

1 Measurements & Parameter Extraction

1.1 Line Width/Misalignment

1.2 Four-Point Resistors [2a, 2b]

1.2.1 Measurement Setup

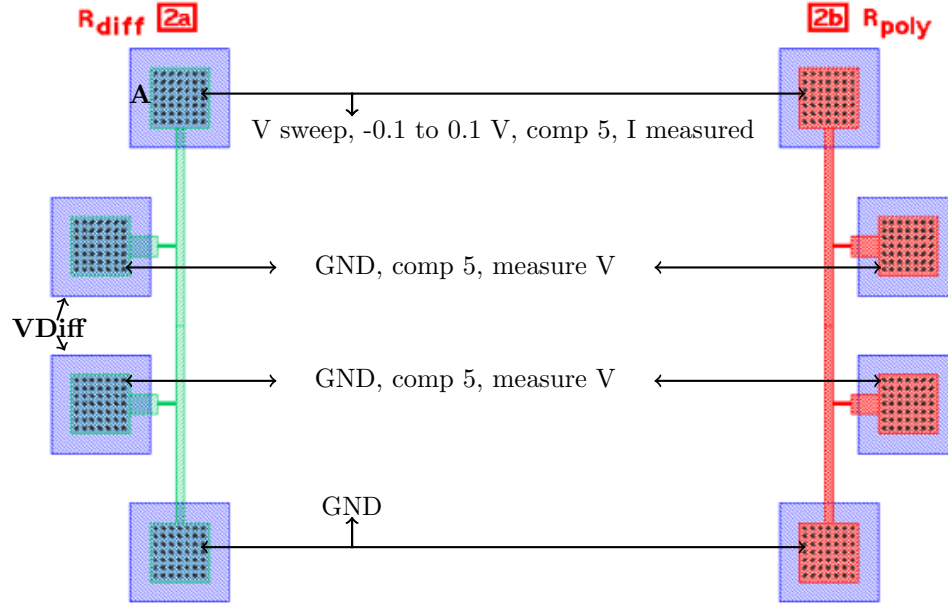


Figure 1: Device 2a is a diffusion resistor and 2b is a poly resistor.

1.2.2 I-V plot for the diffusion resistor, 2a

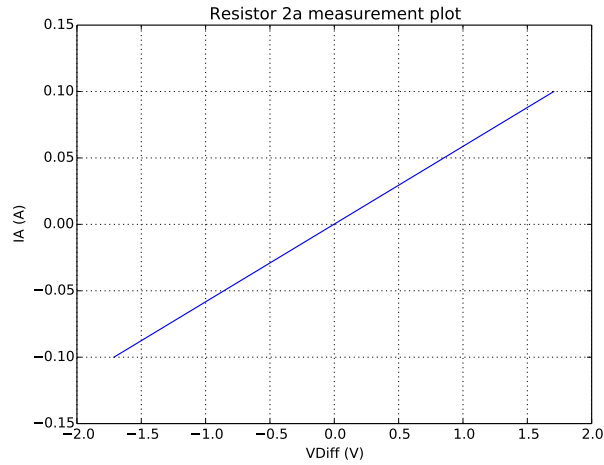


Figure 2: A plot of the measurement data taken for resistor 2a. The plot is based off of 2 data points.

Get resistance, sheet resistance, doping concentration, electron mobility

1.2.3 I-V plot for the poly resistor, 2b

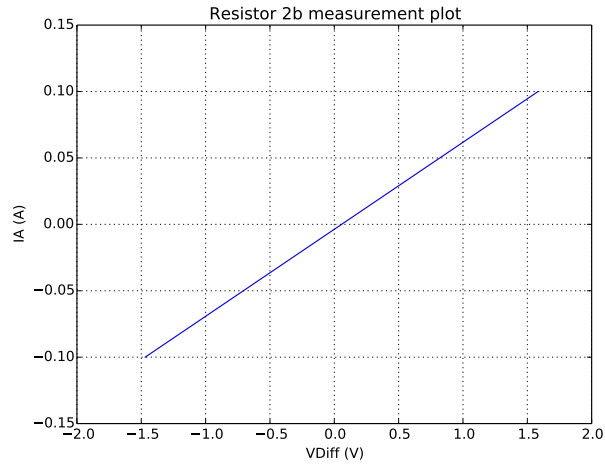


Figure 3: A plot of the measurement data taken for resistor 2b. The plot is based off of 2 data points.

Get resistance and sheet resistance...

1.3 Four-Point Contact-Chain Resistor [2c, 2d]

1.3.1 Measurement Setup

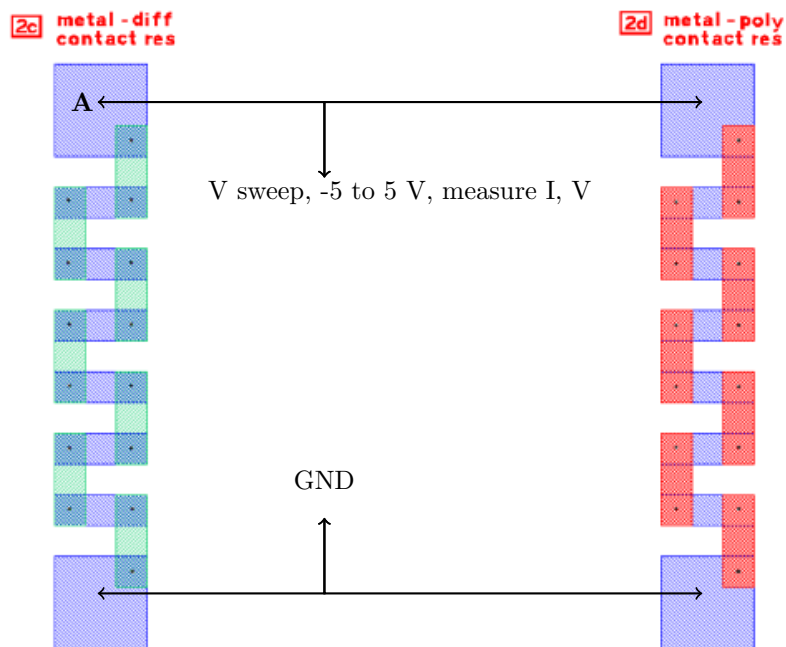


Figure 4: Chain resistor setup for diffusion and poly resistors.

