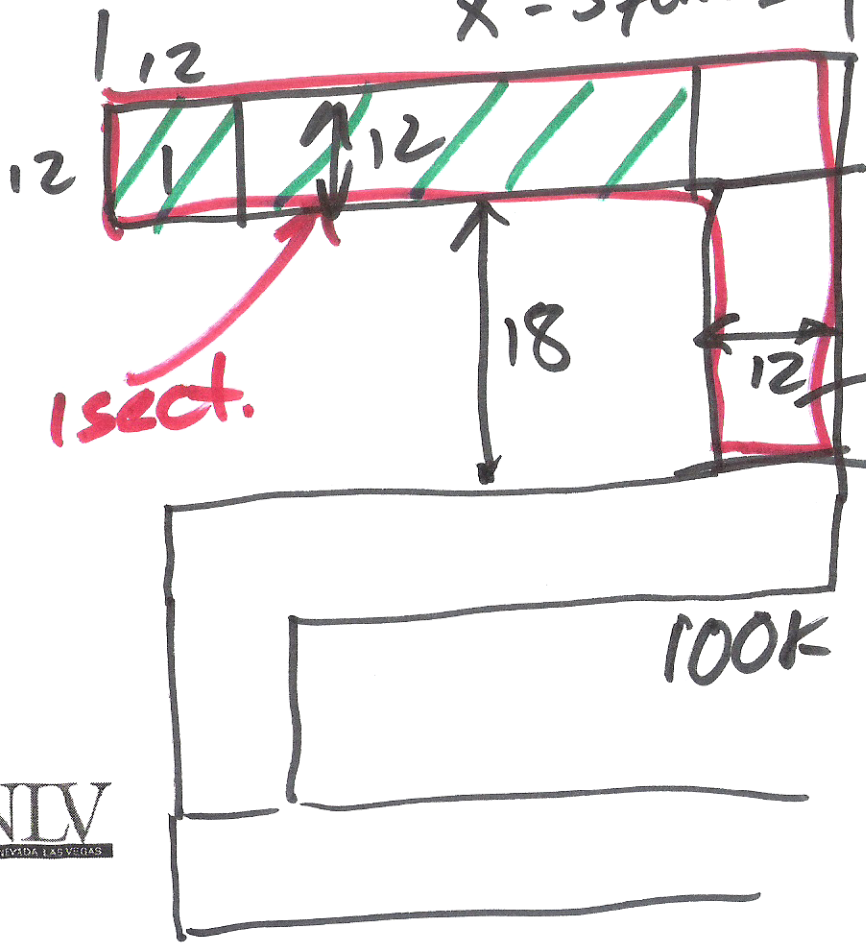
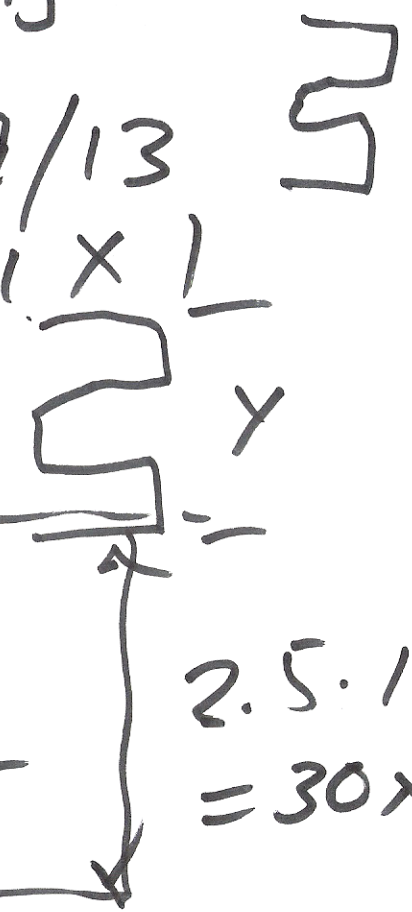
EE 4281 / ECG 6281
Digital IC Design
Lecture 5

