

PN Junction Diodes

Definitions

- Semi-Conductor: is a device that has the resistance of an insulator and the conduction of a conductor. Most devices are made up of Silicon or Germanium.
- Doping: the process of adding impurities to the device to increase the number of free current carriers.
- Current carriers: Majority carriers are the predominate carriers in the semi-conductor material. If it is N-Type material (Arsenic) it is electrons and negative. If it is P-Type material (Aluminum) then it is holes and positive.

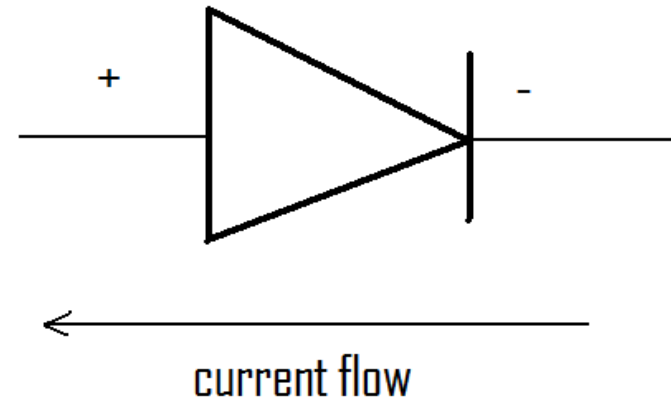


Definitions (continued)

- Recombination: excess electrons fall back into their perspective orbits and limit current flow.

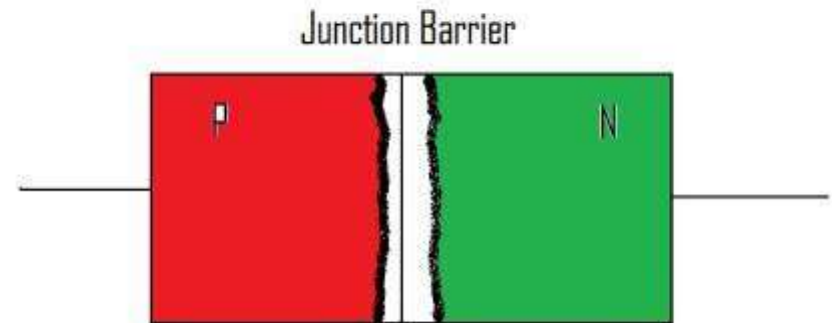
Diode Schematic Diagram

- The diode is comprised of an “Anode-positive” side and the “Cathode-negative” side.
- Conventional current flow is from negative to positive.
- An easy way to remember is Cathode sounds like “K”, which is the shape of the Cathode.



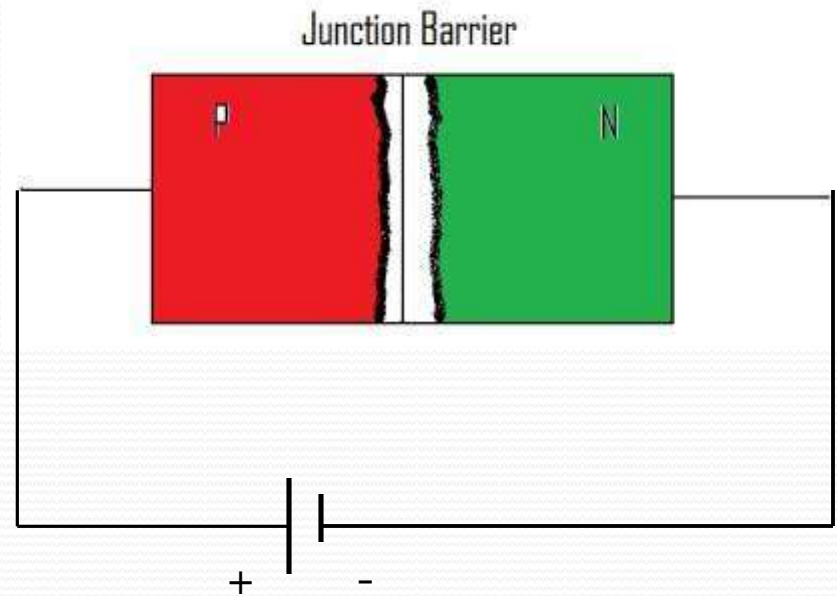
Diode Block Diagram

- The junction barrier (JB) is where recombination occurs and very little current carriers.
- P-Type: doped with Aluminum producing excessive holes and is positive.
- N-Type: doped with Arsenic producing excessive electrons and is negative.



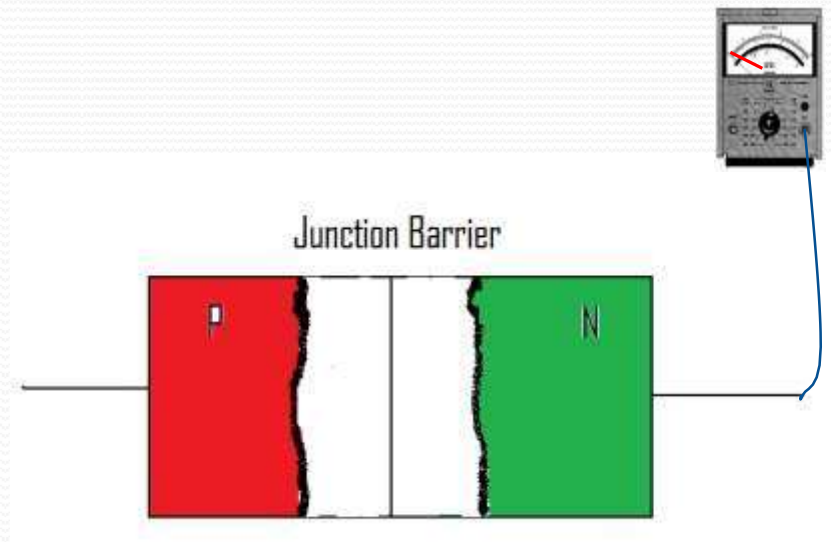
Diode Biasing

- Biasing is in reference to the power supply and the diode material.
- When you have the positive terminal connected to the P-Type material and the negative terminal connected to the N-Type material it is forward biases.



Junction Barrier

- This diode is reversed biased. As can be seen the junction barrier is much larger and current flow has stopped.



Junction Barrier

- Here the diode is Forward biased and as can be seen the junction barrier is almost gone. In this state current flow is at its maximum.

