

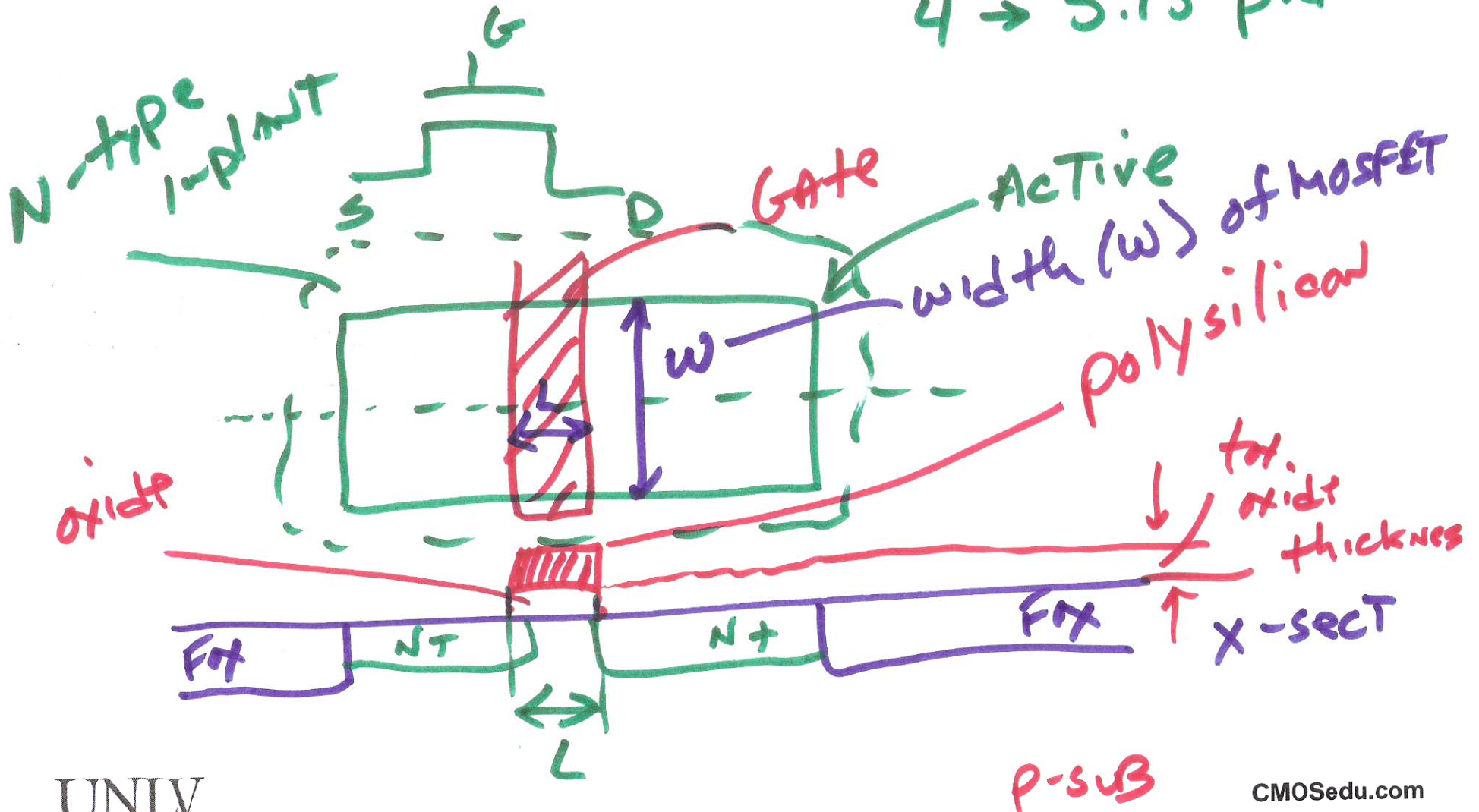
EE 422 / ECE 622

