

EEE/ETE111L  
Class Assignment 07

**Task 01:** Attach screenshots of the simulated circuits ( $V_{DD} = 10\text{ V}$  &  $V_{DD} = 20\text{ V}$ )

40 points

**Task 02:** Attach screenshots of the tables from “Device Parameter Sweep” ( $V_{DD} = 10\text{ V}$  &  $V_{DD} = 20\text{ V}$ )

40 points

**Task 03:** Write your observation from the experiment.

20 points

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**Task 01:**

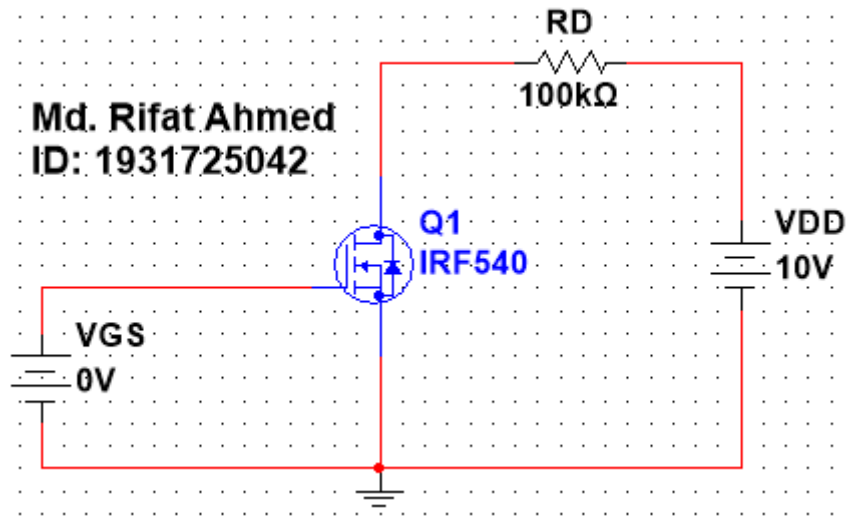


Figure 1: MOSFET Circuit with  $V_{DD} = 10\text{ V}$

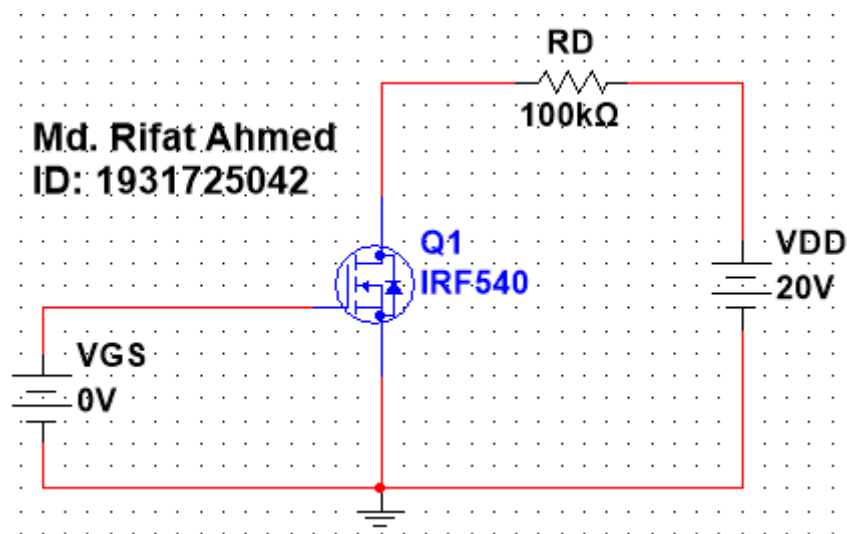


Figure 2: MOSFET Circuit with  $V_{DD} = 20\text{ V}$

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**Task 02:**

Circuit (Mosfet) Device Parameter Sweep		
	Variable, Parameter setting	Operating point value
1	I(RD), vvs dc=0	-9.09127 u
2	I(RD), vvs dc=1	-9.09127 u
3	I(RD), vvs dc=2	-9.09127 u
4	I(RD), vvs dc=3	-9.09127 u
5	I(RD), vvs dc=4	-99.99986 u
6	I(RD), vvs dc=5	-99.99993 u
7	I(RD), vvs dc=6	-99.99994 u
8	I(RD), vvs dc=7	-99.99994 u
9	I(RD), vvs dc=8	-99.99995 u
10	I(RD), vvs dc=9	-99.99995 u
11	I(RD), vvs dc=10	-99.99995 u

Figure 3: “Device Parameter Sweep” Table for VDD = 10V

Circuit (Mosfet) Device Parameter Sweep		
	Variable, Parameter setting	Operating point value
1	I(RD), vvs dc=0	-18.18221 u
2	I(RD), vvs dc=1	-18.18221 u
3	I(RD), vvs dc=2	-18.18221 u
4	I(RD), vvs dc=3	-18.18221 u
5	I(RD), vvs dc=4	-199.99973 u
6	I(RD), vvs dc=5	-199.99985 u
7	I(RD), vvs dc=6	-199.99988 u
8	I(RD), vvs dc=7	-199.99989 u
9	I(RD), vvs dc=8	-199.99989 u
10	I(RD), vvs dc=9	-199.99989 u
11	I(RD), vvs dc=10	-199.99990 u

Figure 4: “Device Parameter Sweep” Table for VDD = 20V

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**Task 03:**

In this experiment we'll looking at 2 MOSFET circuits with different  $V_{DD}$  and see the difference in their switching characteristics. After building the circuit we took the values of  $I(R_D)$  using Parameter Sweep. Then we changed the value of  $V_{DD}$  to 20V and again took the values of  $I(R_D)$ . Looking at the 1<sup>st</sup> table we can see that at the beginning until 3V the value of  $I(R_D)$  is small and constant for  $V_{DD} = 10V$ . But from 4V the value of current increases around 10 times and is almost constant until it reaches 10V. Then we see the similar thing happening for the circuit with  $V_{DD} = 20V$  from the 2<sup>nd</sup> table the value of  $I(R_D)$  is constant at the beginning then jumps to a higher value and again runs almost at a constant current. But one thing that needs to be remembered is that the values are positive even though there's a negative sign in the figures.