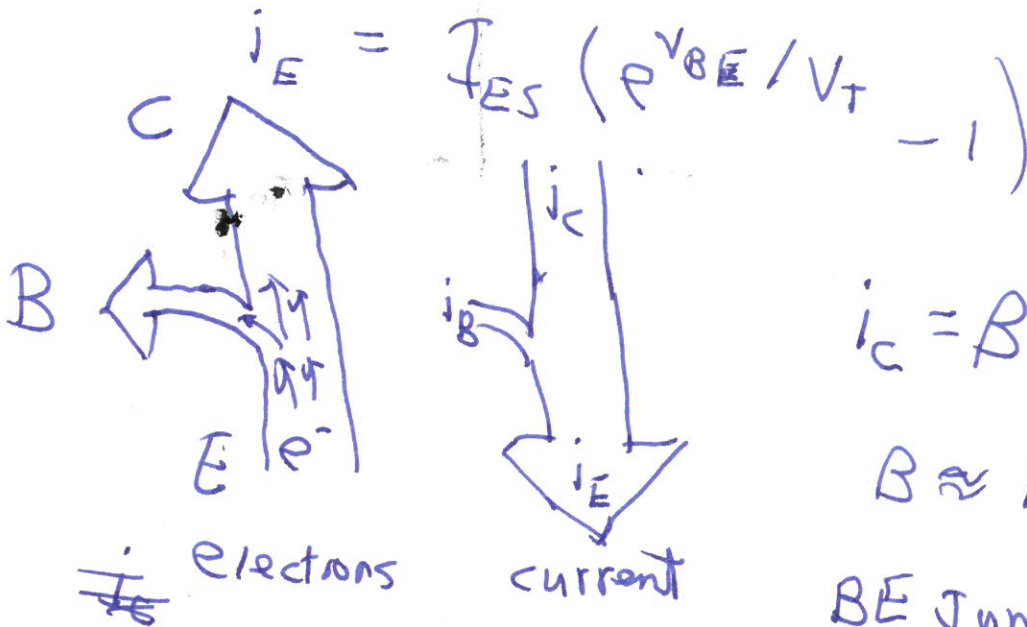
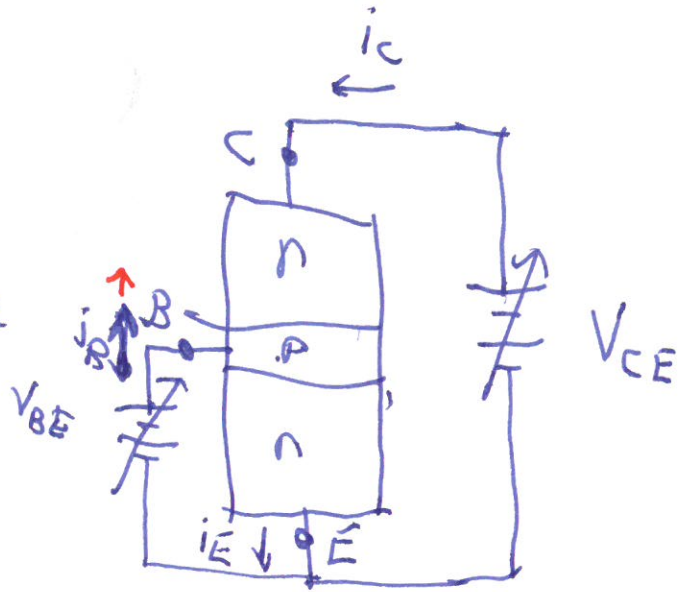
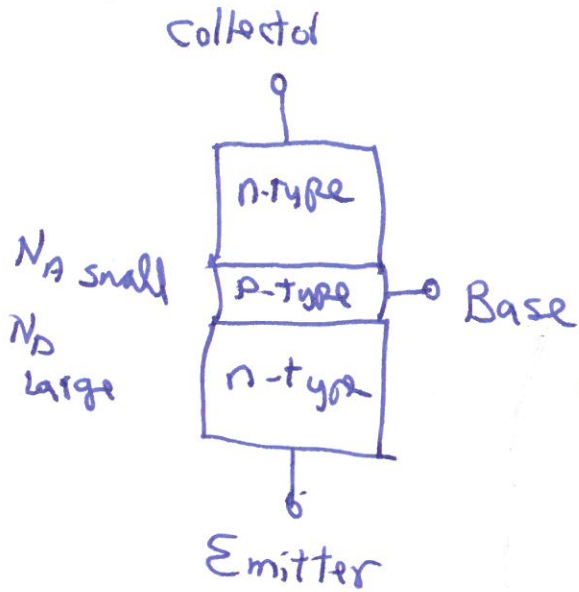




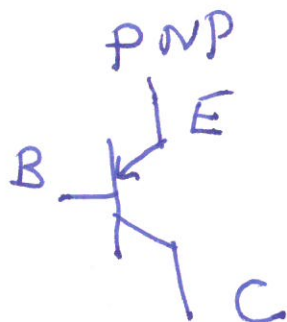
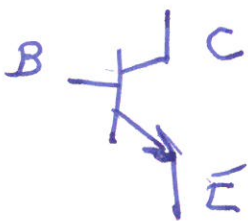
$$I_C = \beta I_B$$

$$\beta \approx 100 \text{ ??}$$

BE Junction is Forward biased

BC Junction is Reverse biased.

NPN
Circuit Symbol



Arrow on E
in direction
of current
P to N

Current Equations

$$i_E = I_{ES} e^{V_{BE}/V_T}$$

$$i_C = \beta i_B$$

$$i_E = i_B + i_C$$

$$i_C = I_S e^{V_{BE}/V_T}$$

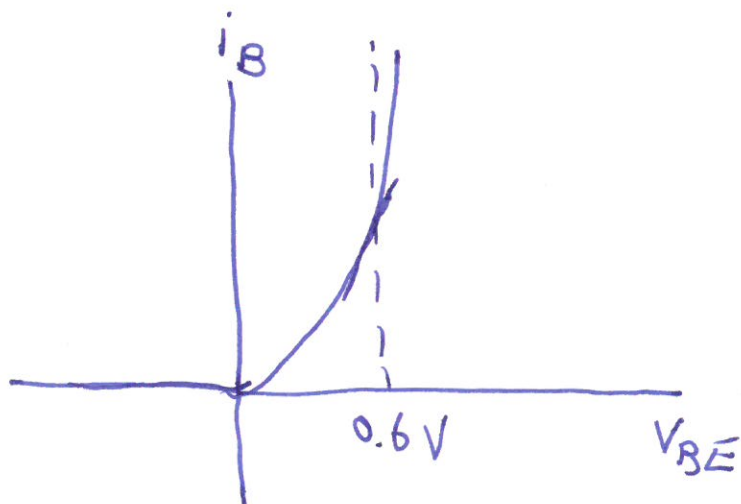
$$i_C = \alpha i_E$$

$$I_S = \alpha I_{ES}$$

$$\alpha = \frac{\beta}{\beta + 1}$$

$$\beta = \frac{\alpha}{1 - \alpha}$$

BE I-V curves



EC I-V curves (Parametric)

