Dual USB Host/Hub Output with Constant Current Limit

The project has 2 Outputs which enables power up 2 USB devices simultaneously from input supply 12-30V DC. The idea of this project to have safe power for USB powered devices. The circuit is designed to simplify USB port power designed based on self-powering 2 port USB HOST/HUB. IC provides two outputs each 1.1Amp constant current 5V DC, when any of USB port is overload/short circuit, the fault flag goes from high to low and outputs are in constant current mode. Project can be used as dual port USB charger in Cars or Truck.

Project has two parts, DC-DC converter and constant current limit switches. LM2576 IC is used as DC-DC converter provides 5V 3Amps from input supply 12V to 30V DC and FPF2303 chip used as dual-channel load switch, consist of dual, independent, current-limited, slew rate controlled, P-channel MOSFET power switches. Slew rated turn-on prevents inrush current from glitching supply.

Circuit provided with two jumpers J1 and J2 to enable the outputs. Switch control is accomplished by pulling down the pin ONA/ONB using jumpers. a current limit condition immediately pulls the fault signal pins FLAG-A or FLAG-B low and the part remains in the constant-current mode until the switch current falls below the current limit. The circuit offers current limiting, UVLO and thermal shutdown protection for each USB port, in event of an over current condition, the load switch limits the load to current limit value. the minimum current limit is set to 1.1A. The Chip does not turn off the response to an over current condition, but remains operating in constant current mode as long as ONA or ONB are enables and thermal shutdown or UVLO is not activated.

The project can be controlled using Arduino by interfacing ONA/ONB pins for ON/OFF the output and Flag pins FLAG-A/FLAG-B to check the fault conditions.

Note: The circuit provides constant current outputs, same board supports other chips details as per bellow

- FPF2300MX Restart Mode
- FPF2300MX Latch Off Mode
- FPF23003MX Constant Current Mode

