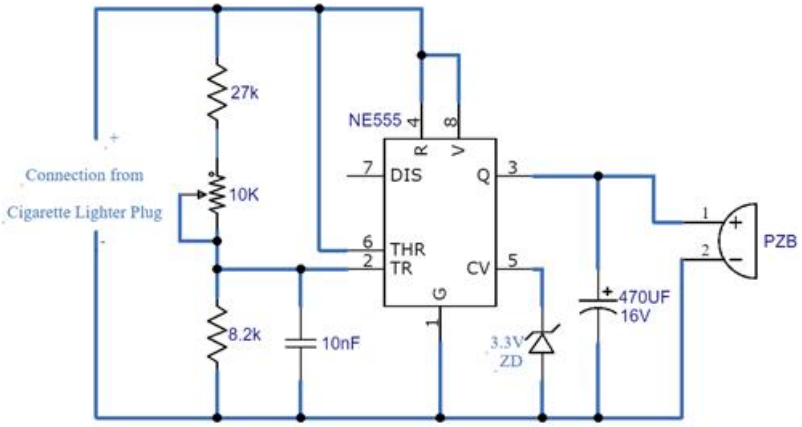
Car Battery Failure Detector

using NE555 Timer IC



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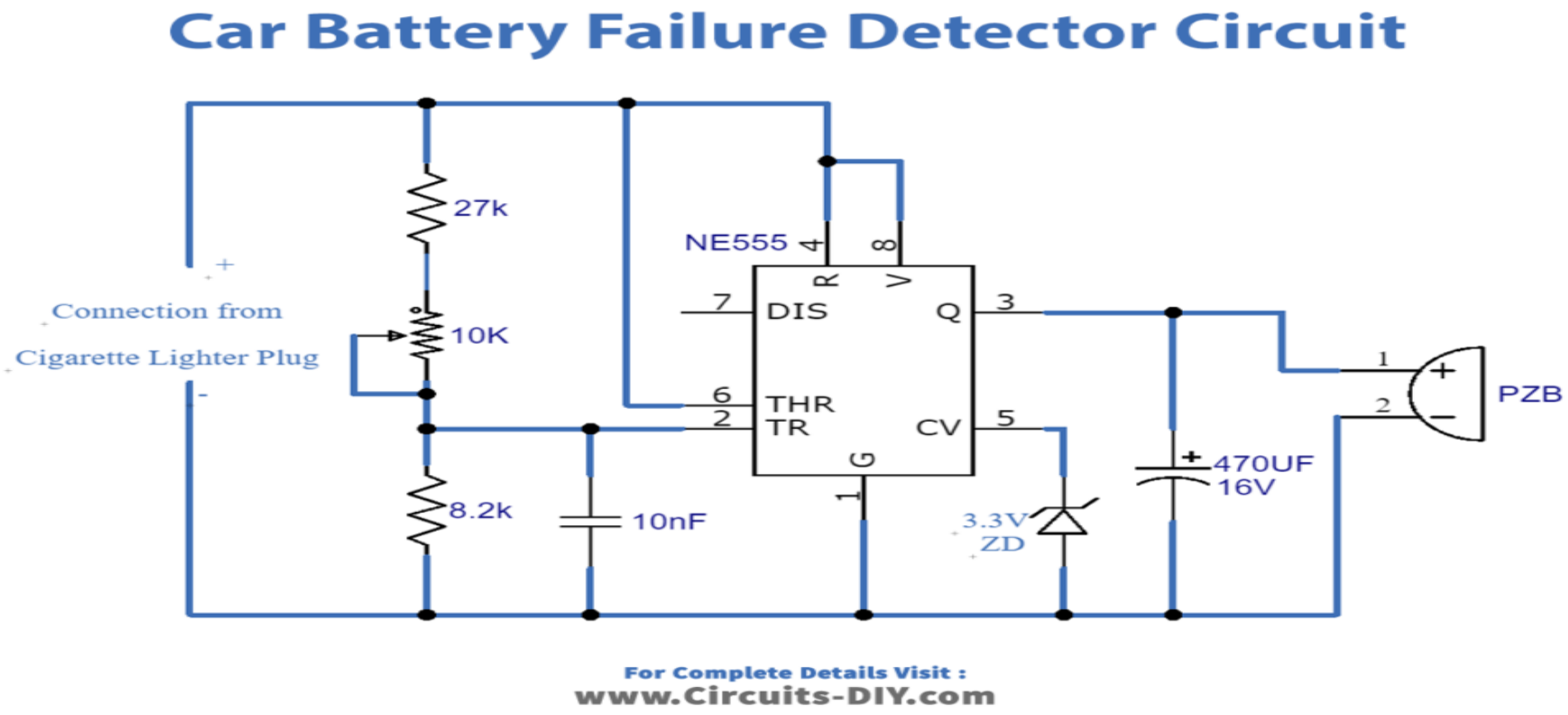
WORKING PRINCIPLE

In this tutorial, we are making an early car battery failure circuit/PCB. It will give an early indication of the failure of your car battery by activating a buzzer for a few seconds. In this way, you will know beforehand that your battery is now near to failure.

The battery that your car owns is a lead-acid battery which helps to start the engine. This battery lasts for 4-6 years. When it is new it drops only 2 volts during cranking but as the time passes and the battery gets old it starts dropping 5-6 volts due to which the car engine doesn't start. This circuit will solve this problem by measuring the voltage drop of the battery. It produces an alarm through a buzzer when the battery's voltage drops to 8V while cranking.

