

# BIPOLAR JUNCTION TRANSISTOR

It consists of two back-to-back p-n junctions manufactured in a single piece of a semiconductor crystal, these two junctions give rise to three regions called emitter, base & collector. As shown in fig, (a). Junction transistor is simply a sandwich of one type of semiconductor material between two layers of the other type, Fig. (a) shows a layer of N-type material sandwiched between two layers of p-type material. It is described as a PNP transistor. Fig (b) shows an NPN transistor consisting of a layer of p-type material sandwiched between two layers of N-type material.

The emitter, base & collector are provided with terminals which are labelled as E, B and C. The two junctions are emitter-base (E/B) junction and collector-base (C/B) junctions.

The symbols employed for PNP & NPN transistors are also shown in figure. The arrowhead is always at the emitter (not at the collector) and in each case,

10. -2  
its direction indicates the conventional direction of current flow. For a PNP transistor, arrowhead points from emitter to base meaning that emitter is positive with respect to base (and also, with respect to collector). For NPN transistor, it points from base to emitter meaning that base (and collector as well) is positive with respect to the emitter.

## I, Emitter :-

It is more heavily doped than any of the other regions because, its main function is to supply majority charge carriers (either electrons or holes) to the base.

## 2, Base :-

It forms the middle section of the transistor. It is very thin ( $10^{-6}$  m) as compared to either the emitter or collector & is very lightly-doped.

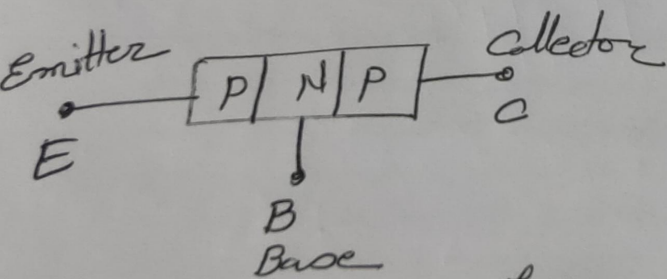
# Collector

Its main function (as indicated by its name) is to collect majority charge carriers coming from the emitter and passing through the base.

In most transistors, collector region is made physically larger than the emitter region because it has to dissipate much greater power.

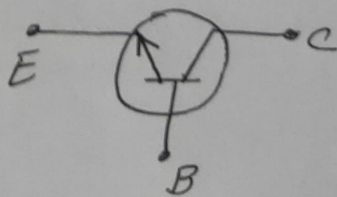
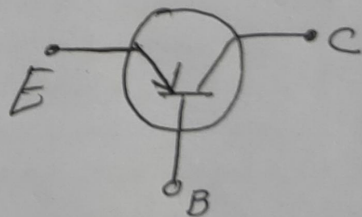
Because of this difference, there is no possibility of inverting the transistor i.e. making its collector the emitter and its emitter the collector.

## Structure



Fig(a)

## Symbol



Fig(b)

