

A Practical Activity Assignment Submitted
For Engineering Design Project – II (UTA-014)

By

Prachi Singhroha

101903545

Submitted to

Dr. Geetanjali



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**

**THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY, (A
DEEMED TO BE UNIVERSITY), PATIALA, PUNJAB**

INDIA

Jan-June 2021

Experiment:

Design a schematic diagram and its PCB layout for Diode full wave bridge rectifier using Autodesk Eagle software.

Description:

Bridge rectifier uses 4 rectifying diodes connected in a "bridged" configuration to produce the desired output but does not require a special center tapped transformer, thereby reducing its size and cost. The single secondary winding is connected to one side of the diode bridge network and the load to the other side as shown below.

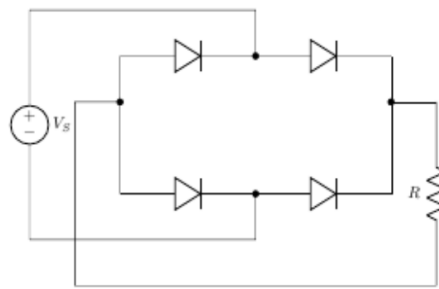


Fig3A.1

Positive Half Cycle

During the positive half cycle of the supply diodes D1 and D2 conduct in series while diodes D3 and D4 are reverse biased (ideally, they can be replaced with open circuits) and the current flows through the load as shown below.

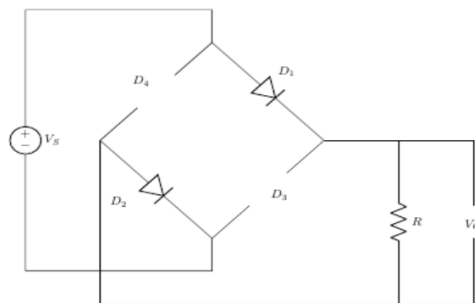


Fig3A.2

For Positive Half Cycle D1 and D2 is Forward Biased and D3 and D4 is Reverse Biased.

$$V_I - V_O = 0$$

$$\Rightarrow V_O = V_I$$

$$V_O = V_I - 2 \times V_b$$

$$V_O = V_I - 2 \times V_b - 2 \times I_{rd}$$

where,

V_I is the input voltage,

V_b barrier potential,

I_{rd} is diode resistance

Negative Half Cycle

During the negative half cycle of the supply, diodes D_3 and D_4 conduct in series, but diodes D_1 and D_2 switch off as they are now reverse biased. The current flowing through the load is the same direction as before.

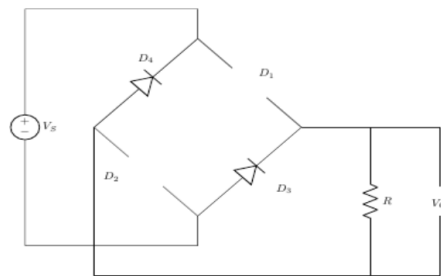


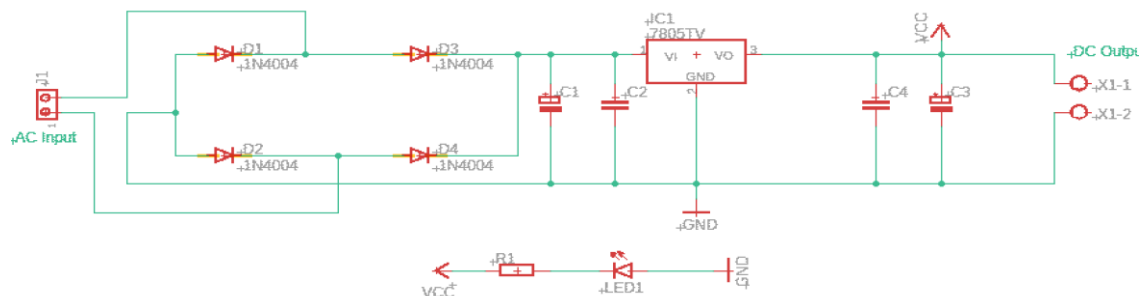
Fig3A.3

For Negative Half Cycle D_1 and D_2 is Reverse Biased and D_3 and D_4 is Forward Biased.

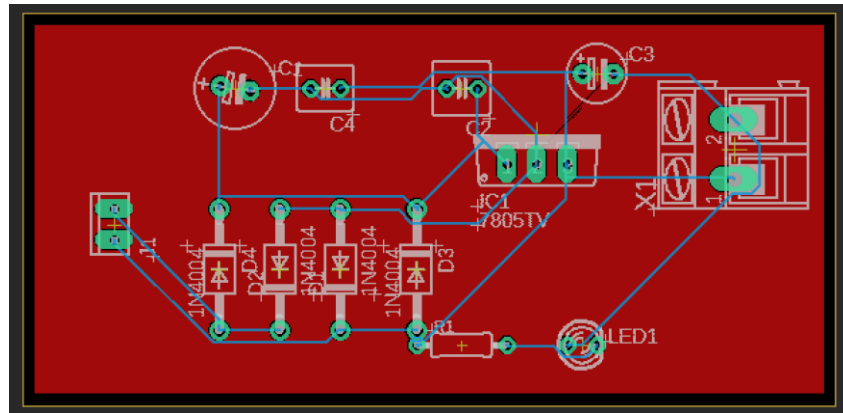
$$V_I - V_O = 0$$

$$\Rightarrow V_O = V_I$$

Schematic Diagram:



PCB layout diagram:



Applications:

- Mobile phones, laptops, charger circuits
- Home inverters convert AC to DC
- Audio Amplifier
- Uninterruptible Power Supply (UPS) circuits to convert AC to DC
- LED Driver Circuits