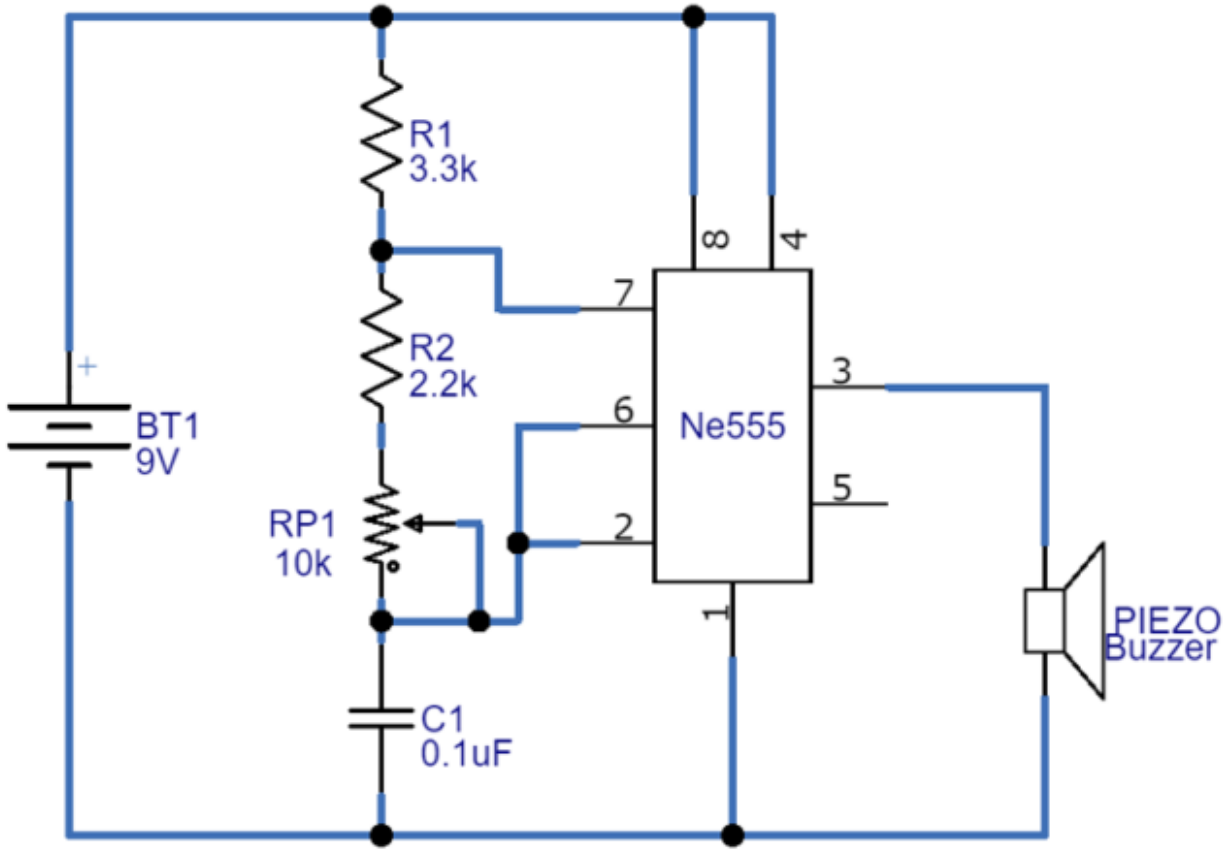


Hardware Components

The following components are required to make Battery Failure Detector Circuit

S.no	Component	Value	Quantity
1.	Cigarette Lighter Plug	–	1
2.	IC	NE555 Timer	1
3.	Zener Diode	3.3V	1
4.	Resistor	27K, 8.2K	1, 1
5.	Variable Resistor/Potentiometer	10K	1
6.	Capacitor	10nF, 470uF/16V	1, 1
7.	Piezo buzzer	–	1

Mosquito Repellent Circuit



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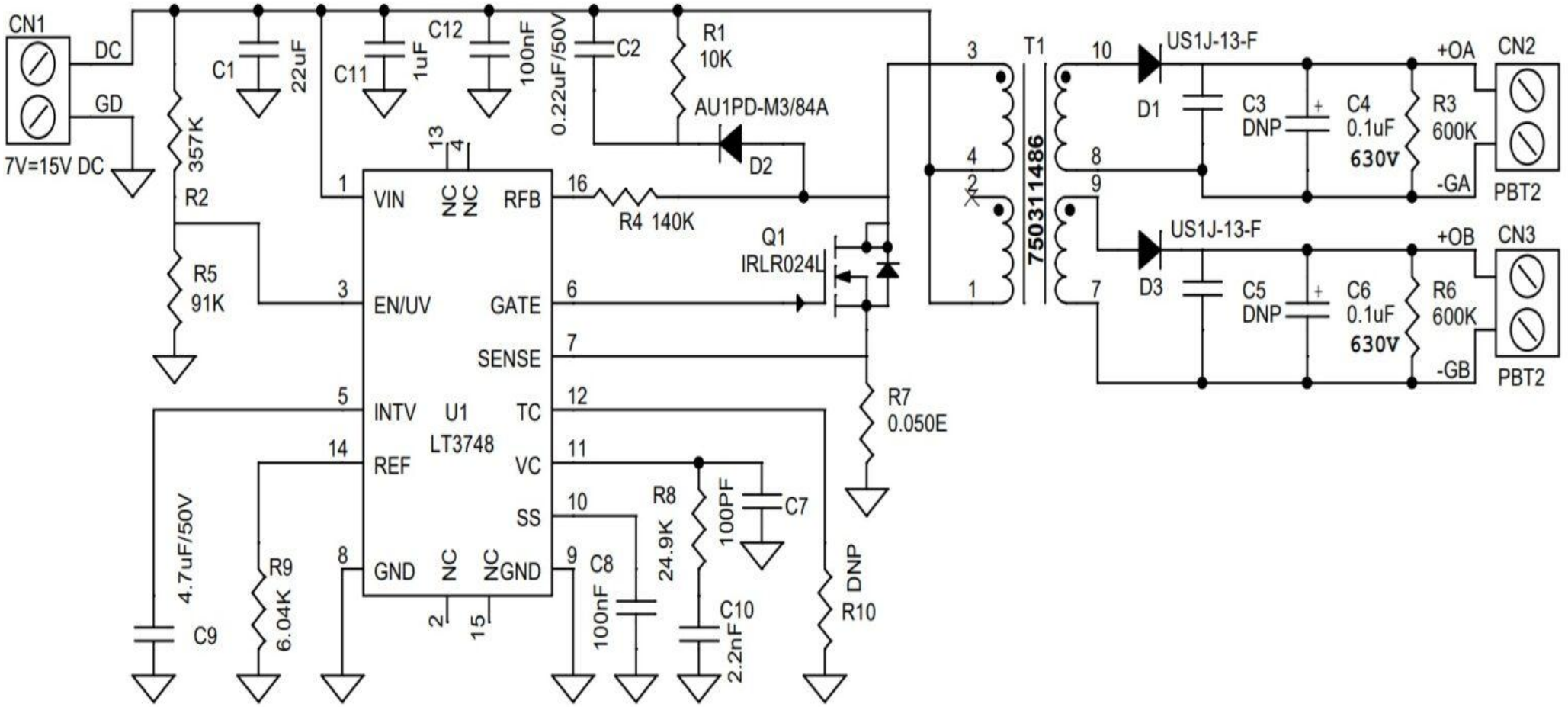
Working Explanation

As we can see, this circuit consists of a timer IC 555 and a piezo buzzer element. We have connected Buzzer at the output (PIN 3) of the 555 timer IC so that a sound of desired frequency can be generated. This circuit will produce a kHz range pulse that is reproduced as sound by the buzzer. We human cannot hear that sound, but this will irritate mosquito and keeps mosquito away. Here the IC 555 relates to components to produce astable pulses, these pulses are reproduced as sound by a buzzer, which can be varied by R3 resistance.

These frequencies do affect the hearing senses of insects and mosquitoes and make them uncomfortable in their compliance. This mosquito-repellent circuit generates an ultrasonic sound with a high output frequency that allows the spreading of mosquitoes within a wide radius. The oscillation frequency is given by the value of the resistor and a capacitor component. The electronic mosquito repellent circuit can be supplied from a 9V DC power supply.

