Feng Chia University

Electrical Engineering Fundamentals II Lab

Laboratory 12

MOSFET transfer Characteristics

Instructor: Prof. Shyan-Lung Lin

Student Name: 周嘉禾

Student ID: D1166506

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I. Introduction

a. To observe the behavior of MOSFET circuits.

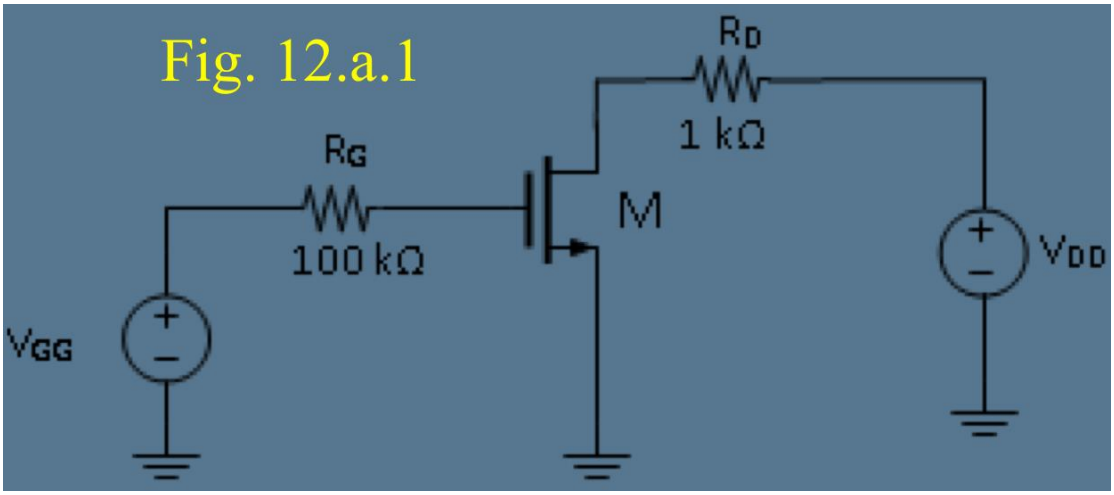
II. Materials

1. Power supply
2. Digital multimeter
3. Function generator
4. Oscilloscope
5. Devices

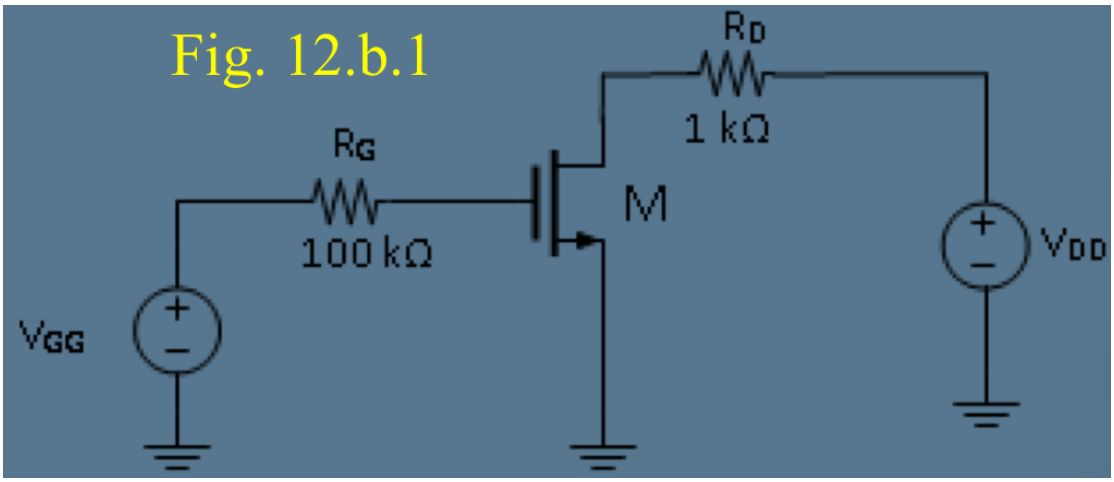
   MOSFET: 2N7000 ×1

   Resistors: R = 1 kΩ ×1, 100 kΩ ×1

III. Circuit diagram



▲ Figure 1. Circuit of Experiment 12.a The i_D-v_{DS} characteristics



▲ Figure 2. Circuit of Experiment 12.b The i_D-v_{GS} characteristics

IV. Methods

Using Digital Multimeter to measure the voltage.