FPF2300, has an auto-restart feature that turns the outputs again after 504ms if the ON pin is still active
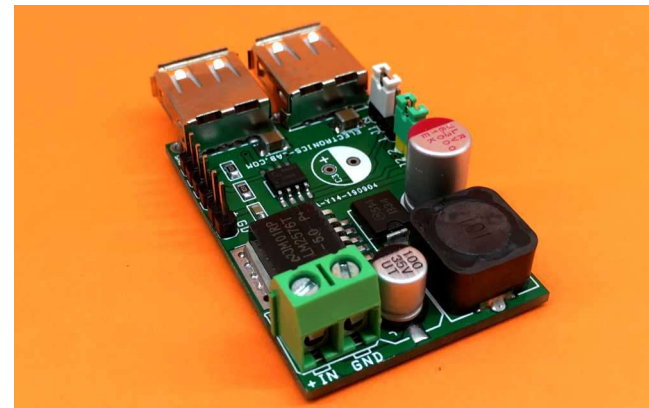**FPF2302,** if the constant current condition persists after 10ms, these parts shutdown the output and pull the fault signal Pin Flag low.
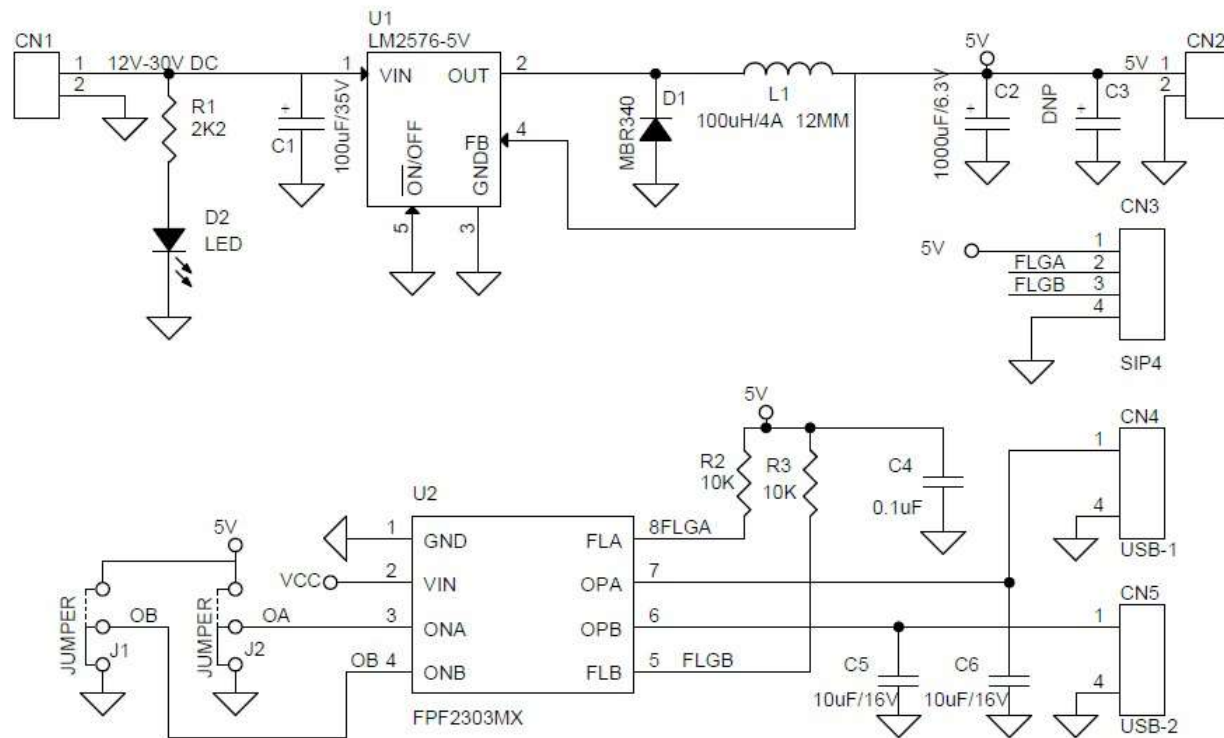**FPF2303** a current limit condition immediately pulls the fault signal pin Flag low and part remains in the constant current mode until the switch current falls below the current limit.
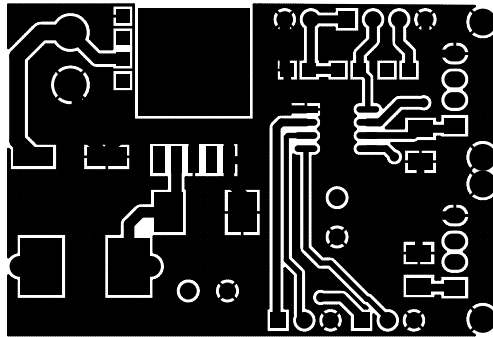
I have tested this board with FPF2303 chip. CN1>>Power Input, CN2>>5V Aux Output, CN3>>Flag-A, Flag-B, CN4>> USB-1 Output, CN5>>USB-2 Output
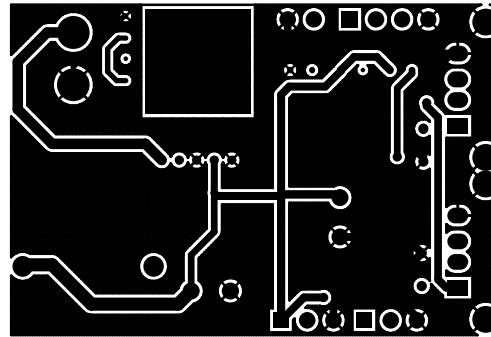
Features
- Operating Voltage 12V-30V DC
- Power LED at Input Supply
- 2 USB Outputs Each 1.1A Max Load / 5V DC
- 5V DC Aux Power Out
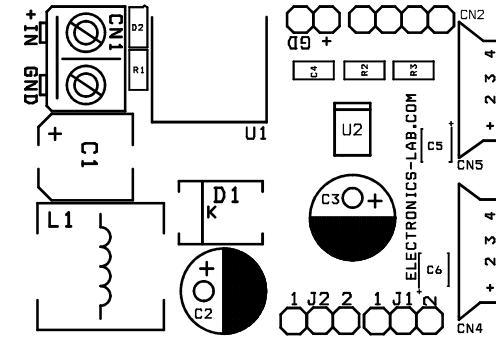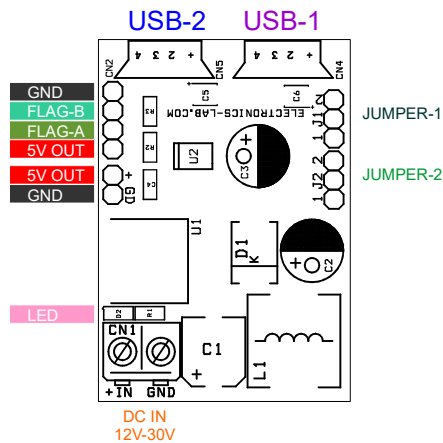- Flag-A and Flag-2 Outputs

07005

TOP LAYER

BOTTOM LAYER

SILK SCREEN TOP

PCB DIMENSIONS 47.78MM X 32.39MM

USB-2   USB-1

GND
FLAG-B
FLAG-A
5V OUT
5V OUT
GND

JUMPER-1

JUMPER-2

LED

DC IN
12V-30V

SR.	QNTY.	REF.	DESC.
1	1	CN1	2 Pin Screw Terminal
2	1	CN3	4 Pin Male Header Connector 2.54mm
3	2	CN4,CN5	USB female A Type Connector
4	1	C1	100uF/35V
5	1	C2	1000uF/6.3V
6	1	C3	DNP (Do not populate)
7	1	C4	0.1uF SMD 0805
8	2	C5,C6	10uF/16V SMD 1210
9	1	D1	MBR340 SMD ON SEMI
10	1	D2	LED-RED SMD 0805
11	2	J1,J2	3 PIN JUMPER
12	1	L1	100uH/4A 12MM SMD
13	1	R1	2K2 SMD 0805
14	2	R2,R3	10K SMD 0805
15	1	U1	LM2576-5V
16	1	U2	FPF2303MX SO8
17	1	CN2	2 PIN MALE HEADER CONNECTOR 2.54MM