2Ei5
Project 2

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Submitted by Yichen Lu, luy191, 400247938

Description

the properties of an ideal switch:

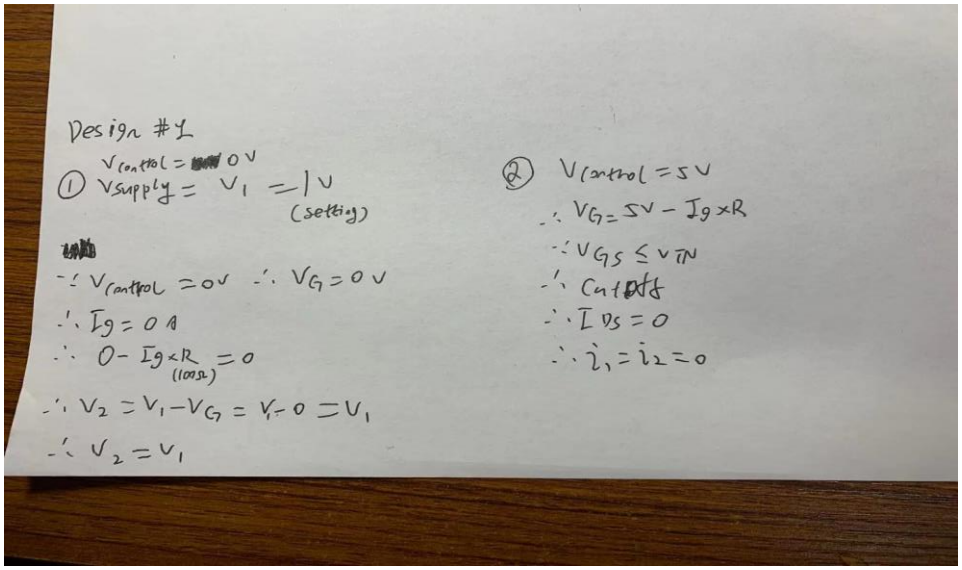
1. The current through the switch is zero when the switch is off.
2. The voltage through the switch is zero when the switch is on.
3. There is infinite breakdown voltage.
4. The turn-on and turn-off transition times of ideal switches are zero.
5. the product of instantaneous voltage and instantaneous current is always zero as the either the voltage or the current is always zero in an ideal switch,

Switch non-idealities:

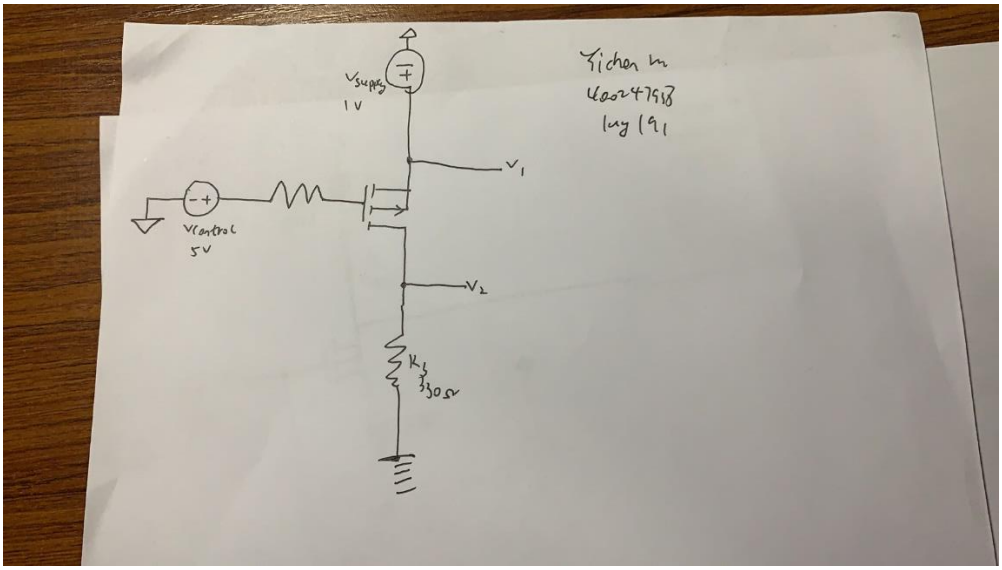
1. there is probably a finite breakdown voltage.
2. The dissipation is not zero because firstly when the switch is off, there is still some current passing through. In addition, when the switch is on, the voltage is probably not zero. What is more, there would be non-zero turn-on and turn-off transition times.