V. Experiments data

1. Experiment 12.a The i_D-v_{DS} characteristics

Table 1: Measurement of the i_D-v_{DS} characteristics

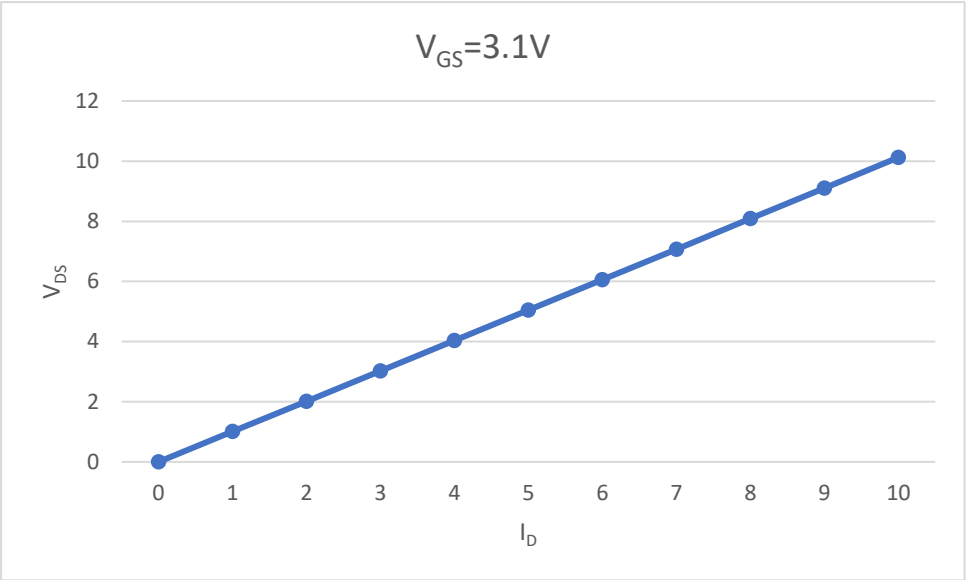
V_{GS}=3.1V		V_{GS}=3.6V		V_{GS}=4.1V		V_{GS}=4.6V		V_{GS}=5.1V	
V_{DS}	I_D	V_{DS}	I_D	V_{DS}	I_D	V_{DS}	I_D	V_{DS}	I_D
0	0.0000 mA	0	0.0000 mA	0	0.0000 mA	0	0.0000 mA	0	0.0000 mA
1	1.0078 mA	1	1.0082 mA	1	1.0084 mA	1	1.0086 mA	1	1.0091 mA
2	2.0159 mA	2	2.0164 mA	2	2.0167 mA	2	2.0171 mA	2	2.0174 mA
3	3.0257 mA	3	3.0266 mA	3	3.0272 mA	3	3.0275 mA	3	3.0277 mA
4	4.0365 mA	4	4.0373 mA	4	4.0382 mA	4	4.0385 mA	4	4.0392 mA
5	5.0479 mA	5	5.0492 mA	5	5.0498 mA	5	5.0507 mA	5	5.0509 mA
6	6.0603 mA	6	6.0619 mA	6	6.0622 mA	6	6.0634 mA	6	6.0637 mA
7	7.0737 mA	7	7.0753 mA	7	7.0766 mA	7	7.0775 mA	7	7.0787 mA
8	8.0887 mA	8	8.0907 mA	8	8.0921 mA	8	8.0933 mA	8	8.0935 mA
9	9.1033 mA	9	9.1058 mA	9	9.1062 mA	9	9.1079 mA	9	9.1089 mA
10	10.1225 mA	10	10.1242 mA	10	10.1265 mA	10	10.1277 mA	10	10.1278 mA

2. Experiment 12.b The i_D-v_{GS} characteristics

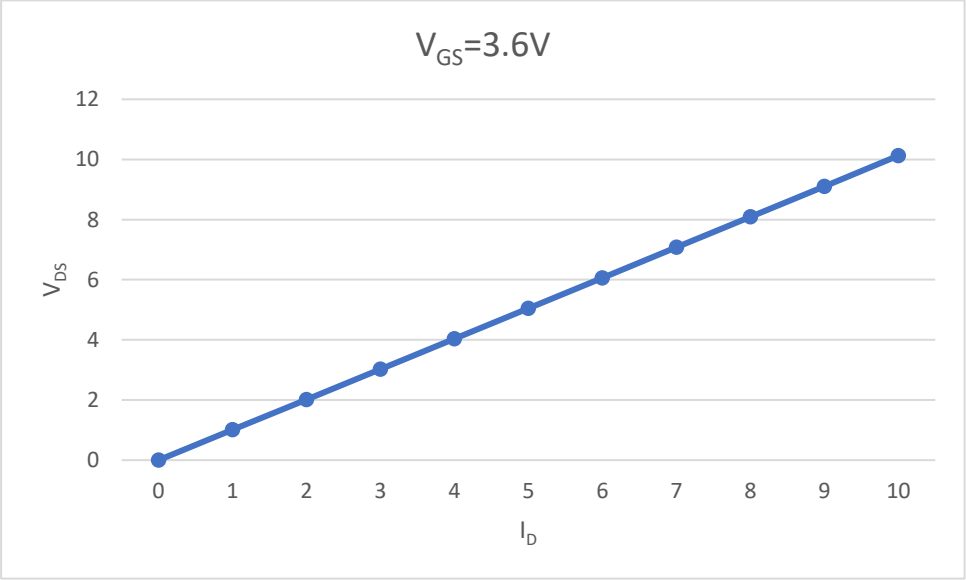
Table 2: Measurement of the i_D-v_{GS} characteristics

