| | |
|---|---|
| $I = qA(\frac{D_p}{L_p}P_{n_0} + \frac{D_n}{L_n}N_{p_0})(e^{\frac{qv(t)}{KT}} - 1)$<br>$I_{op} = qAg_{op}(L_p + L_n)$<br>$V_{oc} = \frac{KT}{q} Ln[\frac{g_{op}}{g_{th}} + 1]$<br>$\Delta\sigma = qg_{op}(\tau_n\mu_n + \tau_p\mu_p)$ | $\Delta P_n(t) = P_{n_0}(e^{\frac{qv(t)}{KT}} - 1)$<br>$\delta P_n(x_n, t) = \Delta P_n(t)e^{\frac{-x_n}{Lp}}$<br>$I = I_0(e^{\frac{qv}{KT}} - 1) - I_{op}$<br>$I = I_0(e^{\frac{qv}{KT}} - 1) + q\frac{An_i}{2\tau_o}W(e^{qV_A/2KT} - 1)$ |
| $I = [\frac{qAD_pP_{n_0}}{L_p} \coth \frac{1}{L_p}](e^{\frac{qv}{KT}} - 1)$<br>$I = qA(\frac{e^{\frac{qv}{KT}} - 1}{1 - e^{\frac{-2q(v_c - v)}{KT}}})[\frac{D_pP_{n_0}}{L_p}(1 + \frac{n_i^2}{P_{p_0}^2}e^{\frac{qv}{KT}}) + \frac{D_nn_{p_0}}{L_n}(1 + \frac{n_i^2}{n_{n_0}^2})e^{\frac{qv}{KT}}]$<br>$i(t) = \frac{Q_p(t)}{\tau_p} + \frac{dQ_p(t)}{dt} + \frac{Q_n(t)}{\tau_n} + \frac{dQ_n(t)}{dt}$ | |
| $\frac{P_{p_0}}{P_{n_0}} = \frac{n_{n_0}}{n_{p_0}} = e^{\frac{(qv_0)}{KT}}$<br>$V_0 = \frac{KT}{q}\ln(\frac{N_aN_d}{n_i^2}) = \frac{-1}{2}\varepsilon_0 w$<br>$\varepsilon_0 = \frac{-q}{E}N_dX_{n_0} = \frac{-q}{E}N_aX_{p_0}$<br>$w = [\frac{2\varepsilon v_0}{q}(\frac{N_a + N_d}{N_aN_d})]^{\frac{1}{2}}$<br>$x_{n_0} = (\frac{N_a}{N_a + N_d})W$<br>$x_{p_0} = (\frac{N_d}{N_a + N_d})W$<br>$C_j = \frac{\varepsilon A}{W}$<br>$C_j = \varepsilon A\left[\frac{qN}{2\varepsilon(V_0 - V)}\right]^{1/2}$<br>$C_j = A\left[\frac{qG\varepsilon^{m+1}}{(m+2)(V_0 - V)}\right]^{1/m+2}$ | $I_E = qA\frac{D_p}{L_p}[\Delta P_E \coth\frac{W_b}{L_p} - \Delta P_c \operatorname{csch}\frac{W_b}{L_p}]$<br>$I_c = qA\frac{D_p}{L_p}[\Delta P_E \operatorname{csch}\frac{W_b}{L_p} - \Delta P_c \coth\frac{W_b}{L_p}]$<br>$I_E = I_{Es}(e^{\frac{qv_{EB}}{KT}} - 1) - \alpha_I I_{cs}(e^{\frac{qv_{CB}}{KT}} - 1)$<br>$I_c = \alpha_N I_{ES}(e^{\frac{qv_{EB}}{KT}} - 1) - I_{cs}(e^{\frac{qv_{CB}}{KT}} - 1)$<br>$\beta = \frac{\tau_B}{\tau_t}$<br>$I_E = \alpha_I I_C + I_{E_0}(e^{\frac{qv_{EB}}{KT}} - 1)$<br>$I_c = \alpha_N I_E - I_{C_0}(e^{\frac{qv_{CB}}{KT}} - 1)$<br>$I_{E_0} = (1 - \alpha_N\alpha_I)I_{ES}$<br>$I_{C_0} = (1 - \alpha_N\alpha_I)I_{CS}$ |