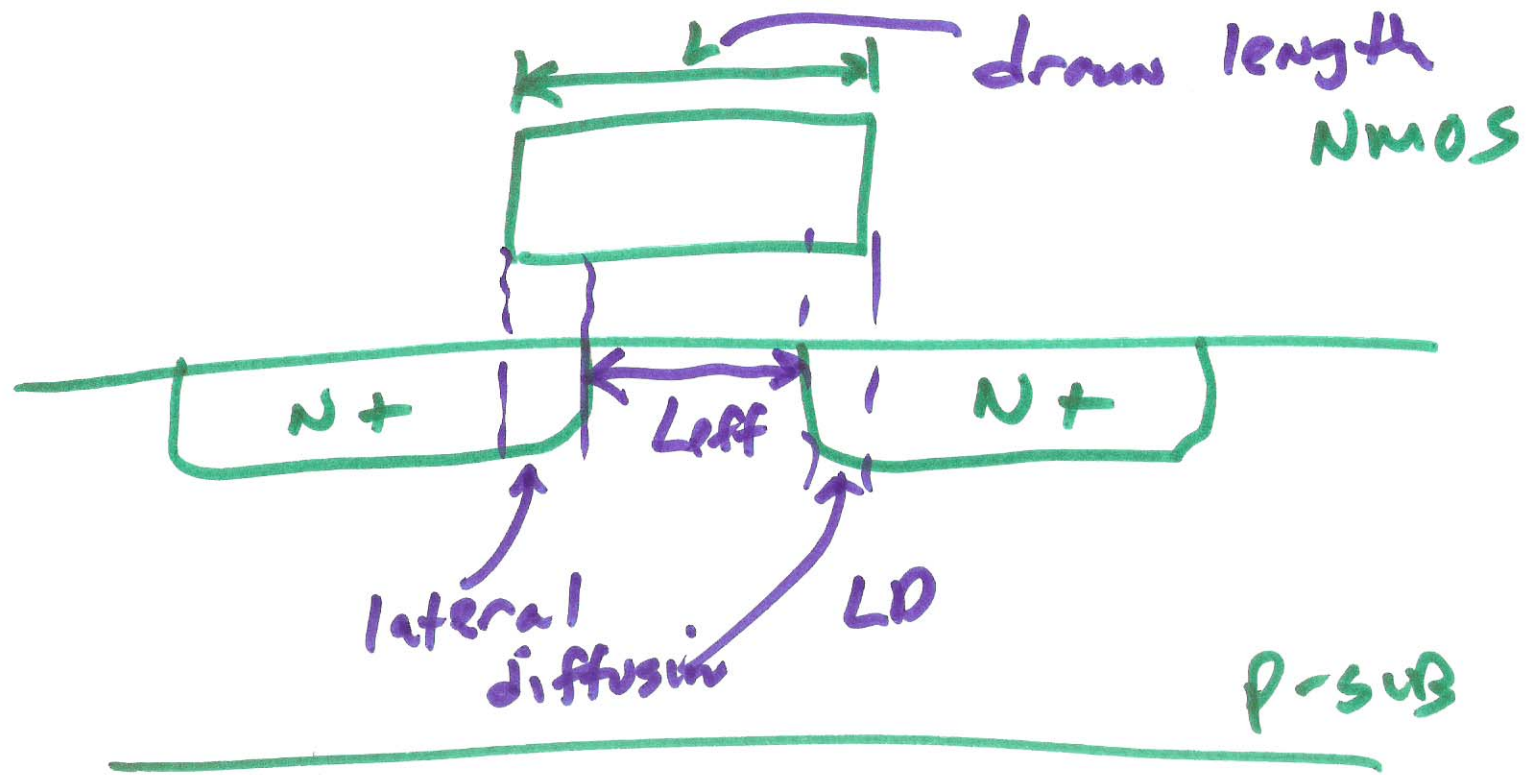
Analog IC Design

1/23/13

Lecture 1

