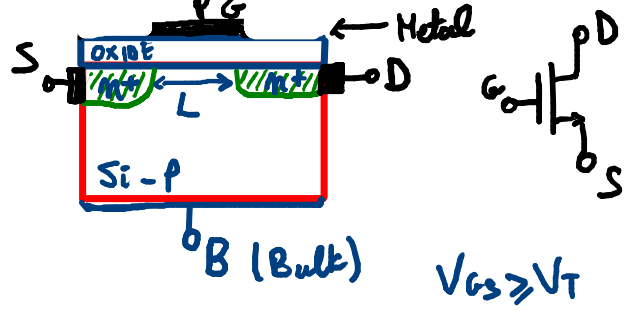


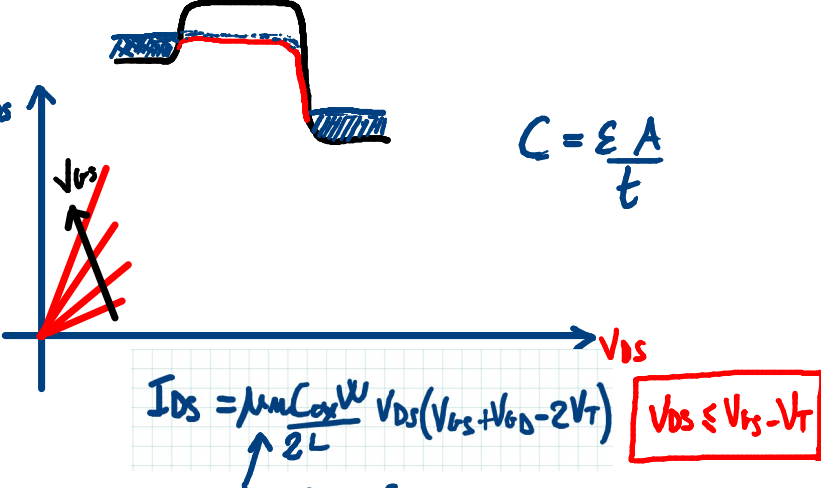
→ MOS FET J FET

Field EFFECT Transistor

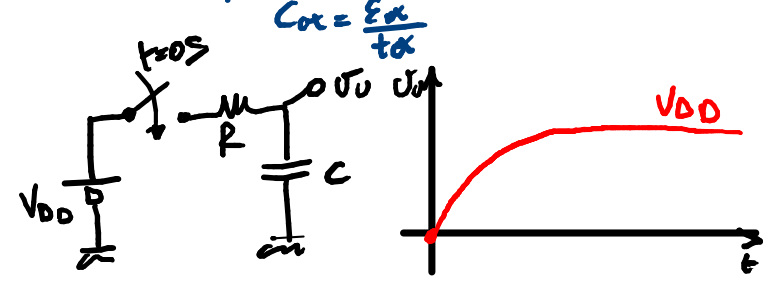


$V_{GS} \geq V_T$

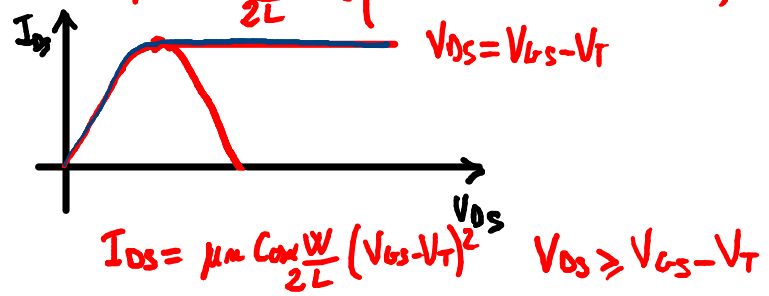
$C = \frac{\epsilon A}{t}$



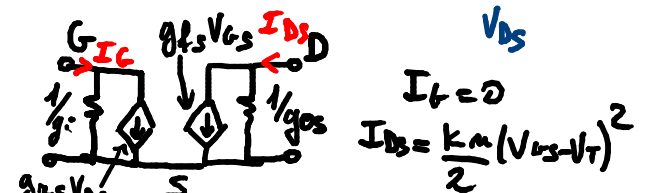
