CET 323 LAB

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Date September 25, 2020.

Class CET 323_01

FET Amplifiers And Switching Circuits

Reading

Floyd, Electronic Devices, Ninth Edition, Chapter 9.

Key Objectives

Part 1 : Calculate and measure dc and ac parameters for a common-Source amplifier.

Part 2 : Calculate and measure dc and ac parameters for two common-drain amplifiers.

Components need

Part 1 : The common-Source JFET amplifier.

Resistor (one of each) : 620 Ω , 1.0 kΩ , 3.3 kΩ , 10 kΩ , 100 kΩ , 1.0 MΩ

One 2N5484 n-channel JFET.

Capacitors (one if each): 0.1 μF , 1.0 μF , 10 μF

Part 2 : The common-Drain JFET amplifier.

Resistor (one of each) : 470 Ω , 1.0 kΩ , 10 kΩ , 100 kΩ , 1.0 MΩ

One 2N5484 n-channel JFET.

Capacitors (one if each): 0.1 μF , 1.0 μF , 10 μF

Part 1 : The common-Source JFET amplifier

1. Measure and record the values of the resistor listed in the Table 9_1
2. Construct the common-source (CS) amplifier shown in Figure 9_1. Set the signal generator for a 500 mVpp sine wave at 1.0 kHz. Check the amplitude and frequency with your oscilloscope.

Table 9_1

Resistor	Listed Value	Measured Value
R_S	1.0 kΩ	
R_D	3.3 kΩ	
R_G	1.0 MΩ	
R_L	10 kΩ	

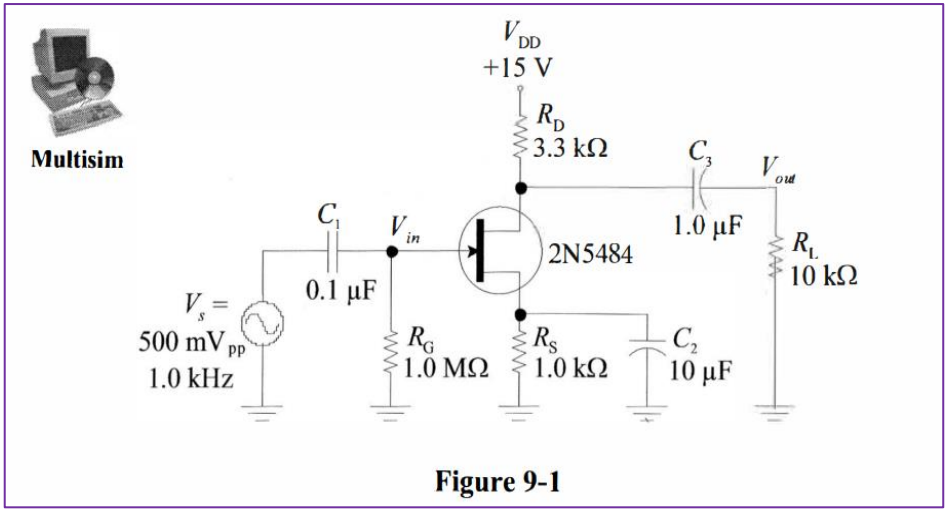

Figure 9-1

3. Measure the dc voltages listed in Table 9_2 and compute I_D . Set the function generator for a 500 mVpp sine wave and measure the ac quantities listed. Compare the input and output ac voltage by viewing V_{in} and V_{out} simultaneously. Measure the voltage gain and note the phase different (0^o or 180^o) between the input and output signal. Enter all from this step in Table 9_2.

Table 9_2 Parameters for CS Amplifier

Quantity	DC value	AC value
Gate Voltage, V_G		
Source Voltage, Vs		
Drain Voltage, V_D		
Drain Current , I_D		
Input Voltage, V_{in}		
Output Voltage, V_{out}		
Voltage gain, A_v		
Phase difference		