1.3.2 b. I-V plot for diffusion resistor, 2c

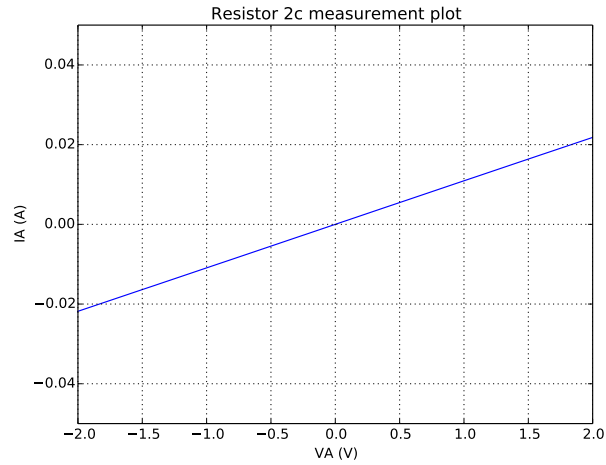


Figure 5: A plot of the measurement data taken for resistor 2c. The plot is based off of 2 data points.

- i. Extract the resistance
- ii. Extract metal-to-diffusion contact resistance

1.3.3 b. I-V plot for poly resistor, 2d

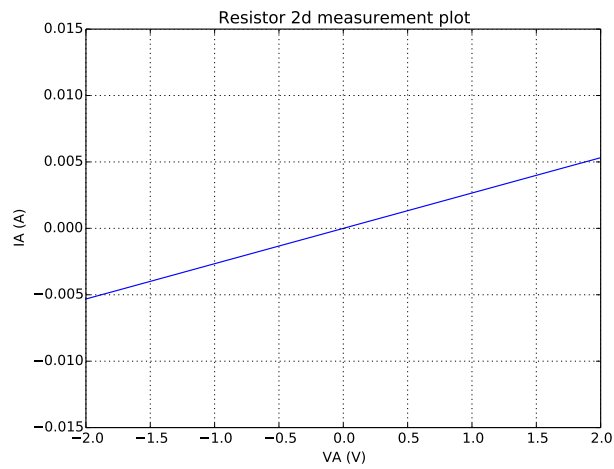


Figure 6: A plot of the measurement data taken for resistor 2d. The plot is based off of 2 data points.

- i. Extract the resistance
- ii. Extract metal-to-poly contact resistance

1.4 Gate Oxide Capacitor, 4

1.4.1 Measurement Setup

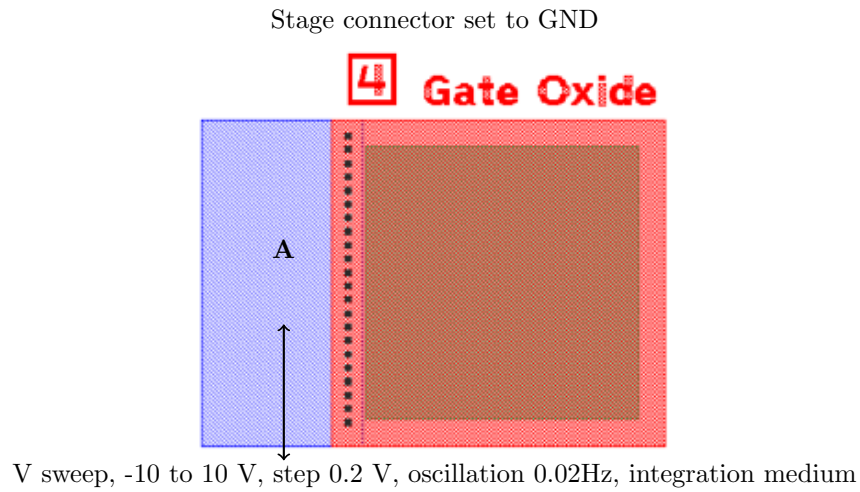


Figure 7: Gate capacitor setup.

1.4.2 C-V plot of gate oxide capacitor w/ lights ON

Minimum capacitance

1.4.3 C-V plot of gate oxide capacitor w/ lights OFF

minimum capacitance ...

1.5 Field Oxide Capacitor, 3

1.5.1 Measurement Setup

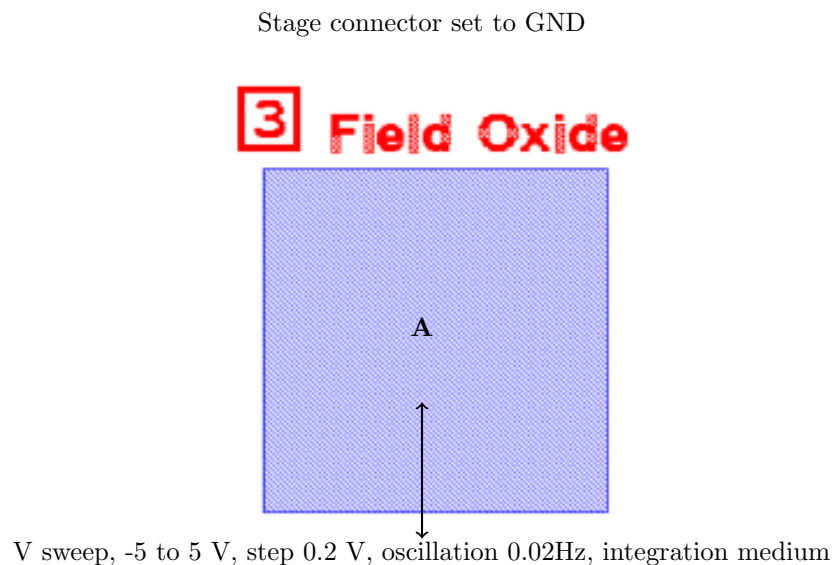


Figure 8: Field oxide capacitor setup.