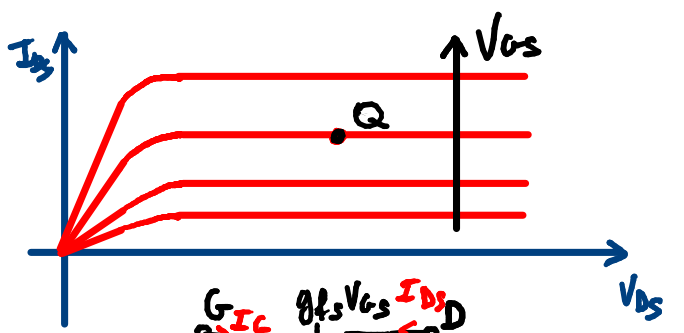
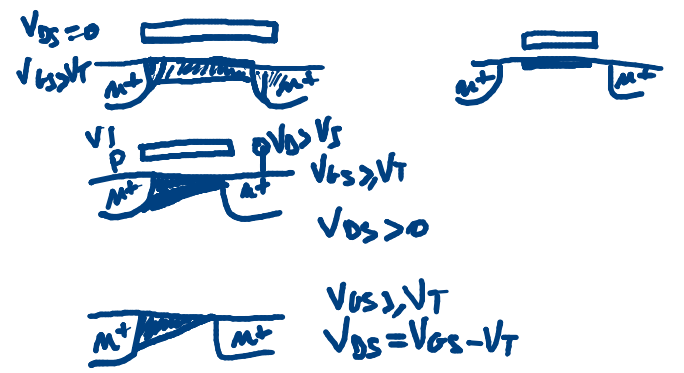
$I_{DS} = \mu_n C_{ox} \frac{W}{2L} V_{DS} (V_{GS} + V_{DS} - 2V_T)$ $V_{DS} < V_{GS} - V_T$



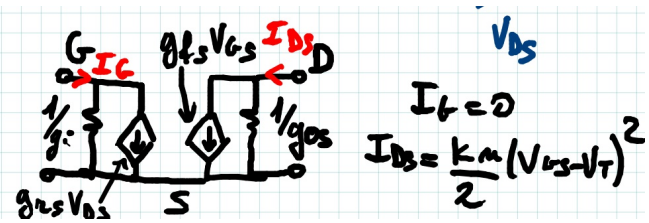
$I_{DS} = \mu_n C_{ox} \frac{W}{2L} V_{DS} (V_{GS} + V_{DS} - V_{GS} - 2V_T) =$
 $V_{DS} = V_{GS} - V_T$