S.no	Component	Value	Qty
1.	IC	NE555 Timer	1
2.	Buzzer	6V	1
3.	Resistor	3.3KΩ,2.2KΩ	1,1
4.	Variable Resistor	10KΩ	1
5.	Capacitor	0.1uF	1
6.	Connecting Wires	–	–
7.	Battery	9V	1

±340V DC Output, 15V DC Input, Isolated Flyback Converter



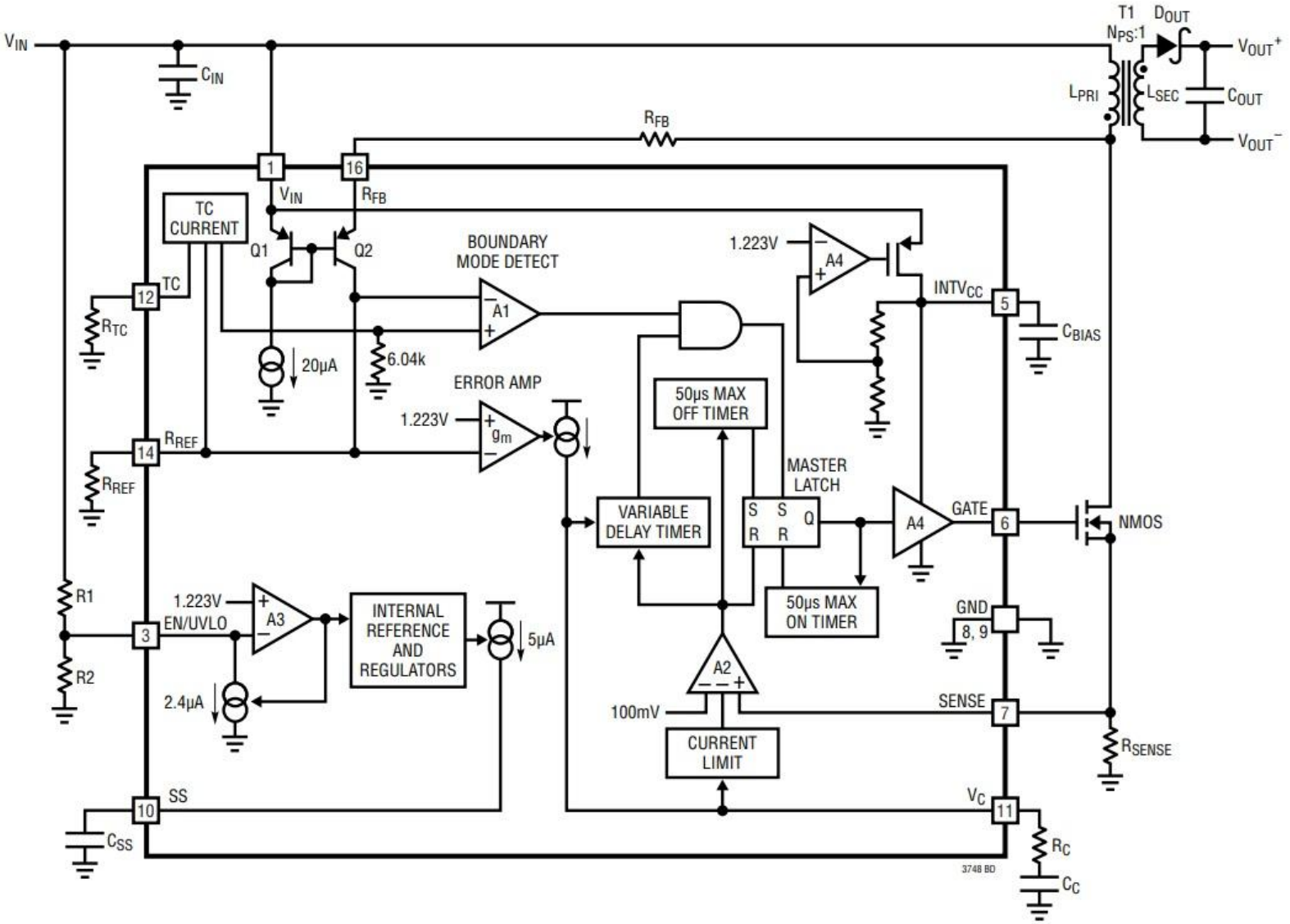
BOM	QNTY.	REF	DESC	MAUFACTURER	SUPPLIER	SUPPLIER PART NO
1	3	CN1,CN2,CN3	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
2	1	C1	22uF/25V CERAMIC SMD SIZE 1210	YAGEO/MURATA	DIGIKEY	
3	1	C2	0.22uF/50V	YAGEO/MURATA	DIGIKEY	
4	3	C3,C5,R10	DNP			

BOM		QNTY.	REF	DESC	MAUFACTURER	SUPPLIER	SUPPLIER PART NO
5	2	C4,C6	0.1uF/630V DC OR 250VX2 THT		KEMET	DIGIKEY	399-9651-ND
6	1	C7	100PF/50V CERAMIC SMD SIZE 0805		YAGEO/MURATA	DIGIKEY	
7	2	C8,C12	100nF/50V CERMAIC SMD SIZE 0805		YAGEO/MURATA	DIGIKEY	
8	1	C9	4.7uF/50V CERAMIC SMD SIZE 0805		YAGEO/MURATA	DIGIKEY	
9	1	C10	2.2nF/50V CERAMIC SMD SIZE 0805		YAGEO/MURATA	DIGIKEY	
10	1	C11	1uF/25V CERAMIC SMD SIZE 1206		YAGEO/MURATA	DIGIKEY	
11	2	D1,D3	US1J-13-F SDM 600V/1 FAST DIODE		DIODE INC	DIGIKEY	US1J-FDICT-ND
12	1	D2	AU1PD-M3/84A 200V/1A FAST DIODE		VISHAY	DIGIKEY	AU1PD-M3/84AGICT-ND
13	1	Q1	IRLR024NPBFCT-ND		INFINEON	DIGIKEY	IRLR024NPBFCT-ND
14	1	R1	10K 5% SMD SIZE 1206		YAGEO/MURATA	DIGIKEY	
15	1	R2	357K 1% SMD SIZE 0805		YAGEO/MURATA	DIGIKEY	
16	2	R3,R6	600K 5% SMD SIZE 1206		YAGEO/MURATA	DIGIKEY	
17	1	R4	140K 1% SMD SIZE 0805		YAGEO/MURATA	DIGIKEY	