1.5.2 C-V plot of field oxide capacitor

Minimum capacitance

1.5.3 Capacitance in the accumulation region

minimum capacitance ...

1.5.4 Field oxide thickness

stuff...

1.6 Intermediate Oxide Capacitors, 5

1.6.1 Measurement Setup

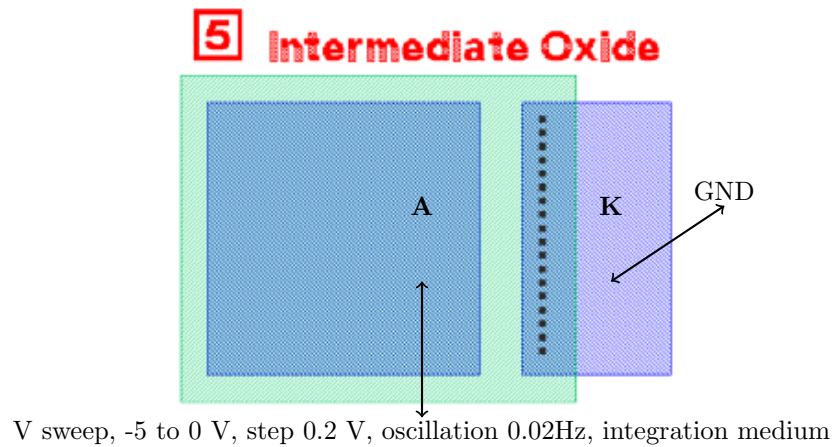


Figure 9: Intermediate oxide capacitor setup.

1.6.2 C-V plot of intermediate oxide capacitor

stuff ...

1.6.3 Capacitance in the accumulation region

stuff...

1.7 Diode, 7

1.7.1 Measurement setups for forward and reverse operations

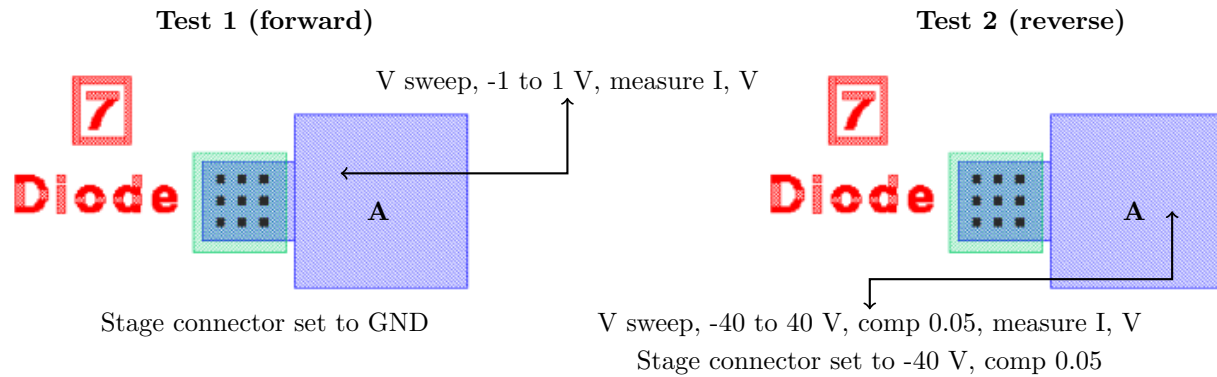


Figure 10: Two tests were performed on this diode; both measurement setups are shown above.

1.7.2 I-V plots for forward and reverse operation

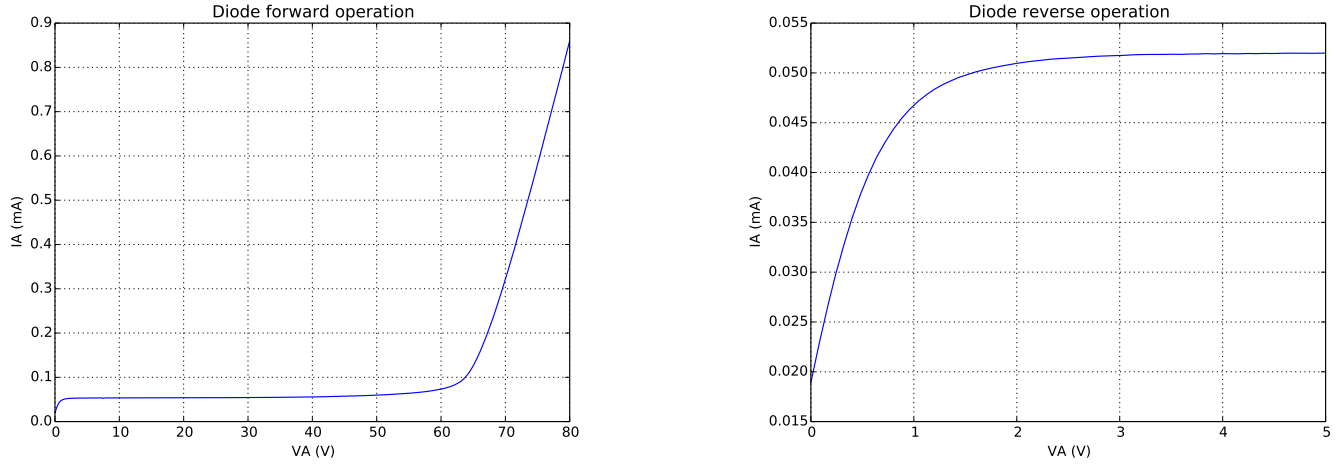


Figure 11: Plots of forward and reverse operation of Diode 7.

