Common Source Amplifier using JFET

Circuit Simulation done by:
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Theory:

Common Source JFET Amplifier uses junction field effect transistors as its main active device offering high input impedance characteristics.The common source circuit provides a medium input and output impedance levels. Both current and voltage gain can be described as medium, but the output is the inverse of the input, i.e. 180° phase change. This provides a good overall performance and as such it is often thought of as the most widely used configuration. The amplifier circuit consists of an N-channel JFET, but the device could also be an equivalent N-channel depletion-mode MOSFET as the circuit diagram would be the same just a change in the FET, connected in a common source configuration. The JFET gate voltage Vg is biased through the potential divider network set up by resistors R1 and R2 and is biased to operate within its saturation region which is equivalent to the active region of the bipolar junction transistor.

Circuit Diagram:

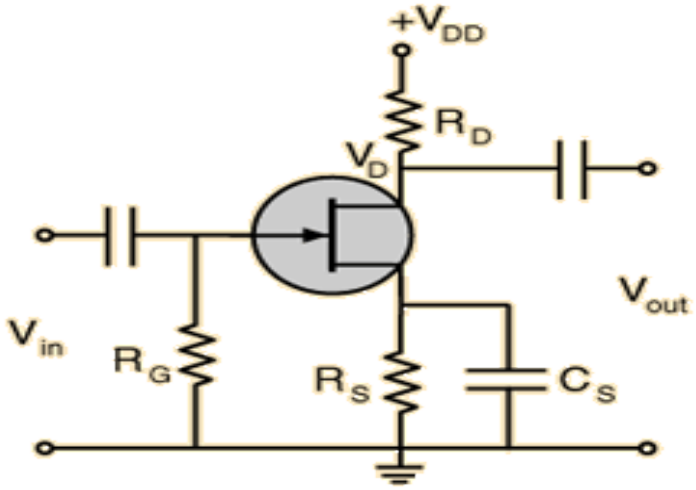

Fig 1: Circuit Diagram of Common Source Amplifier using JFET

Schematic Diagram:

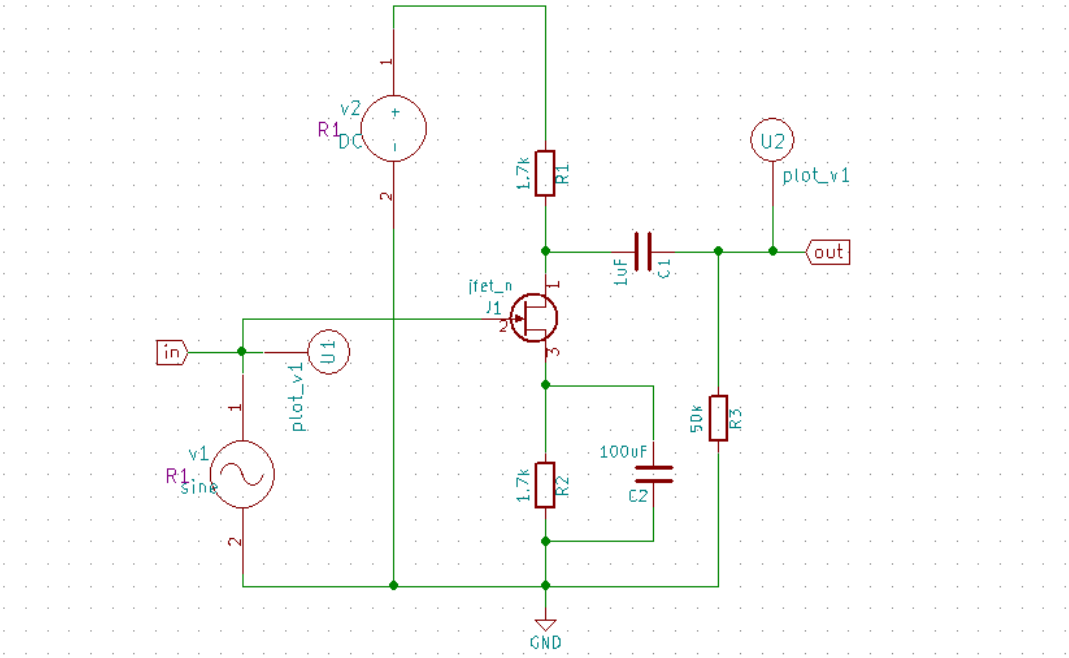

Fig 2: Schematic Diagram of Common Source Amplifier using JFET

Note:

