

USB-PD 3.0 with PPS Controller

Description

The JD6608 is a simplified USB Power Delivery 3.0 protocol controller. It implements the USB Type-C and USB Power Delivery 3.0 Programmable Power Supply (PPS) protocol. In order to meet the PPS specification, JD6608 supports minimum 3.3V and maximum 21V output voltage control. As charging applications such as travel adapters, charger, and power banks. JD6608 can supports PDO selectable function, and control blocking MOSFET turn on or off, which results in a lower cost and easier design.

Features

- Supports USB Type-C and USB PD 3.0 with PPS
- 3.3V to 21V VBUS Range for Source Only
- CC1/CC2 Source Terminator 3A
- CC1/CC2 Pin Protection up to 24V
- Supports PDO Selectable Function and Gate Driver Control
- SOT-23-6 Package

Applications

- Wall-Adapter
- Car Charger
- Power Strip
- USB Power Output Ports

Pin Assignments

S6 Package: SOT-23-6

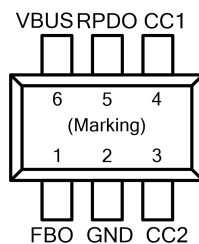


Figure 1. Pin Assignment of JD6608

Ordering Information

JD6608□
 └─ Package Type
 S6: SOT-23-6

SOT-23-6 Marking

Part Number	Product Code
JD6608S6	GH7

Typical Application Circuit

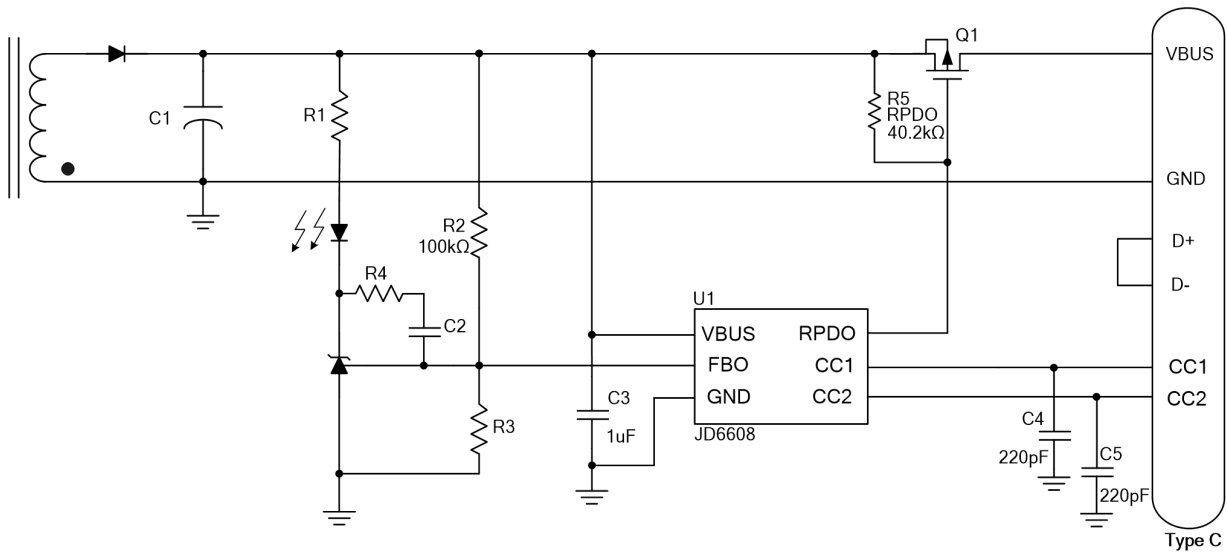


Figure 2. Typical Application Schematic

Table 1. R_{PDO} and Power Configuration Selection:

R _{PDO} (Ω)	Rated Power	5V	9V	12V	PPS
48.7K	18W	3A	2A	1.5A	
40.2K	20W	3A	2.22A	1.67A	
32.4K	25W	3A	2.77A		3.3V-5.9V/3A 3.3V-11V/2.25A
24.3K	27W	3A	3A		3.3V-5.9V/3A 3.3V-11V/2.45A

Note: R_{PDO} resistor tolerance is less than or equal to 1%.

