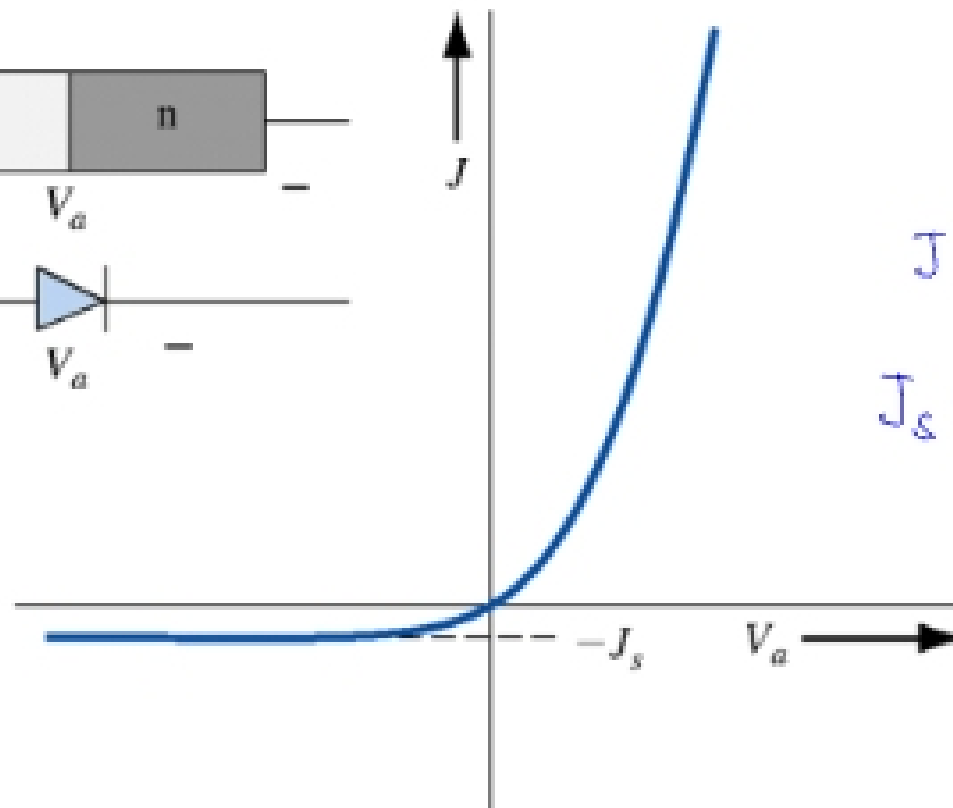
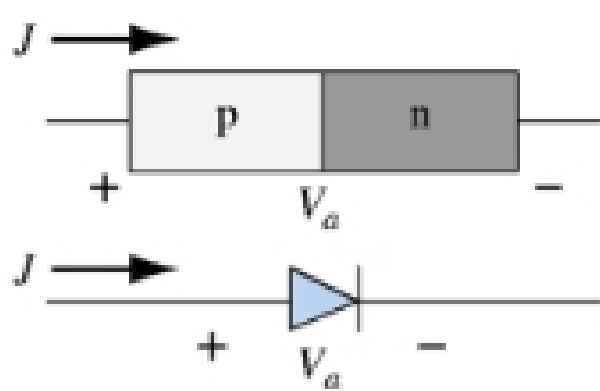


$$J_n(-x_p) = q D_n \left. \frac{dn_p}{dx} \right|_{x=-x_p} = \frac{q D_n n_{p0}}{L_n} \left[\exp\left(\frac{qV_a}{kT}\right) - 1 \right]$$

$$J_p(x_n) = -q D_p \left. \frac{dp_n}{dx} \right|_{x=x_n} = \frac{q D_p p_{n0}}{L_p} \left[\exp\left(\frac{qV_a}{kT}\right) - 1 \right]$$

$$J_{total} = J_n(-x_p) + J_p(x_n) = \left[\frac{q D_n n_{p0}}{L_n} + \frac{q D_p p_{n0}}{L_p} \right] \left[\exp\left(\frac{qV_a}{kT}\right) - 1 \right]$$



$$J = J_s \left[\exp\left(\frac{qV_a}{kT}\right) - 1 \right]$$

$$J_s = \left[\frac{qD_n n_{p0}}{L_n} + \frac{qD_p p_{n0}}{L_p} \right]$$

J_s is referred to as the reverse saturation current density.

