

BIPOLAR JUNCTION TRANSISTOR

- Bipolar junction transistor is a special type of transistor which is used as a current regulator to adjust the output current using the input voltage.
- Bipolar means that the current arrives here from both the majority and minority carriers, as the name suggests.
- The device has three terminals (emitter, base and collector).
- The largest area is the collector, followed by the emitter and the base, which is the thinnest area (collector > emitter > base).
- This is because the core is the thinnest to emit holes or electrons, while the collector will accept the electrons or holes that come out of the emitter..

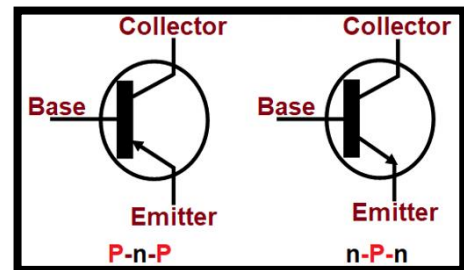
❖ CONSTRUCTION OF BJT:-

- ❖ It can be made with two diodes, the two diodes must be connected in the circuit so that they are in series and face each other (ie in the n side of the diodes that are connected or in p phase of diodes). . Therefore, bjt will develop.

SYMBOL OF BJT:-

IN NPN THE CURRENT FLOWS FROM EMIITER TO BASE HENCE ARROW IS IN OUTWARD DIRECTION.

IN PNP THE CURRENT FLOWS FROM EMITTER TO BASE HENCE ARROW IS IN INWARD DIRECTION.



Working principal:-

- ❖ The first junction that is the emitter base region should be forward bias and the second junction that is base collector that should be reverse bias.

❖ TYPES OF BJT :-

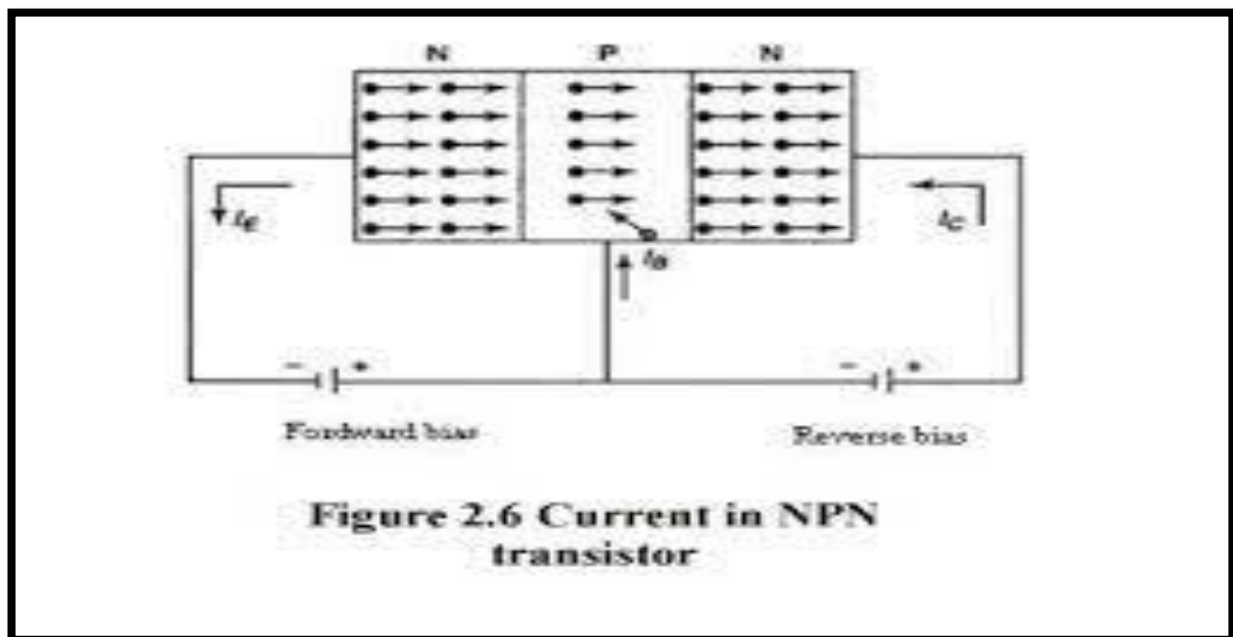
- ❖ There are two types of bjt :-
- ❖ NPN bipolar junction transistor
- ❖ PNP bipolar junction transistor

❖ NPN BIPOLAR JUNCTION TRANSISTOR:-

- ❖ As the name suggests it is the type of transistor where the p side of both the diodes is combined and now it is a common region for both the diodes.

❖ Working of NPN :-

- ❖ By connecting the negative side of the battery to the emitter and the positive side to the base, the emitter and the ground are in continuity. In the second terminal, the positive side of the other battery is connected to the collector and the negative side is connected to the base. Because the electrons in the battery and the emitter repel each other, electrons flow from the emitter to the ground. Because only 5% of the electrons that flow from the base to the collector are connected, the remaining 95% enter the collector, causing the I_E current to be produced. Hence, the current increases as more and more electrons are released.



❖ CURRENT EQUATION:-

BY KCL=

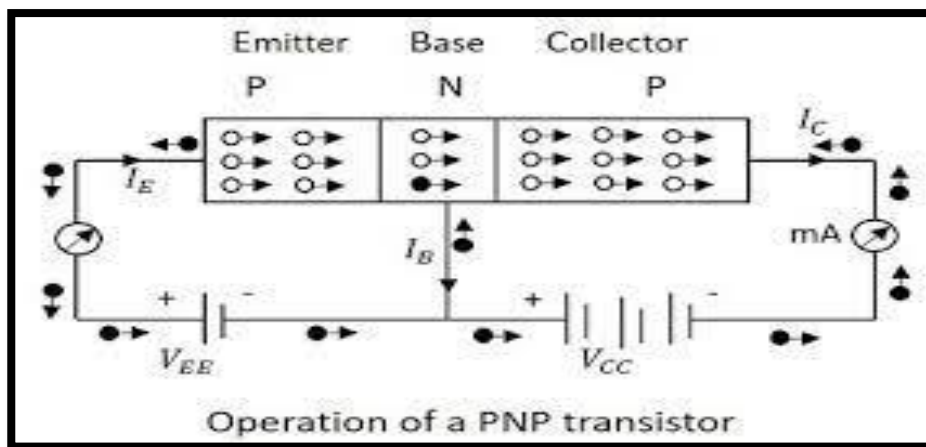
$$I_E = I_C + I_B$$

❖ PNP bipolar junction transistor:-

- ❖ As the name suggests it is the type of transistor where the p side of both the diodes is combined and now it is a common region for both the diodes.

❖ Working of PNP:-

By connecting the positive side of the battery to the emitter and the negative side to the base, the emitter-base junction is forward biased. In the second terminal, the negative side of the other battery is connected to the collector and the positive side is connected to the base. Because the emitter-base junction is forward biased, the holes move from the emitter to the base. The result is the configuration of the current I_E , which occurs when the space is moved from the base to the collector. Only 5% of the hole will now connect, leaving the remaining 95% to reach the collector, causing the I_C current to build up, increasing the current.



❖ CURRENT EQUATION:-

$$\text{BY KCL} = I_E = I_C + I_B$$

❖ Application of bjt

1. Preferred transistor for the logic gate.
2. Can be used as amplifiers.
3. Can be used in oscillator circuits.
4. Preferred in the multi-vibrator circuits.
5. Can be used in clipping and time delay circuits.
6. Used as switching circuits.