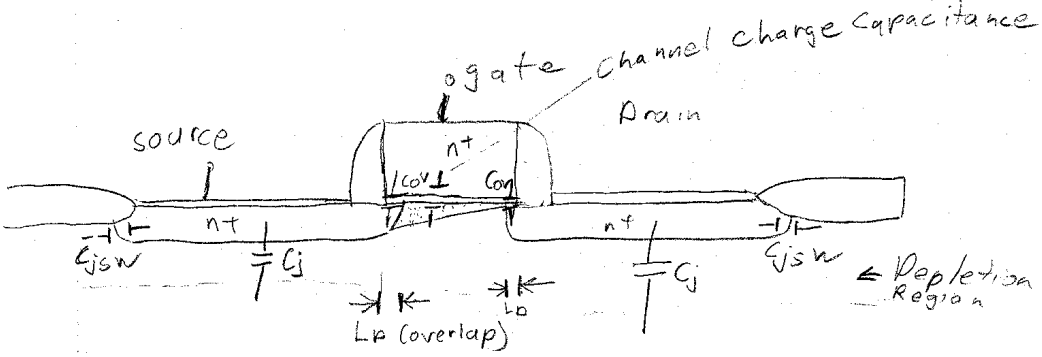
tutorial 10/15



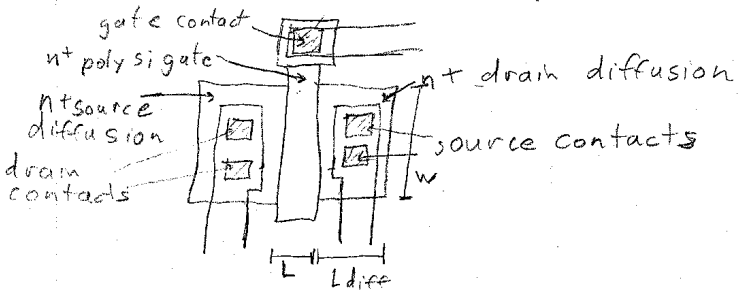
C_{gs} = channel charge + overlap capacitance

channel charge cap $= \frac{2}{3} W L C_{ox}$

overlap cap = $W C_{ov}$

C_{gd} = overlap capacitance = $W C_{ov}$

C_{sb} = source body pn jct. capacitance + side wall capacitance



$C_j = W L_{diff} \sqrt{\frac{q \epsilon_s N_a}{2(\phi_0 - V_{BS})}}$ rev. biased pn-jct $V_{BS} < 0$

$C_{jsw} = (2 L_{diff} + W) C_{JSW}$

$C_{sb} = C_j + C_{jsw}$

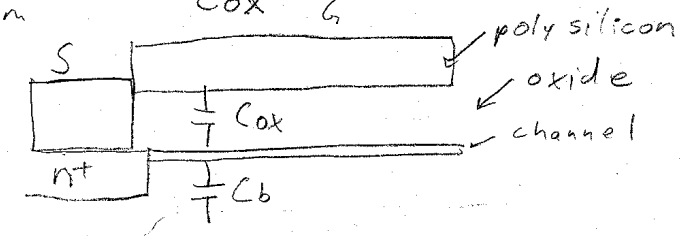
C_{bd} = drain-body pn jct capacitance + side wall capacitance

$C_{db} = C_j + C_{jsw}$

C_{gb} = no Capacitance in the channel because the channel charge blocks the field between the gate and body - Capacitance is only out side channel - it is paracitic.

Back gate Trans conductance

$$\frac{g_{mb}}{g_m} = \frac{C_b(y=0)}{C_{ox}}$$



$$C_{ox} = \frac{Q_{channel}}{V_{GC}} \qquad C_b = \frac{Q_{channel}}{V_{BC}}$$

the capacitances are the ratios between the applied voltages and the charge in the channel. If C_b is bigger than C_{ox} an increase in V_{GC} will cause $Q_{channel}$ and I_{DS} to increase more than the same increase in V_{GC}, so g_{mb} would be larger than g_m.