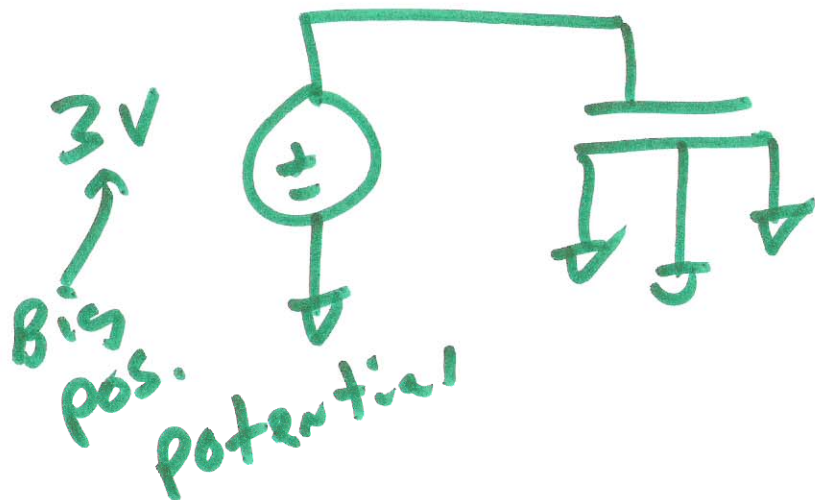
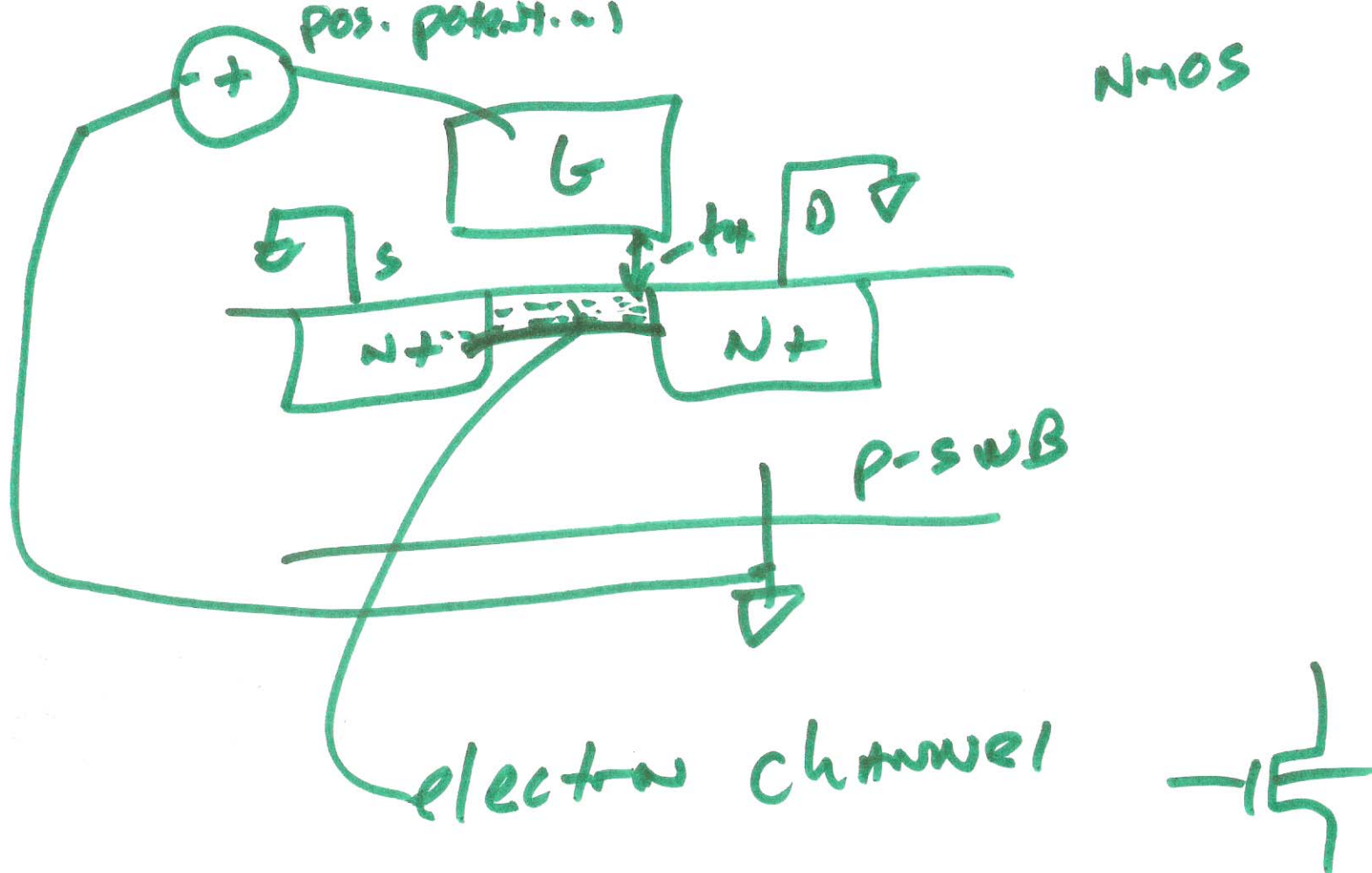
4 → 5:15 pm