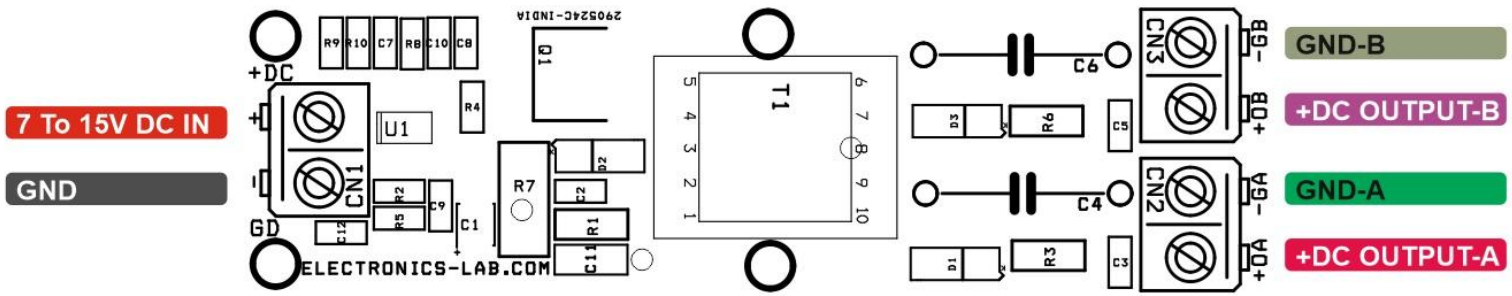
BOM	QNTY.	REF	DESC	MAUFACTURER	SUPPLIER	SUPPLIER PART NO
18	1	R5	91K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
19	1	R7	0.050E/2W 1% SMD SIZE 2512	YAGEO/MURATA	DIGIKEY	YAG6100CT-ND
20	1	R8	24.9K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
21	1	R9	6.04K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
22	1	T1	750311486 TRANSFORMER	WURTH	DIGIKEY	732-2622-1-ND
23	1	U1	LT3748	ANALOG DEVICE	DIGIKEY	505-LT3748HMS#TRPBFCT-ND

LT3748 Block Diagram

BLOCK DIAGRAM



Connections



Gerber View

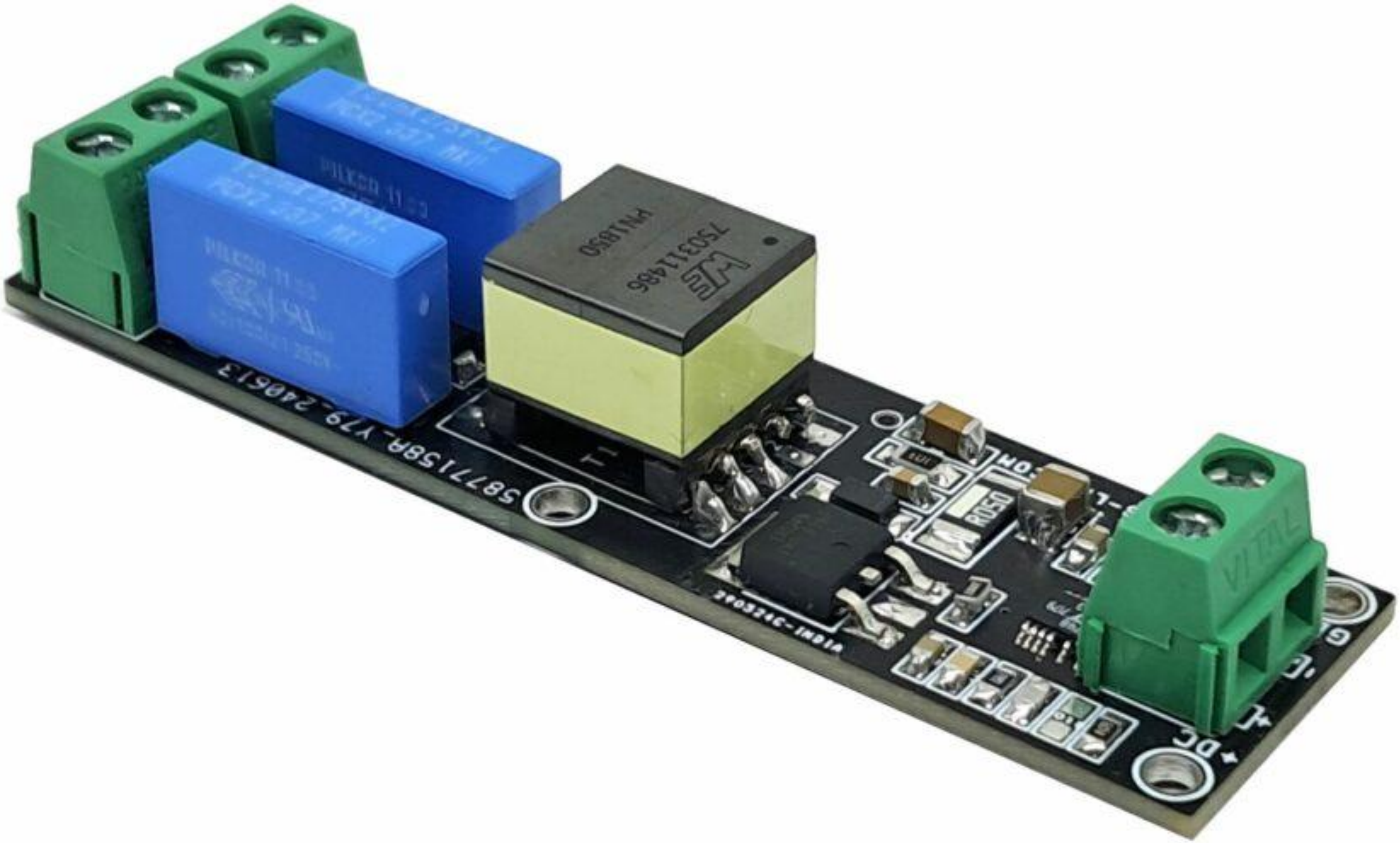
- **top**
  - copper
  - soldermask
  - silkscreen
- **bottom**
  - copper
  - soldermask
  - silkscreen
- **mechanical**
  - drill

    - outline
    - outline
- **other**
    - unknown
    - unknown
    - unknown
    - unknown
    - unknown

