



$$R_g < \dots$$

$$\underline{V_{GS} < 0}$$

$$V_G \approx 0$$

$$I_D = I_S$$

$$V_S = I_S \cdot R_S = I_D \cdot R_S$$

$$V_{GS} = V_G - V_S = 0 - V_S = -I_D \cdot R_S \quad \text{--- (1)}$$

$$V_D = V_{DD} - I_D \cdot R_D$$

$$\begin{aligned} V_{DS} = V_D - V_S &= (V_{DD} - I_D \cdot R_D) - (I_D \cdot R_S) = V_{DD} - I_D \cdot R_D - I_D \cdot R_S \\ &= V_{DD} - I_D (R_D + R_S) \end{aligned}$$

$$\left. \begin{array}{l} \text{-- fisso } I_D \rightarrow V_{GS} \\ \text{-- fisso } V_{GS} \rightarrow I_D \end{array} \right\} \sim R_S$$

$$\textcircled{1}: \quad R_S = \frac{V_{GS}}{I_D}$$

$$\rightarrow I_D = I_{DSS} \left(1 - \frac{V_{GS}}{V_{GS_{off}}} \right)^2 \quad \text{---}$$

$$V_{GS} = V_{GS_{off}} \left(1 - \sqrt{\frac{I_D}{I_{DSS}}} \right)$$