

Low Voltage Lead Acid Battery Disconnect board - Prevents Deep Discharge Of 12V Lead Acid Battery

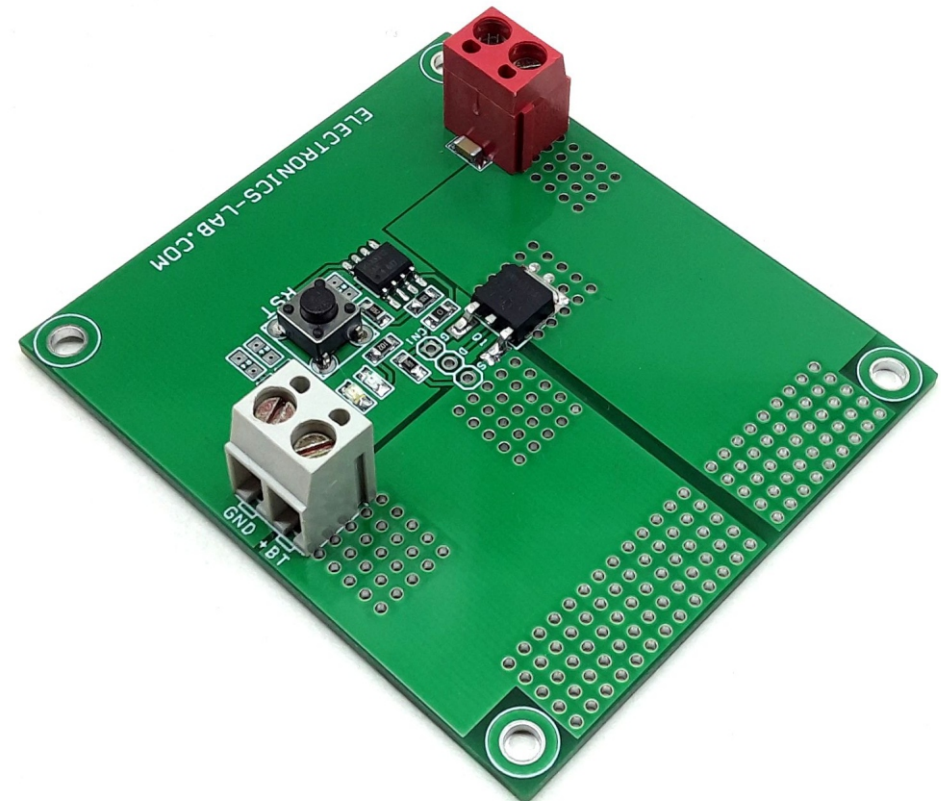
This project helps to optimize the 12V lead-acid (SLA) battery life as it prevents the battery from going into deep discharge. It is very important to disconnect the load before the battery enters into deep discharge as this may destroy or damage the battery cells. The circuit shown here turns off the load before the battery enters deep discharge and avoids a further (deep) discharge that can shorten the SLA battery life. Once the battery is recharged or replaced you need to push a reset switch to power ON the load. The predetermined load level is set to 12V, this voltage level is proportional to the battery voltage which is determined by resistor divider R2, and R9. Once the voltage falls below the setpoint (12V) it disconnects the load, the load-battery connection remains open until the system receives a manual reset command using tactile switch Sw1.

