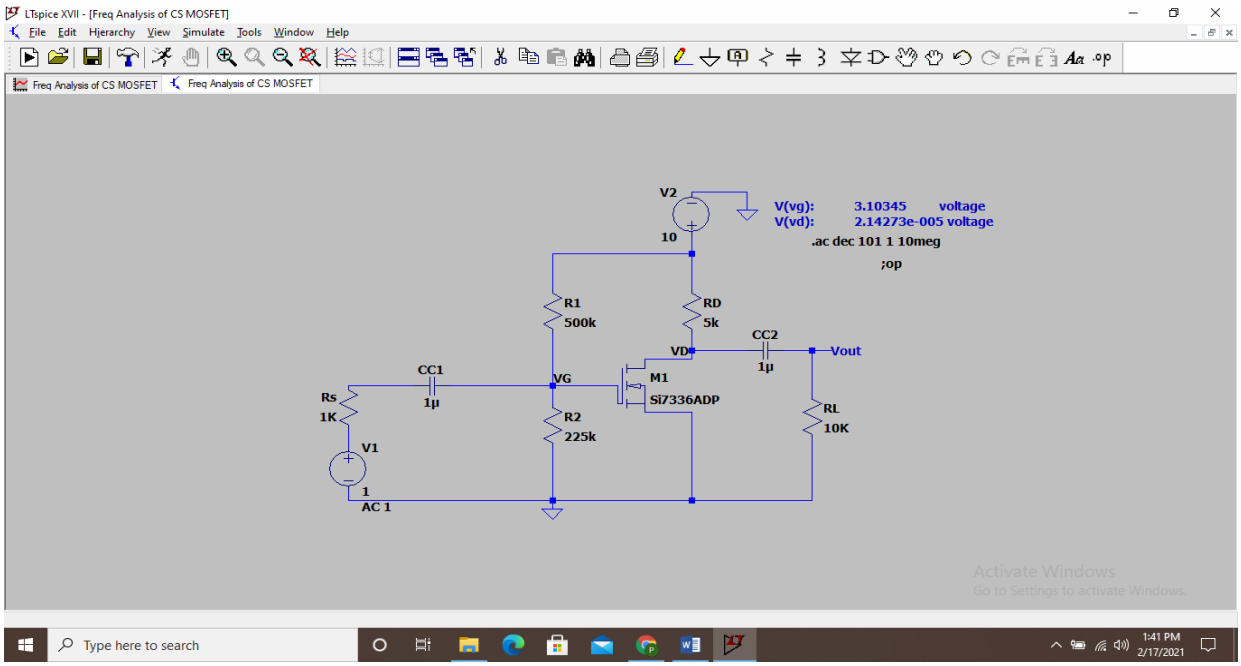
# EXPERIMENT NO. 1

**AIM:** To perform DC analysis and study frequency response of CS MOSFET Single Stage Amplifier using LTspice

**Software Required: LTspice**

**Circuit Diagram:**




**Introduction:**

Frequency Response is the graph of frequency verses gain of the amplifier. The coupling and bypass capacitors cause the fall of the signal in the low frequency response of the amplifier because their impedance becomes large at low frequencies. The stray capacitances are effectively open circuits.

In the mid frequency range large capacitors are effectively short circuits and the stray capacitors are open circuits, so that no capacitance appears in the mid frequency range. Hence the mid band frequency gain is maximum.

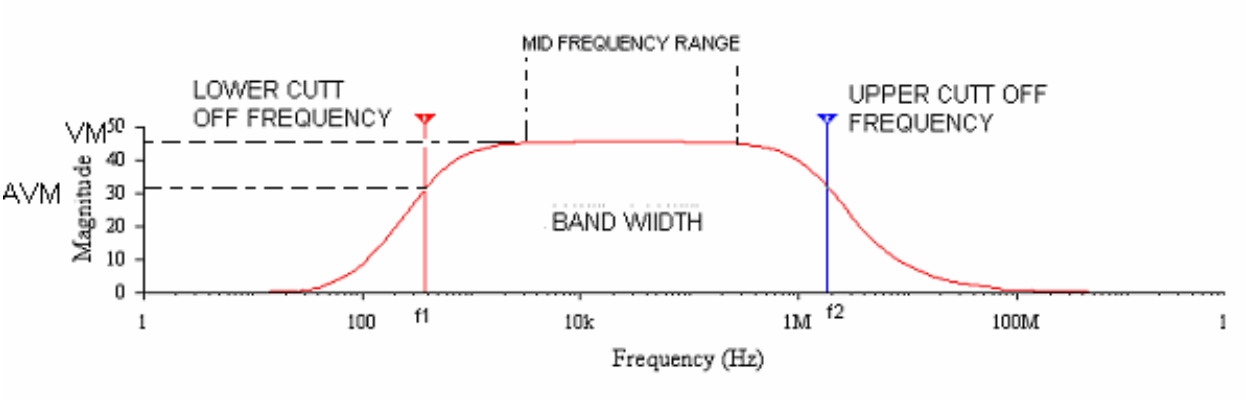
At the high frequencies, the bypass and coupling capacitors are replaced by short circuits. The stray capacitors and the transistor determine the response.