Typical Application Circuit (Continued)

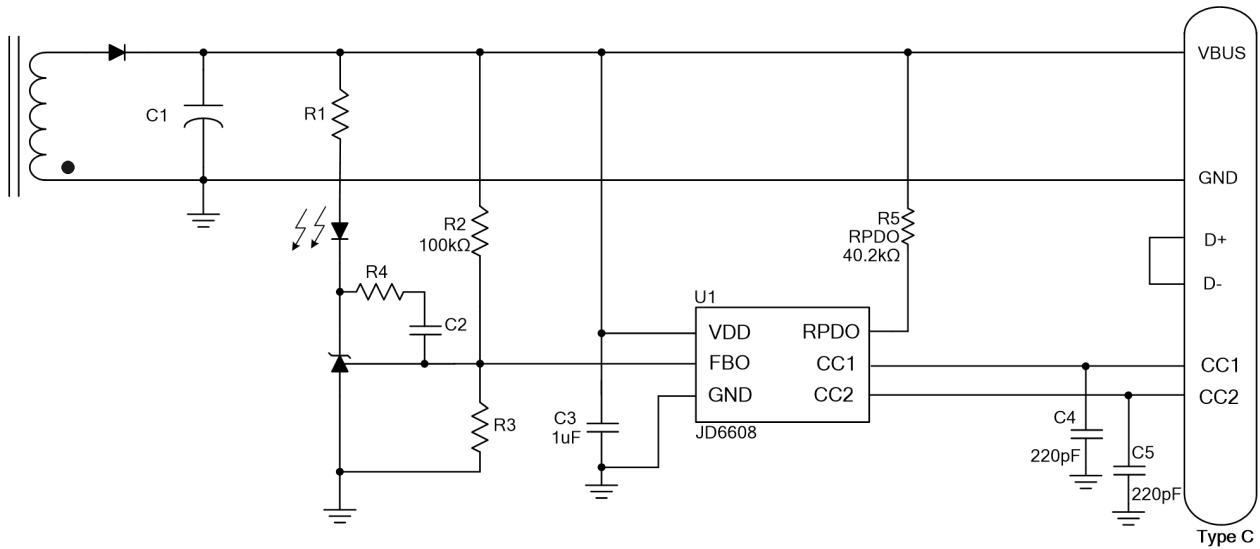


Figure 3. Simplify Application Schematic

Note: The RPDO value and power configuration can refer to the table 1 to selection.

Functional Pin Description

Pin Name	Pin No.	Pin Function
FBO	1	Voltage loop feedback.
GND	2	Power ground.
CC2	3	Type-C configuration channel signal 2.
CC1	4	Type-C configuration channel signal 1.
RPDO/Gate	5	Dual function pin. Select the PDO and gate driver control.
VBUS	6	Supply input voltage pin. Connect this pin to GND via the recommended ceramic capacitor.

Absolute Maximum Ratings (Note 1)

- Input Supply Voltage VDD ----- -0.3V to +30V
- CC1, CC2, RPDO ----- -0.3V to +30V
- FBO ----- -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
- Package Thermal Resistance, (θ_{JA})
 SOT-23-6 ----- 250°C/W
- Package Thermal Resistance, (θ_{JC})
 SOT-23-6 ----- 110°C/W

Note 1: Stresses beyond this listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

Recommended Operating Conditions

- Input Supply Voltage (VBUS) ----- +2.65V to +21V
- Operating Ambient Temperature Range ----- -40°C to +85°C
- Operating Junction Temperature Range ----- -40°C to +125°C

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						
VBUS Input Voltage Range	V _{BUS}		2.65		21	V
VBUS Over Voltage Protection	V _{BUS(OVP)}			24		V
Input UVLO Threshold	V _{BUS_UVLO}	V _{BUS} Rising		2.6	2.65	V
	V _{BUS_HYS}	V _{BUS} Falling		2.45		V
VDD Supply Current	I _{BUS_SUP}	V _{BUS} =5V, Nothing Attach		100		μA
VBUSC Bleed Discharge Resistance	R _{CBLEED}		8	10	12.5	kΩ
VBUS Discharge Resistance	R _{DIS}			400		Ω
USB Type-C						
SRC CC Current	I _{CC_3A}	Cable is attached whit Rd, PD Disabled	304	330	356	μA
CCOV Rising (Note 2)	V _{CCOV-rising}			1.04*V _{DD}		V
CCOV Falling (Note 2)	V _{CCOV-falling}			V _{DD}		V
UP/Down Current Step	I _{UP} , I _{DOWN}	I _{UP} =22μA (5V), 62μA (9V), 92μA (12V), 122μA (15V), 172μA (20V)		2		μA
		In the PPS		0.2		μA

Note 2: Guarantee by design.

Application Information

JD6608 is a simplified USB Power Delivery 3.0 that supports Programmable Power Supply (PPS). It is designed for USB Type-C power source applications such as charging adapters, car chargers, power strips and other USB output power devices.

VBUS

The VBUS is supply input voltage pin to connect the output of power stage. A 1 μ F ceramic capacitor must be connected between the VBUS to GND pin for internal regulator normal operation. It is recommended to use a ceramic capacitor. In addition, the JD6608 provide the VBUS discharge function to discharge the output capacitor.