9/9/13

$-\frac{R_F}{R_I}$

R = 100K





$= [(X-1).1K + 600 + 1.5K]_N$

N-spacing

$X \cdot 12\lambda$

$30\lambda \cdot N = X \cdot 12\lambda$

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Metal layers

1- N-well

metal 3 ← for our process is the top metal layer

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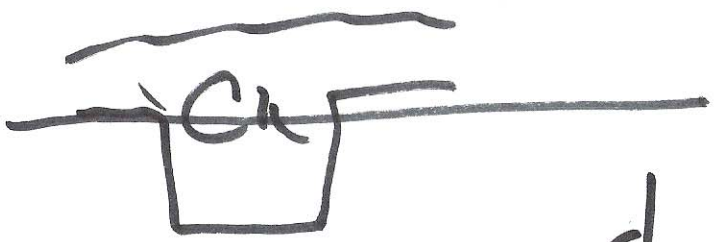
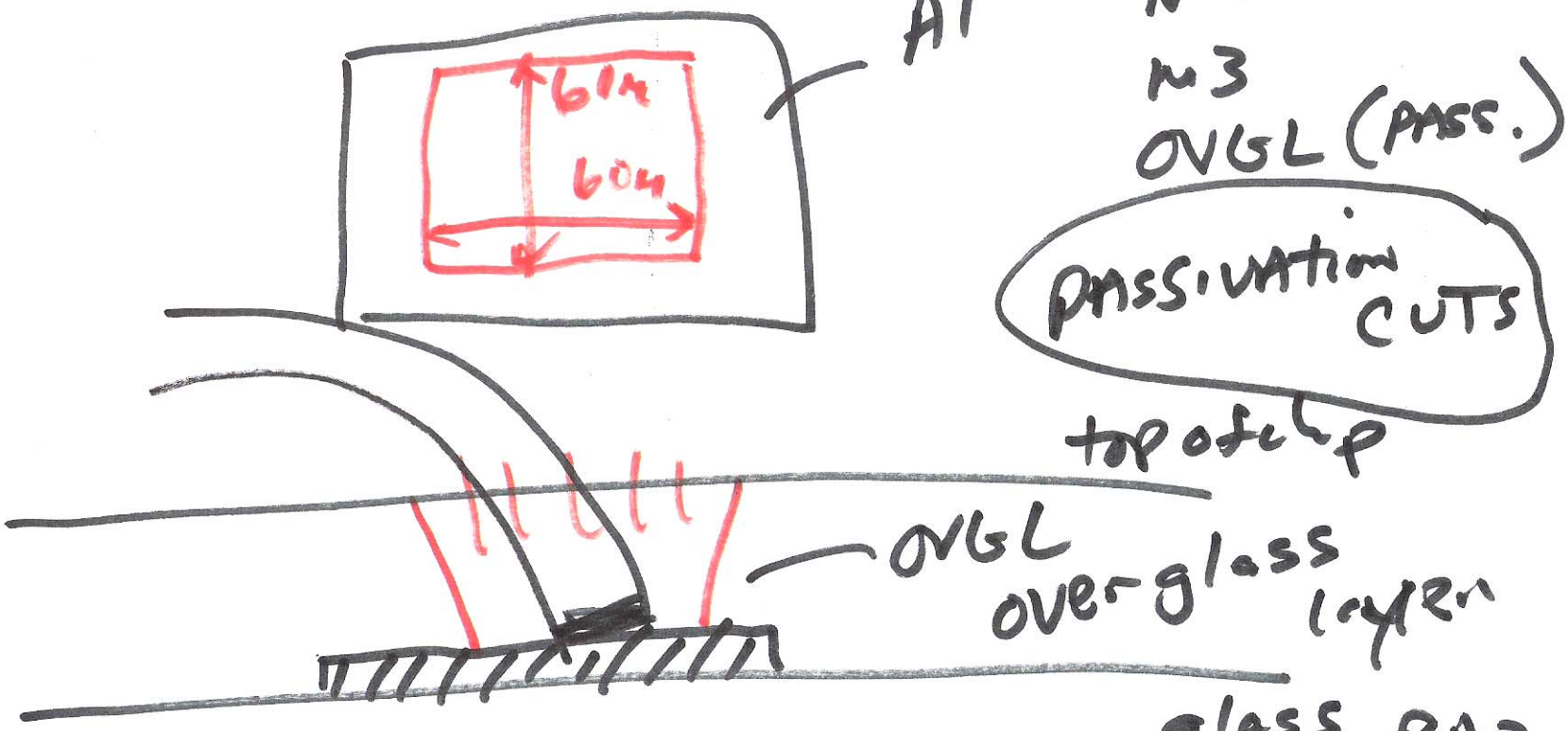
$\lambda = 300\,nm = 0.3\mu$