V_{DS}=10V	
V_{GS}	I_D
0	0.0002 mA
1	0.0034 mA
2	10.0932 mA
3	10.1182 mA
4	10.1249 mA
5	10.1285 mA
6	10.1297 mA
7	10.1308 mA
8	10.1312 mA
9	10.1315 mA
10	10.1322 mA

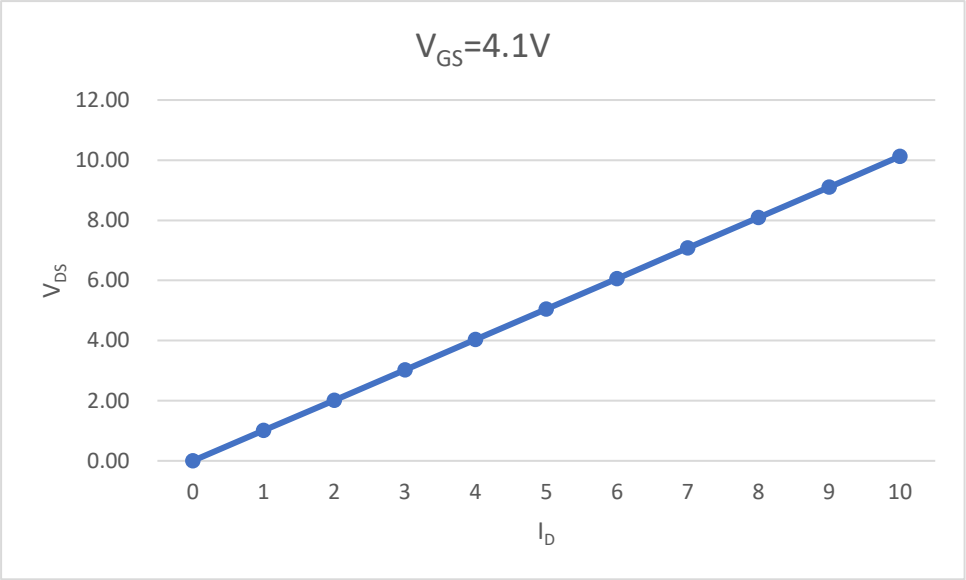
VI. Results



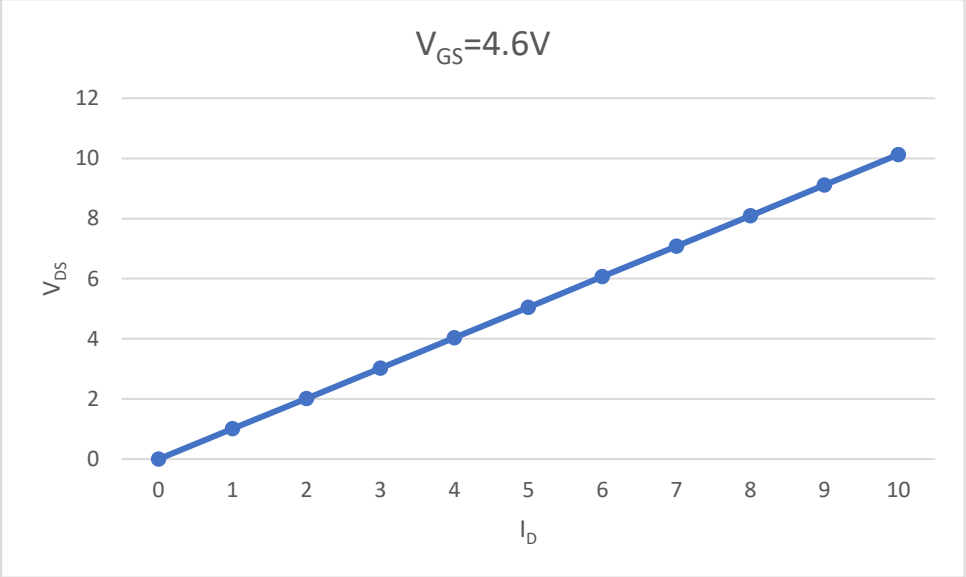
▲ Figure 3. The i_D-v_{DS} characteristics with V_{GS}=3.1V