USB Type-C / USB-PD Protocol

JD6608 is used for the USB Type-C interface to support the role of Source. When the sink device is connected, JD6608 will provide 3A current capability on the CC pin. It supports USB-PD 3.0 and compatible with USB-PD 2.0 protocol. The output provides fixed voltage 5V/9V/12V, which can connect a external resistor to select the PDO voltage/current. (Please refer to page 2 for select the RPDO and power configuration).

VBUS Over-Voltage Protection

JD6608 supports over-voltage protection of VBUS pin. When VBUS voltage is larger than the OVP threshold (24V typ.), GATE pin goes to low level to turn off blocking P-MOSFET. When the fault is removed, the GATE driver recovers to normal operation. If Blocking MOS is not used in application schematic, this function is invalid.

Gate Driver

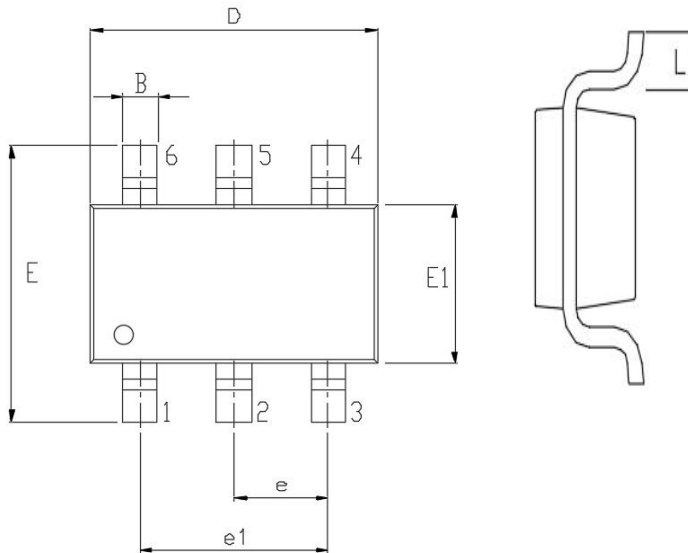
JD6608 provides a gate driver for controlling external P-MOSFET. The gate driver not only can control P-MOSFET smooth turn on to avoid VBUS drops in the capacitive load condition but also provide quickly turn-off in any fault condition. The dynamic parameter Ciss of P-MOSFET is recommended to use less than 8nF to ensure normal function.

Configuration Channel Protection

JD6608 supports over-voltage protection of CC1/CC2 pin. When CC1/CC2 pin is touched by the external power in abnormal situation, the CC1/CC2 pin of both sink device and source device may be damaged. In order to protect the CC1/CC2 pin of the devices from damage in abnormal situation, the JD6608 will return the output voltage to default output voltage 5V.

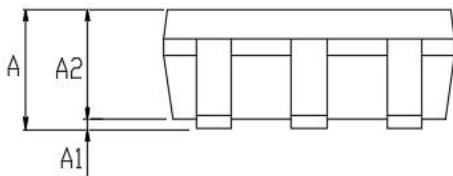
Outline Information

SOT-23-6 Package (Unit: mm)

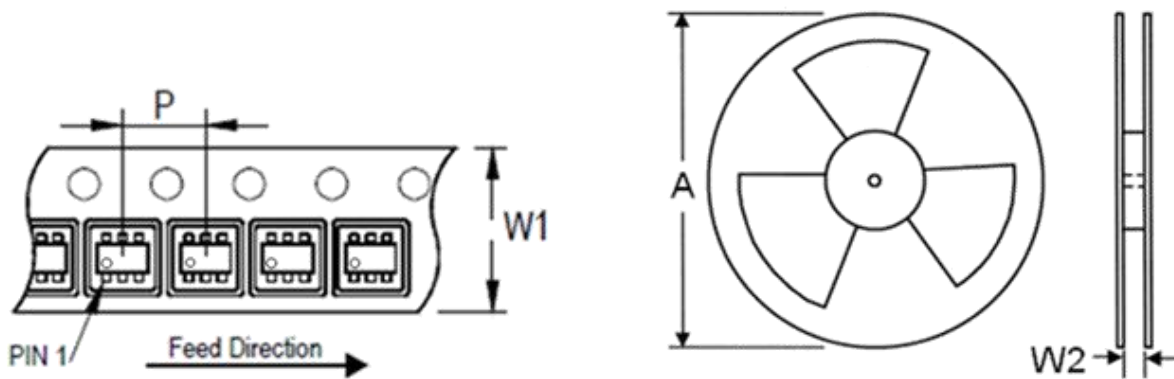


SYMBOLS UNIT	DIMENSION IN MILLIMETER	
	MIN	MAX
A	0.90	1.45
A1	0.00	0.15
A2	0.90	1.30
B	0.30	0.50
D	2.80	3.00
E	2.60	3.00
E1	1.50	1.70
e	0.90	1.00
e1	1.80	2.00
L	0.30	0.60

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

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