1.7.3 Extract the turn-on voltage and the series resistance

1.8 MOSFETs of Varying Length, [8a-d]

1.8.1 Measurement setups

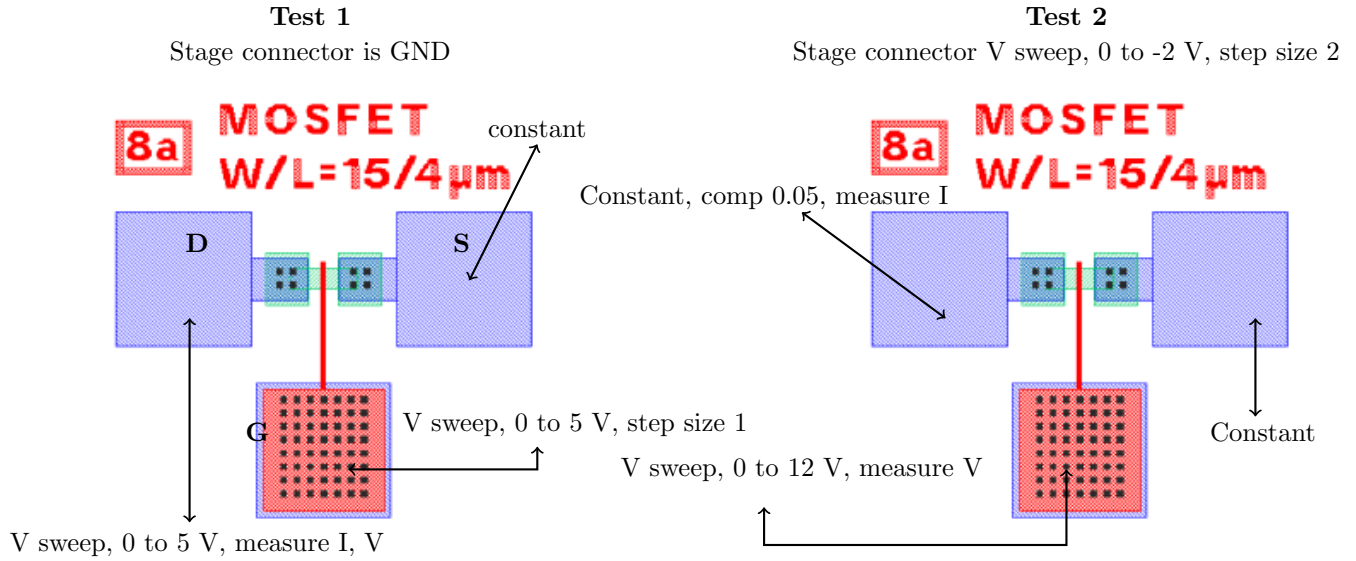


Figure 12: Measurement setup for Mosfet 8a. The same setup is used for Mosfets 8a-d. The only difference is the channel length which changes from 4 (8a) to 6 (8b) to 8 (8c) to 10 (8d) microns.

1.8.2 Plots of I_D - V_D , sweeping V_G

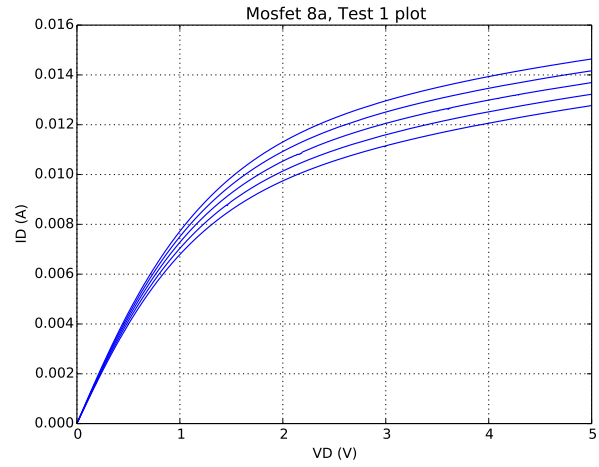


Figure 13: Test 1 for Mosfet 8a

Calculate stuff here...

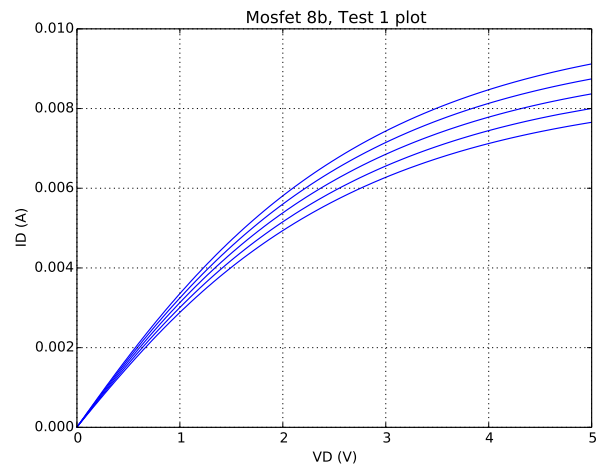


Figure 14: Test 1 for Mosfet 8b

Calculate stuff here...

