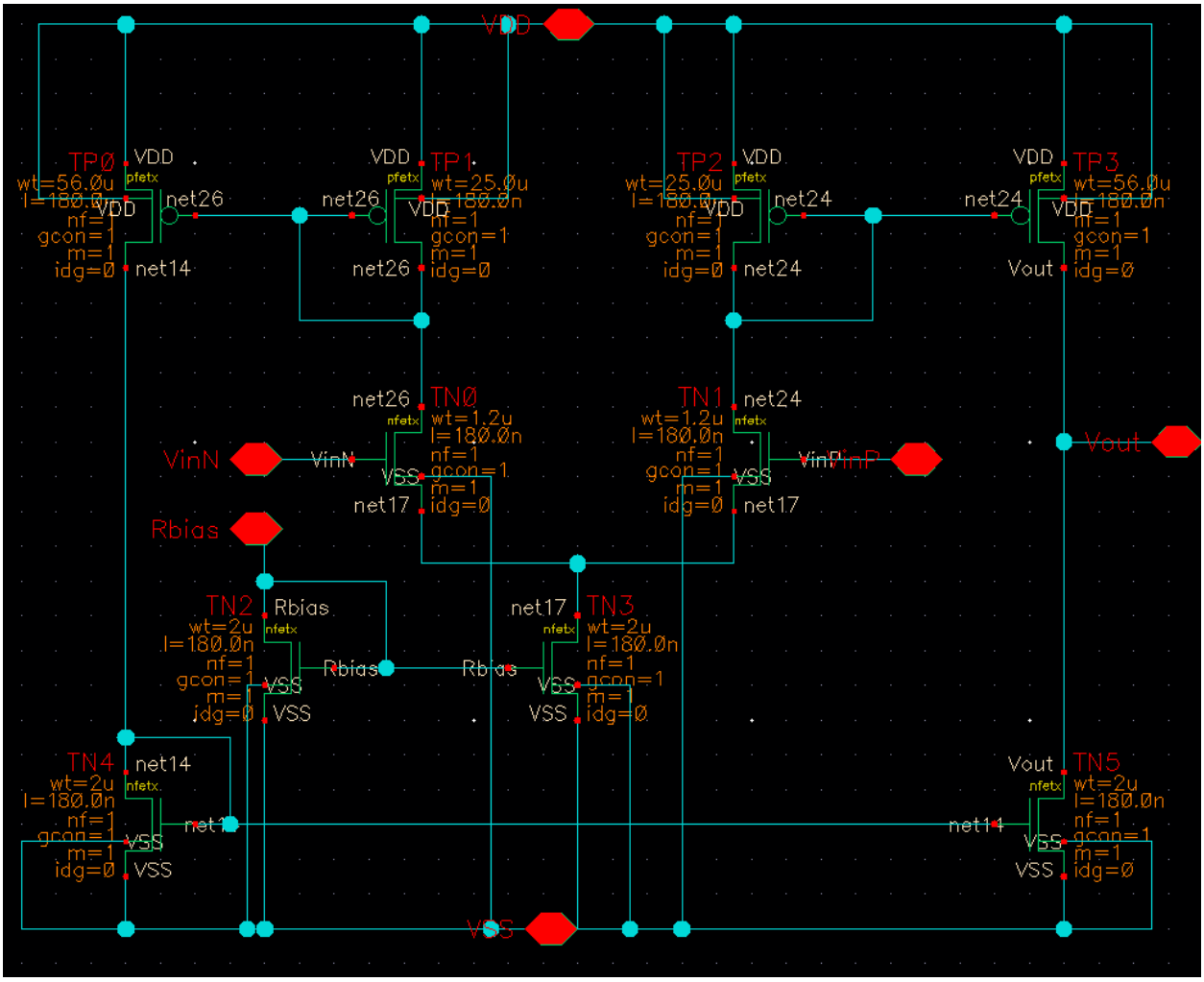
Matthew Loden

ECEN 474

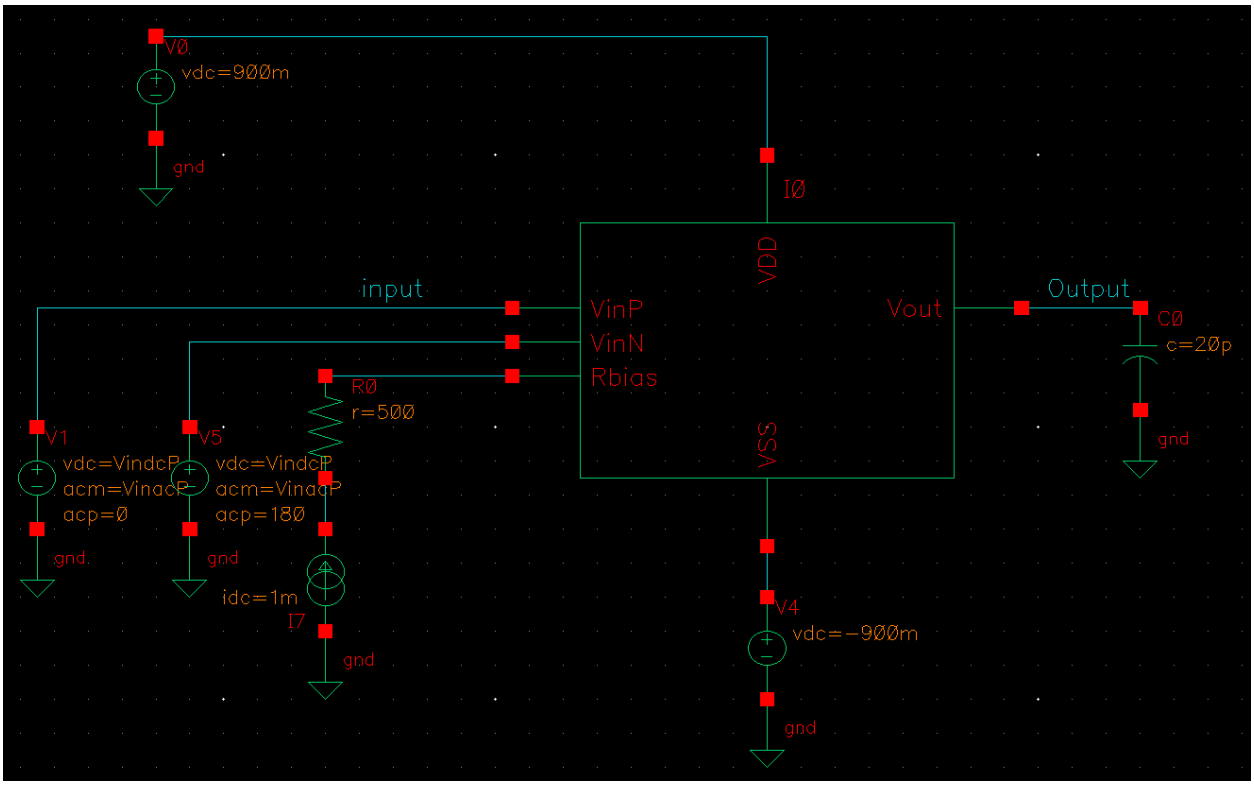
Lab 08 – Operational Transconductance Amplifier