**Experiment Procedure:**

1) Open New Schematics, Use the components icon to enter the components menu and select a component/device. Place the component/device on your schematics

2) Place all the required component/device on your schematics, assign value and names by double click. Click on wire icon to connect the components.
3) Set input as AC signal with 1V amplitude and click on Label Net icon and assign label at all terminals of transistor
4) Save the schematics in the desired folder and click on Run icon to stimulate the circuit.
5) A new output window will pop out. This window provides all types of DC voltages and currents.
6) Select a text box and copy paste VG, VD and VS values in it and click ok.
7) For: Frequency Response: Click on Simulate, Edit Simulation Cmd and in AC analysis, set Sweep type as decade, Start frequency as 1 Hz, Stop frequency as 10MHz and Number of points per decade as 101 and click on Run icon to stimulate the circuit.
8) A new output window will pop out. Now click on "Zoom full extents" and click on Vout
9) Observe the bode plot and note down the gain.

**Frequency Response Graph:**



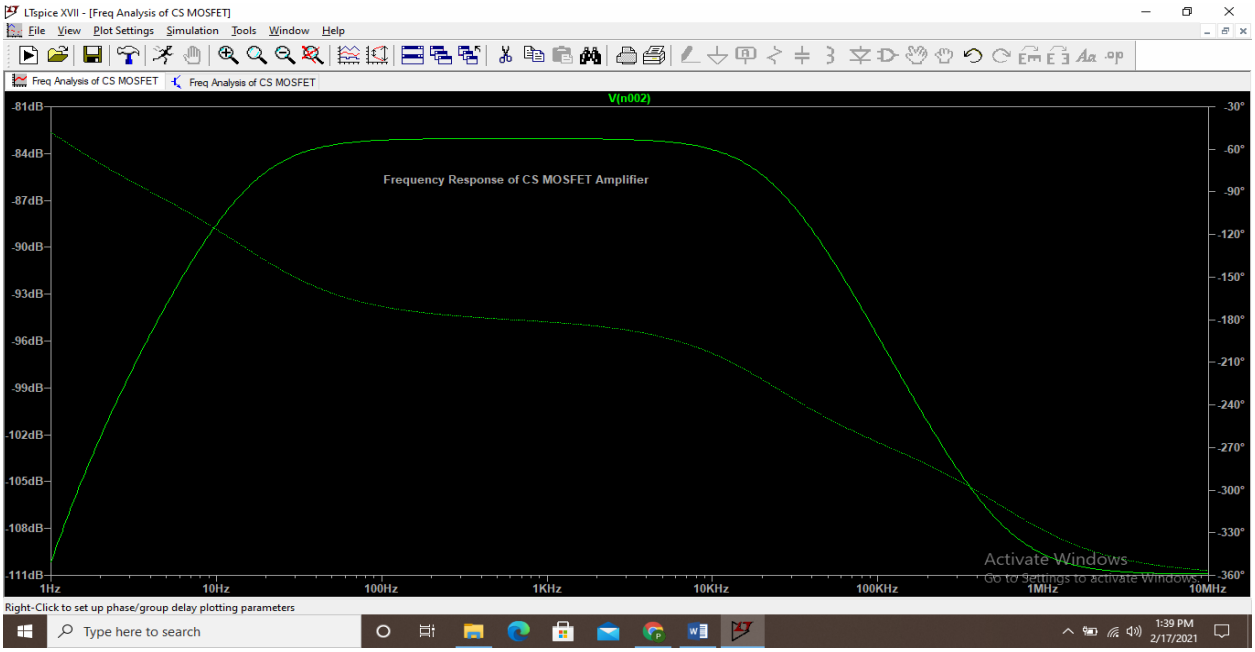

**OBSERVATION:**

Graph shows the frequency response of MOSFET amplifier in common source configuration. The voltage gain $A_v$ is plotted against the frequency.

**CONCLUSION:**

The frequency response of single stage amplifier is stimulated. The gain is decreasing below the cut-off frequencies in low and high frequency region whereas it is constant for mid frequency region.

## Result:


LTspice XVII - [Freq Analysis of CS MOSFET]
File View Plot Settings Simulation Tools Window Help
Freq Analysis of CS MOSFET
Freq Analysis of CS MOSFET
V(n002)
Frequency Response of CS MOSFET Amplifier
-81dB
-84dB
-87dB
-90dB
-93dB
-96dB
-99dB
-102dB
-105dB
-108dB
-111dB
-30°
-60°
-90°
-120°
-150°
-180°
-210°
-240°
-270°
-300°
-330°
-360°
1Hz
10Hz
100Hz
1KHz
10KHz
100KHz
1MHz
10MHz
Activate Windows
Go to Settings to activate Windows.
Right-Click to set up phase/group delay plotting parameters
Type here to search
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