$R_1 = R_2 = 1.7k$

$R_3 = 50k$

$C_1 = 1uF$

$C_2 = 100uF$

Simulation Results:

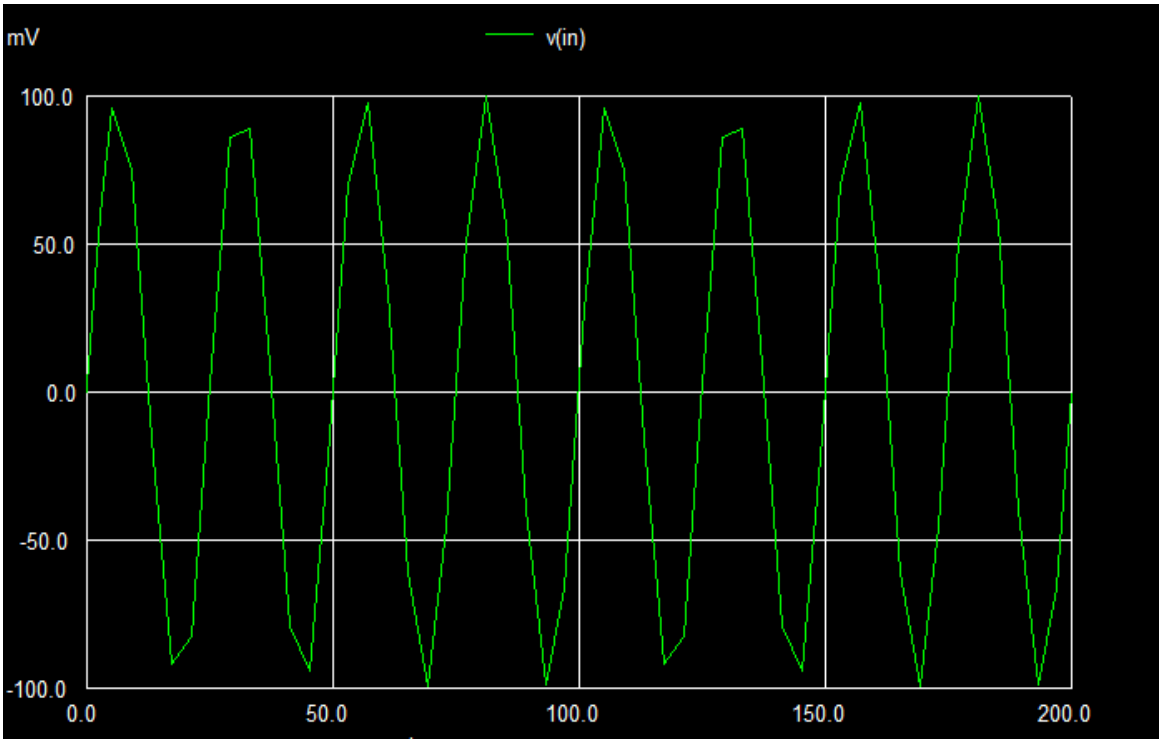

Fig 3: Ngspice plot of AC input

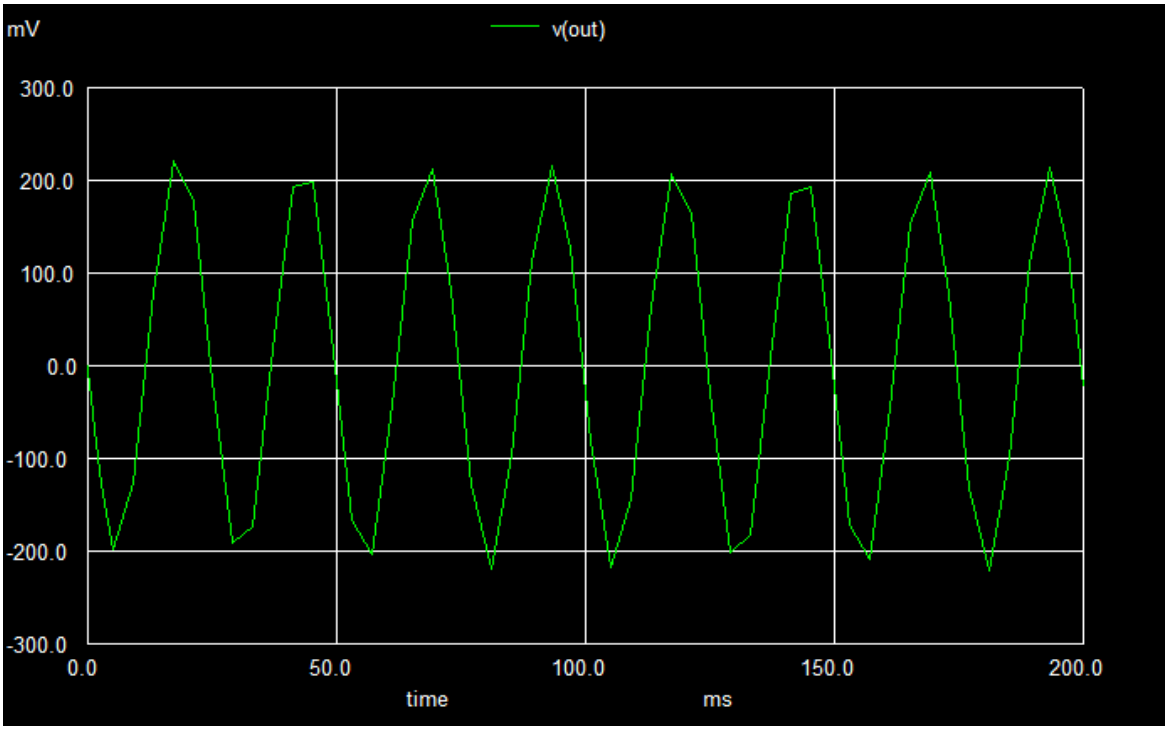