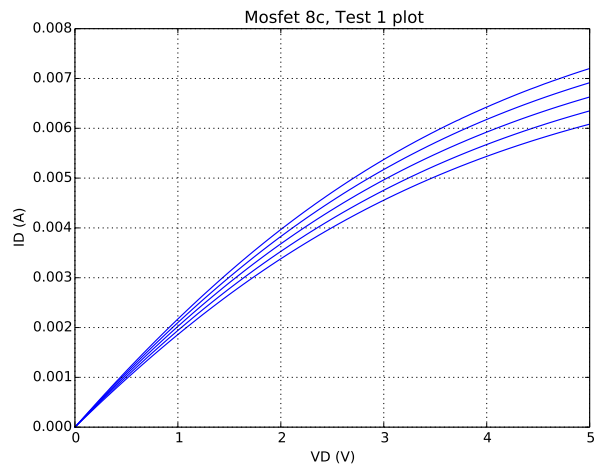


Figure 15: Test 1 for Mosfet 8c

Calculate stuff here...

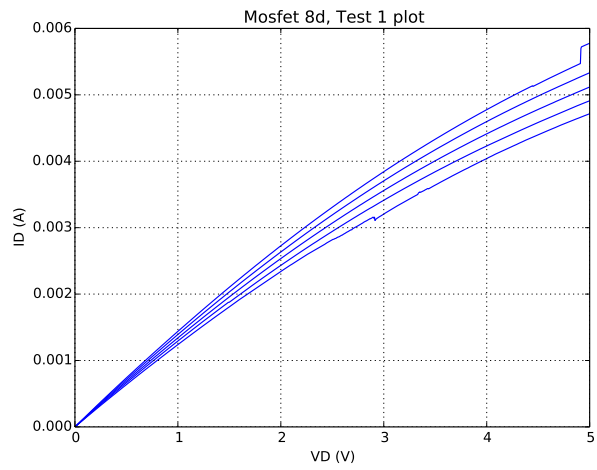


Figure 16: Test 1 for Mosfet 8d

Calculate stuff here...

1.8.3 Plots of I_D - V_G , sweeping V_B

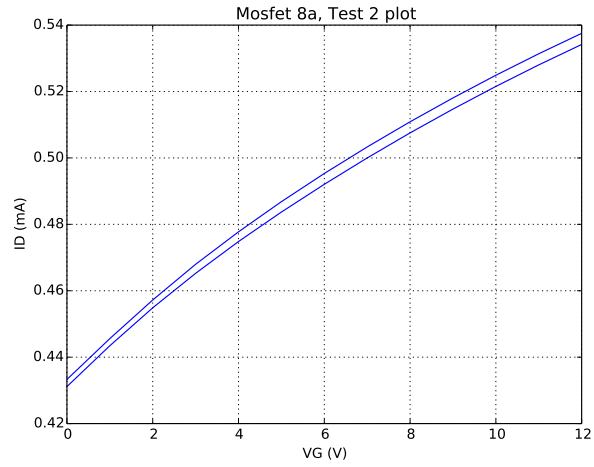


Figure 17: Test 2 for Mosfet 8a

Calculate stuff here...

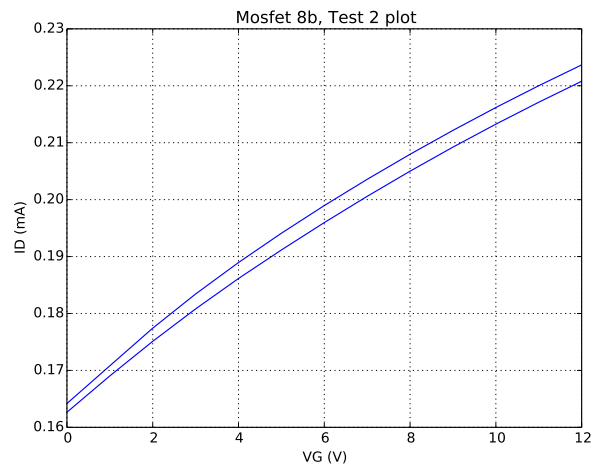


Figure 18: Test 2 for Mosfet 8b

Calculate stuff here...

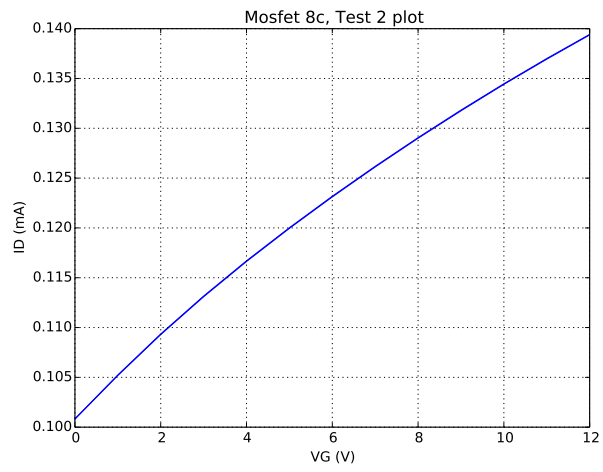


Figure 19: Test 2 for Mosfet 8c

Calculate stuff here...

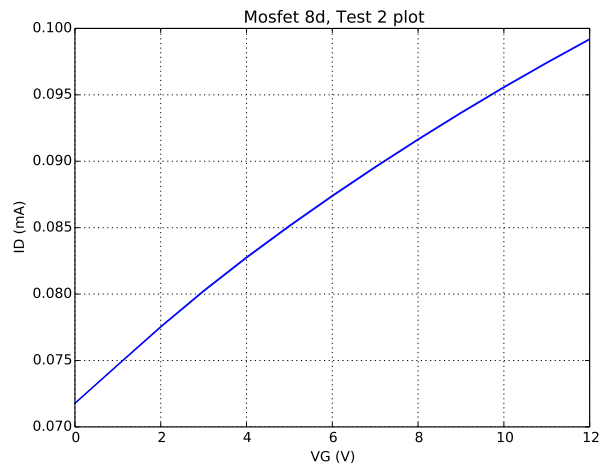


Figure 20: Test 2 for Mosfet 8d

Calculate stuff here...

