

E = emitter
C = collector
B = base

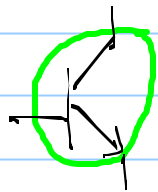
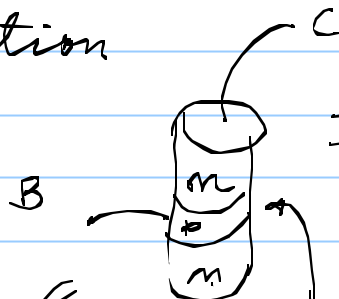
BJT



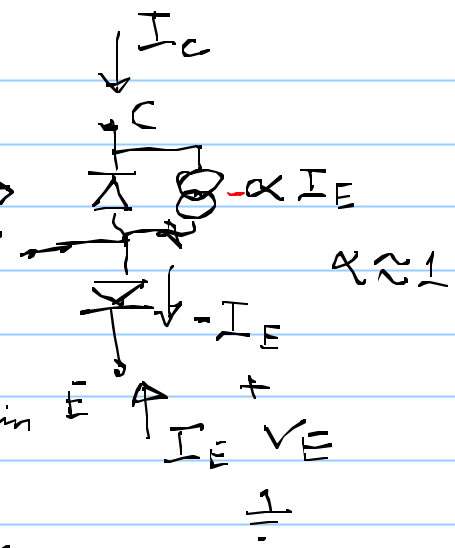
BJT construction



n, p, n



very thin E



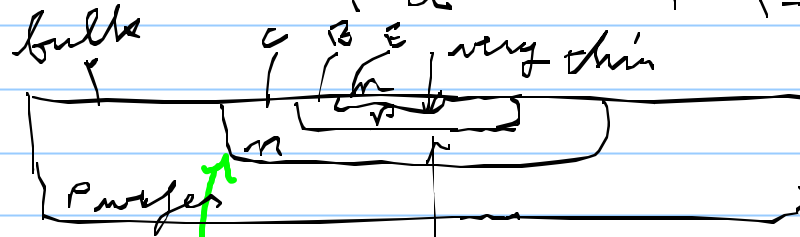
normally back bias C B junction

forward bias BE junction

KCL: $I_B + I_C + I_E = 0$; $I_E = -\frac{1}{\alpha} I_C$

$$I_B + I_C - \frac{1}{\alpha} I_C = 0 \Rightarrow \left(\frac{\alpha-1}{\alpha}\right) I_C = -I_B$$

$$I_C = \frac{\alpha}{1-\alpha} I_B ; \beta = \frac{\alpha}{1-\alpha} ; \beta \approx 100$$



planar
technology
side view

back bias
: this diode
i.e. tie bulk to the negative
point in the circuit