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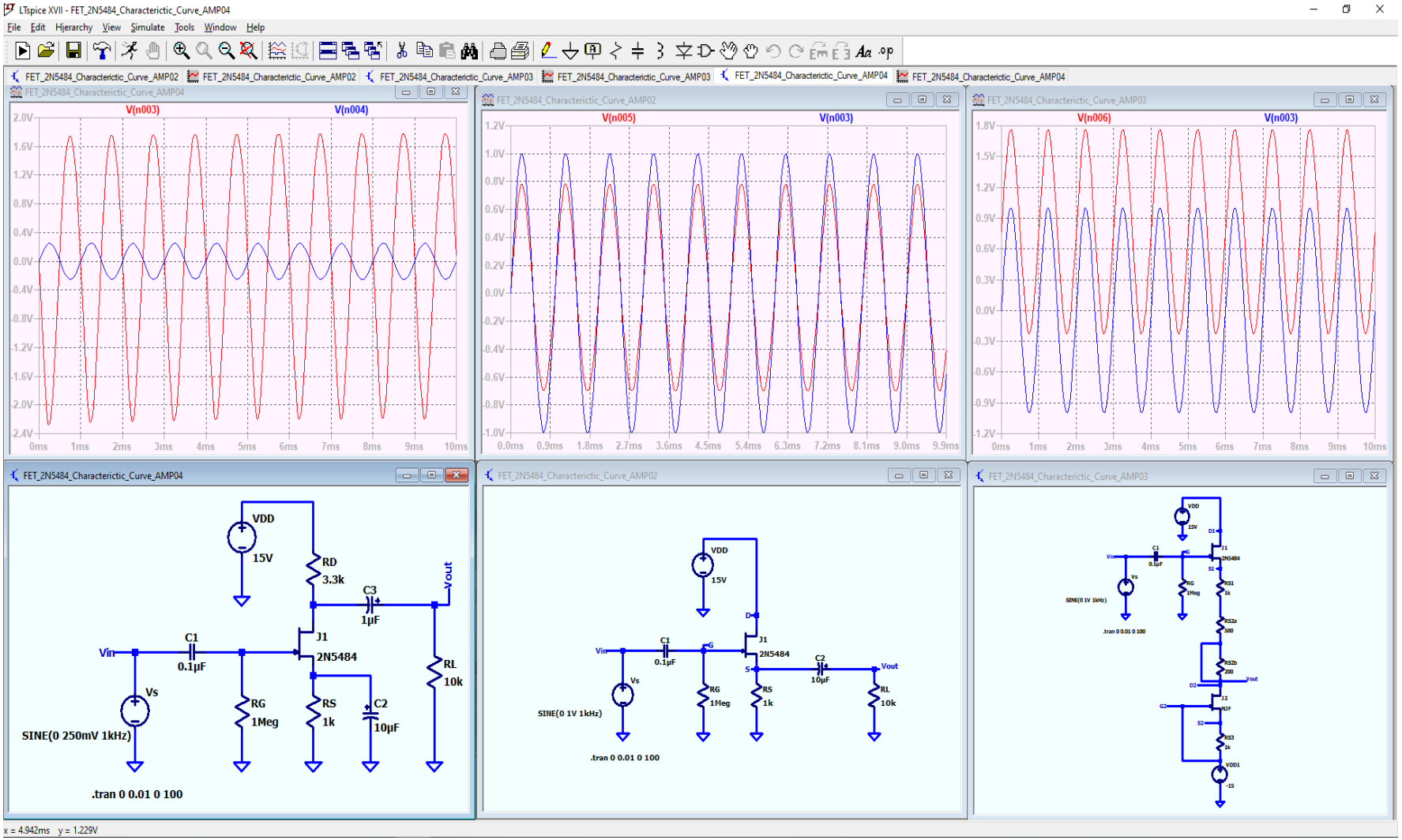

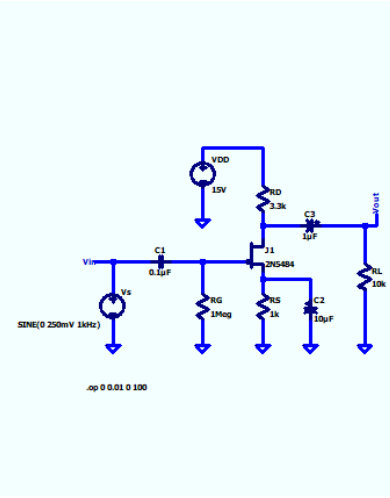

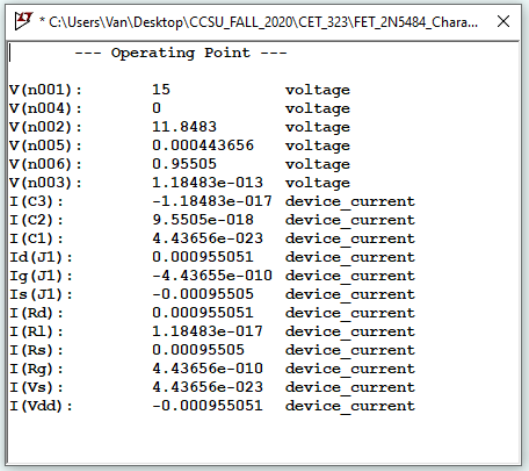

Table 9_2 Parameters for CS Amplifier

Quantity	DC value	AC value
Gate Voltage, V_G (n005)	0.44 µV	
Source Voltage, Vs (n006)	0.955 V	
Drain Voltage, V_D (n001)	15V	
Drain Current , I_D (V_{dd})	-0.96 kA	
Input Voltage, V_{in} (n004)		0
Output Voltage, V_{out} (n003)		1.1483e V
Voltage gain, A_v		
Phase difference		

