Build a common gate amplifier that meets the following specs	

Spec.	
DC Gain	20 dB
BW	$\geq$ 14 MHz
Power Consumption	$\leq$ 70 uW
Cap Load	1 pF

$$P_{cons} = V_{DD}\, I_D \leq 70\ uW \rightarrow I_D \leq 58\ uA$$

$$GBW = \frac{g_m}{2\pi C_{out}} \geq 10 * 14\ MHz \rightarrow g_m \geq 880\ uS \rightarrow g_m = 1.05\ mS \rightarrow \frac{g_m}{I_D} = 18.1$$

$$A_v = g_m R_{out} = 10 \rightarrow R_{out} = 9.6\ k\Omega \rightarrow R_D = 11.5\ k\Omega \rightarrow r_o \geq 58.1\ k\Omega \rightarrow \frac{g_m}{g_{ds}} \geq 61$$

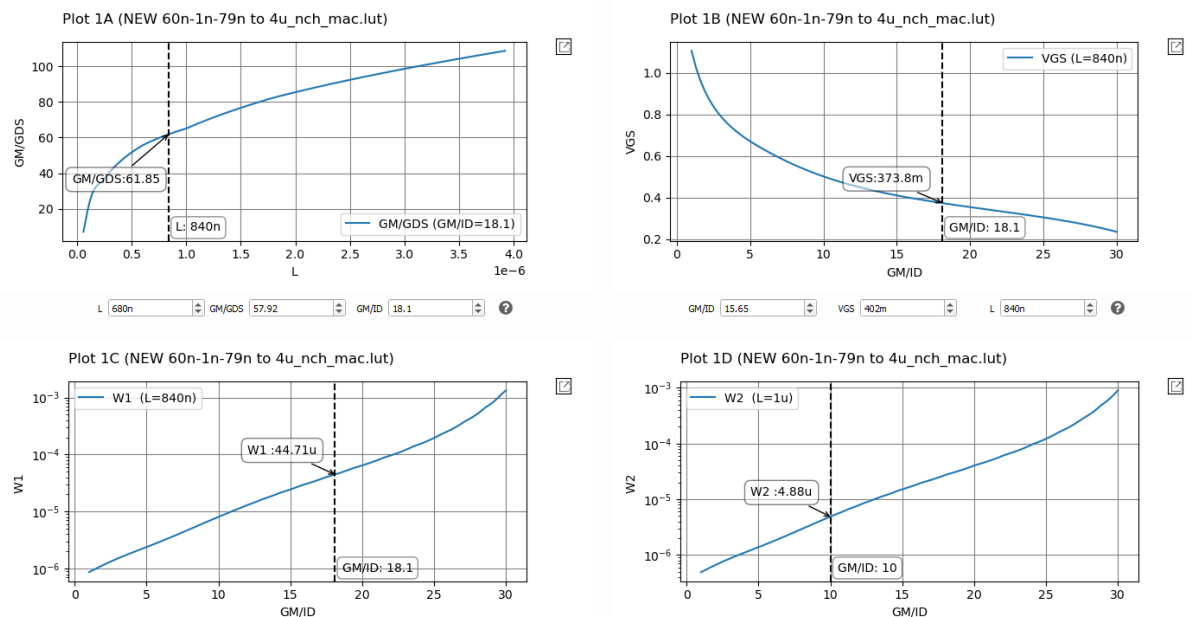$$V_{out} = V_{DD} - I_D * R_D = 1.2 - 58u * 11.5k = 0.533\ V$$

Assume Vout divided equally between M1 and M2
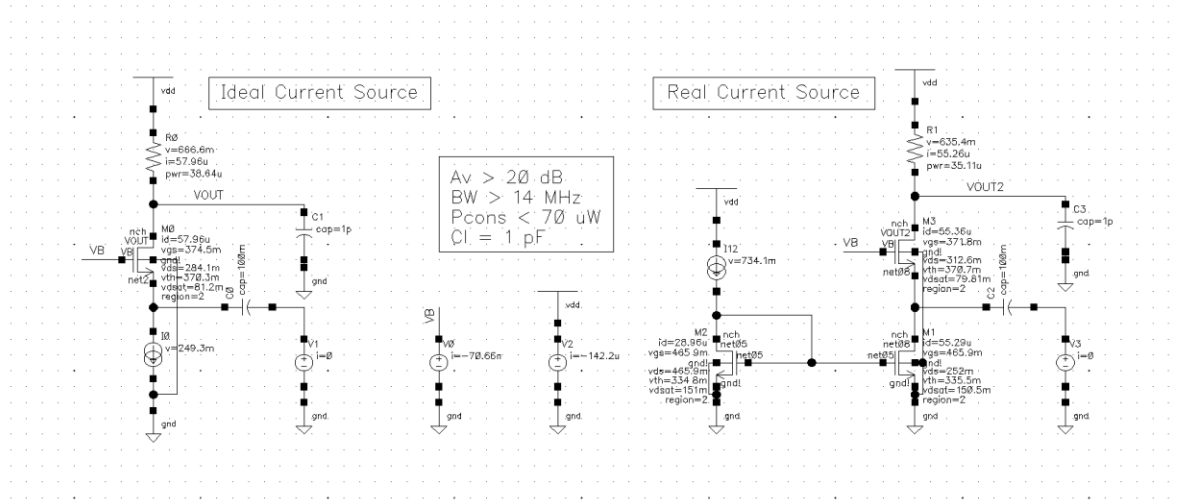
$$L_1 = 840\ nm, V_{GS1} = 373.8\ mV, W_1 = 44.71\ um$$

For the Current source device assume long L and bias it in SI (*gmoverid = 10*) to achieve large output resistance

$$L_2 = 1\ um, W_2 = 4.88\ um$$

Simulations

1. DC Operating Points

Ideal Current Source

Real Current Source

Av > 20 dB
BW > 14 MHz
Pcons < 70 uW
Cl = 1 pF

2. AC Analysis