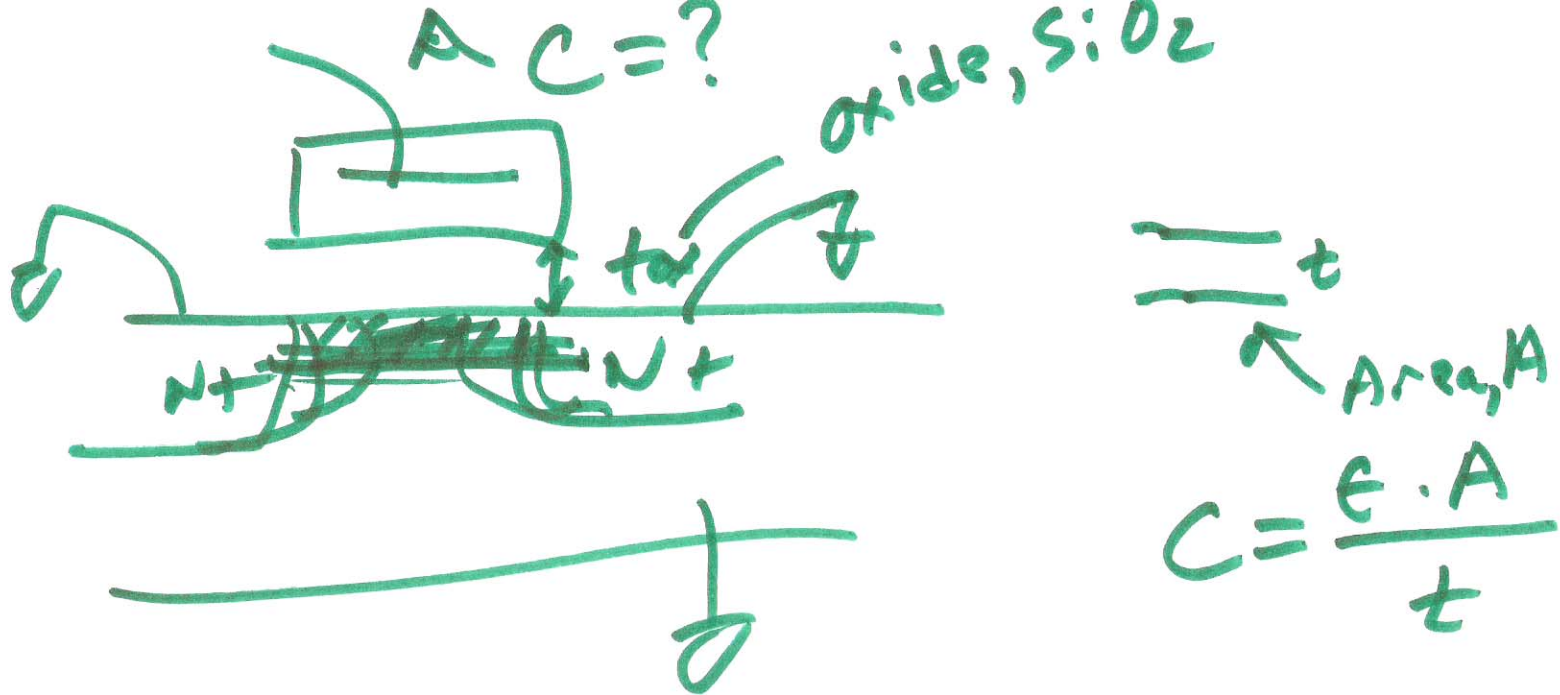


$$L_{eff} = L - 2LD$$

2)