1.9 MOSFETs of varying width [9a-c]

1.9.1 Measurement setup

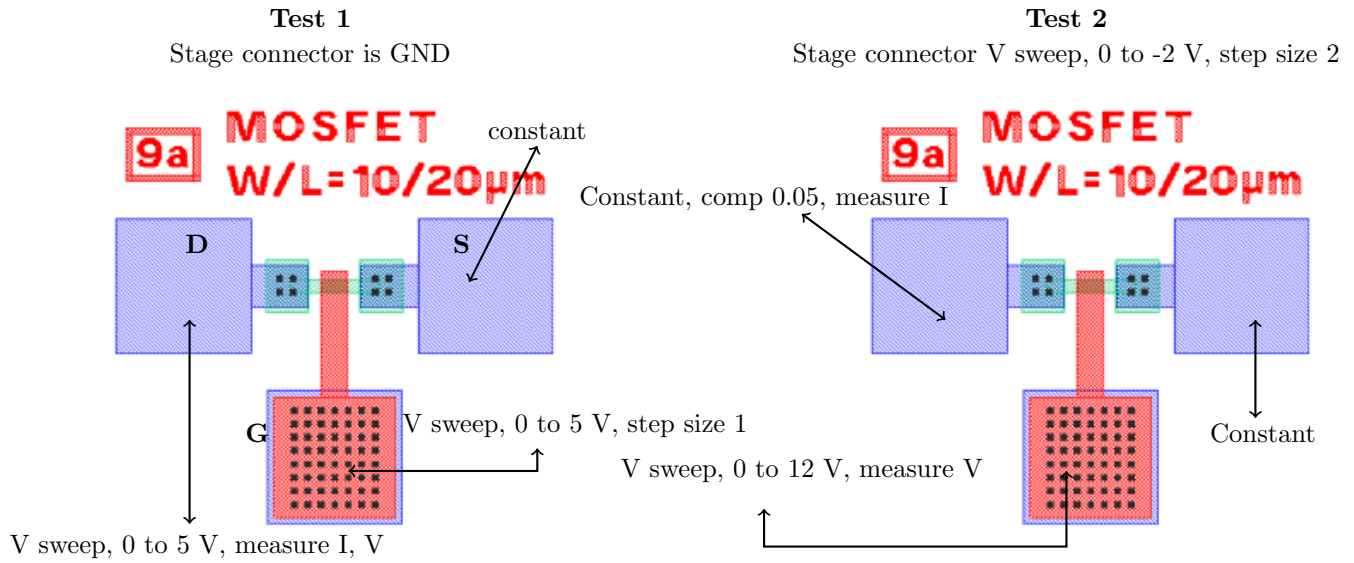


Figure 21: Measurement setup for Mosfet 9a. The same setup is used for Mosfets 9a-c. The only difference is the channel widths which changes from 10 (9a) to 15 (9b) to 20 (9c) microns.

1.9.2 Plots of I_D - V_D , sweeping V_G

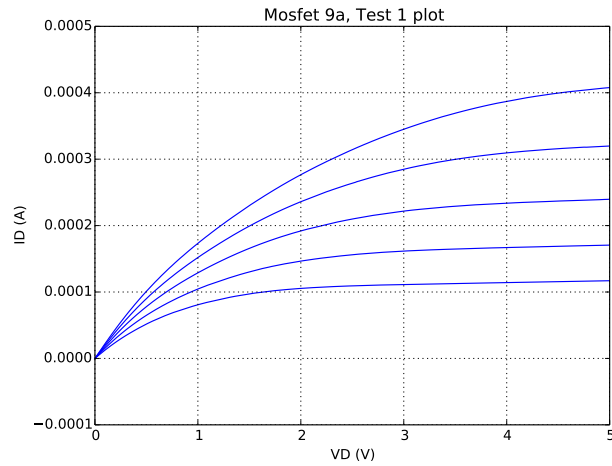


Figure 22: Test 1 for Mosfet 9a

Calculate stuff here...

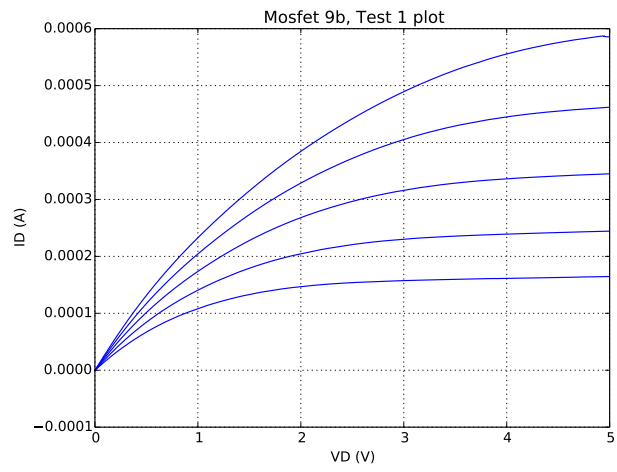


Figure 23: Test 1 for Mosfet 9b

Calculate stuff here...

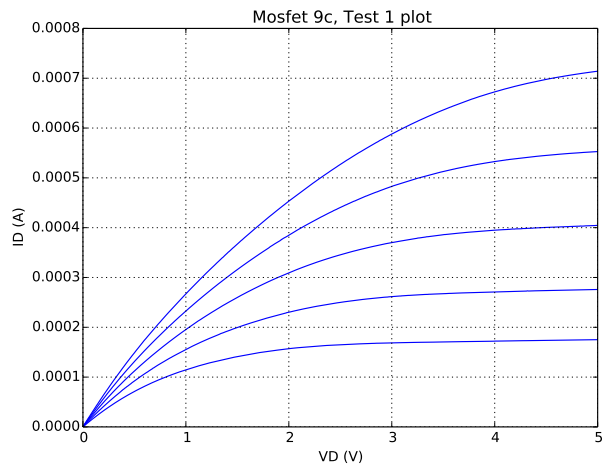


Figure 24: Test 1 for Mosfet 9c

Calculate stuff here...

