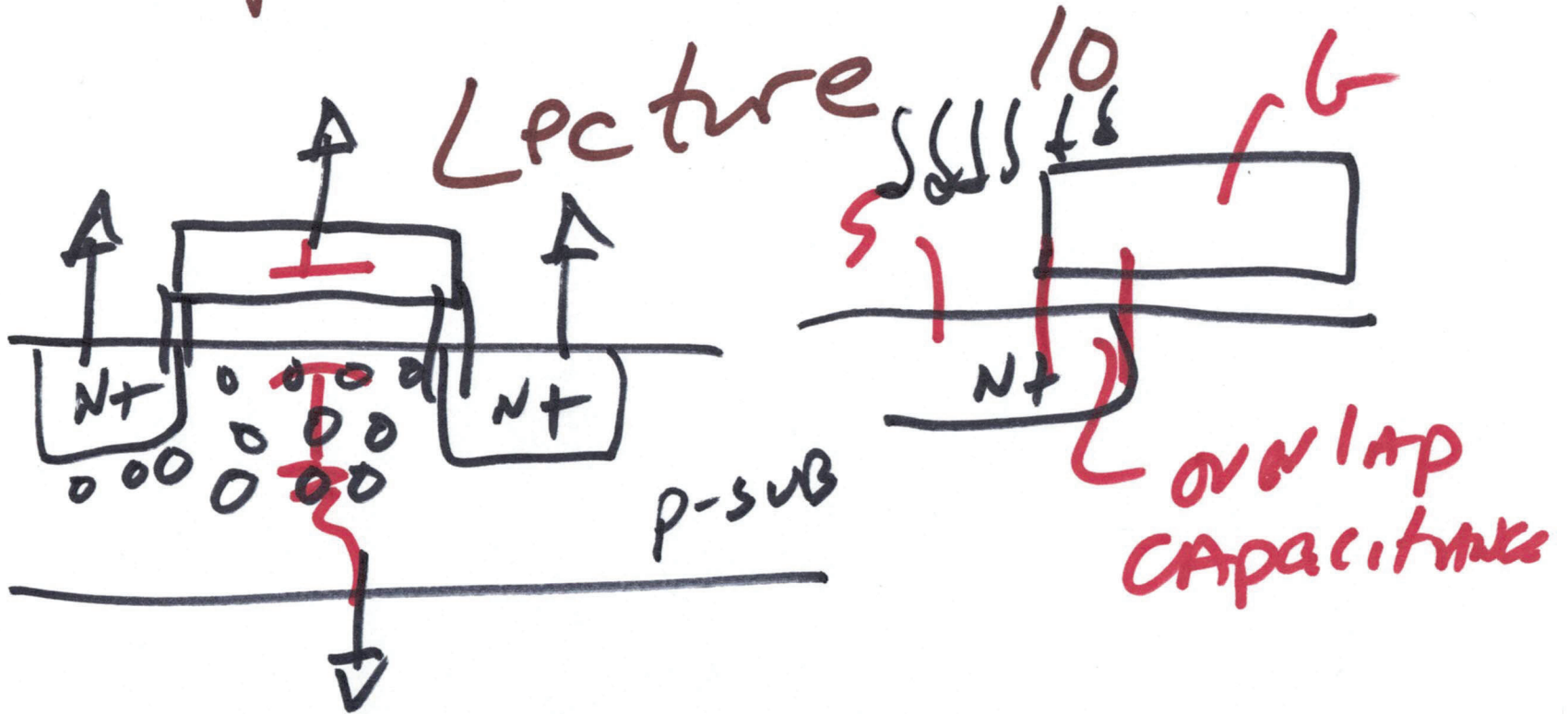


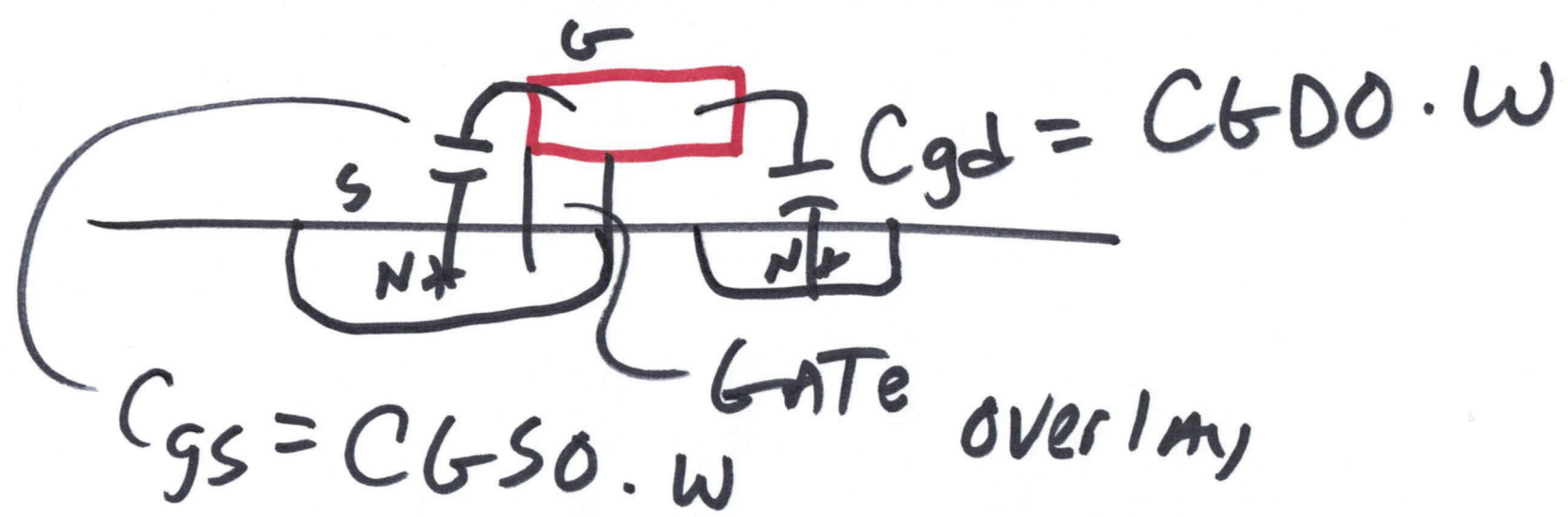