Show filenames

layerstopbottom

Photos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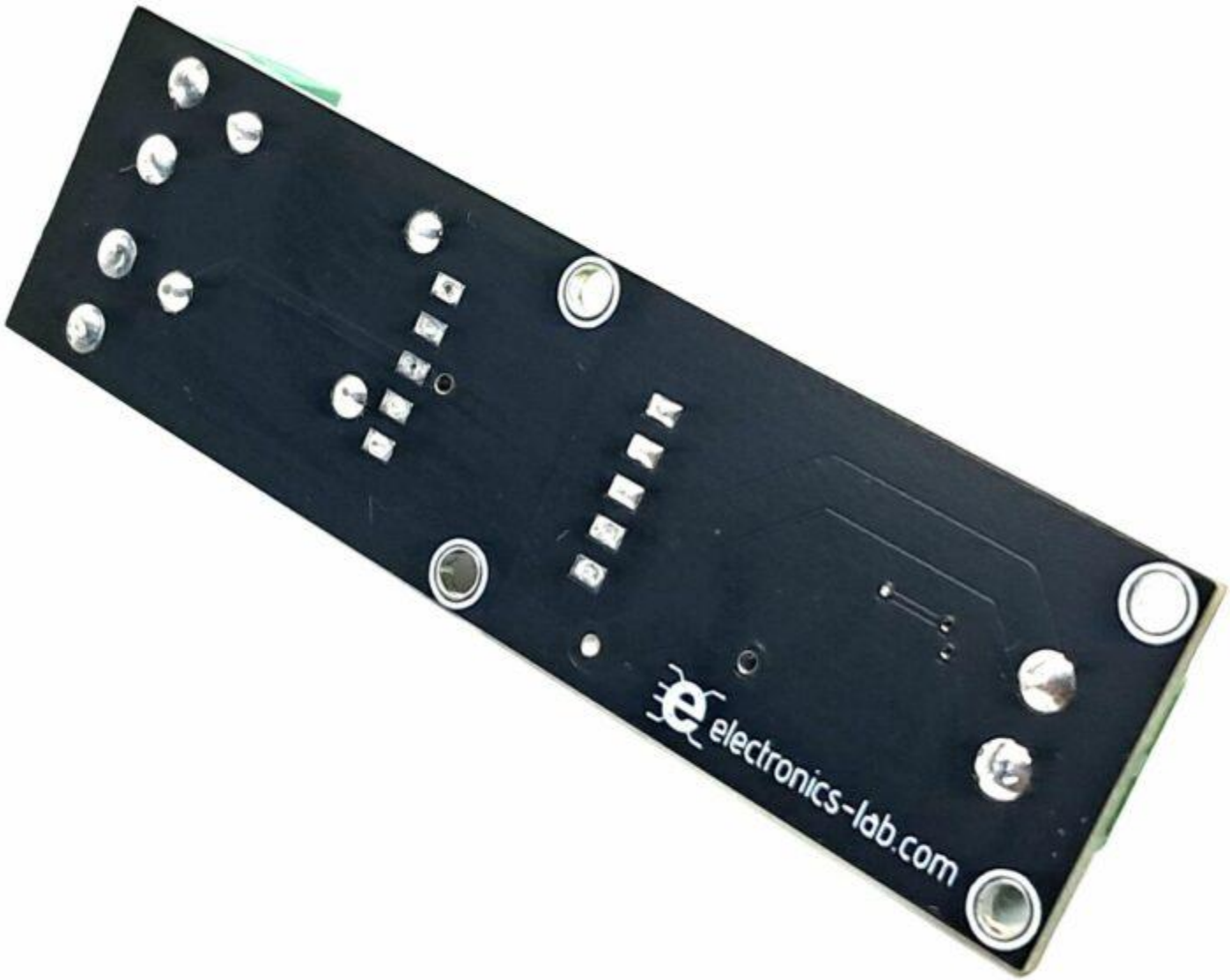
750311486