Schematic and Pre-lab Simulations:

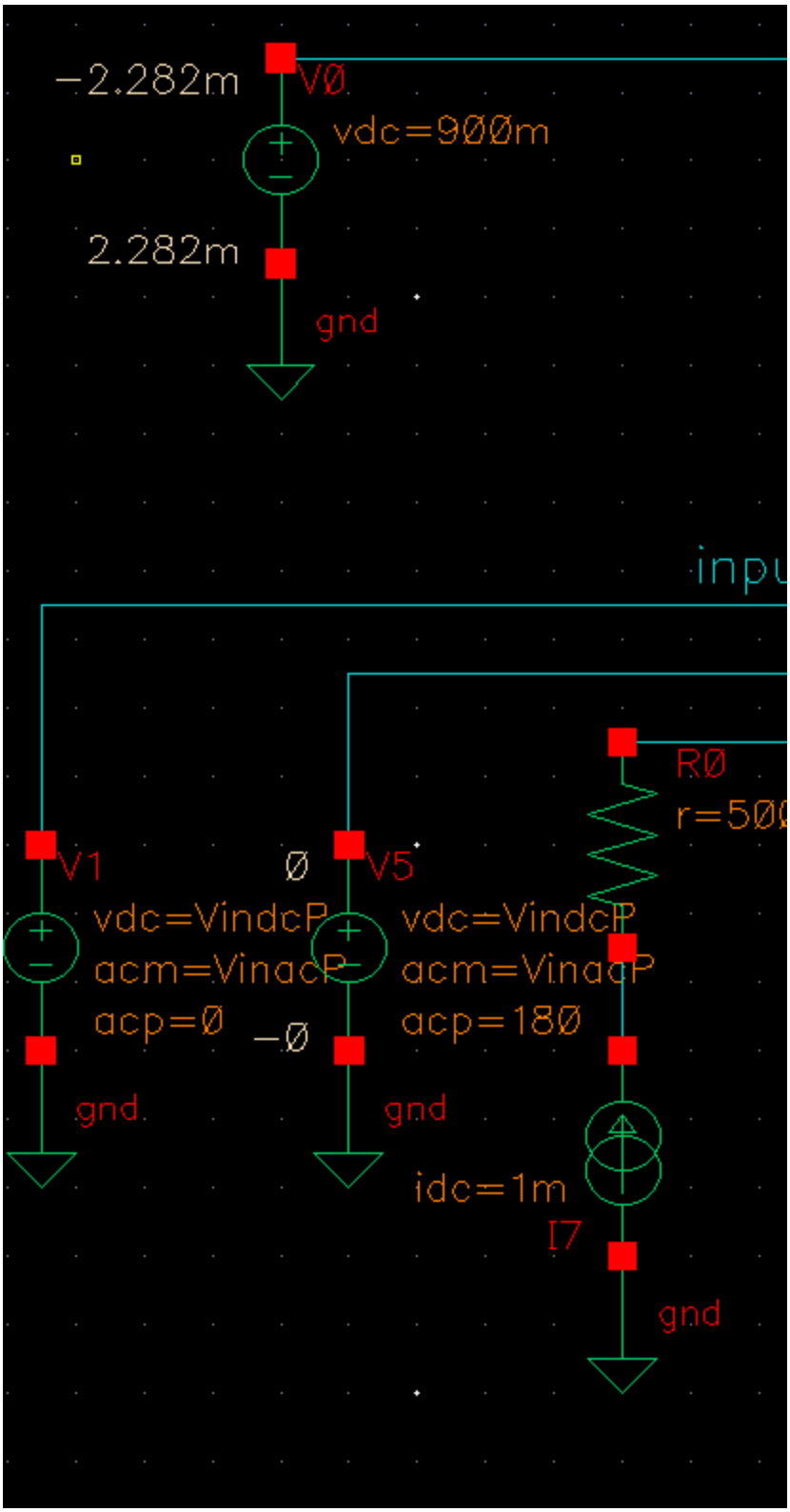
Schematic:



