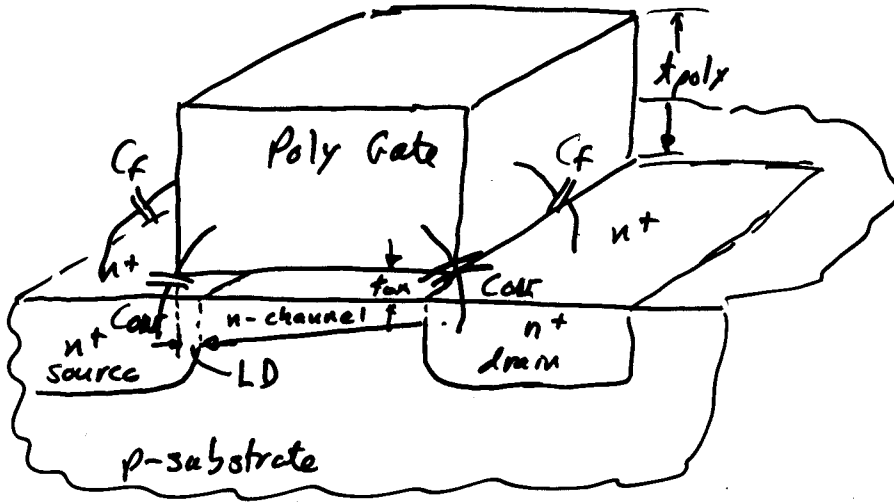


Overlap Capacitances

$$C_{OL} = C_{ox} + C_f = C_{ox}(LD) + \frac{2\epsilon_{ox}}{\pi} \ln\left(1 + \frac{t_{poly}}{t_{ox}}\right)$$

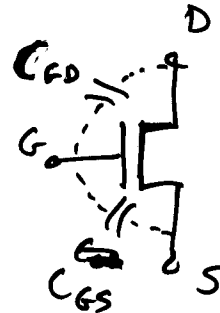
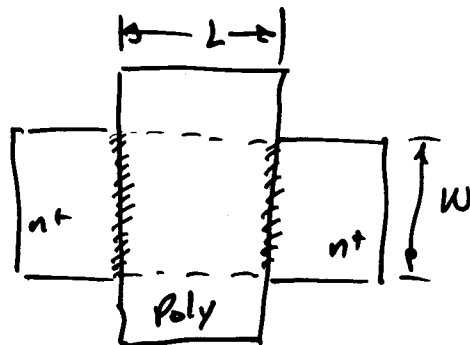
Ex. 2.13

Find $C_{OL} = C_d$ for $\frac{t_{poly}}{t_{ox}} = 100$ and $LD = 10 \mu m$

$$C_f = \frac{2(4)(8.85 \times 10^{-14})}{3.14} \ln(1+100) = 0.11 \text{ fF}/\mu m$$

$$C_{ox} = \frac{4(8.85 \times 10^{-14})}{22 \times 10^{-8}} \times 10 \times 10^{-7} = 0.16 \text{ fF}/\mu m$$

$$C_{OL} = C_{ox} + C_f = 0.27 \text{ fF}/\mu m.$$



$$C_{GD} = W \times C_{OL}$$

$$C_{GS}(\text{sd.}) = W \times C_{OL} + \frac{2}{3} W L C_{ox}$$