
EXPERIMENT 1: Rectifier Diode and Zener Diode Characteristics

Objectives: To understand the current voltage characteristics of a rectifier diode and a zener diode.

Materials and Equipment:

Resistor: $1K\Omega$ [1]

Rectifier Diode: [1]

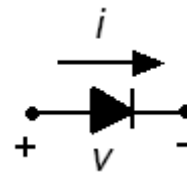
zener diode: 5.6V [1]

Theory:

Ideally a semiconductor diode is defined by

$$i > 0, v = 0$$

$$v < 0, i = 0$$



Practically, it must overcome some barrier (V_γ) to go into conduction. The resistor as shown in fig 1 (*used to limit the forward current*) does not come into picture before the conduction of the diode. Once the diode conducts the potential across its terminal is mentioned around V_γ . The current voltage relationship of a semiconductor diode is defined by exponential function.

$$i \equiv f(e^v)$$

Rectifier diodes are never operated in the breakdown region.

Special purpose diodes called zener diodes are always operated with the reverse potential and in the breakdown region only. Once a zener breaks down the potential across its terminal is sustained around the breakdown voltage, irrespective of the magnitude of reverse current.

Rectifier Diode Characteristics

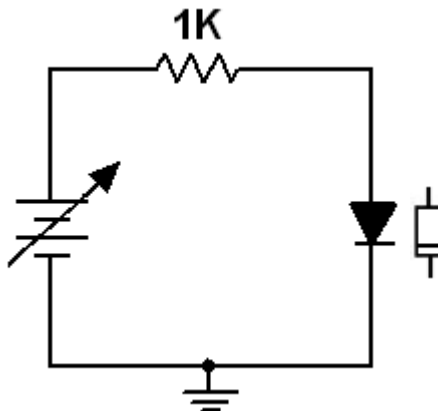
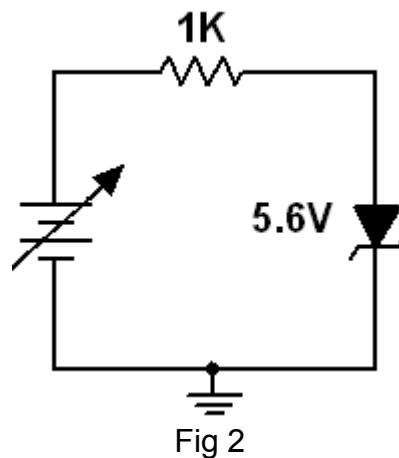


Fig 1

Procedure

1. Connect the circuit as shown in fig 1.
2. Change the input voltage from 0V to 2V in steps of 0.1V.
3. Note the voltage across the diode and resistor for every voltage levels.
4. Find the cut-in voltage of the diode.
5. Reverse the polarity of the diode and change the input voltage from 0V to 10V in steps of 0.5V.
6. Note the voltage across the diode and resistor for every voltage levels.
7. Plot the current voltage characteristics of the rectifier diode.

Zener Diode Characteristics



Procedure

1. Connect the circuit as shown in fig 2.
2. Change the input voltage from 0V to 2V in steps of 0.1V.
3. Note the voltage across the diode and resistor for every voltage levels.
4. Reverse the polarity of the diode and change the input voltage from 0V to 10V in steps of 0.5V.
5. Note the voltage across the diode and resistor for every voltage levels.
6. Plot the current voltage characteristics of the zener diode.