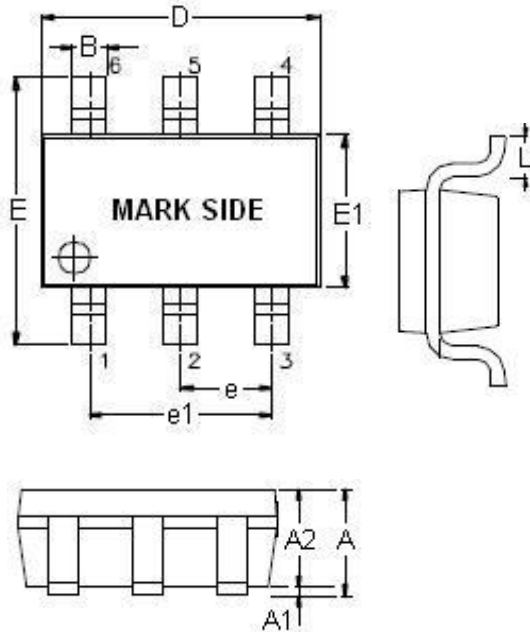
The output voltage(12V) can be inhibited by connect VSEN2 to VDD. If PD without QC 2.0 the device will keep output voltage level 5V guarantee safe operation for only 5V USB PD.

Shunt Regulator

The wide power supply output voltage through external resistor from RVDD to VIN. The internal with Zener-Diode clamp VIN pin at 7.5V. RVDD =2.2K Ω and CVDD=1 μ F.

Outline Information

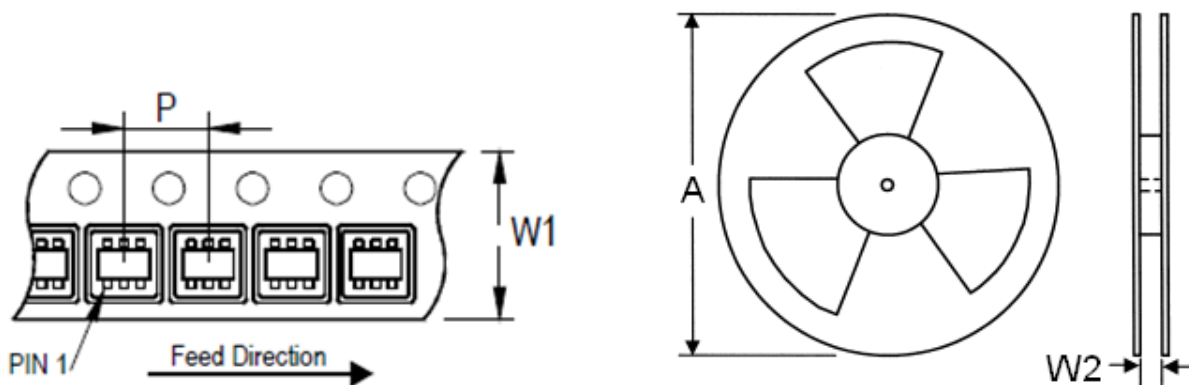
SOT-23-6 Package (Unit: mm)



SYMBOLS UNIT	DIMENSION IN MILLIMETER	
	MIN	MAX
A	0.90	1.45
A1	0.00	0.15
A2	0.90	1.30
B	0.30	0.50
D	2.80	3.00
E	2.60	3.00
E1	1.50	1.70
e	0.90	1.00
e1	1.80	2.00
L	0.30	0.60

Note : Followed From JEDEC MO-178-C.

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			
8	4	7	180	8.4	300~1000	3,000

Life Support Policy

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