PN1850
R050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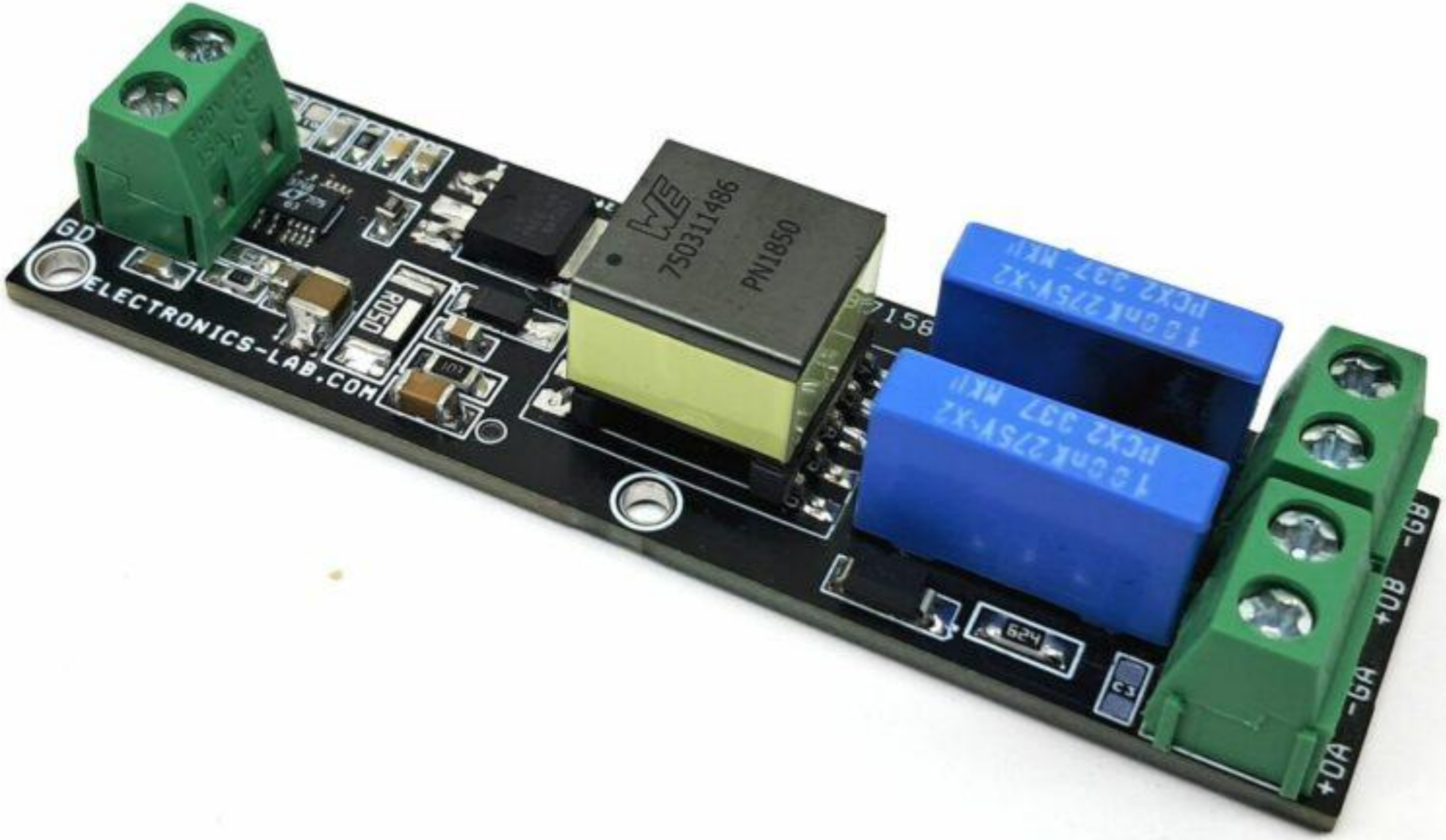
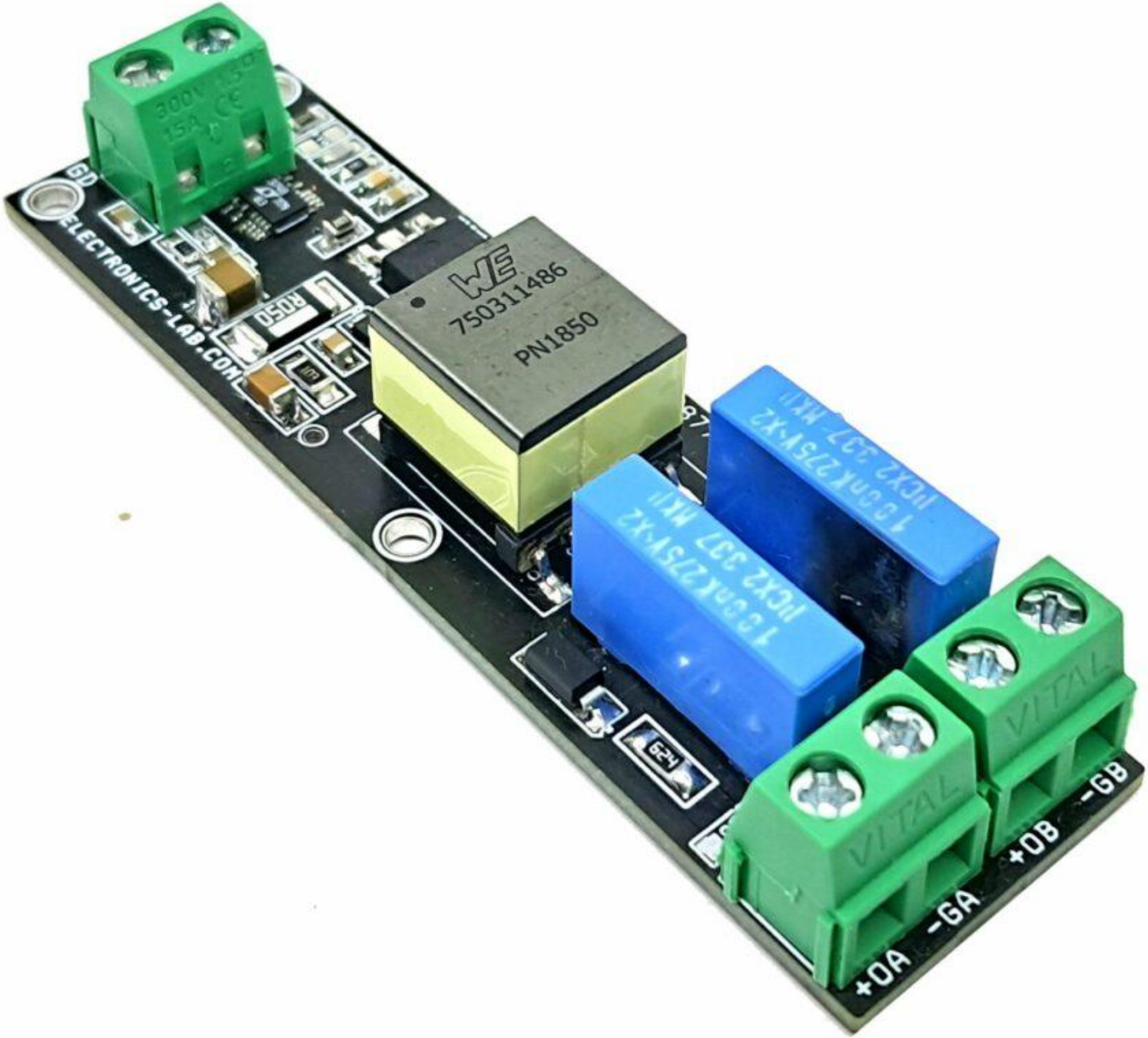