1.9.3 Plots of I_D - V_G , sweeping V_B

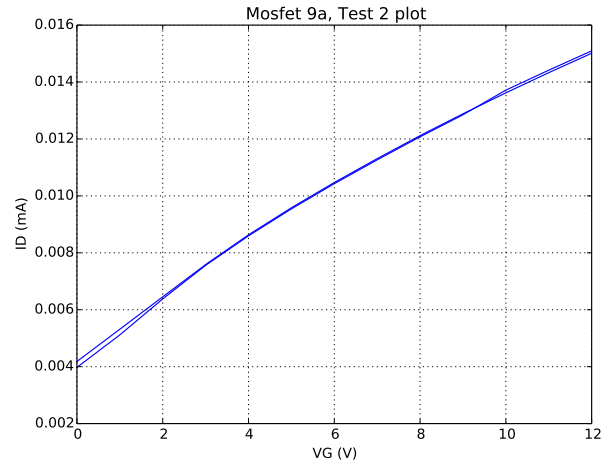


Figure 25: Test 2 for Mosfet 9a

Calculate stuff here...

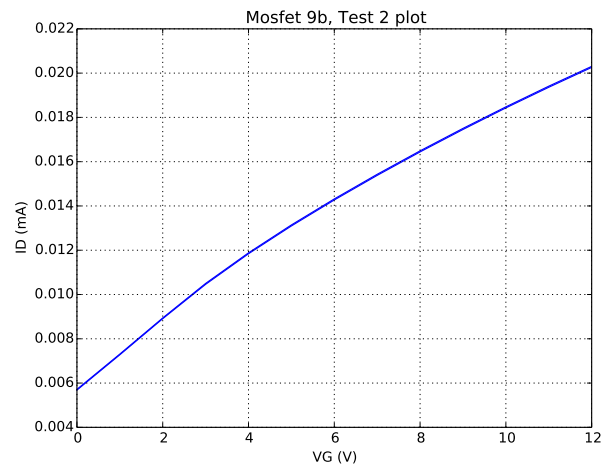


Figure 26: Test 2 for Mosfet 9b

Calculate stuff here...

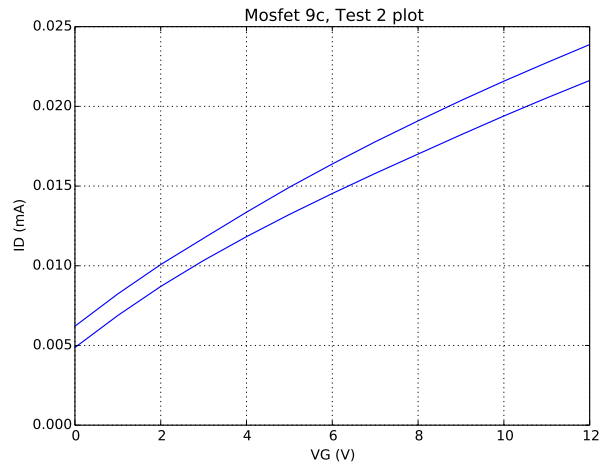


Figure 27: Test 2 for Mosfet 9c

Calculate stuff here...

1.10 Large MOSFET, 10

1.10.1 Measurement setup

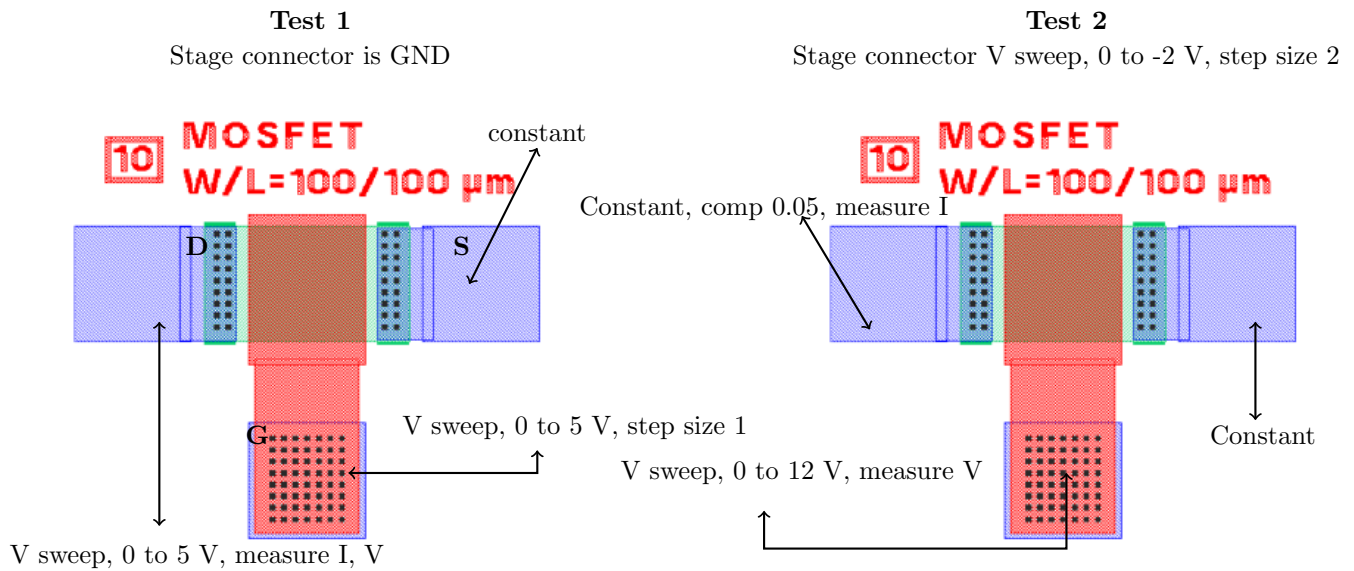


Figure 28: Measurement setup for Mosfet 10. This mosfet has very large dimensions compared to others.