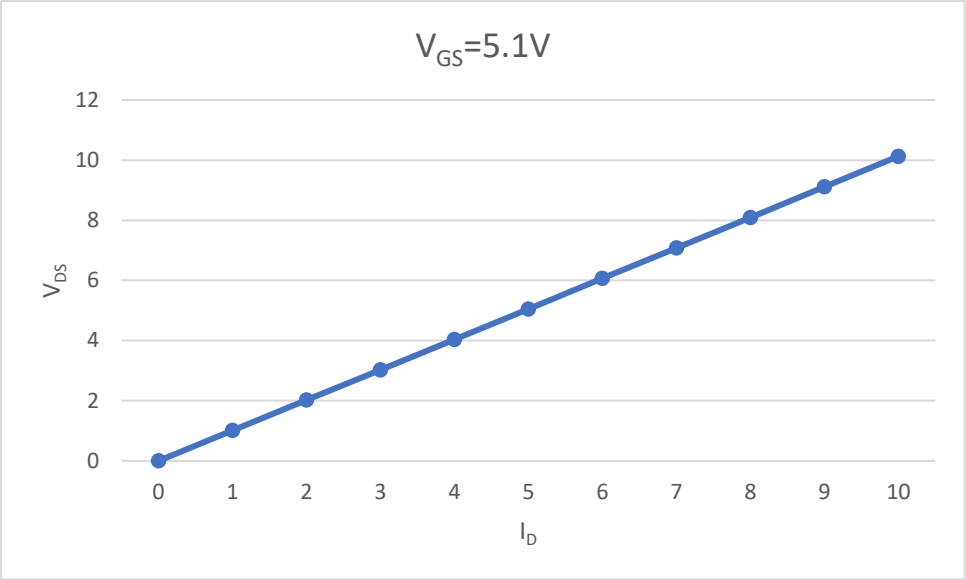
▲ Figure 4. The i_D-v_{DS} characteristics with V_{GS}=3.6V



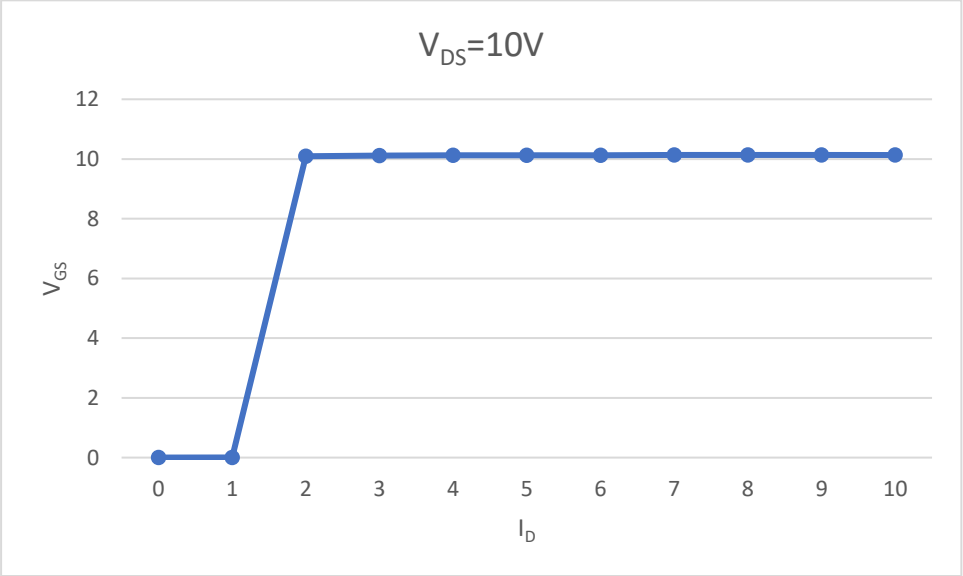
▲ Figure 5. The i_D-v_{DS} characteristics with V_{GS}=4.1V



▲ Figure 6. The i_D-v_{DS} characteristics with V_{GS}=4.6V



▲ Figure 7. The i_D-v_{DS} characteristics with V_{GS}=5.1V



▲ Figure 8. The i_D-v_{GS} characteristics with V_{DS}=10V

VII. Discussion

None

VIII. Conclusion

From the experimental data above, the MOSFET work in an ideal situation.