Laboratory VIII

EPOKA UNIVERSITY

Discrete – Circuit MOSFET Amplifier

Build in Multisim the biasing scheme given in Fig. 2.

1. Determine the bias/quiescent point of the circuit by measuring the DC parameters V_{GS}, V_{DS} and ID.
2. Determine the region in which the transistor is operating.
3. Determine the voltages at all nodes and the currents through all branches.

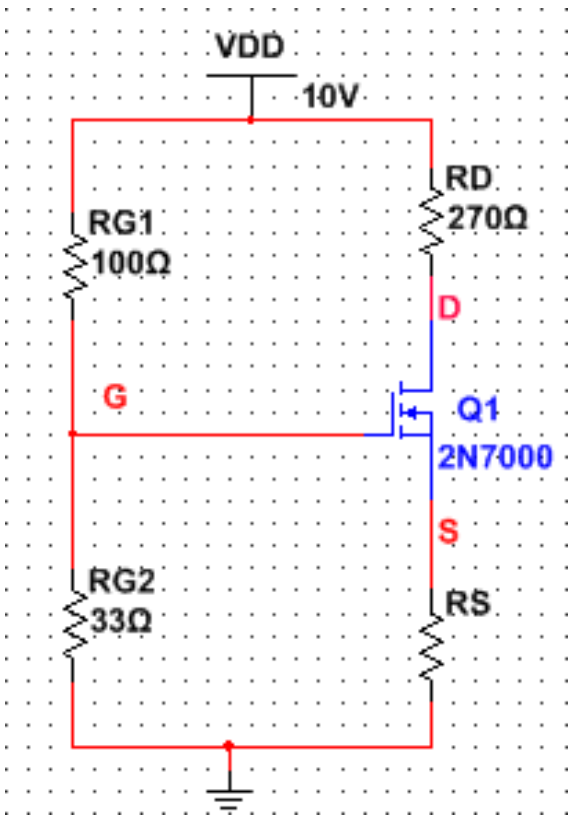

Figure 2: Biasing scheme

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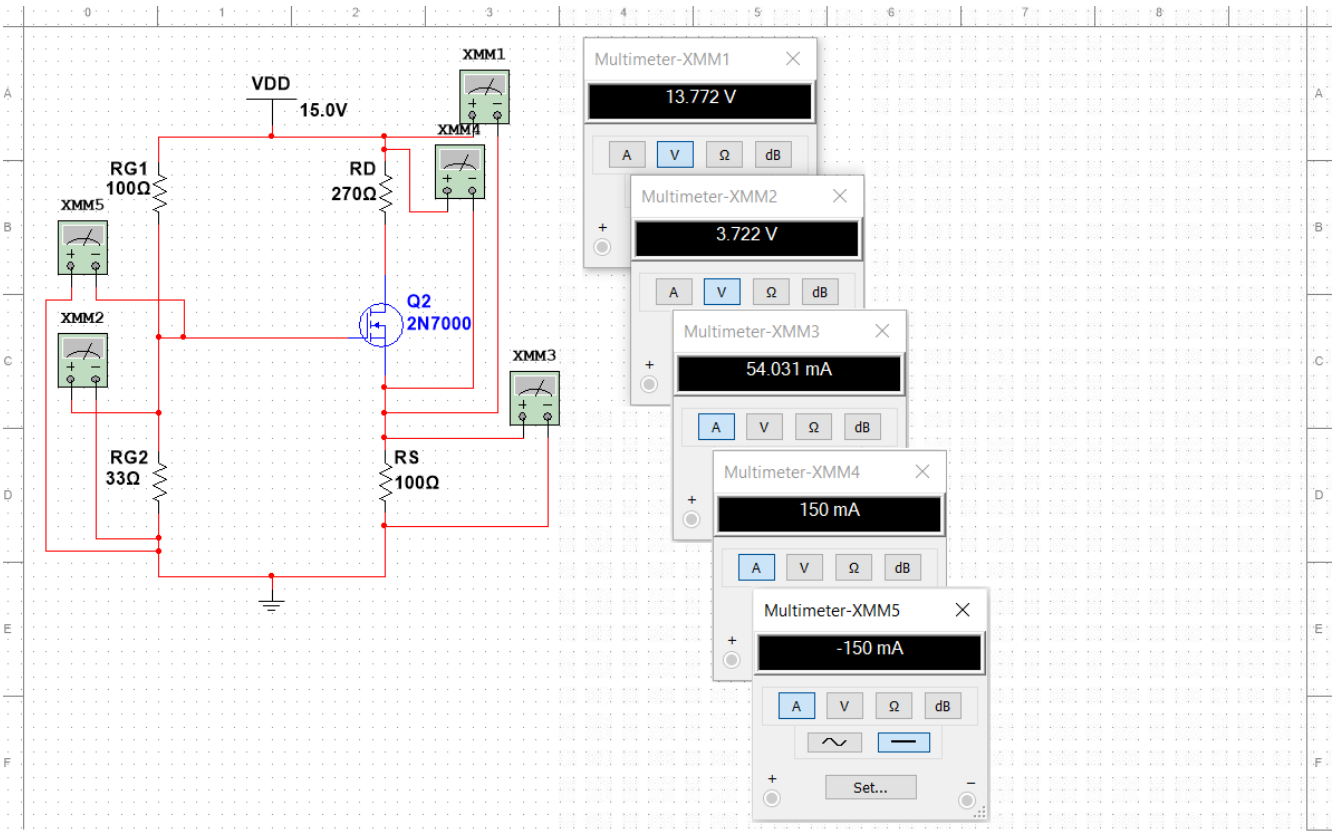