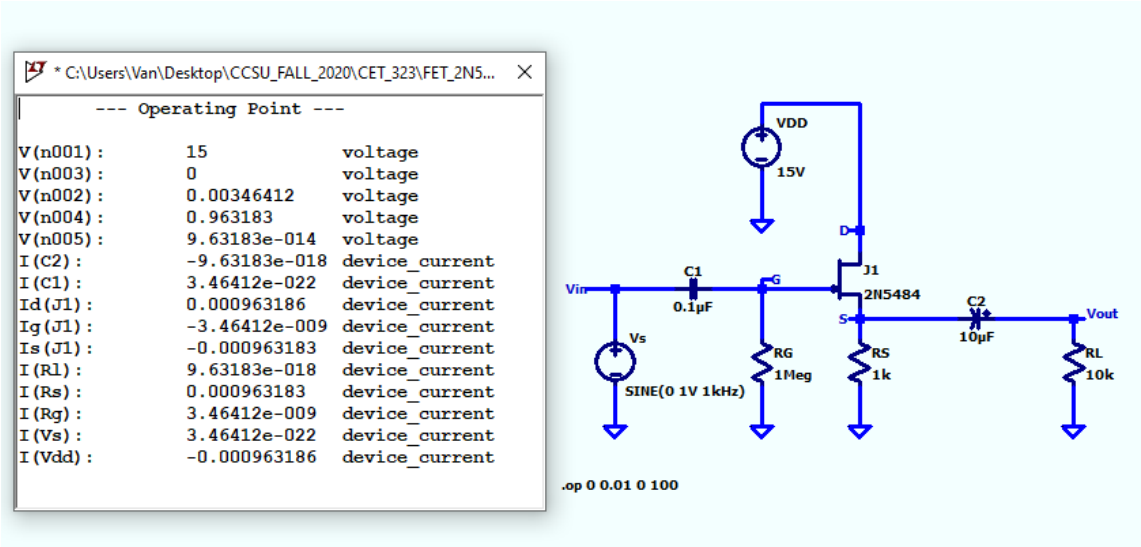

Table 9_2 Parameters for CS Amplifier

Quantity	DC value	AC value
Gate Voltage, V_G (n002)	3.46 kV	
Source Voltage, Vs (n004)	0.963 V	
Drain Voltage, V_D (n001)	15 V	
Drain Current , I_D (Vdd)	- 0.963 µA	
Input Voltage, V_{in} (n003)		0
Output Voltage, V_{out} (n005)		9.63183e
Voltage gain, A_v		
Phase difference		

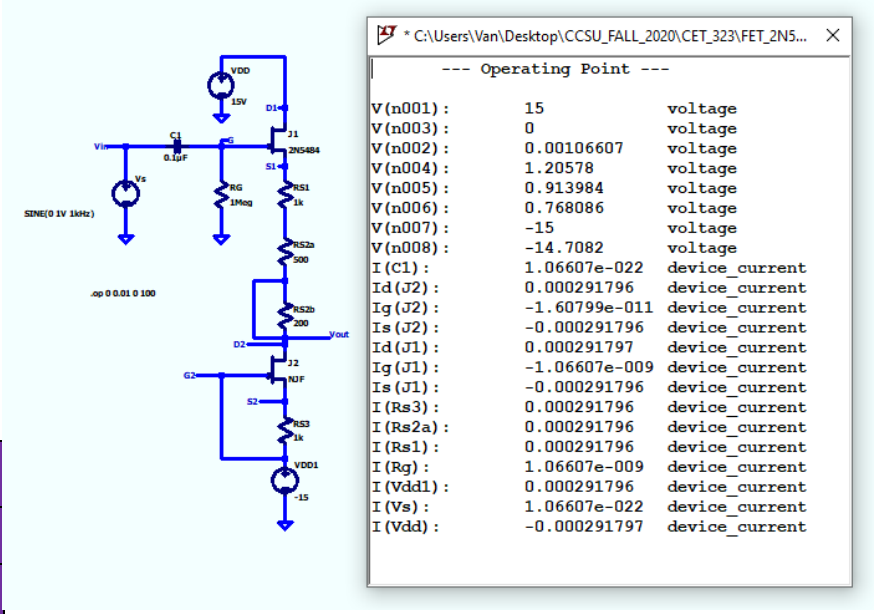

Table 9_2 Parameters for CS Amplifier

Quantity	DC value	AC value
Gate Voltage, V_G (n002)	1.06 kV	
Source Voltage, Vs (n004)	1.20578 V	
Drain Voltage, V_D (n001)	15 V	
Source Voltage, Vs_1 (n005)	0.913984 V	
Source Voltage, Vs_2 (n008)	-14.7 V	
Gate Voltage, V_{G2} (n007)	- 15 V	
Drain Current , I_D (Vdd)	-0.291797 µA	
Input Voltage, V_{in} (n003)		0 V
Output Voltage, V_{out} (n006)		0.768086 V
Voltage gain, A_v		
Phase difference