

High Current Half-Bridge with Over Current & Voltage Feedback for Step Down DC-DC Converter

This project enables the user to create a high current DC-DC converter. The project consists of a high current inductor, high current low voltage 2 x MOSFETs, half-bridge driver LT1158 chip, voltage feedback using onboard R9 and R10 resistor dividers, shunt resistor for overcurrent shut-down. The project has all the required components to create a high current step-down DC-DC converter, refer to the datasheet of LT1158 chip for components selection. The Half-bridge requires a PWM input signal, Arduino or another microcontroller/DSP can be used as a host to generate PWM signal and control enable and fault conditions.

Arduino Example Code helps users to test the board, the project provides output approx. 5V/4Amps from input Supply 22-24V DC.

Application: DC-DC Converter, High Current Solar Charger, SLA Battery Charger.

Key Features

- High Current Low Voltage 2x MOSFET IRF540 (User may Use Other Low Ohm MOSFET)
- Half-Bridge Driver LT1158 Chip
- L1 High Current Inductor Default 100uH/7.8Amp
- R2 and R3 Resistor for Current Sense, For Over Current Limit/Short Circuit – Refer Data Sheet for R2, R3 Value.
- Fault: Open collector NPN output which turns on when V12 – V11(Current Sense Pins) exceeds the fault conduction threshold.
- D3 LED for Output
- D2 LED for Input Supply
- Voltage Feedback Output CN5, Resistor Divider R9, R10, C11
- Inputs and Fault Output Cn2
- Operating Supply 12V to 30V DC (**Input Supply Should Not Exceed 30V**)

Over Current Shutdown-Open collector NPN output which turns on when V12 – V11(Current Sense Pins) exceeds the fault conduction threshold.

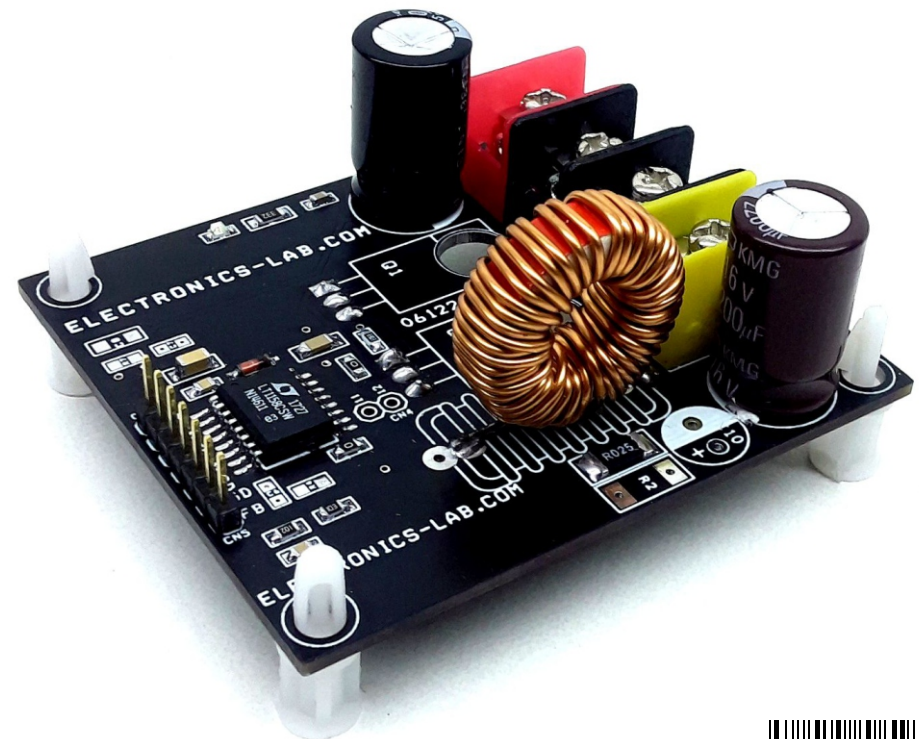
- For Internal Over Current Shutdown Use R7 and C8, Refer Data Sheet for Values
- For Host Controlled Shutdown Use Fault and Enables Pins

Voltage Feedback

- CN5, Feedback from Output using Resistor Divider R9 and R10, Use C11 for stability

Connections: Cn2

- Pin1 = VCC
- Pin2 = Enable – Pull Low to disable the Output
- Pin3 = Fault Output – Goes Low when Over Current Condition Occurs
- Pin4 = PWM Input 0 to 100Khz
- Pin5 = GND
- Use R7 and C8 for Internal Over Current Shutdown, Refer Data sheet of Lt1158