1.10.2 Plots of I_D - V_D , sweeping V_G

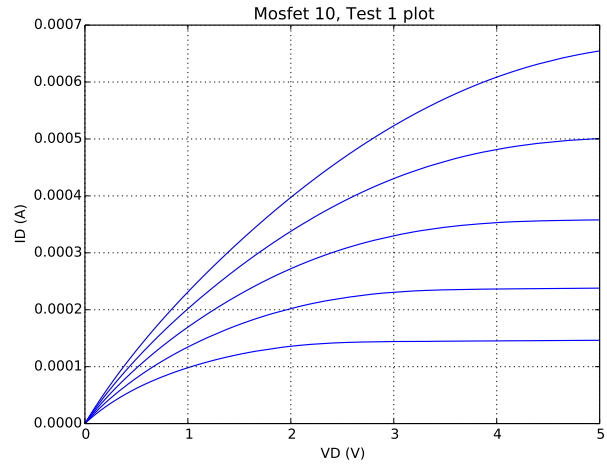


Figure 29: Test 1 for Mosfet 10

Calculate stuff here...

1.10.3 Plots of I_D - V_G , sweeping V_B

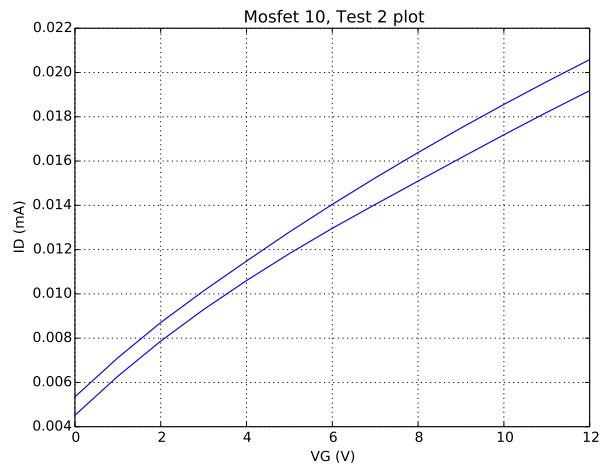


Figure 30: Test 2 for Mosfet 10

Calculate stuff here...

1.11 Inverter, 14

1.11.1 Measurement setup

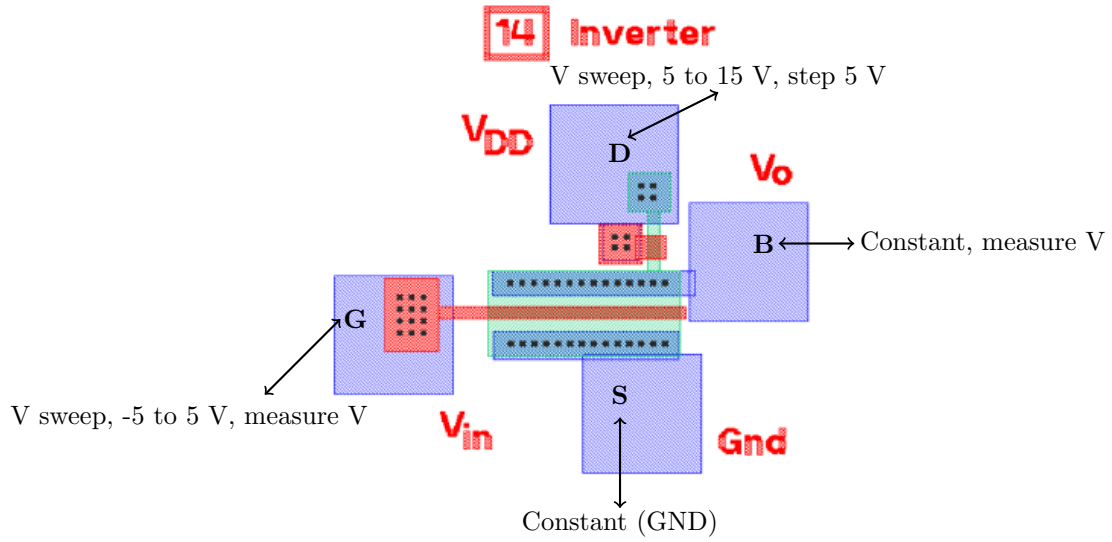


Figure 31: Setup for the inverter. Note that the source is connected to a GND and not the stage connector.

1.11.2 b. $V_{in} - V_{out}$ plot

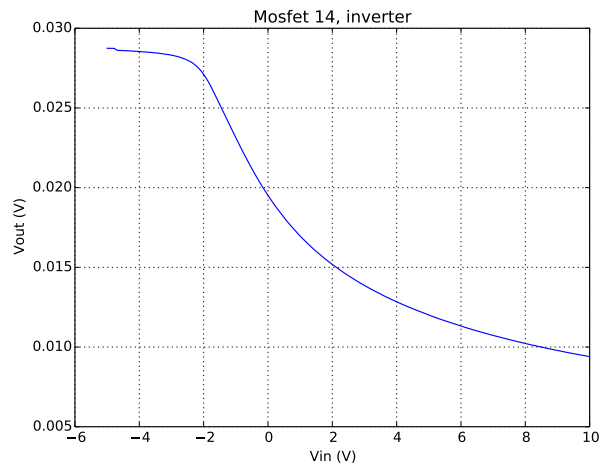


Figure 32: Plot for Inverter. Note both axis are in units of Volts.

1.11.3 Estimate V_M

calculations here....

2 References

1. Jaeger, Richard. *Introduction to microelectronic fabrication*. New Jersey: Prentice Hall, 2002. Print.