$I_{DS} = \mu_n C_{ox} \frac{W}{2L} (V_{GS} - V_T)^2$ $V_{DS} \geq V_{GS} - V_T$



$I_D = 0$
 $I_{DS} = \frac{k_n}{2} (V_{GS} - V_T)^2$



$$I_G = g_i V_{GS} + g_{rs} V_{DS}$$

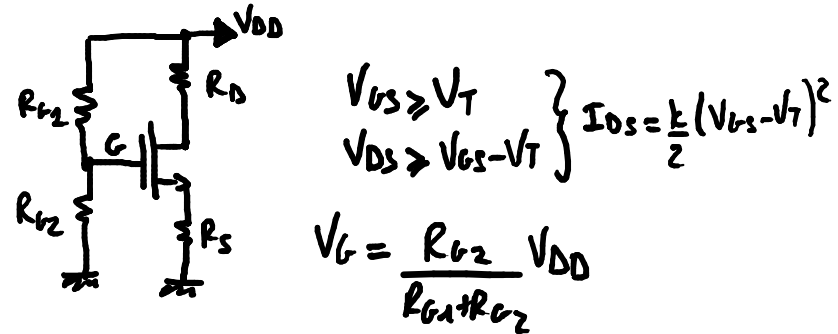
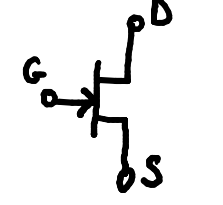
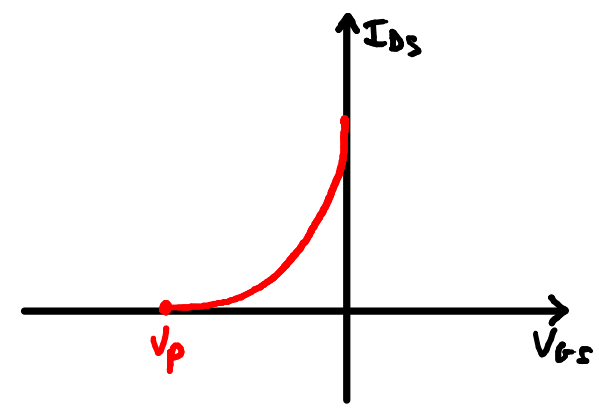
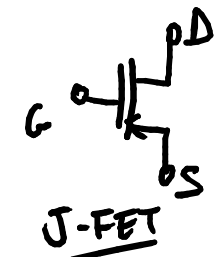
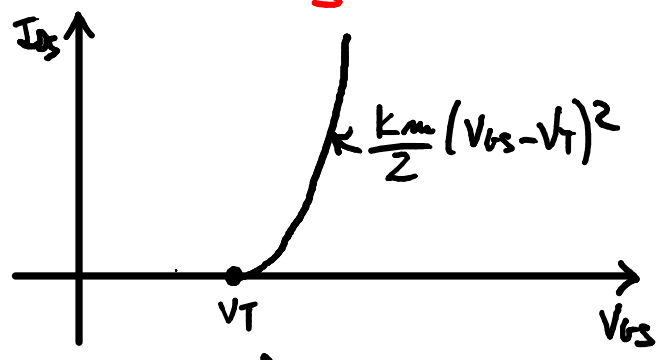
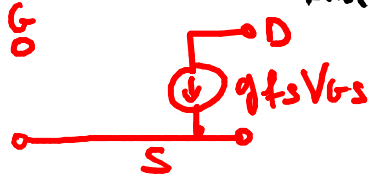
$$g_i = \left. \frac{\partial I_G}{\partial V_{GS}} \right|_{V_{DS} = \text{const}} = 0$$

$$g_{rs} = \left. \frac{\partial I_G}{\partial V_{DS}} \right|_{V_{GS} = \text{const}} = 0$$

$$I_{DS} = g_{fs} V_{GS} + g_{os} V_{DS}$$

$$g_{os} = \left. \frac{\partial I_{DS}}{\partial V_{DS}} \right|_{V_{GS} = \text{const}} = 0$$

$$g_{fs} = \left. \frac{\partial I_{DS}}{\partial V_{GS}} \right|_{V_{DS} = \text{const}} = \frac{\partial}{\partial V_{GS}} \left(\frac{k}{2} (V_{GS} - V_T)^2 \right) = k(V_{GS} - V_T)$$

