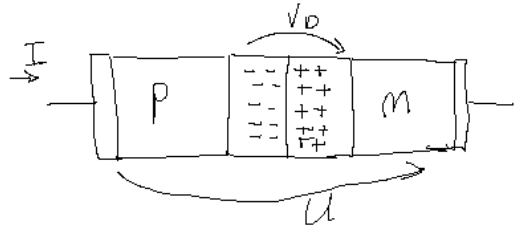
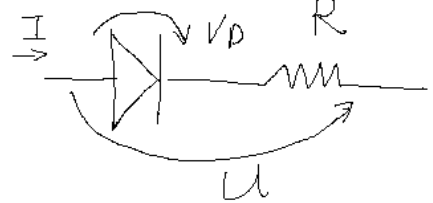
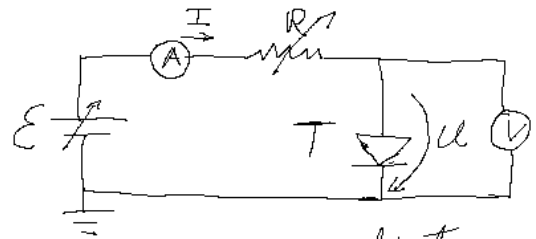
Modelos para a junção PN







Polarização direta

Modelo 1: $I = I_S\left(e^{\frac{q V_D}{\eta kT}} - 1\right)$

$$U = RI + V_D = RI + \frac{\eta kT}{q}\ln\left(\frac{I}{I_S} + 1\right)$$

$$I_S = a\,T^3\,e^{-\frac{E_G}{kT}}$$

Modelo 2: $I = I_S\left(e^{\frac{qV_D}{kT}} - 1\right) + I_\lambda\left(e^{\frac{qV_D}{2kT}} - 1\right)$

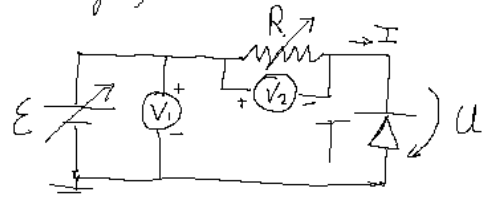
$$U = RI + V_D$$

$$U = RI + \frac{2kT}{q}\ln\left\{\sqrt{\left(\frac{I_\lambda}{2I_S}\right)^2 + \left(\frac{I+I_\lambda}{I_S}+1\right)} - \frac{I_n}{2I_S}\right\}$$

$$I_S = a\,T^3\,e^{-\frac{E_G}{kT}}$$

$$I_\lambda = b\,(kT)^{3/2}\,e^{-\frac{E_G}{2kT}}$$

Polarização inversa do díodo:



$$I = \frac{V_2}{R}$$

$$U = V_1 - V_2$$

Modelo 1: $I = I_S \Rightarrow V_2 = RI_S$, $U = V_1 - RI_S$

Modelo 2: $I = I_S + I_\lambda \Rightarrow V_2 = R(I_S + I_\lambda)$, $U = V_1 - R(I_S + I_\lambda)$