

Dual MOSFET Driver - Two Channel DC SSR Using MOSFETS & Gate Driver



The project presented here is a dual-channel MOSFET DC relay. The project is capable of driving a 5A load on each channel with an input supply of 48V DC. The LTC7067 chip drives the two high-side N-Channel MOSFETs with supply voltages up to 48V DC. Its powerful 0.8 Ω pull-down and 1.5 Ω pull-up MOSFET drivers allow the use of large gate capacitance and high voltage MOSFETs. Additional features include UVLO, TTL/CMOS compatible inputs, and fault indicator. The optional diodes D2 and D3 can be used for inductive loads. Open-Drain Fault Output is available. The open-drain output pulls to GND during VCC UVLO/OVLO and floating supplies UVLO condition.

Note 1: The project requires dual supply, VCC and VDD, VDD is load supply in the range 12V to 48V, and gate supply 12V to 14V. The board can work with a single supply if the load supply is between 12V to 14V in this case close jumper J1.

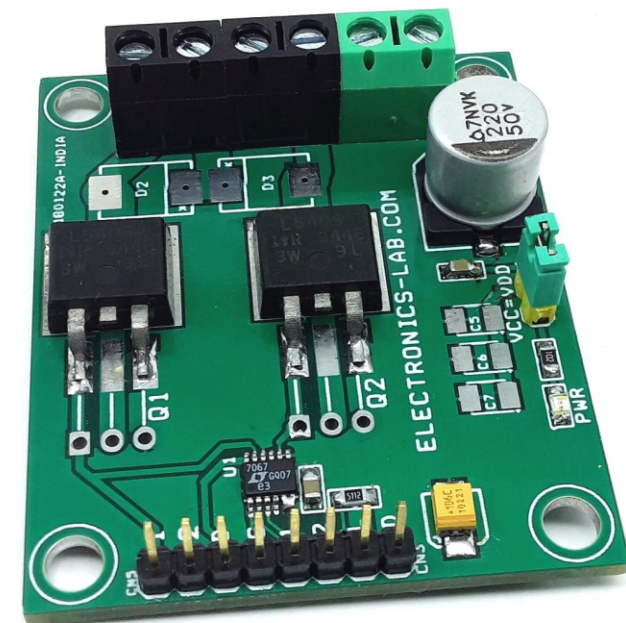
Note 2: The project can work with a higher load supply up to 140V. In this case, use appropriate MOSFET Q1 and Q2 and choose higher voltage capacitor C2, C3.

Note 3: C5, C6, C7 are optional DC Bus capacitors, and can be used as per user's requirements.

Note 4: The project is capable of driving resistive loads. Optional diodes D2, D3 are provided for inductive loads such as motors, solenoids. Recommended diode MBRS360 3A-60V.

Features

- VDD (Load Supply) 12V to 48V DC
- VCC for Gate Driver 12-14V DC
- Load 5A Each Channel with Forced Air Colling (Fan)
- On Board Jumper for 12V-14V Single Supply Operations for Load and Gate Driver
- Fault Condition Output Normally High, Goes Low When UVLO/OVLO and Floating Supplies UVLO Condition Occurs
- Optional Clamp Diode D2, D3 for inductive Loads
- TTL/CMOS Compatible Control Inputs
- Input PWM Duty Cycle 0 to 100%
- Input Frequency 20Khz-Tested (Supports Higher Frequency)
- Under Voltage Lockout
- PCB Dimensions 53.98 x 45.09mm
- 4 x 3mm Mounting Holes
- Onboard Power LED