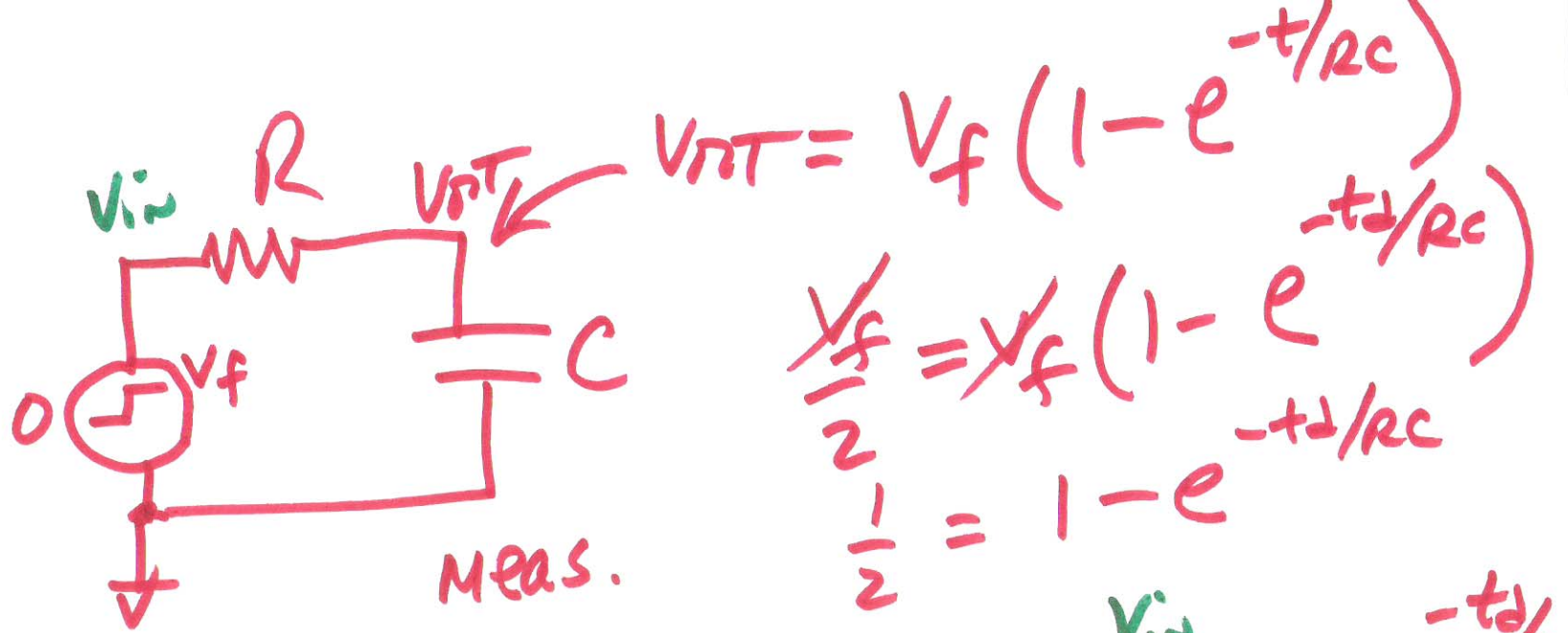


3)