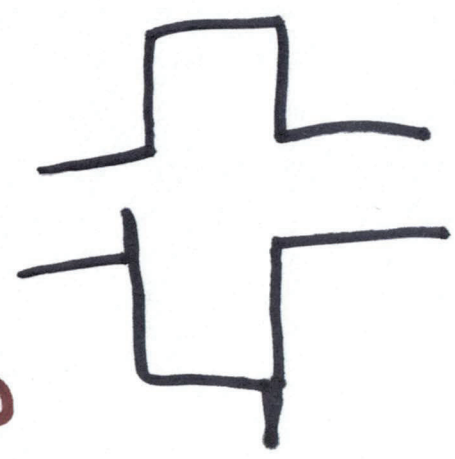
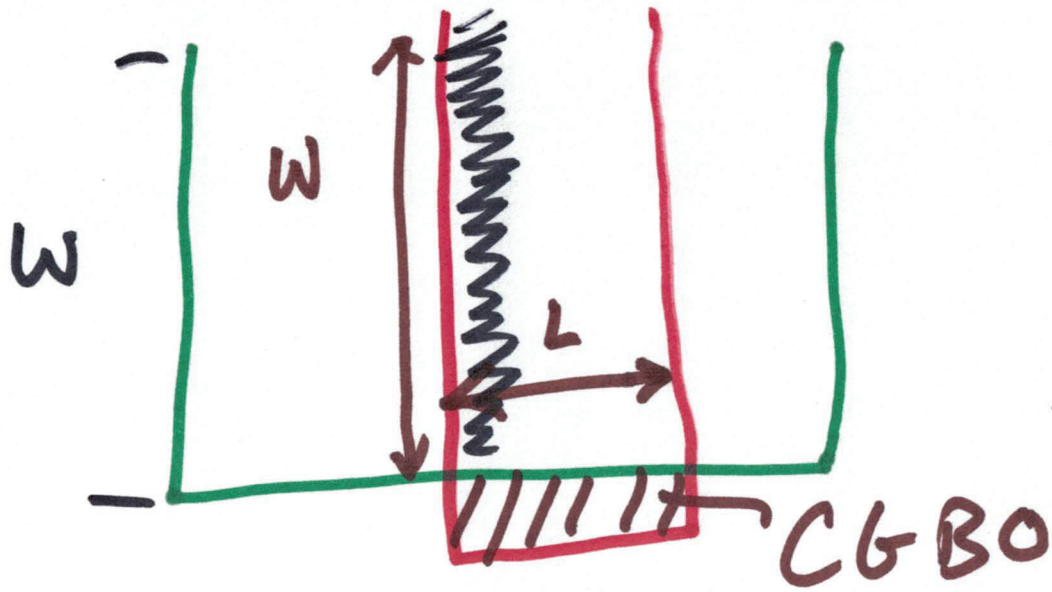
EE 421 / ELG 621