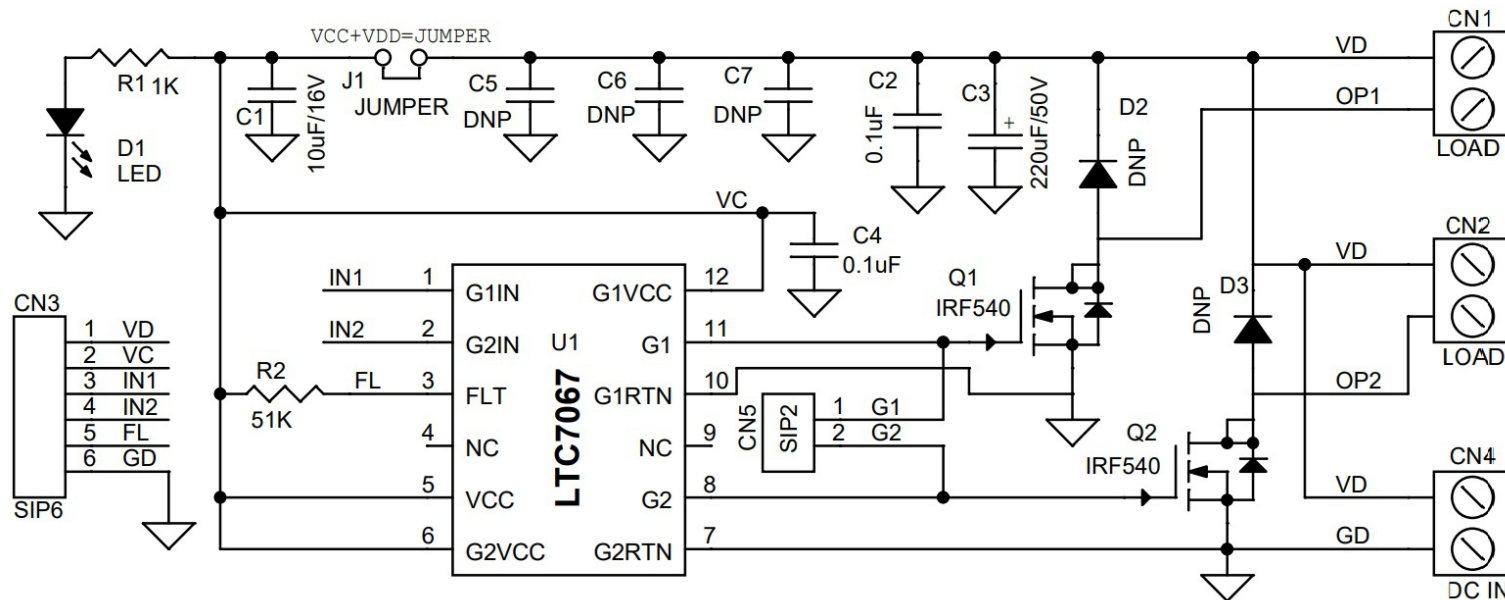


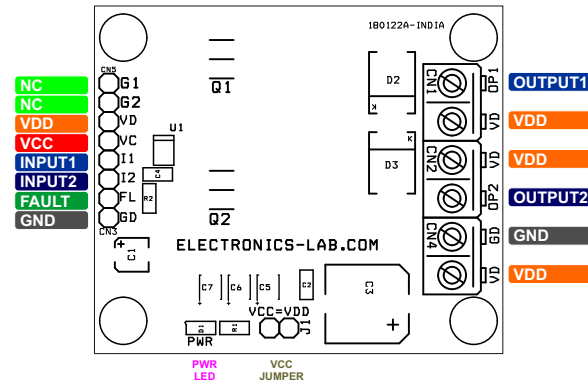
Connections CN3 Connector

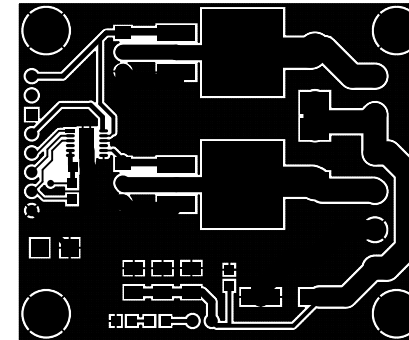
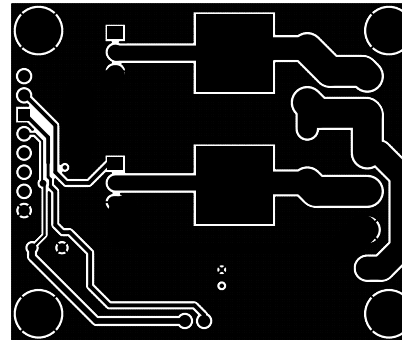
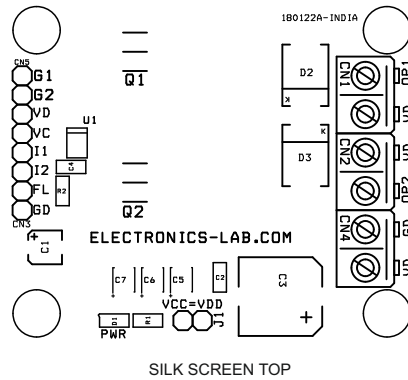
- Pin1 VDD Load Supply 12V to 48V
- Pin2 VCC Gate Driver Supply 12V to 14V
- Pin3 Input 1
- Pin4 Input 2
- Pin5 Fault Output Normally High
- Pin6 GND

Other Components Details

- Connector CN1 and CN2 Load 1 and Load2
- Connector CN3 Load Supply 12V to 48V
- LED D1 Power LED
- Jumper J1 for Single Supply Operation (Read Note 1)
- CN5 Not In use







PCB DIMENSIONS 53.98MM X 45.09MM

BOM						
NO	QNTY	REF	DESC	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	2	CN1,CN2	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
2	1	CN3	6 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5319-ND
3	1	CN4	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
4	1	CN5	2 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5315-ND
5	1	C1	10uF/16V SMD 1210 OR 1206	YAGEO/MURATA	DIGIKEY	
6	2	C2,C4	0.1uF/50V SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
7	1	C3	220uF/50V SMD ELKTROLYTIC	WURTH	DIGIKEY	732-8463-1-ND
8	5	D2,D3,C5,C6,C7	DNP			READ NOTE
9	1	D1	LED RED SMD SIZE 0805	LITE ON INC	DIGIKEY	160-1427-1-ND
10	1	J1	JUMPER - 2 PIN MALE HEADER PITCH 2.54MM		DIGIKEY	732-5315-ND
11	2	Q1,Q2	IRF540 TO263	INFINION	DIGIKEY	IRF540NSTRPBFCT-ND
12	1	R1	1K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
13	1	R2	51K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
14	1	U1	LTC7067	ANALOG DEVICE	DIGIKEY	505-LTC7067RMSE#PBF-ND
15	1	J1-S	JUMPER SHUNT	SULLINS CONNECTOR	DIGIKEY	S9001-ND