



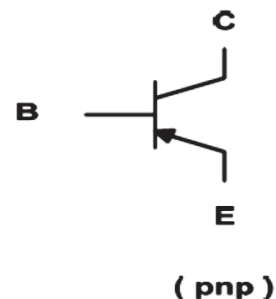
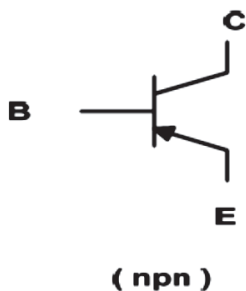
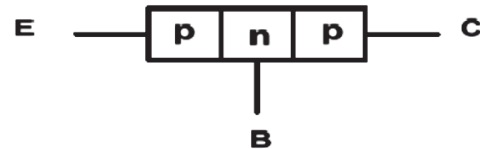
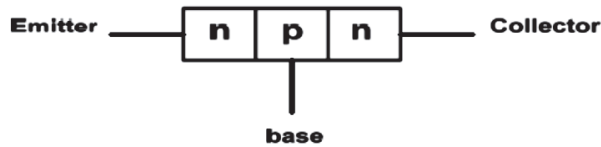
Bipolar junction transistor

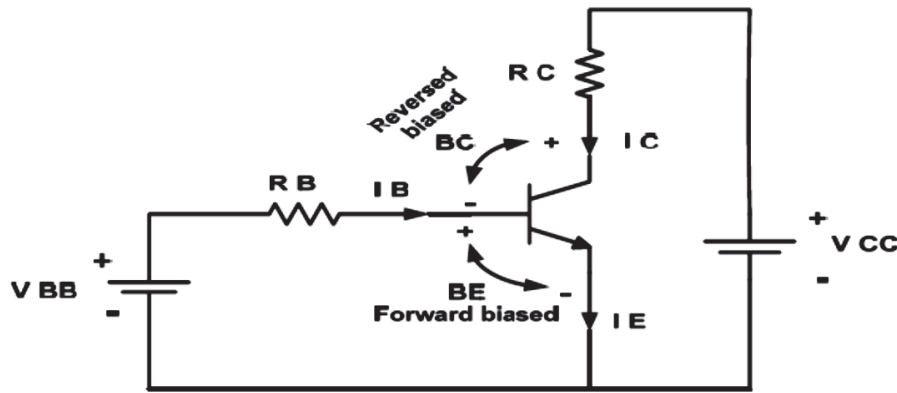
1. Construction of bipolar junction transistor .
2. Biasing of bipolar junction transistor

Bipolar junction transistor (BJT) :

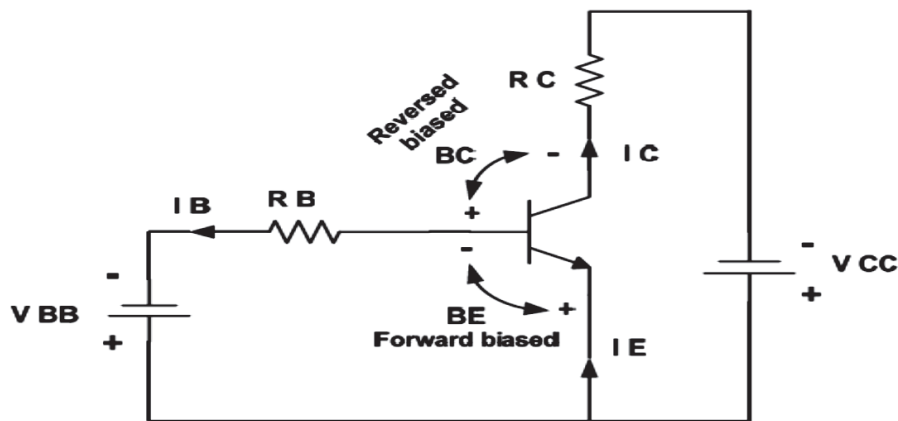
The (BJT) is constructed with three doped semiconductor regions separated by two P-N junctions . The three regions are called emitter , base and collector .