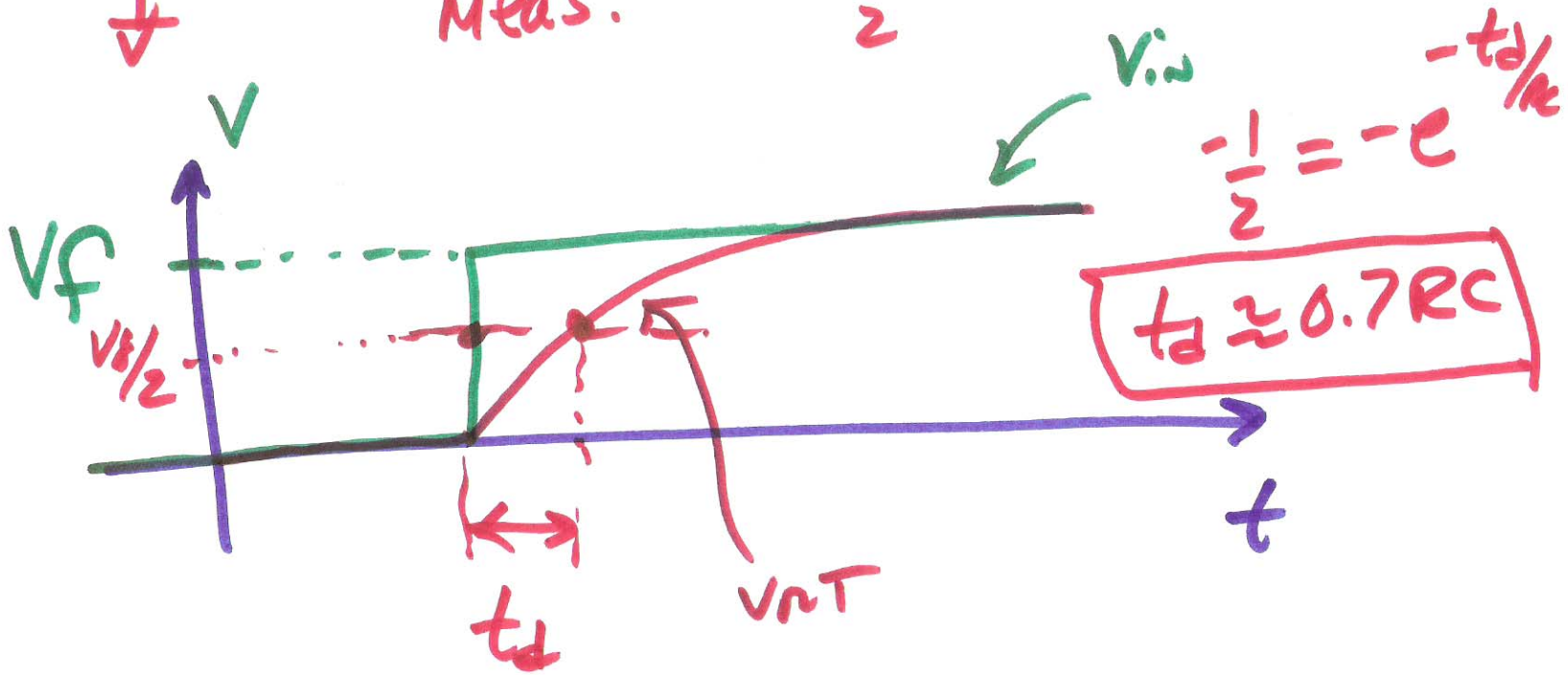
$$C_{ox} = \frac{\epsilon_{ox}}{t_{ox}} \cdot L \cdot W = \epsilon'_{ox} \cdot L \cdot W$$

