Design the current mirror shown in g.1 to get an Rout  $\geq$  800k @ VDC = 400mV at M4 drain and use a mirroring ratio 1 : 1

- assume  $Iin = 25\mu A$ 

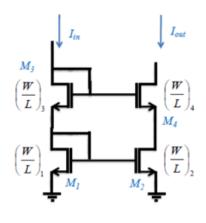
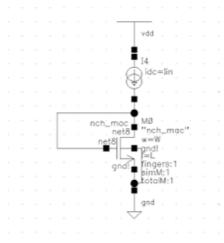


Figure 1:



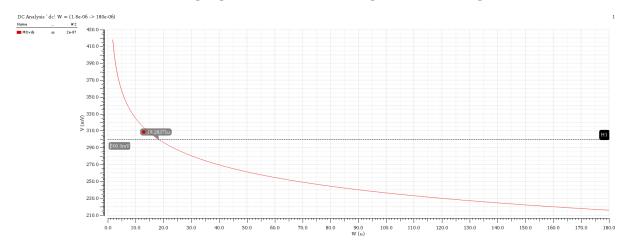
Assumptions and design strategy

$$V_{GS1,2} = V_{DS1,2} = 300 \text{ mV}$$

$$L_{1,2} = 3L_{\min} = 180 \text{ nm}$$

Sweep  $W_{1,2}$  from  $10\text{L} \rightarrow 100\text{L}$  using the TB on the right

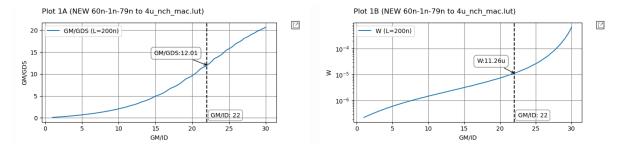
Select the proper W that achive our previous assumptions



$$W_{1,2} = 18.3 \text{ um} \rightarrow r_{\text{o}1,2} = 66.8 \text{ k}\Omega$$

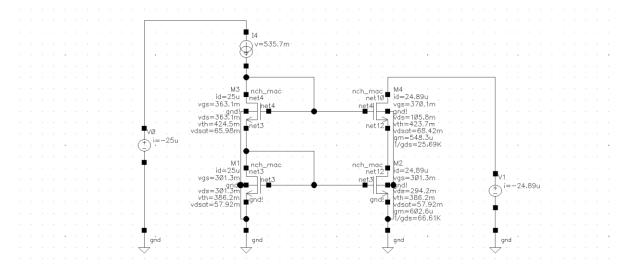
$$R_{out} = g_{m4} r_{o4} r_{o1} = 800 \; k\Omega \rightarrow g_{m4} r_{o4} = 12$$

Assume 
$$\left(\frac{g_m}{I_D}\right)_4 = 22$$



 $L_{3,4} = 200 \text{ nm} \rightarrow W_{3,4} = 11.3 \text{ um}$ 

## Apply to Cadence



sweep VDC at M4 drain and draw the structure rout vs VDC at f = 1Hz

