Feng Chia University

Electrical Engineering Fundamentals II Lab

Laboratory 12

MOSFET transfer Characteristics

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1. Introduction
2. To observe the behavior of MOSFET circuits.
3. 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

1. Circuit diagram

一張含有 圖表, 文字, 字型, 螢幕擷取畫面 的圖片

自動產生的描述

▲ Figure 1. Circuit of Experiment 12.a The iD-vDS characteristics

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自動產生的描述

▲ Figure 2. Circuit of Experiment 12.b The iD-vGS characteristics

1. Methods

Using Digital Multimeter to measure the voltage.

1. Experiments data
   1. Experiment 12.a The iD-vDS characteristics

Table 1: Measurement of the iD-vDS characteristics

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| VGS=3.1V | | VGS=3.6V | | VGS=4.1V | | VGS=4.6V | | VGS=5.1V | |
| VDS | ID | VDS | ID | VDS | ID | VDS | ID | VDS | ID |
| 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 |

* 1. Experiment 12.b The iD-vGS characteristics

Table 2: Measurement of the iD-vGS characteristics

|  |  |
| --- | --- |
| VDS=10V | |
| VGS | ID |
| 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 |

1. Results

▲ Figure 3. The iD-vDS characteristics with VGS=3.1V

▲ Figure 4. The iD-vDS characteristics with VGS=3.6V

▲ Figure 5. The iD-vDS characteristics with VGS=4.1V

▲ Figure 6. The iD-vDS characteristics with VGS=4.6V

▲ Figure 7. The iD-vDS characteristics with VGS=5.1V

▲ Figure 8. The iD-vGS characteristics with VDS=10V

1. Discussion

None

1. Conclusion

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