ELECTRONICS-LAB.COM
750311486
PN1850
R050
+OA
-GA
+OB
-GB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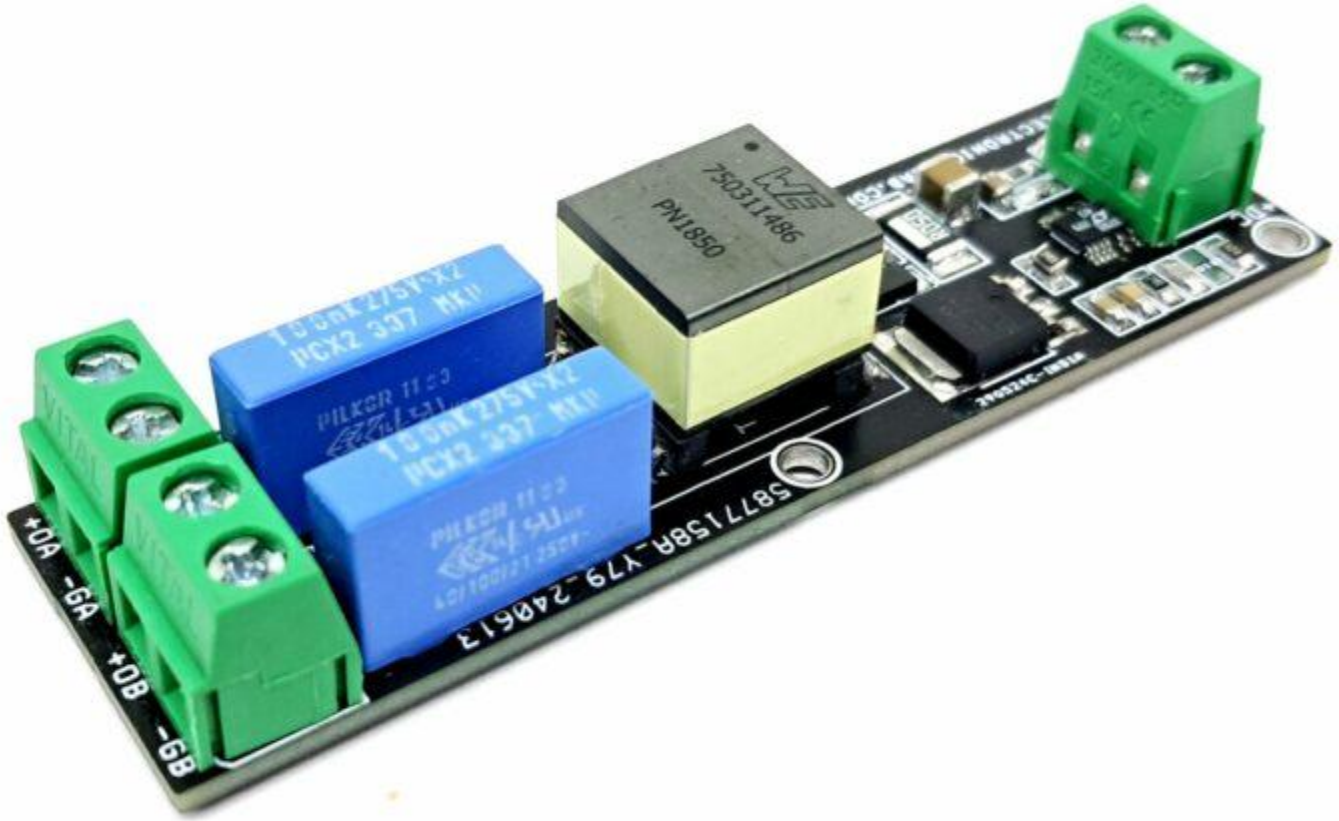
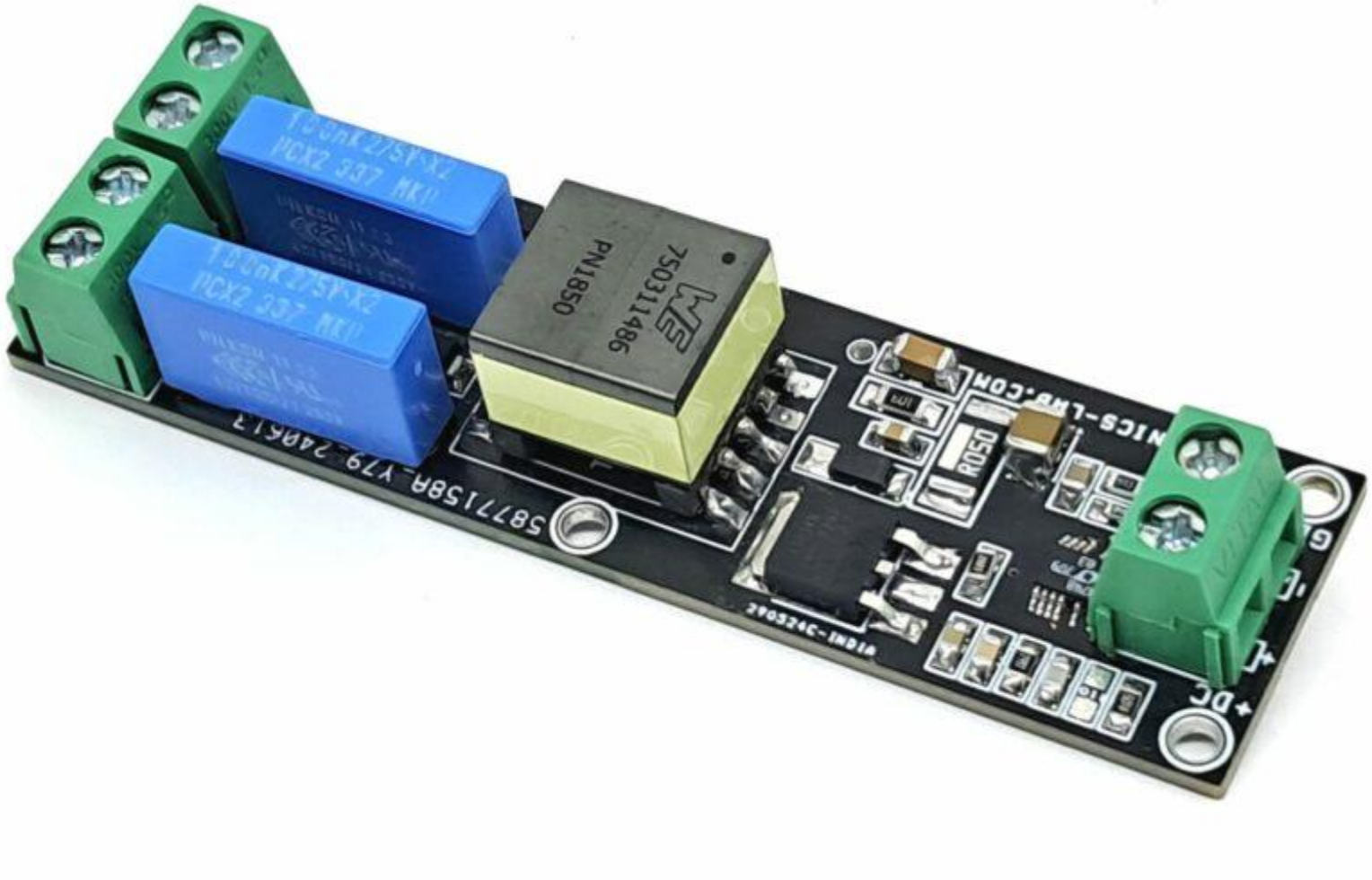
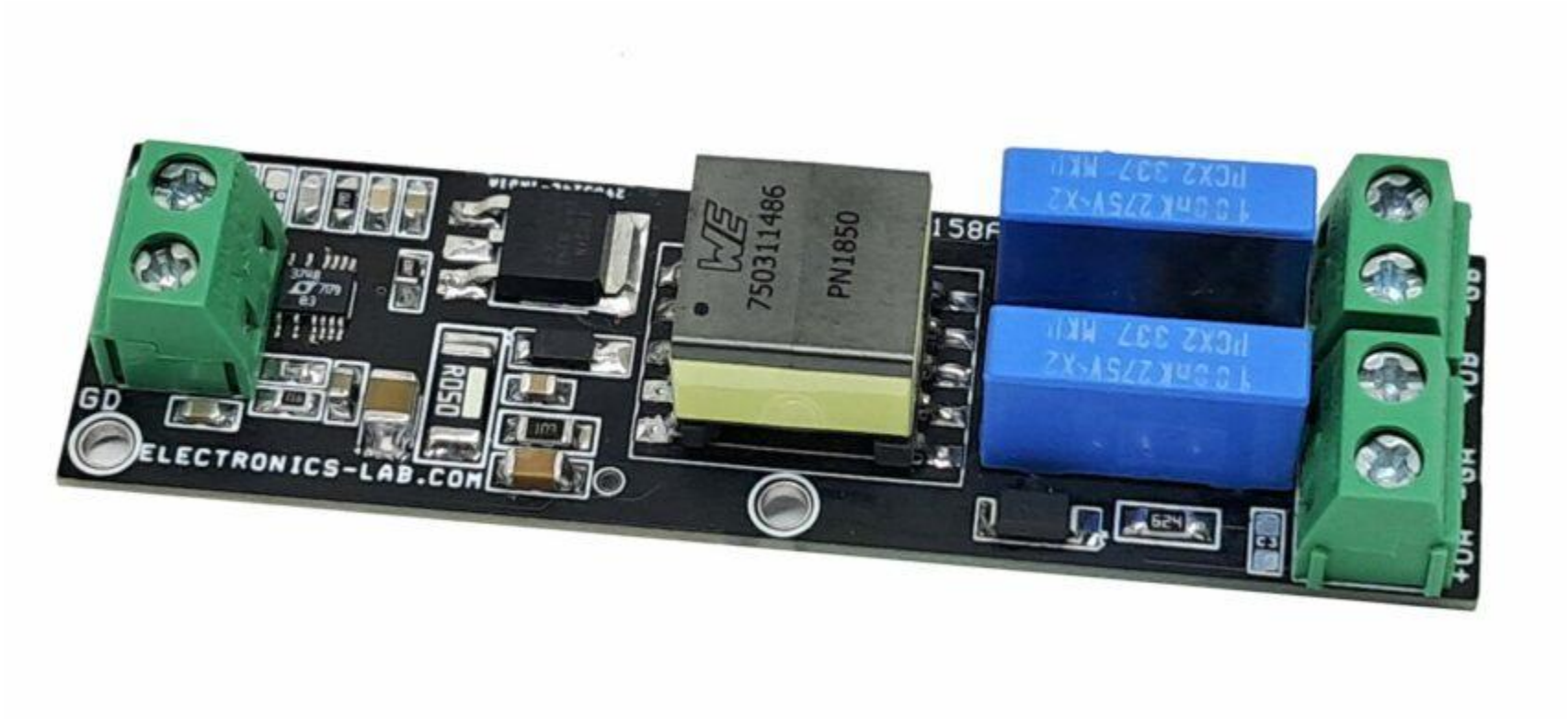