Digital IC Design

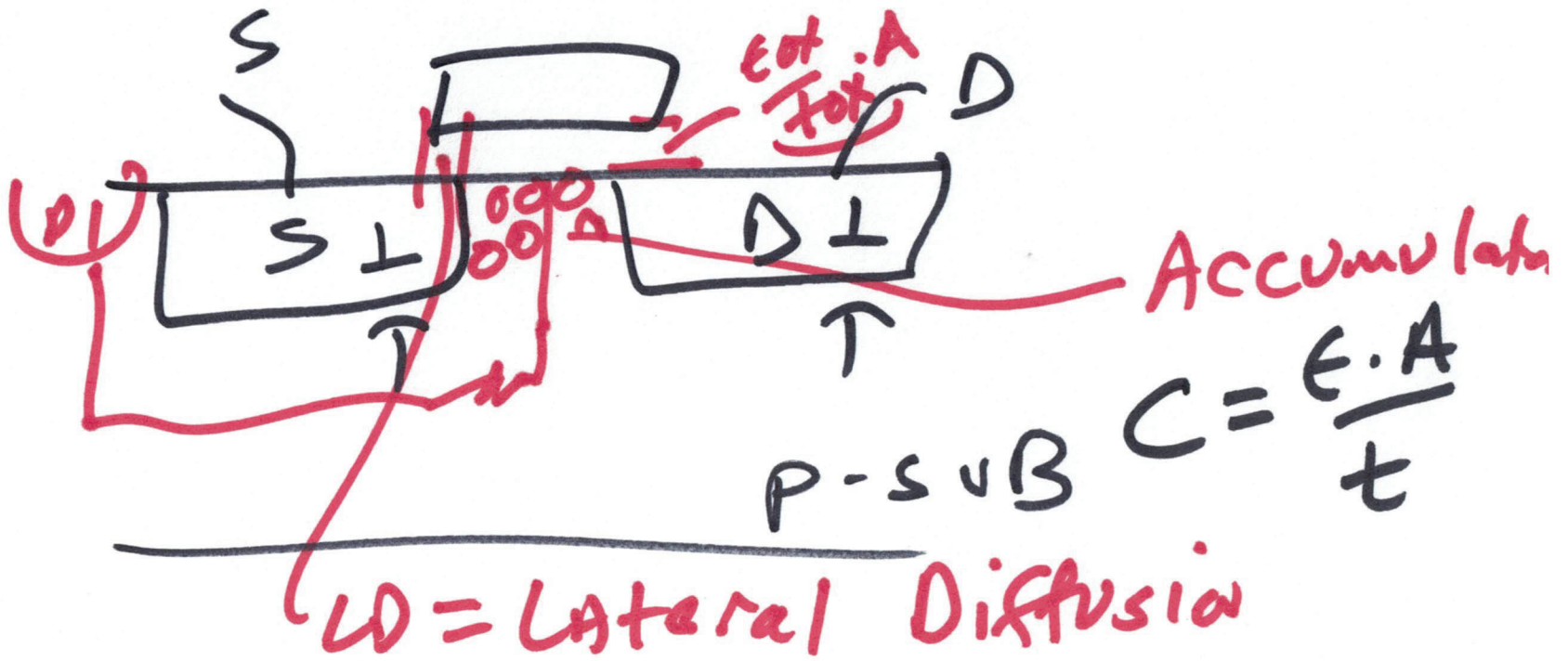
Sept. 27, 2021

Lecture 10



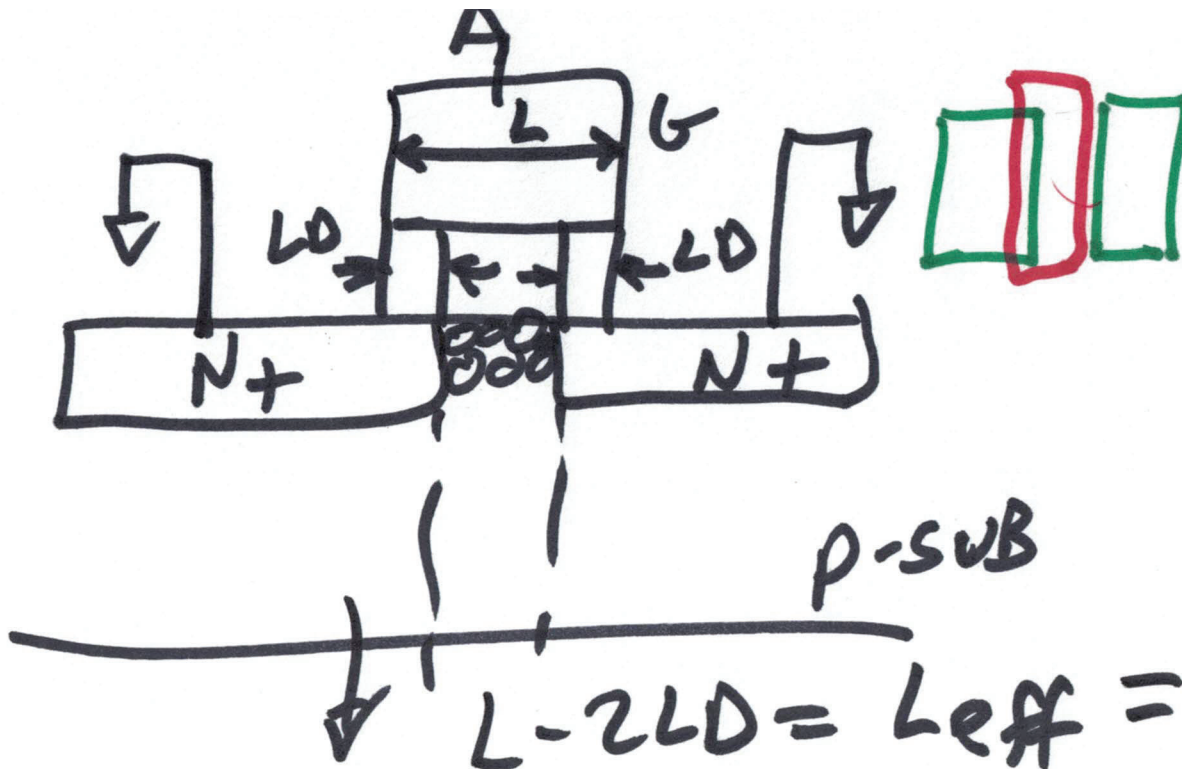


2)



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

$$\frac{\epsilon_{ox}}{t_{ox}} \cdot LD \cdot W = \frac{C'_{ox} \cdot LD \cdot W}{CGSO}$$