$75\mu \times 75\mu$

$$drawn = \frac{75\mu}{0.3\mu} = 250\lambda$$



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1.5 mm × 1.5 mm — (Tiny chip)

$\frac{1.25\,mm}{1.5\,\mu m} = 1.54$ squares 5λ min.

$R_{\square}|_{m3} = 0.05\,\Omega/\square$

Calculate $R_{parasitic,m3} = \frac{1{,}250\mu}{1.54} .05$

$= 41.7\,\Omega$

Calculate the parasitic C of the Bond pAD.

$C_{pad} = 8\,aF/\mu m^2 \cdot 75\mu m \cdot 75\mu m +$

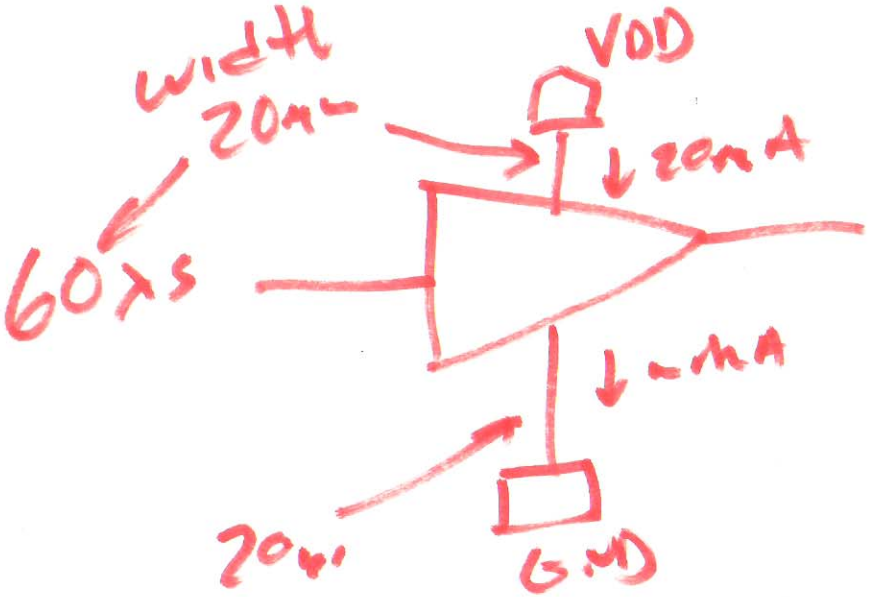
$300\mu m \cdot .24\,\frac{aF}{\mu m} = 52.2\,fF$