Connections Cn1

- Pin1 = VCC 12V to 30V Input
- Pin2 + GND

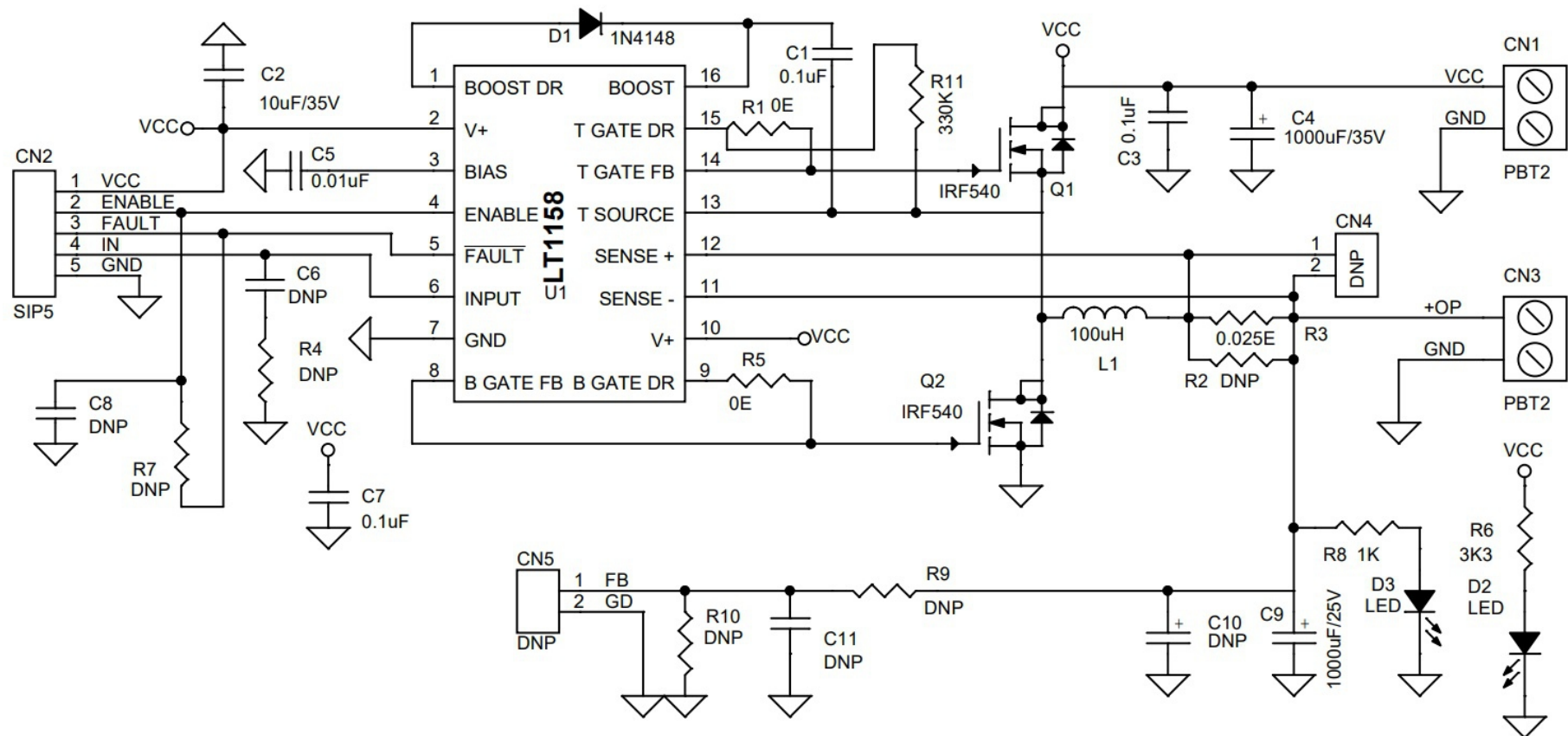
Connections Cn3

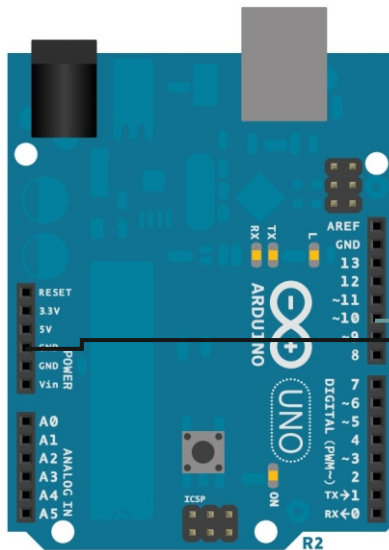
- Pin1 = + Output
- Pin2 = GND

CN4: Not Installed

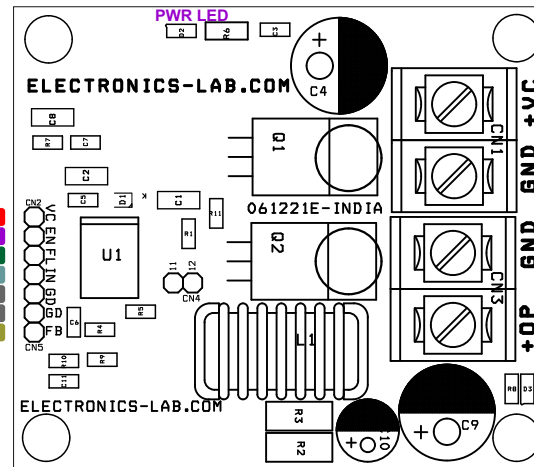
Connections Cn5

- Pin 1 = +Voltage Feedback Output
- Pin 2 = GND





VCC
ENABLE
FAULT
PWM INPUT
GND
GND
V-FEEDBACK

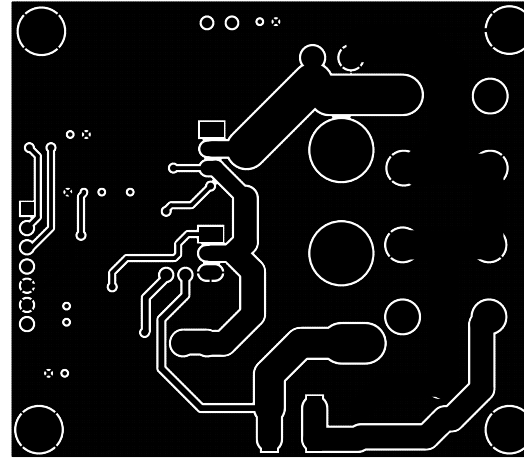
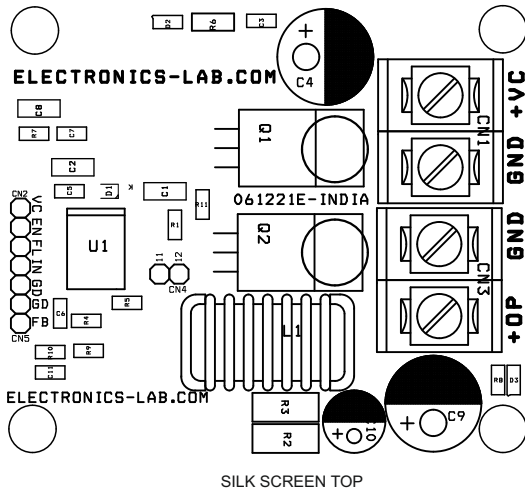


VCC
GND
GND
V-OUTPUT
OP-LED

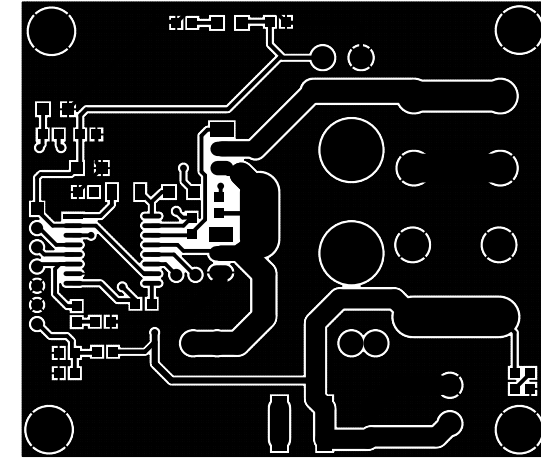


BOM						
NO	QNTY.	REF.	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	2	CN1,CN3	2 PIN BARRIER BLOCK PITCH 9.53MM	TE CONNECTIVITY	DIGIKEY	A98481-ND
2	1	CN2	5 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5318-ND
3	10	R4,CN4,CN5,C6,R7,C8,R9,R10,C10,C11	DNP			READ NOTE
4	2	C3,C7	0.1uF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
5	1	C2	10uF/35V		DIGIKEY	
6	1	C4	1000uF/35V	RUBYCON	DIGIKEY	1189-1745-ND
7	1	C5	0.01uF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
8	1	C9	1000uF/25V	EPCOS	DIGIKEY	495-6061-ND
9	1	D1	1N4148	MICROCHIP	DIGIKEY	1N4148UR-1-ND
10	2	D2,D3	LED SMD SIZE 0805	OSRAM	DIGIKEY	475-1278-1-ND
11	1	L1	100uH/7.8AMP	BOURNS INC	DIGIKEY	2300LL-101-V-RC-ND
12	2	Q1,Q2	IRF540	VISHAY	DIGIKEY	IRF540IR-ND
13	2	R1,R5	0E SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
14	1	R2	DNP			
15	1	R3	0.025E 1% SMD SIZE 0805	YAGEO	DIGIKEY	YAG2169CT-ND
16	1	R6	3K3 5% SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	
17	1	R8	1K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
18	1	R11	330K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
19	1	U1	LT1158	ANALOG DEVICE	DIGIKEY	LT1158CSW#TRPBFTR-ND
20	1	C1	0.1uF/50V SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	





BOTTOM LAYER



TOP LAYER

PCB DIMENSIONS 69.22 X 55.88MM