One type consists of two N regions separated by a P region (npn) , and the other type consists of two P regions separated by an N region (pnp) as shown in the Fig. below .





V_{BB} forward biased
 V_{CC} reversed biased
 $I_E = I_C + I_B$

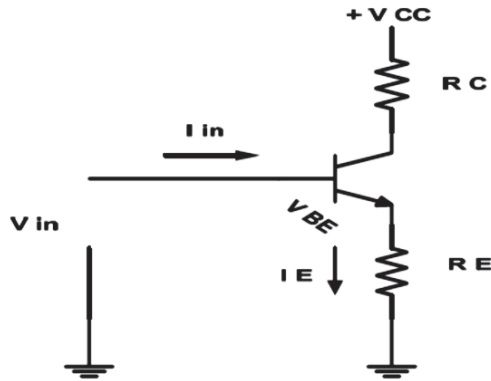


V_{BB} forward biased
 V_{CC} reversed biased
 $I_E = I_C + I_B$

pnp type

Bipolar junction transistor

1. Input resistance at the transistor base.
2. Voltage – divider base circuit .



$$R_{in(base)} = \frac{V_{in}}{I_{in}}$$

$$V_{in} = V_{BE} + I_E R_E$$

With the assumption that $V_{BE} \ll I_E R_E$
 $V_{in} = I_E R_E$

Now since $I_E \approx I_C = \beta_{DC} I_B$

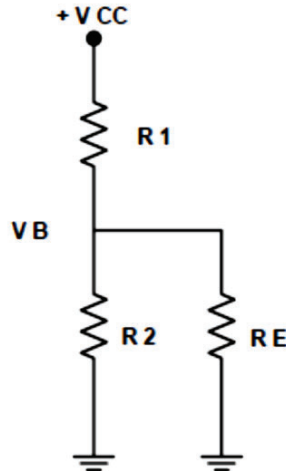
$$V_{in} = \beta_{DC} I_B R_E$$

The input current is the base current

$$R_{in(base)} = \frac{V_{in}}{I_{in}} = \frac{\beta_{DC} I_B R_E}{I_B}$$

$$R_{in(base)} = \beta_{D.C} R_E$$

Analysis of a voltage – divider base circuit

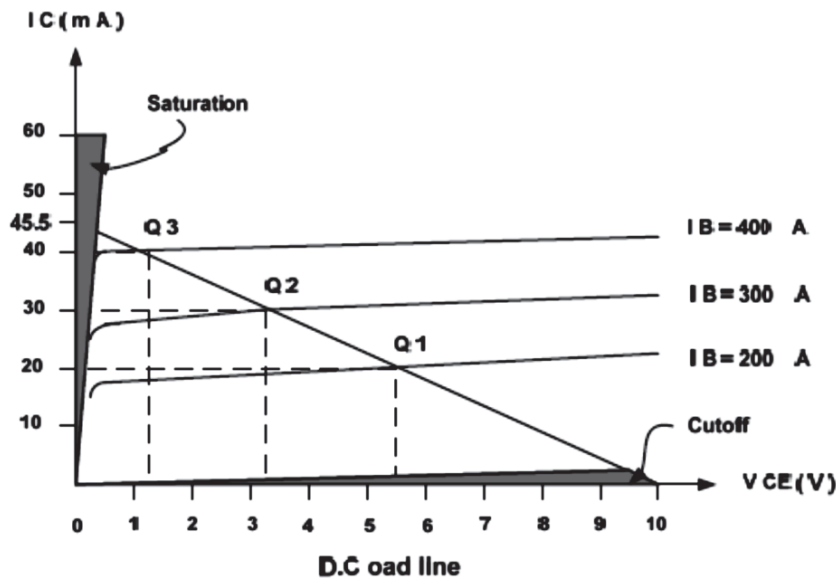


From figure above , the total resistance from base to ground is:

$$R2 // \beta D.C RE$$

D.C load line and transistor as switch

1. D.C load line.
2. Transistor as switch



Transistor as switch