$$\epsilon'_{ox} = \frac{\epsilon_{ox}}{t_{ox}}$$

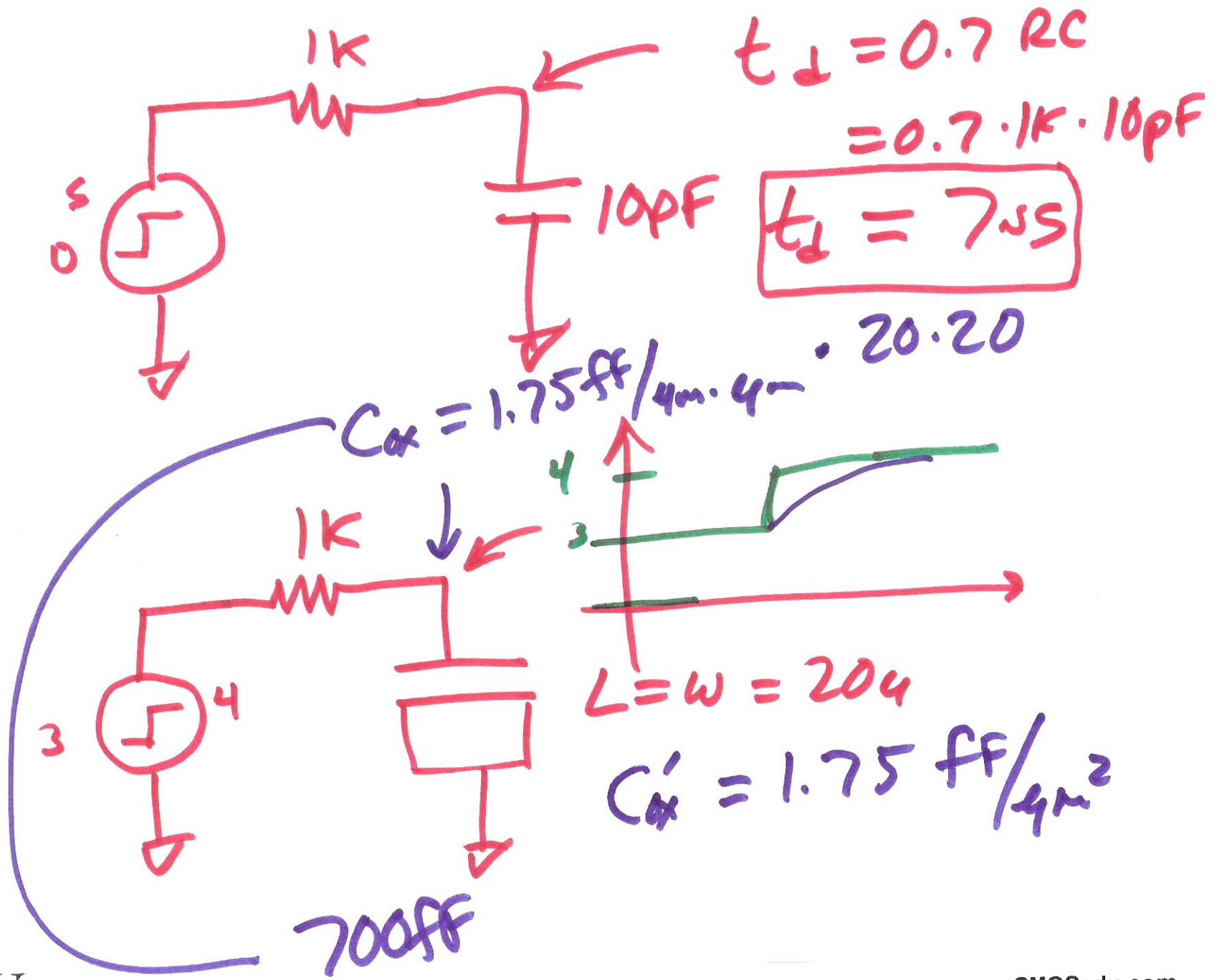


$$\frac{V_f}{2} = V_f (1 - e^{-t_d/RC})$$

$$\frac{1}{2} = 1 - e^{-t_d/RC}$$

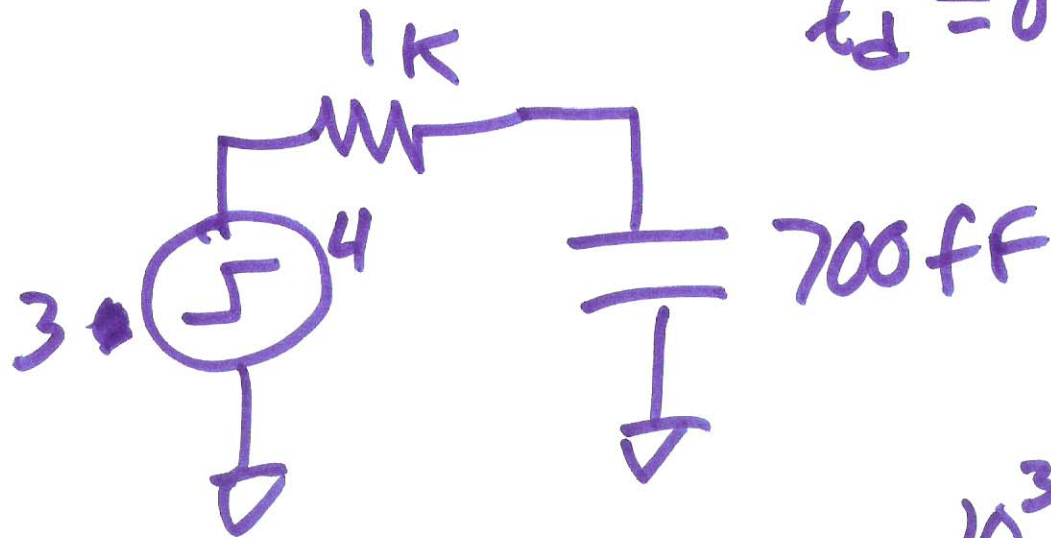


5)



b)