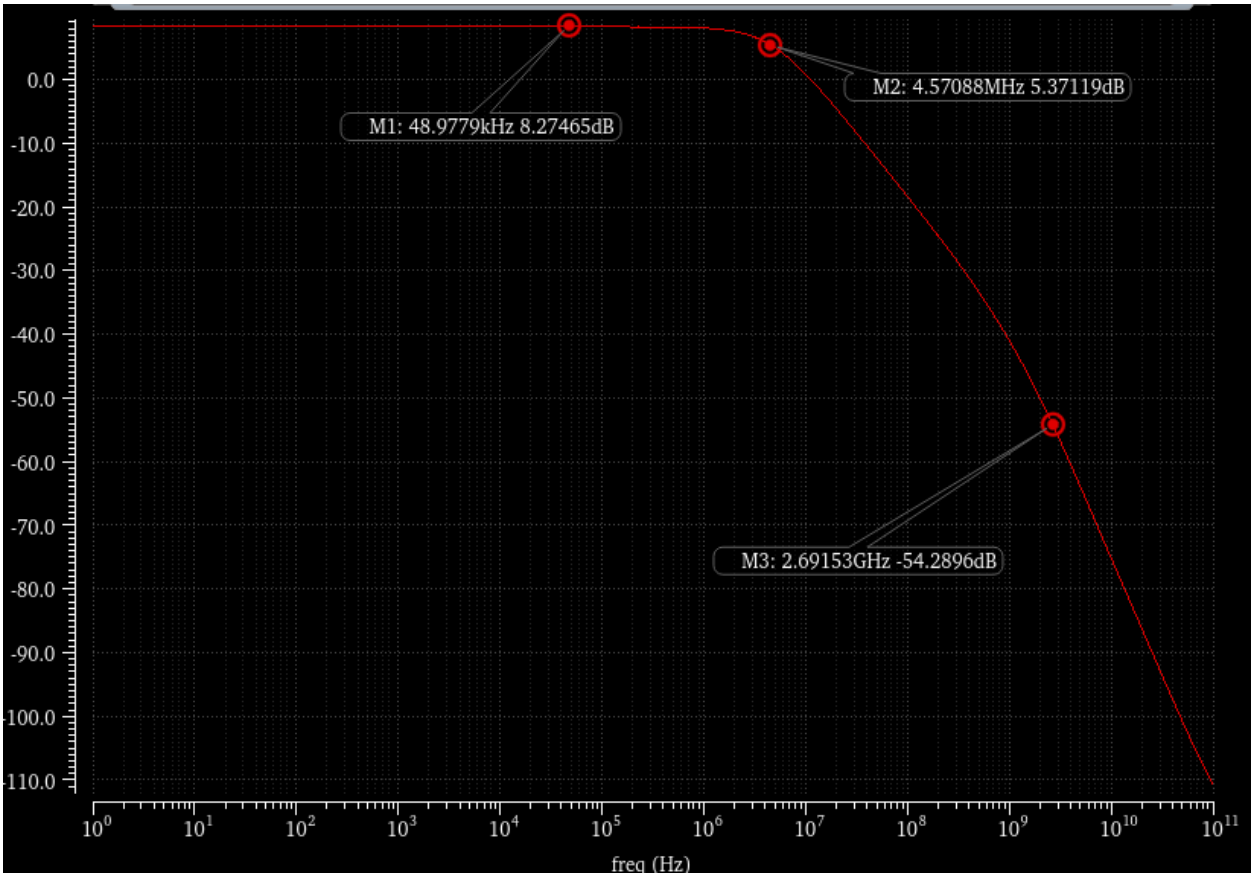
Test Bench:



Power Draw from Voltage Sources Not Including Current Source:

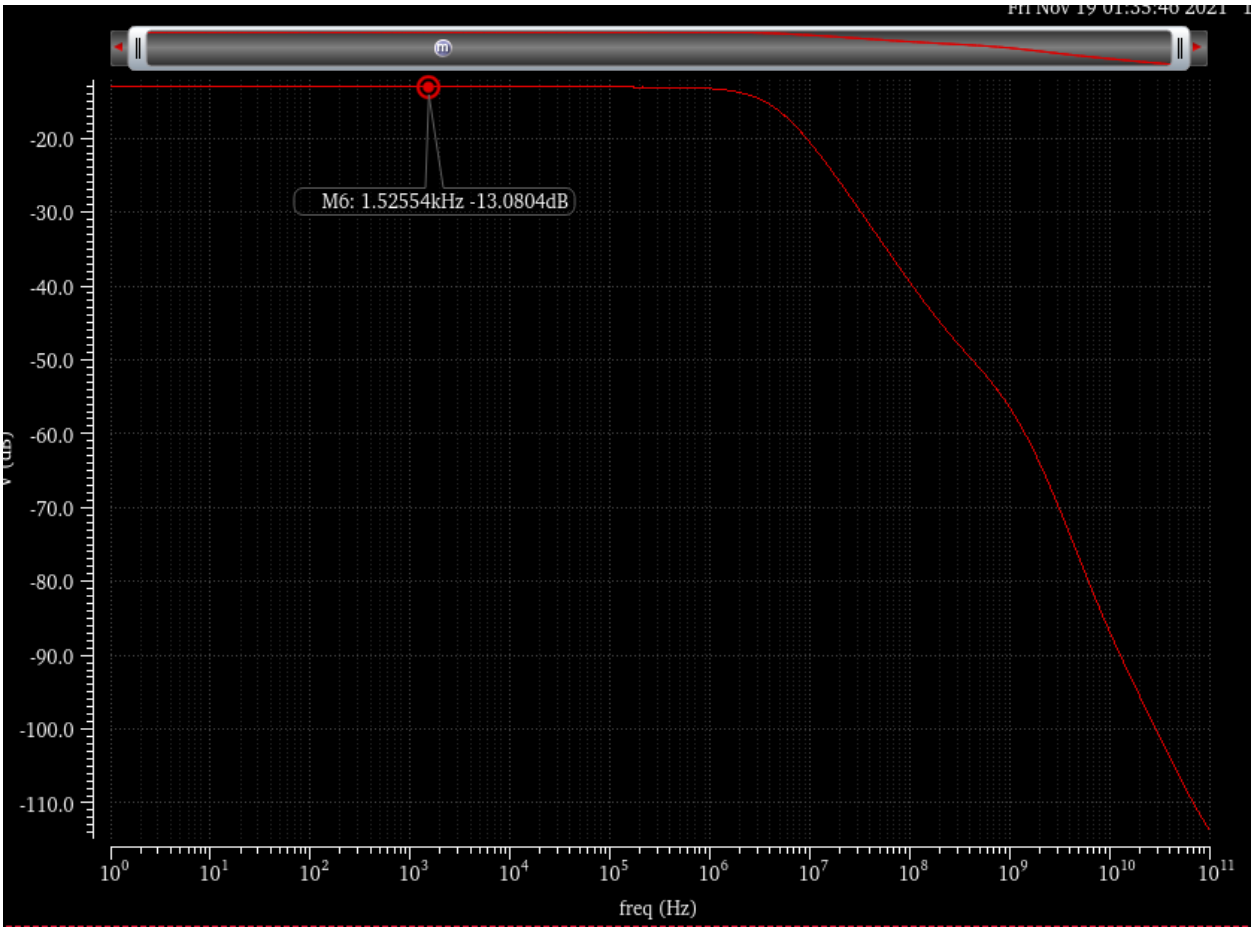


Power = (2.282-1)mA * 1.8v = 2.307mW

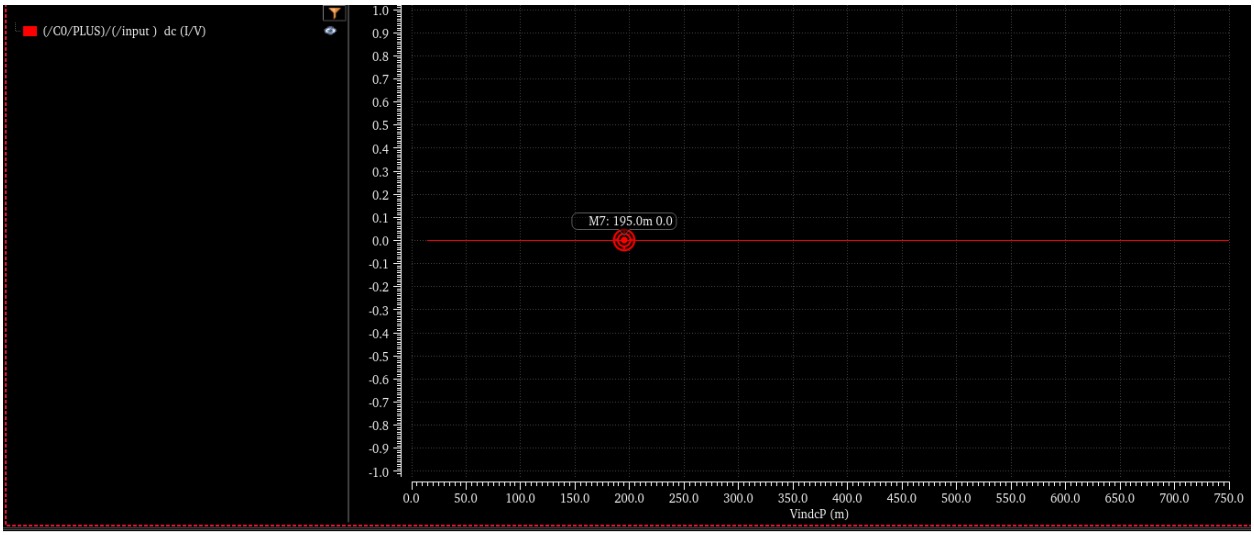


Adm = 8.27dB , Dominant Pole = 4.57MHz , Phase margin ensured > 60 due to second pole occurring at 2.69GHz which is much larger than three times the pole one frequency.