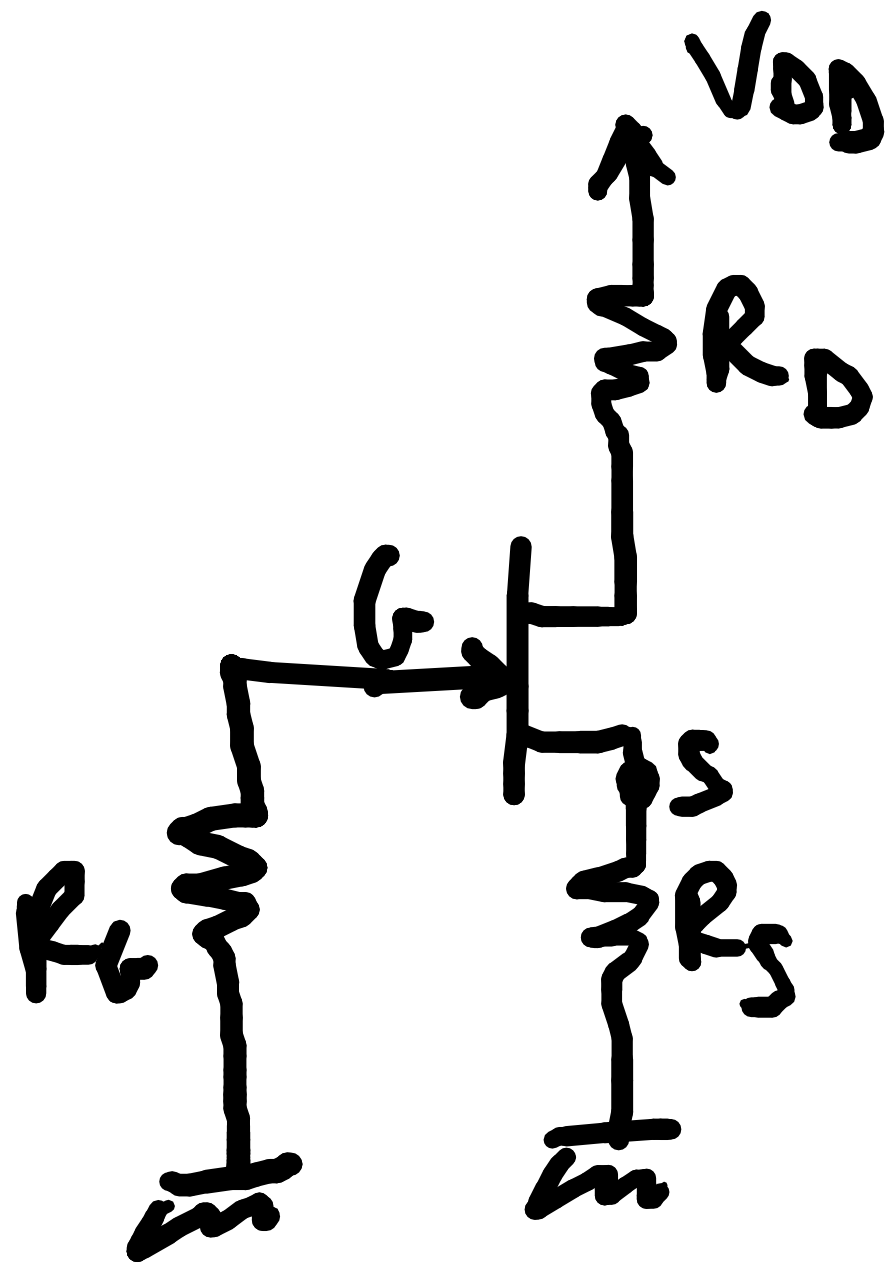


$$\left. \begin{matrix} V_{GS} \geq V_T \\ V_{DS} \geq V_{GS} - V_T \end{matrix} \right\} I_{DS} = \frac{k}{2} (V_{GS} - V_T)^2$$

$$V_G = \frac{R_{G2}}{R_{G1} + R_{G2}} V_{DD}$$

$$V_{GS} = V_G - V_S \quad V_S = R_S I_{DS}$$

$$\begin{cases} I_{DS} = \frac{k}{2} (V_{GS} - V_T)^2 \\ V_{GS} = \frac{R_{G2}}{R_{G1} + R_{G2}} V_{DD} - R_S I_{DS} \end{cases}$$



$$V_{GS} = V_G - V_S$$

$$V_S = R_S I_{DS}$$

$$V_{GS} = -R_S I_{DS}$$

