MOS SINGLE STAGE CIRCUITS

Goal:
To design

a) Common Source Amplifier of voltage gain 40,

b) Common Source Amplifier

c) Simple Common Gate Amplifier and

Find the 3 dB cut off frequency for all the three.

COMMON SOURCE AMPLIFIER

Procedure:
1) Connect the circuit as above in the figure.

2) Input a sine wave – 1KHz – 100mVpp – Zero VDC offset.

3) Now adjust the 10k pot, till you see a sine wave of maximum output swing at the drain of the mosfet.

The waveforms at various points would look as follows,
4) Now sweep the frequency from 1KHz to 10MHz and note down the frequency where the output is \(0.707\) of its initial amplitude i.e. 3.1Vpp. This gives the \(F_{3dB}\) point of the circuit.

**COMMON DRAIN AMPLIFIER**
**Procedure:**

1) Connect the circuit as above in the figure.

2) Input a sine wave – 1KHz – 4Vpp – Zero VDC offset.

3) Now adjust the 10k pot, till you see a sine wave of maximum output swing at the source of the mosfet.

The waveforms at various points would look as follows,

4) Now sweep the frequency from 1KHz to 10MHz and note down the frequency where the output is 0.707 of its initial amplitude i.e. 2.4Vpp. This gives the $F_{3dB}$ point of the circuit.

**COMMON GATE AMPLIFIER**
**Procedure:**

1) Connect the circuit as above in the figure.

2) Input a sine wave – 1KHz – 100mVpp – minus 2 VDC offset.

3) Now adjust DC offset (if required), till you see a sine wave of maximum output swing at the drain of the mosfet.

The waveforms at various points would look as follows,

- At Vin: Vpp = 100mV, Vavg = -2V
- At drain: Vpp = 500mV, Vavg = 9.5V

4) Now sweep the frequency from 1KHz to 10MHz and note down the frequency where the output is **0.707** of its initial amplitude. This gives the $F_{\text{3dB}}$ point of the circuit.

**RESULTS:**

**COMMON SOURCE AMPLIFIER**

The 3-dB point is ____

**COMMON DRAIN AMPLIFIER**

The 3-dB point is ____

**COMMON GATE AMPLIFIER**

The 3-dB point is ____