Fig 4: Ngspice plot of output Voltage.

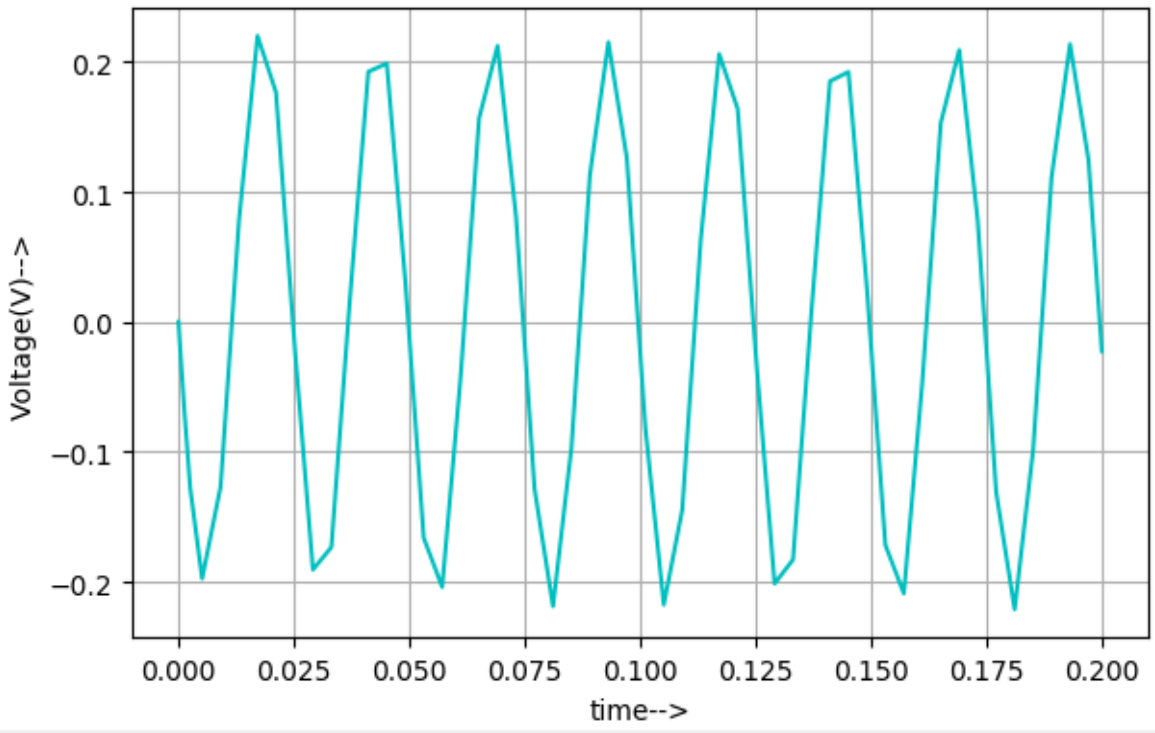

Fig 5: Python plot of output voltage.

Referance:

https://www.electronics-tutorials.ws/amplifier/amp_3.html