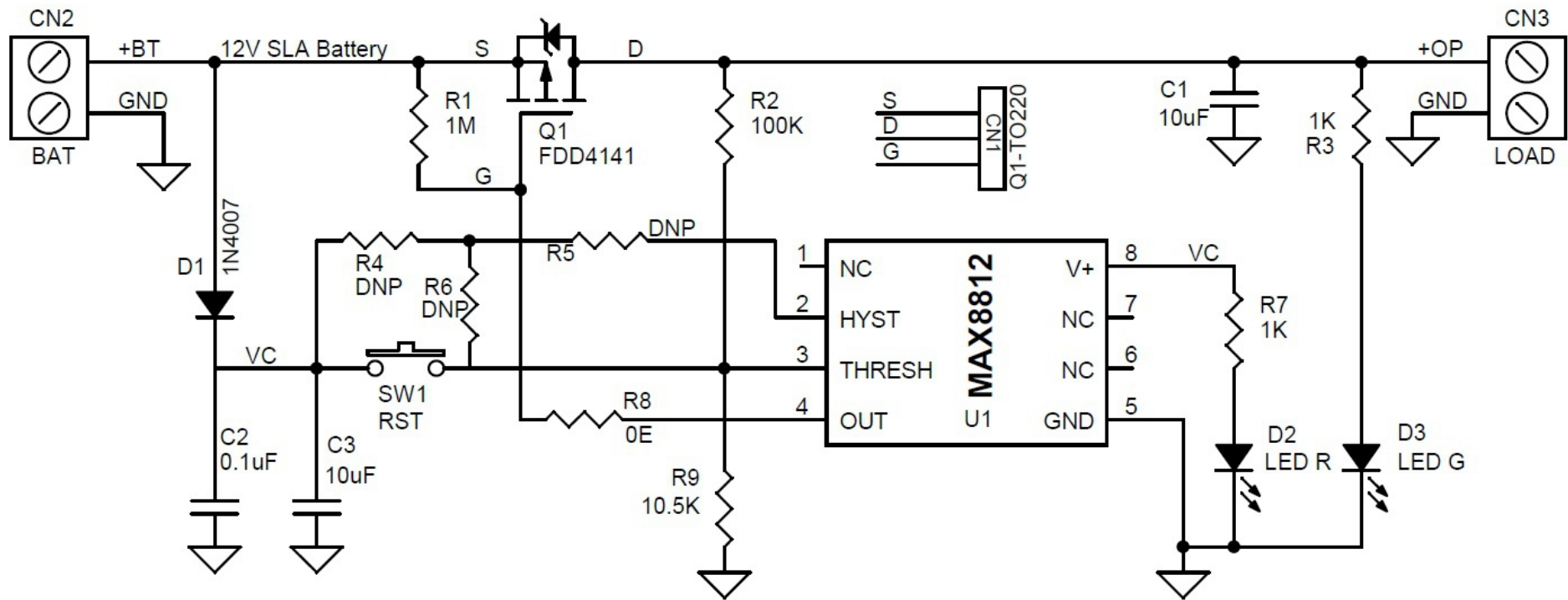
The circuit drains 5uA + PWR LED D2 5mA, so the circuit can remain in that state for an extended period without causing a deep discharge of the battery. Users may not use LED D2 if not required. The circuit is capable to drive continuous load up to 5A and can provide more power with forced air cool to the MOSFET Q1. Connector CN1 is optional if the user wants to use TO220 MOSFET. The project is ideal for 1Ah to 10Ah 12V lead-acid batteries. Low ohm MOSFET is used to provide continuous maximum current output.

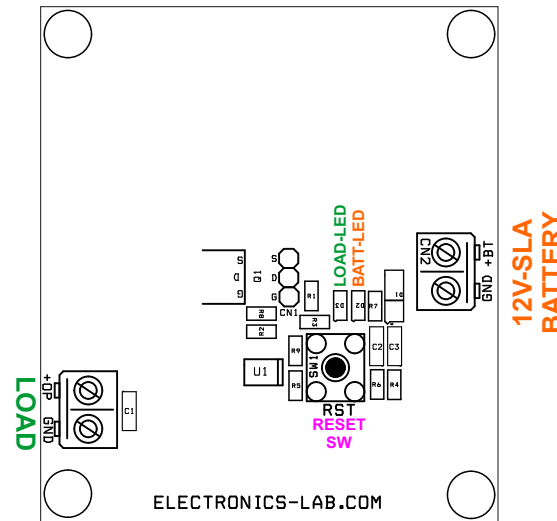
Note: Default Trip voltage (disconnect voltage) level is set to 12V, this can be changed as per user requirement. Use this formula to calculate the V-Trip voltage $V_{\text{Trip}} = 1.15V(R_9 + R_2) / R_9$