GBW = Adm * P1 = 11.84MHz

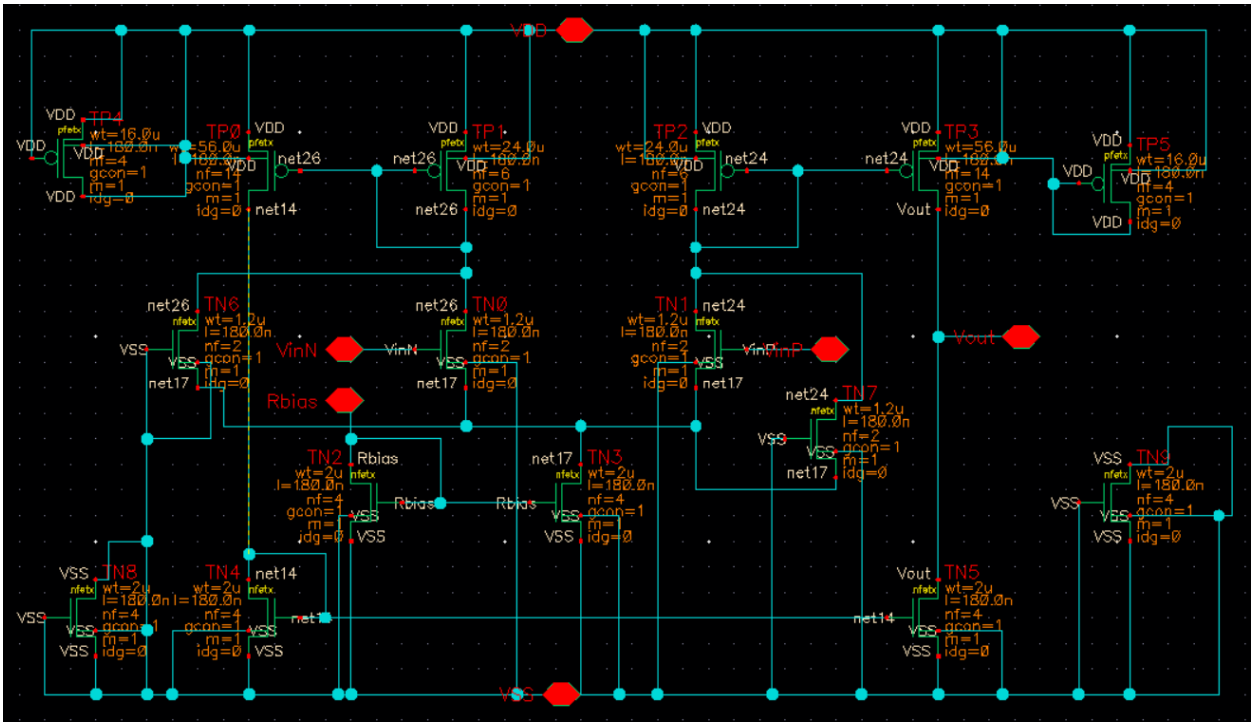


Acm

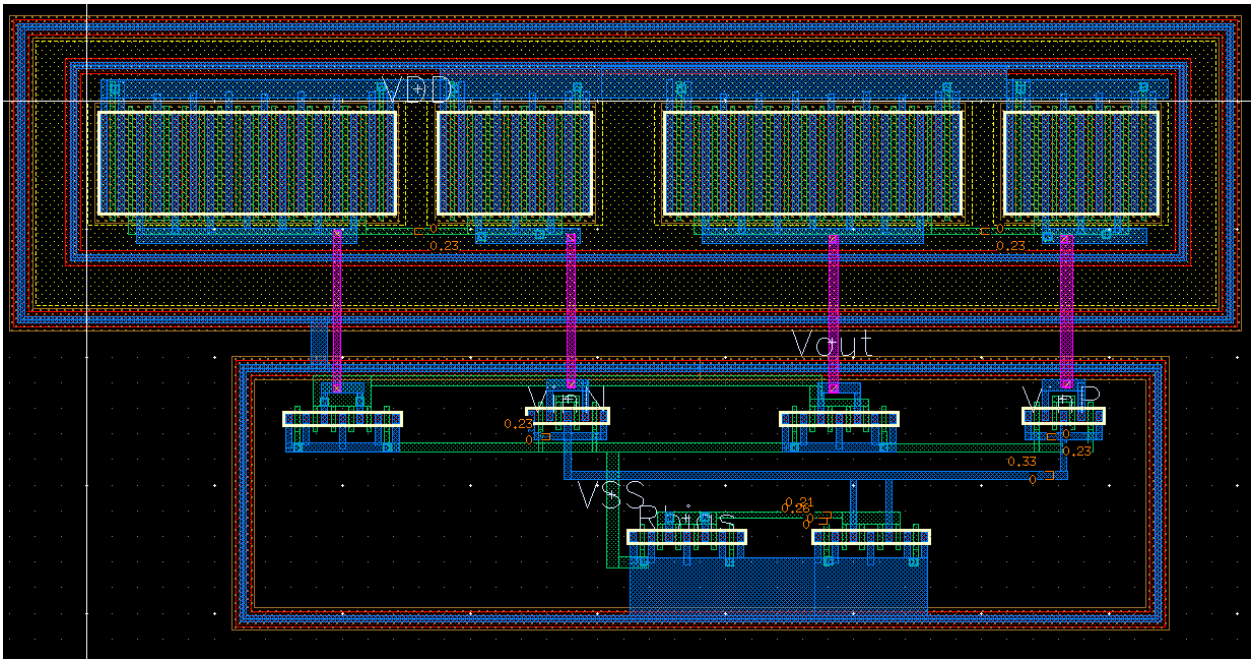


Transconductance

Layout Schematic:

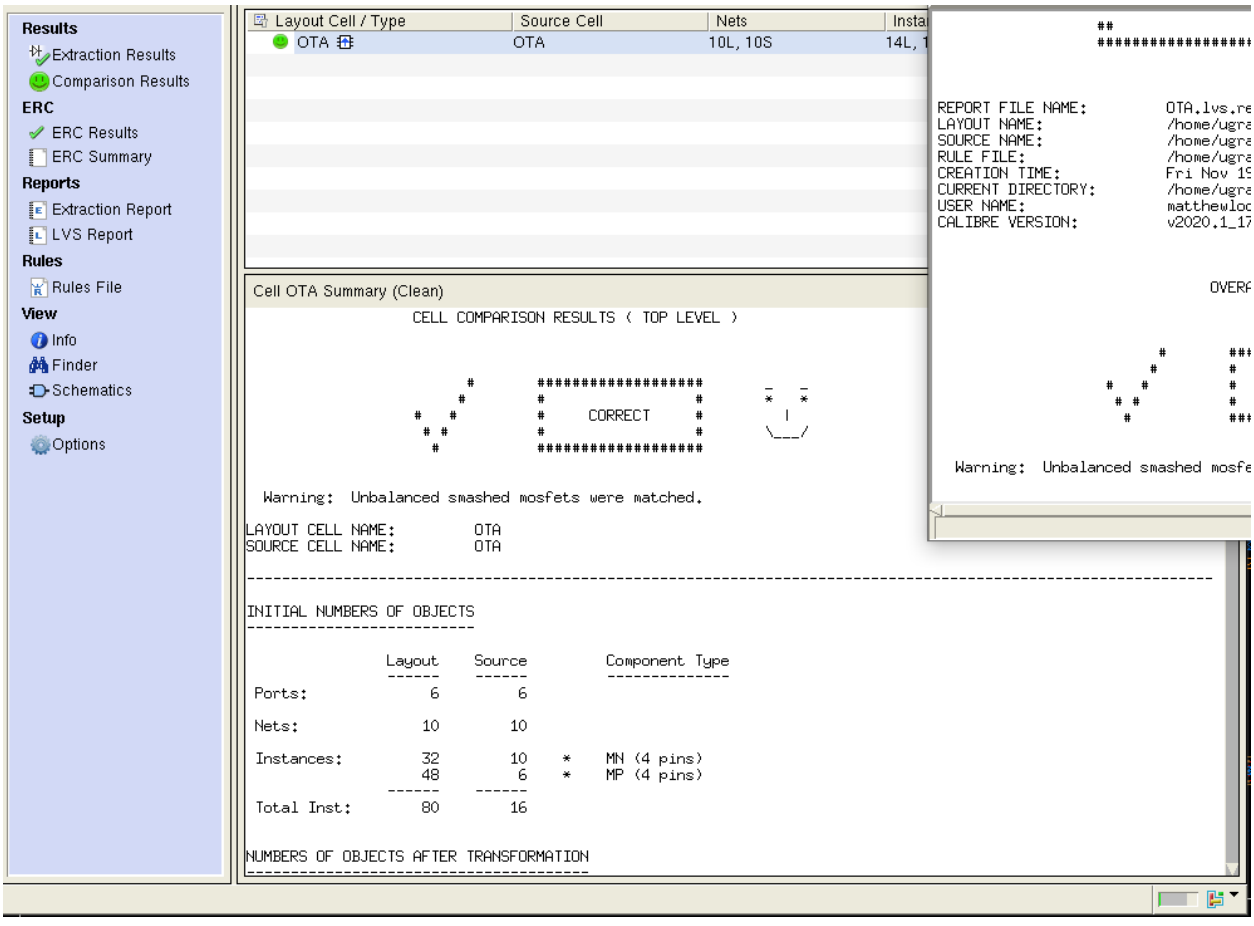


Layout:

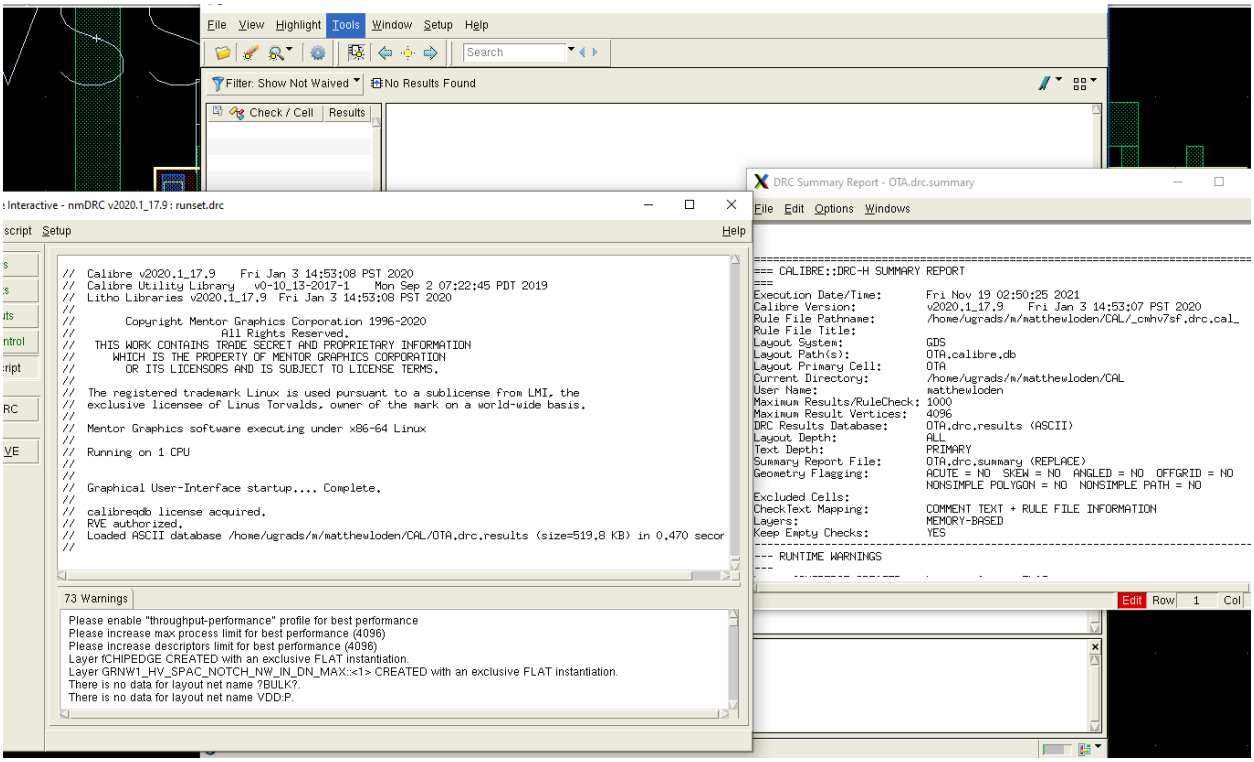


LVS:

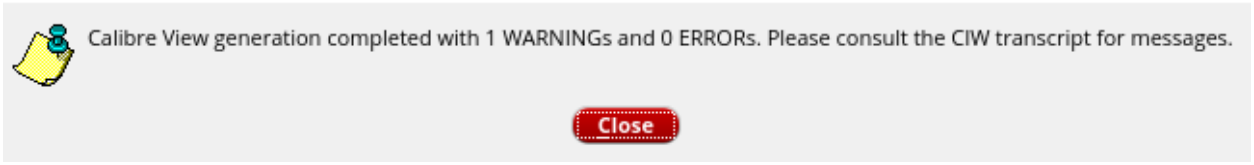
```
REPORT FILE NAME:          OTA.lvs.report
LAYOUT NAME:               /home/ugrads/m/matthewloden/CAL/OTA.sp ('OTA')
SOURCE NAME:               /home/ugrads/m/matthewloden/LVS/OTA.netlist.lvs ('OTA'
RULE FILE:                 /home/ugrads/m/matthewloden/CAL/_cmhv7sf.lvs.cal_
CREATION TIME:             Fri Nov 19 02:56:09 2021
CURRENT DIRECTORY:         /home/ugrads/m/matthewloden/CAL
USER NAME:                 matthewloden
CALIBRE VERSION:           v2020.1_17.9    Fri Jan 3 14:53:07 PST 2020


                        OVERALL COMPARISON RESULTS


                  #       ####################       _   _
                #         #                  #       *   *
              #           #     CORRECT      #         |
            #   #         #                  #        \___/
             # #          #                  #
               #          ####################

  Warning:  Unbalanced smashed mosfets were matched.
```



DRC:

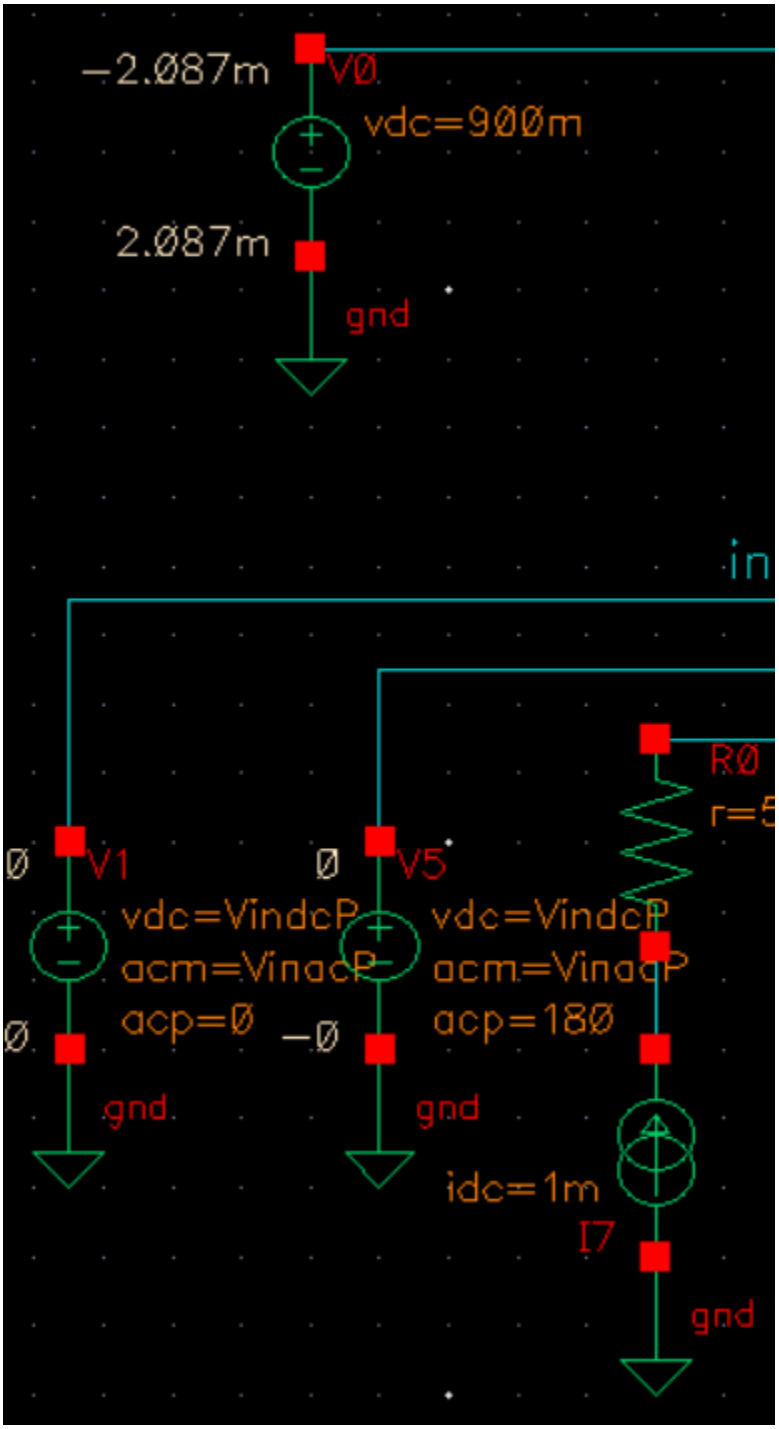


PEX Extraction:

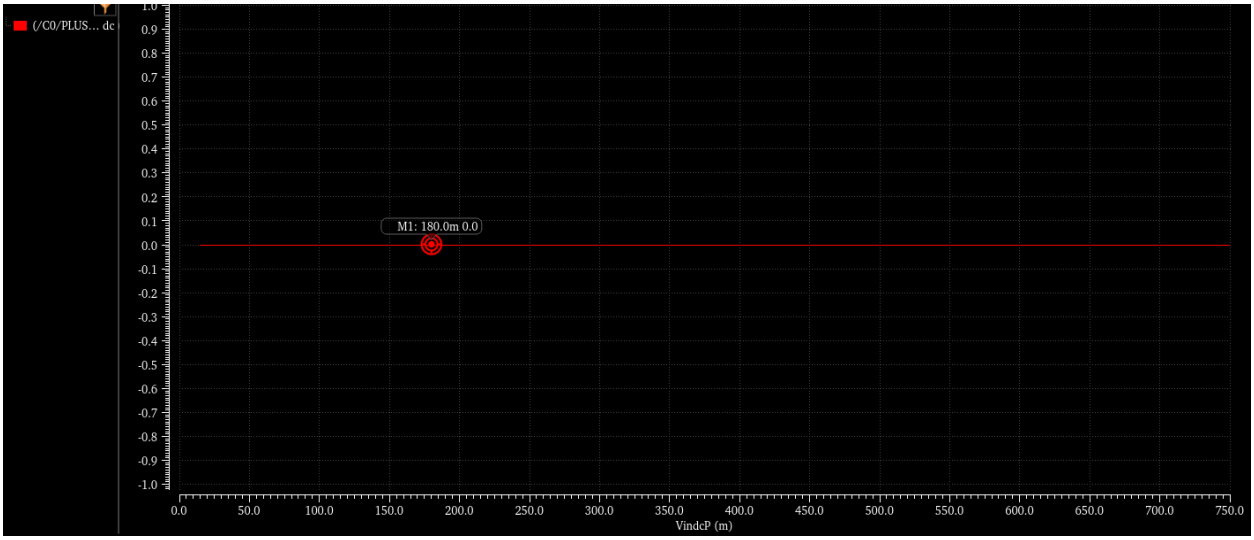


Post Lab Data Calculations and Simulations:

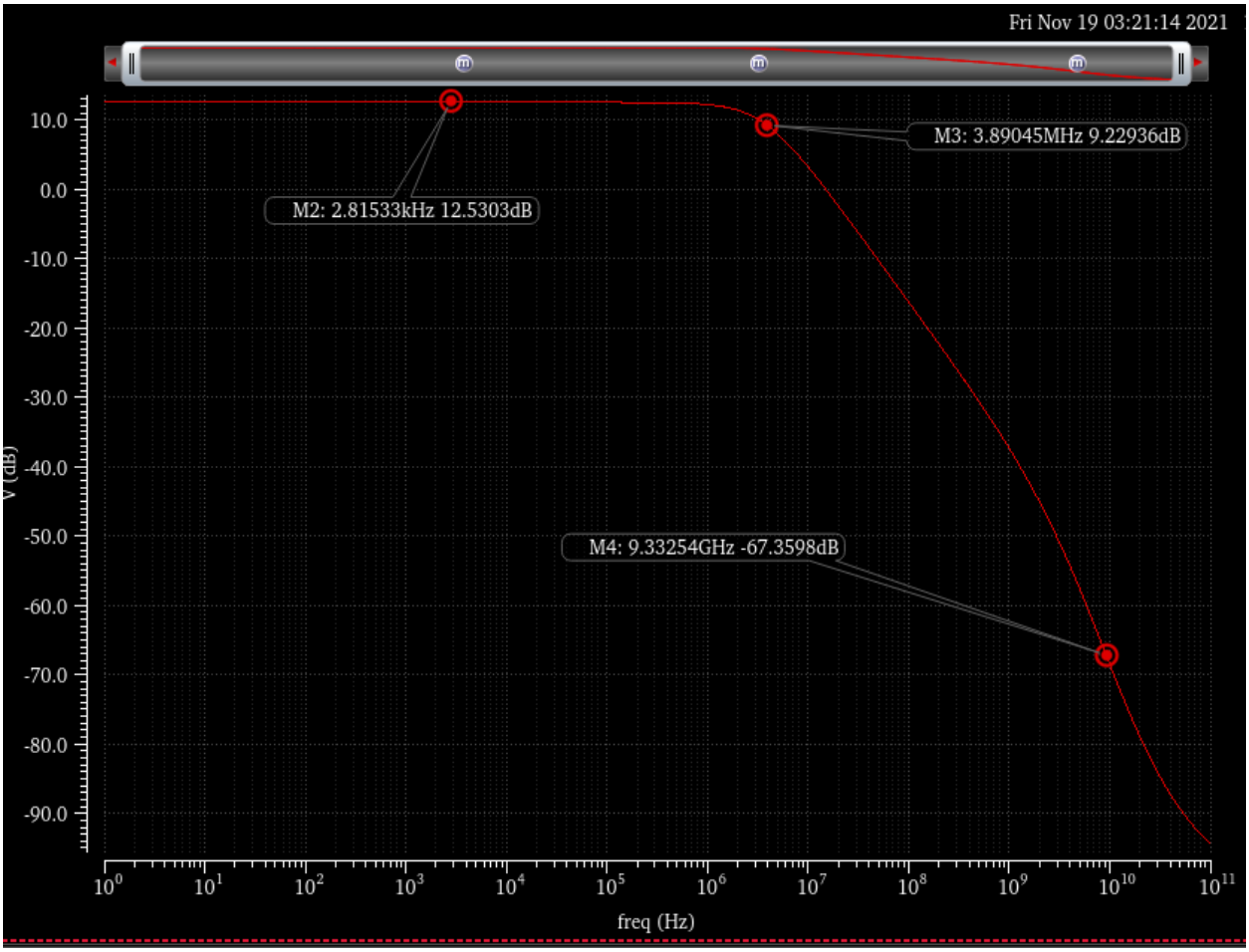
Power Provided by the Voltage Source



Power = 1.8*(2.087-1) = 1.9566mW



Transconductance



Adm Gain: 12.53dB , P1 = 3.89MHz , GBW = 16.46MHz

P2 = 9.33 GHz, the stability of the system is ensured due to sufficiently large difference from the first pole to the second >> 3factor.

Acm = -9.63dB