EXP. NO: 1

Name of experiment: Zener Diode

Purpose of experiment: In this experiment, we try to observe the relation between the voltage and corresponding current generated. We will then plot it to get the dependence.

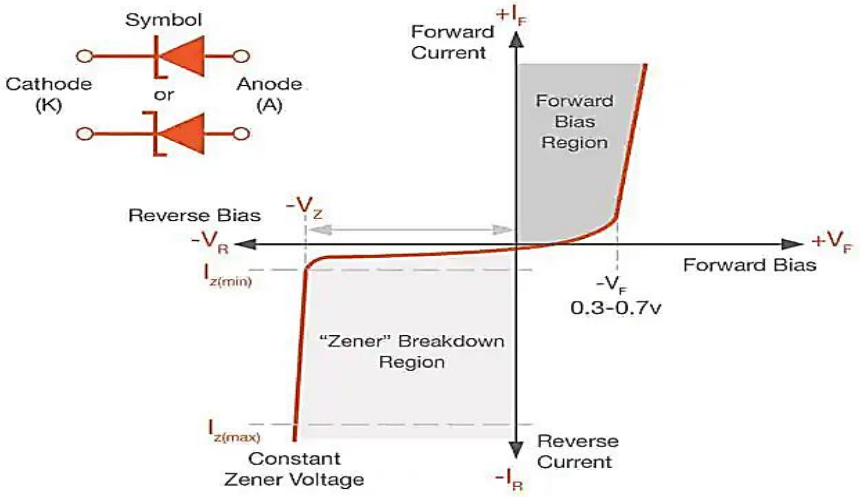
Apparatus: A Zener diode, A DC voltage supplier, Bread board , 100Ω resistor, 2 multi meter for measuring current and voltage, Connecting wires.

Theory

Zener diodes are a special type of diode that can conduct in reverse when a certain voltage is reached. This voltage is known as the breakdown voltage or the zener voltage. When the voltage across a zener diode exceeds its breakdown voltage, the diode conducts in the reverse direction, allowing current to flow. Zener diodes are commonly used in voltage regulators, surge protectors, and voltage references.

A Zener Diode is constructed for operation in the reverse breakdown region.The relation between I-V is almost linear in this case $Vz = Vz0 + Izrz$, where rz is the dynamic resistance of the zener at the operating point.Vz0 is the voltage at which the straight-line approximation of the I-V characteristic intersects the horizontal axis. After reaching a certain voltage, called the breakdown voltage, the current increases widely even for a small change in voltage. However, there is no appreciable change in voltage. So, when we plot the graph, we should get a curve very near to x-axis and almost parallel to it for quite sometime. After the Zener potential Vz there will be a sudden change and the graph will become exponential.

Huda Asaad & Elaf Hussien& Raneen Mouad
E-Mail: huda.asaad@uomus.edu.iq , raneen.mouad@uomus.edu.iq

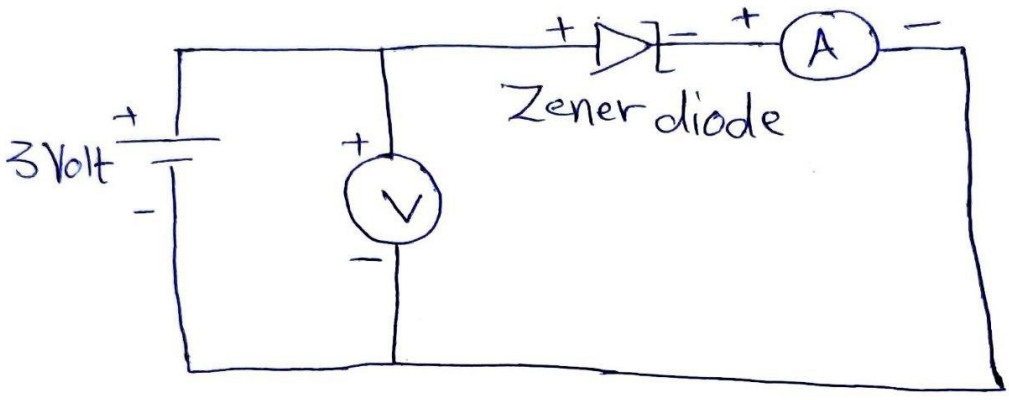


What difference between diode and zener diode?

The main difference between a diode and a zener diode is that a diode only conducts in one direction, while a zener diode can conduct in both directions when a certain voltage is reached. This property makes zener diodes useful in applications where voltage regulation or protection is required. Zener diodes can also be used as voltage references, as their breakdown voltage is very stable over a wide range of temperatures and currents.

Procedure

1- We first construct the circuit as shown in the figure with the 100Ω resistance and a variable DC input voltage.



Huda Asaad & Elaf Hussien& Raneen Mouad
E-Mail: huda.asaad@uomus.edu.iq , raneen.mouad@uomus.edu.iq

Now, we start increasing the voltage till there is some reading in the multimeter for current. Then, we note that reading. Now, we start increasing the input voltage and take the corresponding current readings. We get a set of values and construct a V vs I graph. This graph gives us the I-V characteristics. The slope of the curve at any point gives the dynamic resistance at that voltage.

2. calculating

$Vi(v)$	*0.5 v*	*1 v*	*2 v*	*2.5 v*	*3 v*
I(mA)					

Discussions

1. The precautions are quite similar to that taken in a normal diode
2. Excessive flow of current may damage the diode
3. Current for sufficiently long time may change the characteristics
4. Zener diodes are used in voltage regulation in circuits because even when, a large current flows through, their voltage does not change appreciably.