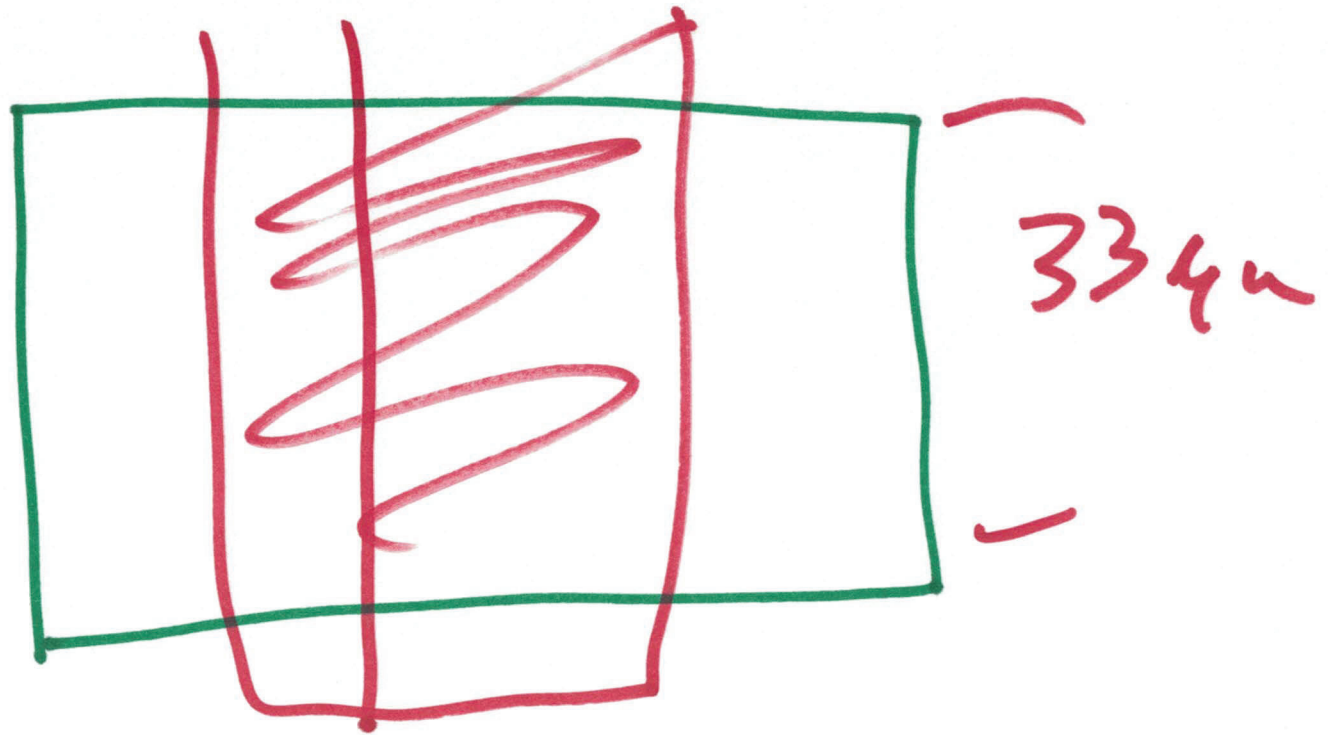


0.64 μ m
 $LD \approx 50 \text{ nm}$
 $= 0.05 \mu$

$$L - 2LD = L_{\text{eff}} = 500 \text{ nm} = \frac{1}{2} \mu \Rightarrow C5$$

$$C_{\text{ox}}' \cdot W \cdot LD + C_{\text{ox}}' \cdot W \cdot LD + C_{\text{ox}}' \cdot W \cdot (L - 2LD) = C_{\text{ox}}' \cdot W \cdot L = C_{\text{ox}}$$