Equivalent Circuit



$$t_d = 0.7 \cdot 1k \cdot 700fF$$
$$t_d \approx \frac{1}{2} NS$$

$$10^3 \cdot 700 \cdot 10^{-15}$$
$$700 \cdot 10^{-12}$$
$$700 PS$$

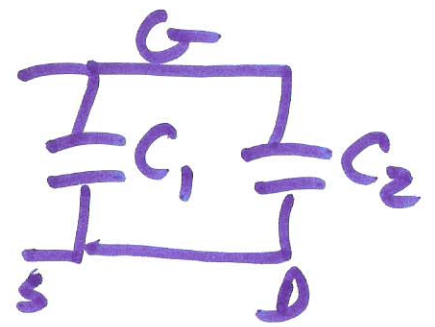
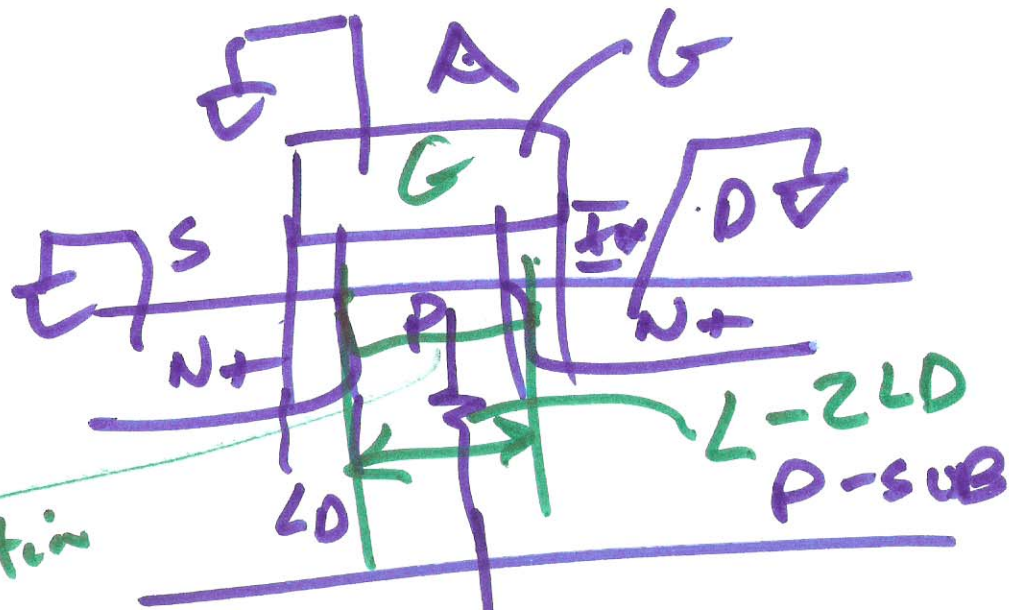
$$0.7 \cdot 700 PS$$

$$490 PS$$

$$.49 NS$$

$$\approx \frac{1}{2} NS$$

CMOSedu.com



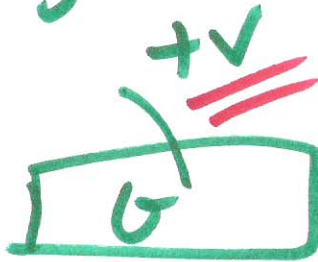
Accumulation holes

$$C_{gs,d} = \text{overlap CAP} = 2 \left(LD \cdot W \cdot \frac{\epsilon_{ox}}{tox} \right) C'_x$$

$$C_{gb} = \text{CAP G-B} = \frac{\epsilon_{ox}}{tox} \cdot W \cdot (L - 2LD)$$

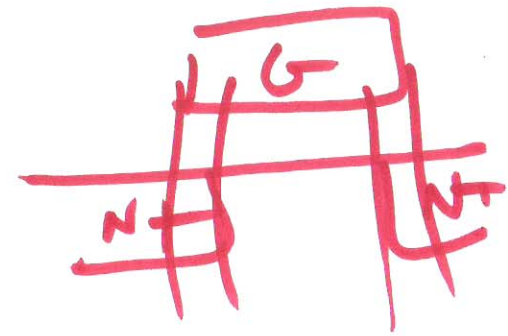
$$C_{g,tot} = C_{gs,d} + C_{gb} = C'_x \cdot L \cdot W !$$

String inversion



P-type

Accumulation



p-sub