## 参考公式

$$i_{\mathrm{D}} = I_{\mathrm{S}}(e^{\frac{v_{\mathrm{D}}}{V_T}} - 1) \qquad r_{\mathrm{d}} = \frac{V_T}{I_{\mathrm{D}}} \qquad i_{\mathrm{D}} = K_{\mathrm{n}}(v_{\mathrm{GS}} - V_{\mathrm{TN}})^2$$

$$i_{\mathrm{D}} \approx 2K_{\mathrm{n}}(v_{\mathrm{GS}} - V_{\mathrm{TN}})\, v_{\mathrm{DS}} \qquad K_{\mathrm{n}} = \frac{K'_{\mathrm{n}}}{2} \bullet \frac{W}{L} = \frac{\mu_{\mathrm{n}} C_{\mathrm{ox}}}{2}\left(\frac{W}{L}\right)$$

$$i_{\mathrm{D}} = K_{\mathrm{n}}(v_{\mathrm{GS}} - V_{\mathrm{TN}})^2(1 + \lambda v_{\mathrm{DS}}) \qquad r_{\mathrm{ds}} = [\lambda K_{\mathrm{n}}(v_{\mathrm{GS}} - V_{\mathrm{TN}})^2]^{-1} = \frac{1}{\lambda I_{\mathrm{D}}}$$

$$g_{\mathrm{m}} = 2K_{\mathrm{n}}(V_{\mathrm{GSQ}} - V_{\mathrm{TN}}) = 2\sqrt{K_{\mathrm{n}} I_{\mathrm{DQ}}} = \frac{2}{V_{\mathrm{TN}}}\sqrt{I_{\mathrm{DO}} I_{\mathrm{D}}} \qquad R_{\mathrm{o}} = R // r_{\mathrm{ds}} // \frac{1}{g_{\mathrm{m}}}$$

$$r_{be} = 200 + (1+\beta)\frac{26(\mathrm{mV})}{I_{\mathrm{EQ}}(\mathrm{mA})}$$

$$f_{\mathrm{H}} = \frac{1}{2\pi R'_{\mathrm{si}} C}, \quad C = C_{\mathrm{gs}} + (1 + g_{\mathrm{m}} R'_{\mathrm{L}}) C_{\mathrm{gd}}, \quad R'_{\mathrm{si}} = R_{\mathrm{si}} // R_{\mathrm{g}}$$

$$A_{v\mathrm{d1}} = -\frac{1}{2} g_{\mathrm{m}}(r_{\mathrm{ds}} // R_{\mathrm{d}}) \qquad A_{v\mathrm{c1}} = -\frac{g_{\mathrm{m}}(r_{\mathrm{ds}} // R_{\mathrm{d}})}{1 + g_{\mathrm{m}}(2r_{\mathrm{o}})} \qquad K_{\mathrm{CMR1}} \approx g_{\mathrm{m}} r_{\mathrm{o}}$$

$$A_{v\mathrm{d1}} = -\frac{\beta R_{\mathrm{c}}}{2r_{\mathrm{be}}} \qquad A_{v\mathrm{c1}} = \frac{-\beta R_{\mathrm{c}}}{r_{\mathrm{be}} + (1+\beta)\, 2r_{\mathrm{o}}} \qquad K_{CMR1} \approx \frac{\beta\, r_{\mathrm{o}}}{r_{\mathrm{be}}}$$

$$R_{\mathrm{ic}} = \frac{1}{2}[r_{\pi} + (1+\beta)(2r_{\mathrm{o}})]$$

$$V_{\mathrm{O}} = (1 + R_{\mathrm{f}} / R_1)\left[V_{\mathrm{IO}} + I_{\mathrm{IB}}(R_1 // R_{\mathrm{f}} - R_2) + \frac{1}{2} I_{\mathrm{IO}}\ (R_1 // R_{\mathrm{f}} + R_2)\right]$$

$$A_{\mathrm{f}} = \frac{A}{1 + AF} \qquad P_{\mathrm{om}} = \frac{1}{2} \cdot \frac{V_{\mathrm{om}}^2}{R_{\mathrm{L}}} = \frac{1}{2} \cdot \frac{(V_{\mathrm{CC}} - V_{\mathrm{CES}})^2}{R_{\mathrm{L}}} \qquad P_{\mathrm{V}} = \frac{2V_{\mathrm{CC}} V_{\mathrm{om}}}{\pi R_{\mathrm{L}}} \approx \frac{2}{\pi} \cdot \frac{V_{\mathrm{CC}}^2}{R_{\mathrm{L}}}$$

$$P_{\mathrm{T1}} = \frac{1}{R_{\mathrm{L}}}\left(\frac{V_{\mathrm{CC}} V_{\mathrm{om}}}{\pi} - \frac{V_{om}^2}{4}\right) \qquad P_T = P_{\mathrm{T1}} + P_{\mathrm{T2}} = \frac{2}{R_{\mathrm{L}}}\left(\frac{V_{\mathrm{CC}} V_{\mathrm{om}}}{\pi} - \frac{V_{om}^2}{4}\right)$$

$$\dot{F}_V = \frac{\mathrm{j}\omega RC}{(1 - \omega^2 R^2 C^2) + \mathrm{j}3\omega RC} \qquad \dot{F}_V = \frac{1}{3 + \mathrm{j}\left(\frac{\omega}{\omega_0} - \frac{\omega_0}{\omega}\right)}$$

$V_{\mathrm{L}}$＝（1.1～1.2）$V_2$ $\qquad I_{\mathrm{L}} = \frac{0.9V_2}{R_{\mathrm{L}}}$ 6 $\qquad V_{\mathrm{O}} = (1 + \frac{R_2}{R_1})V_{\mathrm{REF}} + I_{\mathrm{d}} R_2$