

## Experiment #5- Part#2

### JFET Characteristics

#### Procedure

1. Connect the circuit shown in Fig.6.

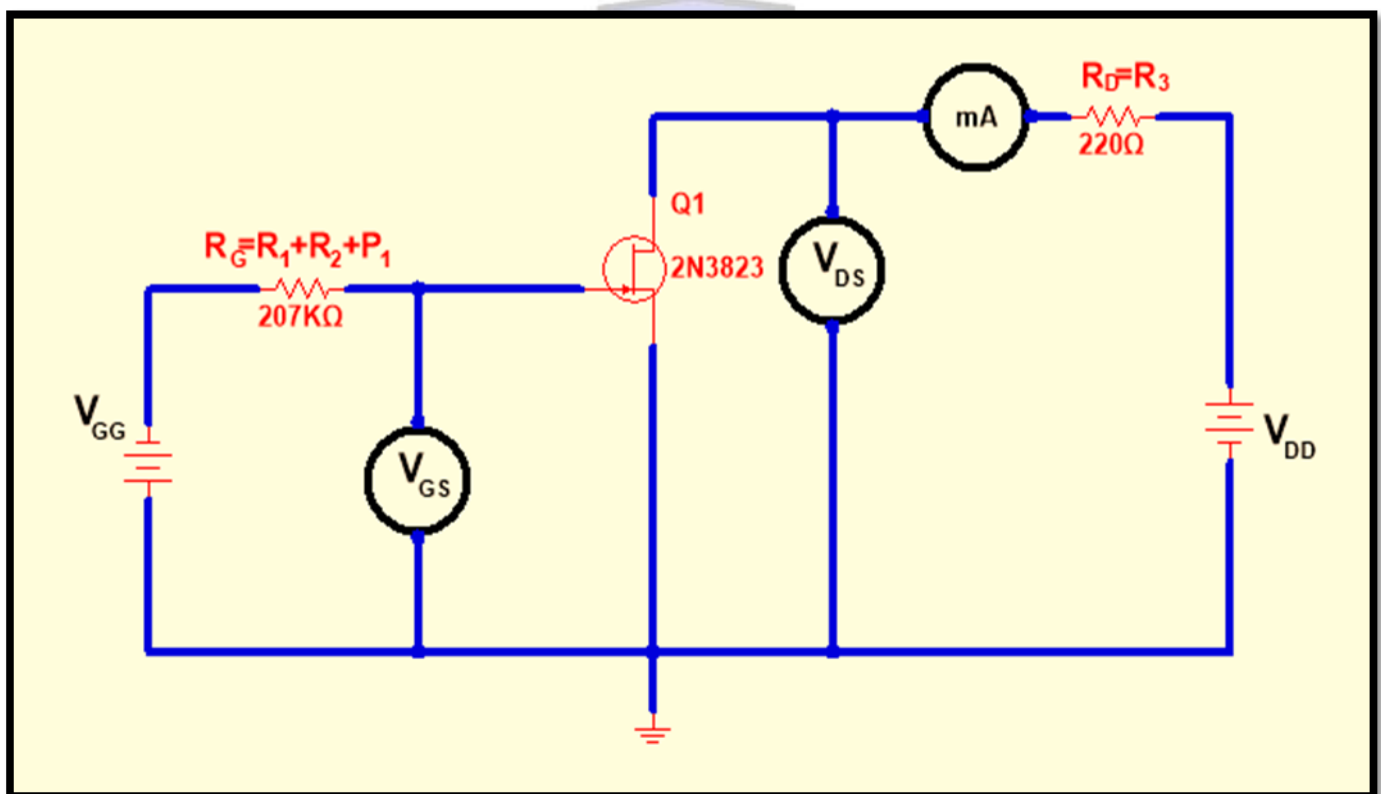


Figure 6: The Test Circuit for Getting JFET Characteristics

2. Adjust  $V_{DD}$  so that  $V_{DS} = 5V$ , and vary  $V_{GG}$  to change  $V_{GS}$  from  $0V$  to  $-3V$  in different steps recording  $I_D$  for each step. Repeat with  $V_{DS} = 10V$ . Tabulate your results as shown in Table-1.
3. Set  $V_{GG}$  to  $0V$  so that  $V_{GS} = 0V$  and vary  $V_{DD}$  so that  $V_{DS}$  changes in several steps recording  $I_D$  in each step. Repeat with  $V_{GS} = -1V$ . Tabulate your results as illustrated in Table 2.



**Table 1: Recorded Data for the JFET Transfer Characteristics**

VDS = 5V		VDS = 10V	
VGS(V)	ID (mA)	VGS(V)	ID (mA)
0		0	
-0.25		-0.25	
-0.5		-0.5	
-0.75		-0.75	
-1		-1	
-1.25		-1.25	
-1.5		-1.5	
-1.75		-1.75	
-2		-2	
-2.25		-2.25	
-2.5		-2.5	
-2.75		-2.75	
-3		-3	

**Table 2: Recorded Data for the JFET Drain Characteristics**

VDS = 0V		VDS = -1V	
VGS(V)	ID (mA)	VGS(V)	ID (mA)
0		0	
0.5		0.5	
1		1	
1.5		1.5	
2		2	
2.5		2.5	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	



## Discussion

1. From the obtained data, sketch the transfer characteristics of the JFET.
2. Determine the values of  $V_P$  and  $I_{DSS}$  from the plot.
3. Calculate theoretically the value of  $g_m$  at  $V_{GS} = -1V$  and  $V_{GS} = -2V$  when  $V_{DS} = 10V$  and compare them with the measured quantities.
4. Sketch the drain characteristics of the JFET from the obtained data.
5. From the linear region of the drain characteristic, determine the value of the drain to source resistance  $r_{ds}$  when  $V_{GS} = 0V$ .
6. Compare between the JFET and the BJT.

