Spec.	
Common Source Degenerated Amplifier	
DC Gain	6 dB
BW	≥ 1 GHz
Power Consumption	≤ 0.4 mW
Cap Load	100 fF

- Steps

1 | $P_{cons} = V_{DD}\, I_D \leq 0.4\ mW \rightarrow I_D \leq 330\ uA$

2 | Assume $C_{out} = 1.2C_L = 120\ fF$

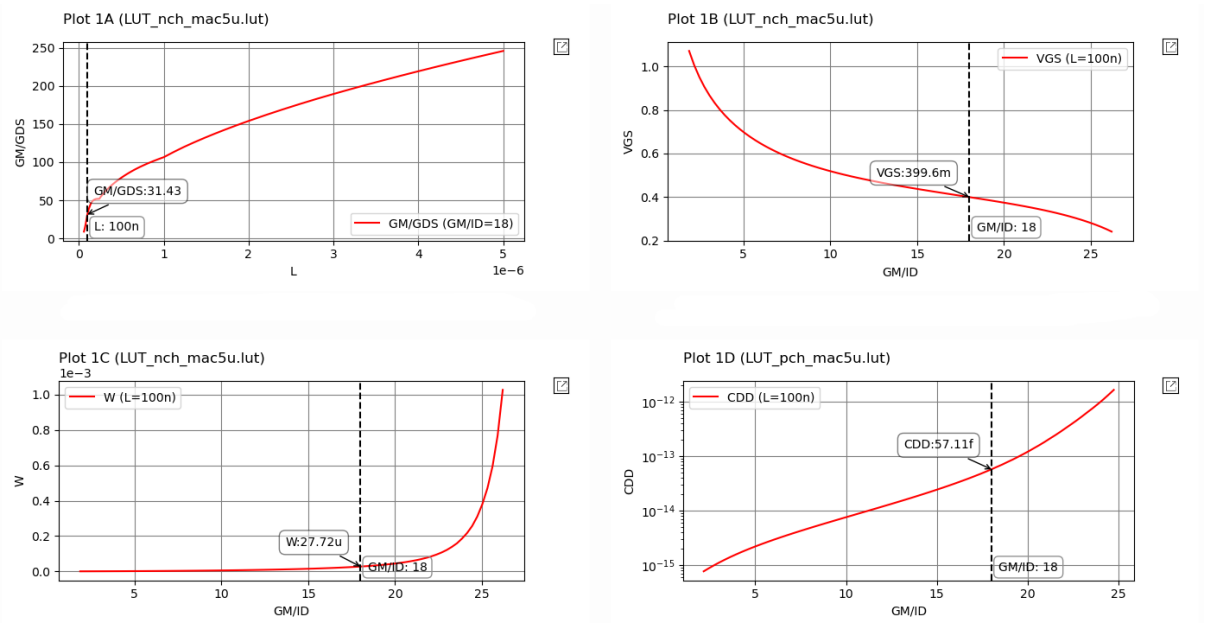
3 | $GBW = \frac{Gm}{2\pi C_{out}} \geq 2 * 1\ GHz \rightarrow G_m \geq 1.5\ mS \rightarrow G_m = 1.8\ mS$

4 | Assume $\frac{g_m}{I_D} = 18 \rightarrow g_m = 5.95\ mS \rightarrow R_S = 387.5\ \Omega \rightarrow V_{Rs} = 127.8\ mV$

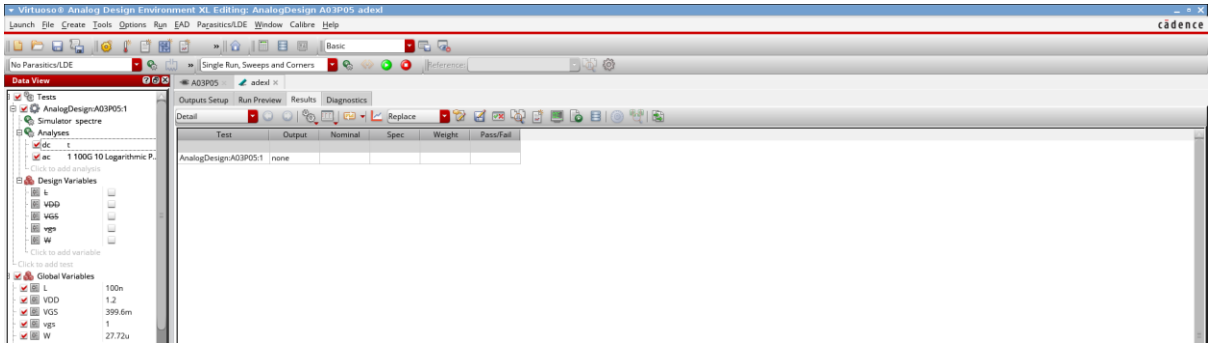
5 | $A_v = G_m R_{out} = 2 \rightarrow R_{out} = 1.112\ k\Omega \rightarrow R_D = 1.225\ k\Omega \rightarrow R_{LFD} \geq 12.055\ k\Omega$

6 | $R_{LFD} = g_m r_o R_s \rightarrow \frac{g_m}{g_{ds}} \geq 31.1$

7 | $V_{out} = V_{DD} - I_D * R_D = 800\ mV$ and $V_{DS} = 672\ mV$

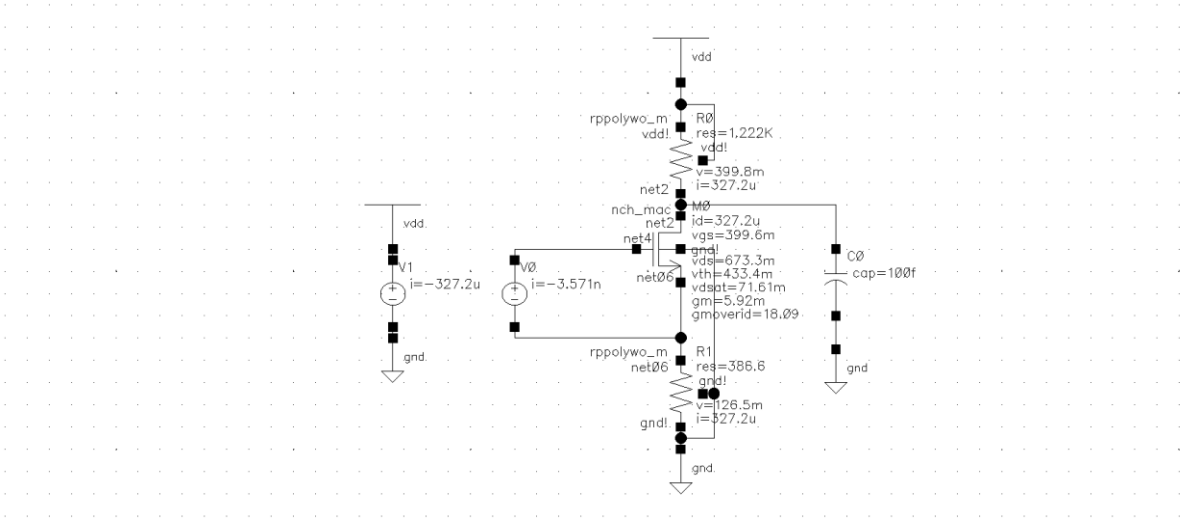


- Setup



- Results

1. DC Operating Points



2. AC Analysis