4)



| 334 |

$$C = \frac{2.5 \text{ fF}}{\mu\text{m}^2}$$

$$= \frac{.334 \cdot 334}{1} = 2.7 \text{ pF}$$

$$C_{ox}' = \frac{\epsilon_{ox}}{t_{ox}} = \frac{3.9 \cdot 8.85 \cdot 10^{-18} / 10^{-6}}{1.38 \times 10^{-8}}$$

$$\frac{FF}{\mu m^2} = \frac{10^{-15}}{10^{-12}} = 10^{-3} \quad \frac{3.9 \cdot 8.85 \cdot 10^{-18}}{1.38 \times 10^{-14}}$$

$$= \frac{3.9 \cdot 8.85}{1.38} \times 10^{-4}$$

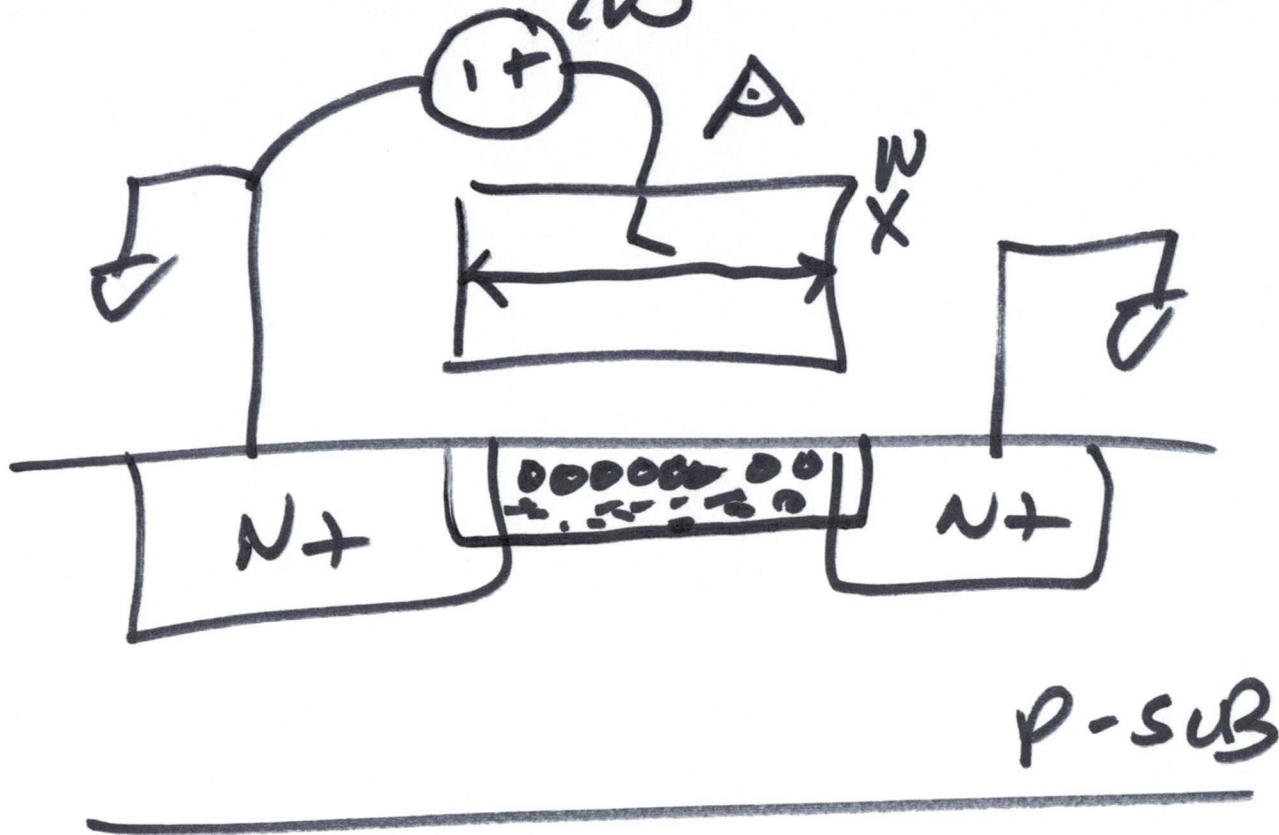
$$2.5 \times 10^{-3}$$

~~2.5 × 10⁻³~~

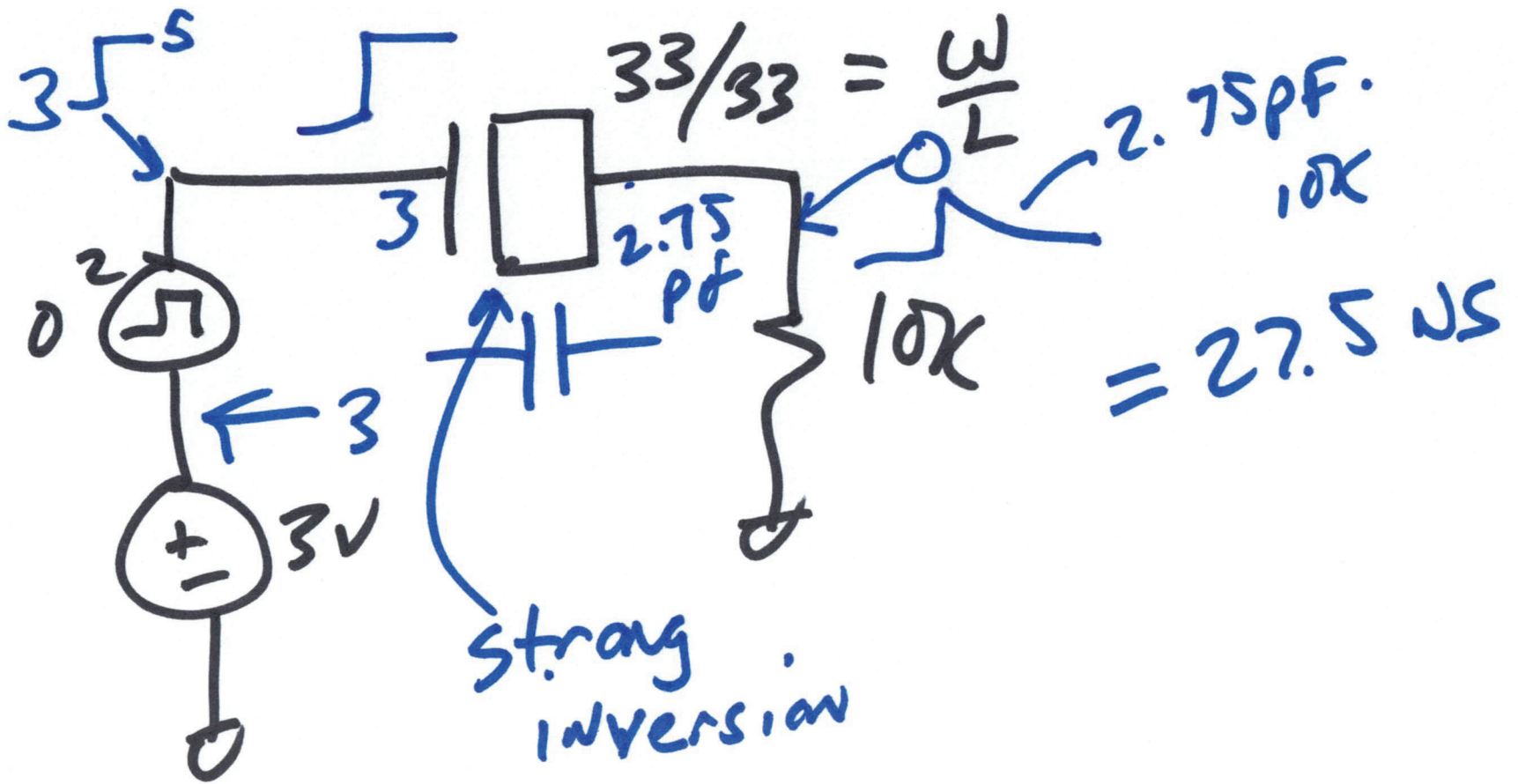
$$2.5 \frac{FF}{\mu m^2}$$

6)

Strong inversion



$$C_{ox} = C'_{ox} \cdot L \cdot W$$



3)