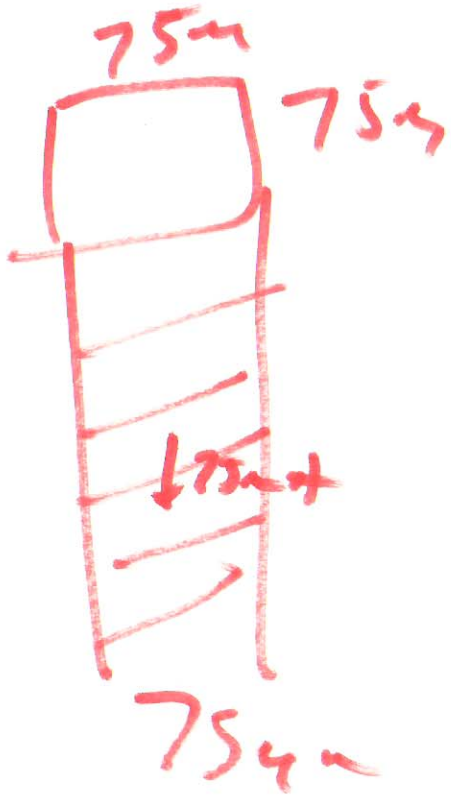
Electromigration

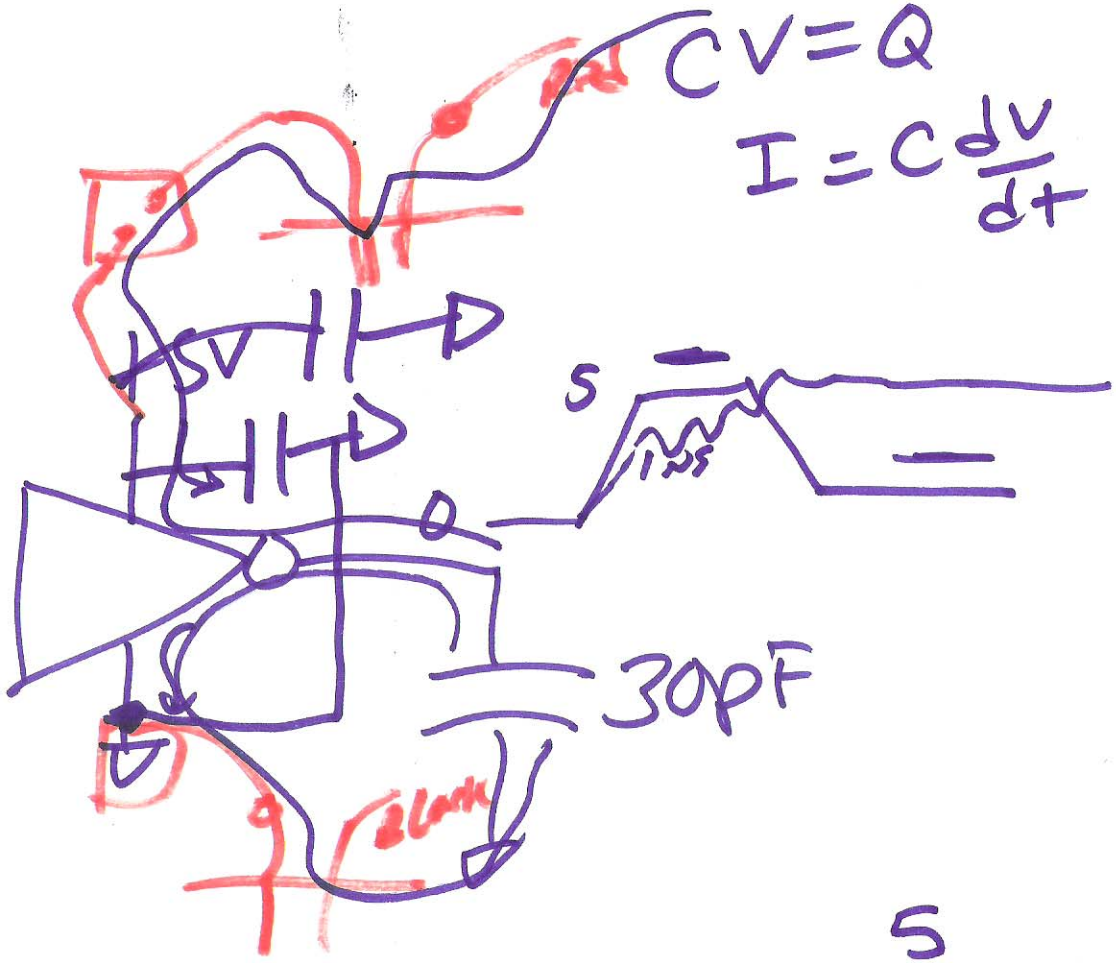
$J_{al} \simeq 1mA/\mu m\text{-width}$

$I \leq 1.5mA$

$\Updownarrow 5\lambda = 1.5\mu m$







$CV = Q$

$I = C\frac{dV}{dt}$

$I_{peak} = 30pF \cdot \frac{5}{1ns}$

$= 150mA$