Fig. 1: Biasing Scheme

a) *Prompts:* V_G = 3.722V, V_D = 13.772V, V_S = 0.54031V,

$I_D = I_S$ = 0.15A => The source and drain currents are equal but opposite.

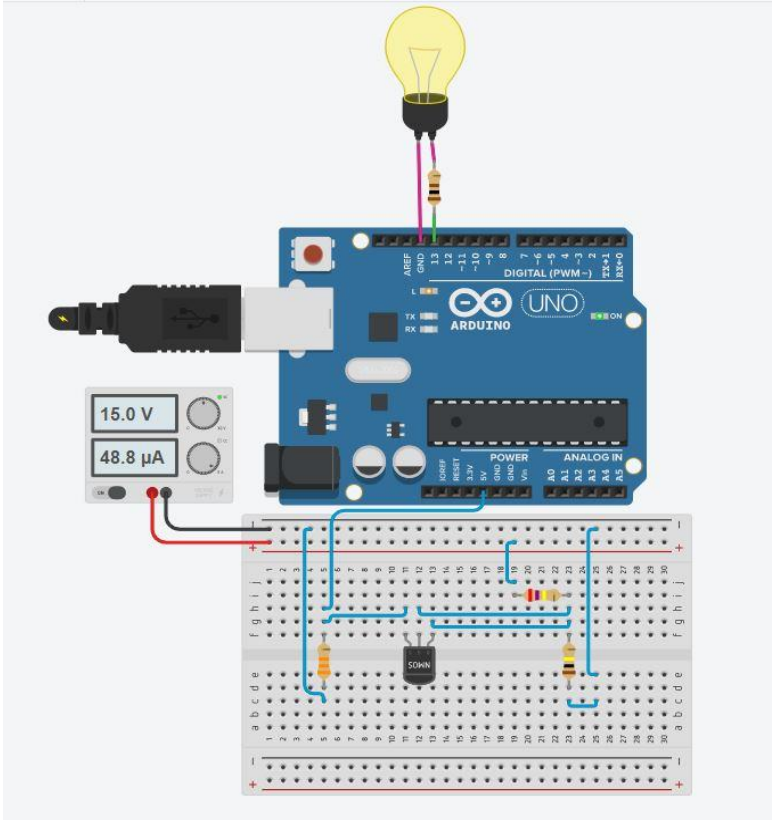
$V_{GS} = V_G – V_S$ = 3.722V - 0.54031V = 3.18169V

$V_{DS} = V_D – V_S$ = 13.772V - 0.54031V = 13.23169V

b) V_D = 13.772, $V_G – V_{th}$ => 13.772 > 3.722 – V_{th} : Saturation Region (Emitter Junction = Forward Biased, Collector Junction = Forward Biased, => Saturation Region)

c) Voltages and currents are determined at Fig. 1

Simulation Link: click here



Arduino Code:

```
// C++ code
/*
  This program blinks pin 13 of the Arduino (the
  built-in LED)
*/
void setup(){
  pinMode(LED_BUILTIN, OUTPUT);
}
void loop(){
  // turn the LED on (HIGH is the voltage level)
  digitalWrite(LED_BUILTIN, HIGH);
  delay(1000); // Wait for 1000 millisecond(s)
  // turn the LED off by making the voltage LOW
  digitalWrite(LED_BUILTIN, LOW);
  delay(1000); // Wait for 1000 millisecond(s)
}
```