PCX2 337 MKII
PILKOR
PN1850
+0A -6A +0B -6B


PN1850
7503114B6
R050
DC+
DC-
G



Video

LT3748 Datasheet

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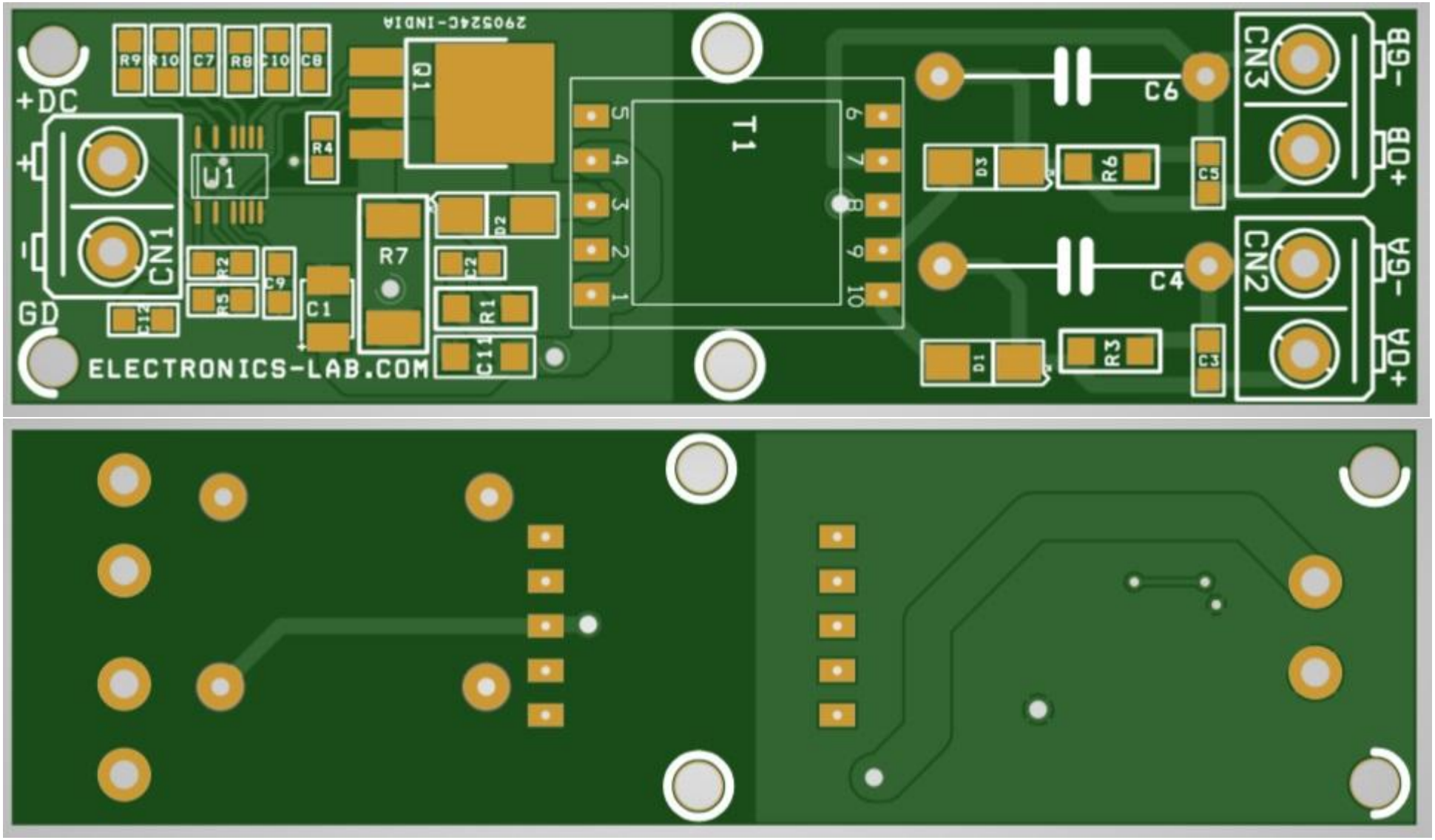
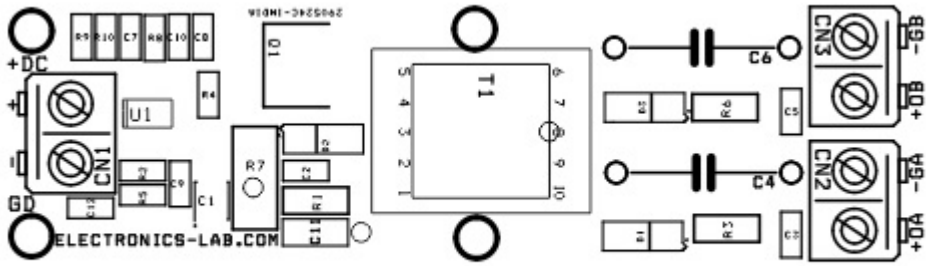
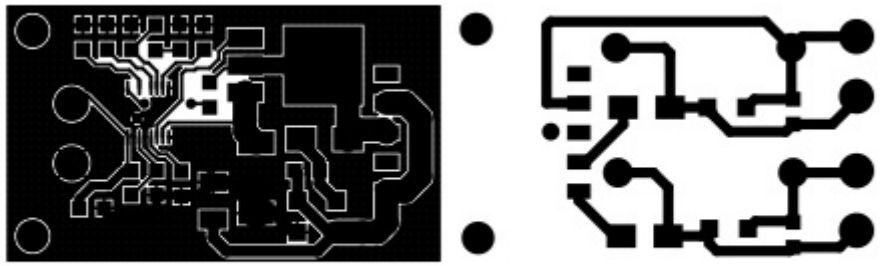
PCB

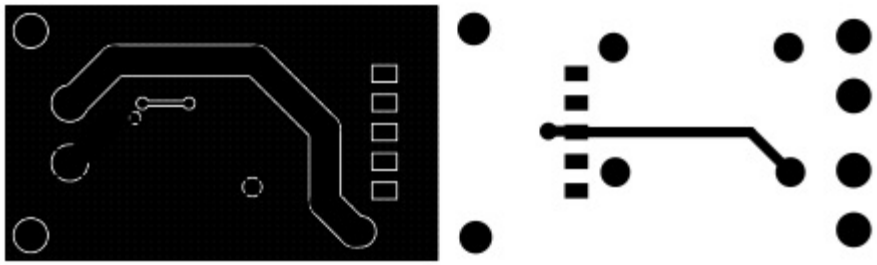

R9
R10
C7
R8
C10
C8
Q1
+DC
R4
U1
CN1
R7
D2
C2
R2
C9
C1
R1
C12
R5
C11
GD
ELECTRONICS-LAB.COM
T1
C6
D3
R6
C5
C4
CN3
-GB
+OB
CN2
-GA
+OA
D1
R3
C3



SILK SCREEN TOP



TOP LAYER



BOTTOM LAYER