Features

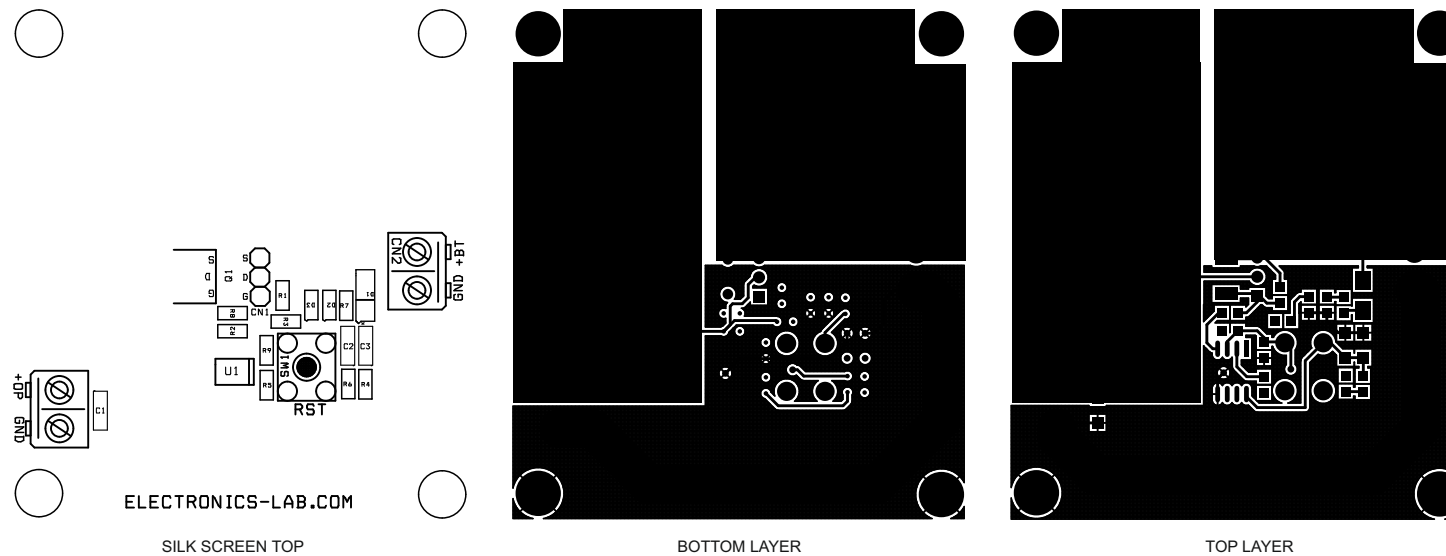
- Input Supply (12V Lead Acid Battery)
- Continues Load up to 5Amps
- Deep Discharge Disconnect Voltage Level 12V
- Large size PCB thermal area provided for MOSFET for heat dissipation
- On Board Tactile Switch for Reset the output
- LED D2 Indicates Battery Power
- LED D3 Indicated Load ON/OFF
- Screw Terminal CN2 Battery
- Screw Terminal CN1 Load
- PCB Dimensions 68.10MM X 60.33MM







BOM						
NO.	QNTY.	REF.	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	Q1-TO220 DNP			
2	1	CN2	2 PIN SCREW TERMINAL 5.08MM PITCH	PHOENIX	DIGIKEY	277-1247-ND
3	1	CN3	2 PIN SCREW TERMINAL 5.08MM PITCH	PHOENIX	DIGIKEY	277-1247-ND
4	2	C1,C3	10uF/16V SMD SIZE 1206	MURATA/YAGEO		
5	1	C2	0.1uF/50V SMD SIZE 0805	MURATA/YAGEO		
6	1	D1	1N4007 SMD	DIODE	DIGIKEY	S1MBD1TR-ND
7	1	D2	LED RED SIZE 0805	OSRAM	DIGIKEY	475-1415-1-ND
8	1	D3	LED GREEN SMD SIZE 0805	OSRAM	DIGIKEY	475-1410-2-ND
9	1	Q1	FDD4141 MOSFET	ON SEMI	MOUSER	512-FDD4141
10	1	R1	1M 5% SMD SIZE 0805	MURATA/YAGEO		
11	1	R2	100K 1% SMD SIZE 0805	MURATA/YAGEO		
12	2	R3,R7	1K 5% SMD SIZE 0805	MURATA/YAGEO		
13	3	R4,R5,R6	DNP			
14	1	R8	0E SMD SIZE 0805	MURATA/YAGEO		
15	1	R9	10.5K 1% SMD SIZE 0805	MURATA/YAGEO		
16	1	SW1	4 PIN TACTILE SWITCH	C&K	DIGIKEY	CKN9085TR-ND
17	1	U1	MAX8212	MAXIM	DIGIKEY	MAX8212ESA+-ND



PCB DIMENSIONS 68.10MM X 60.33MM