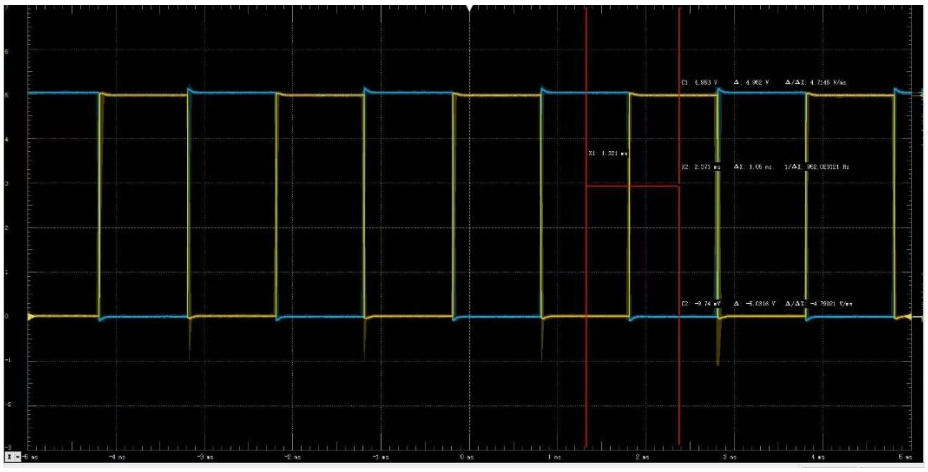
Test Plan

1. V control, V supply and V1 would be set as 5v, 1v and 0v respectively.
2. V1 and V control would be measured.
3.



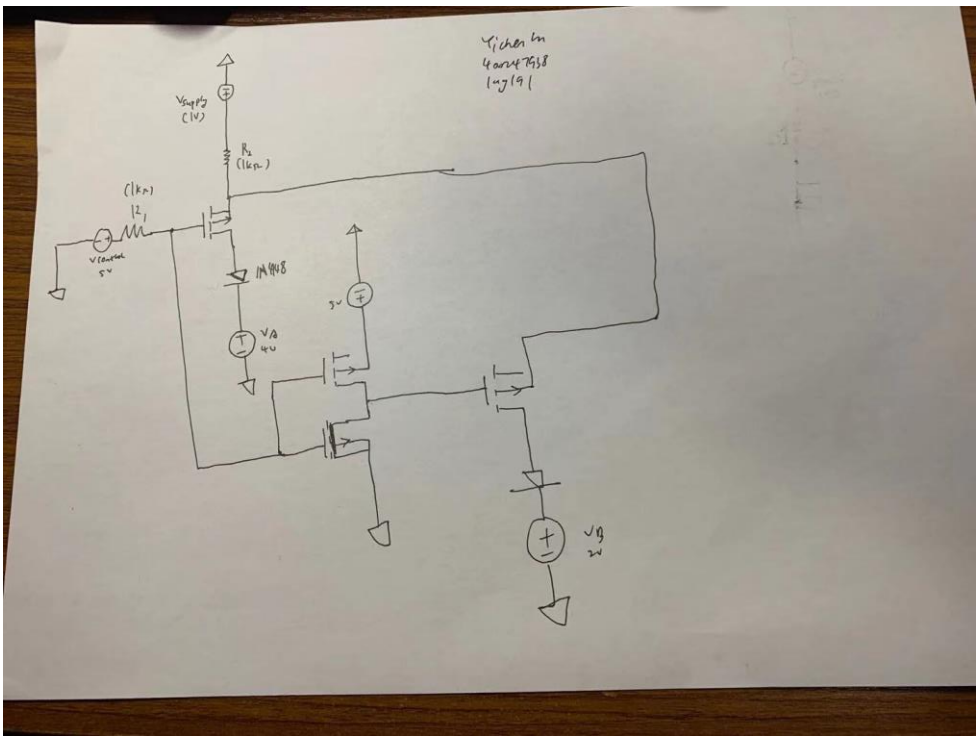
Switch type1

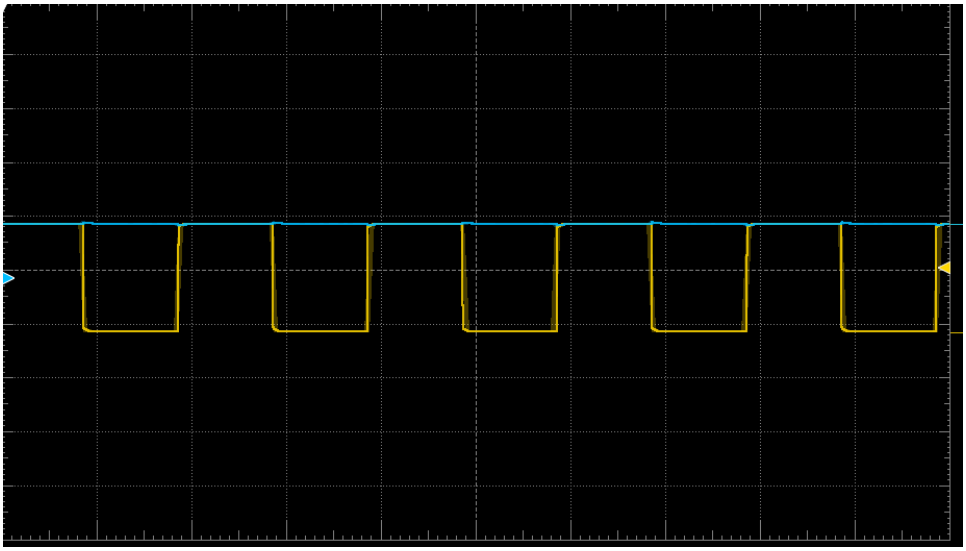




a. The experimental values are almost what I expected as the theoretical values.
b. Design tradeoff: Initially, I set another resistor between v1 and v supply. However, I found that this resistor is not necessary which means would not affect my experimental values.

Switch type2





a. Overall, the experimental values are almost what I expected as the theoretical values. But there are still some errors comparing to the theoretical values.
b. Design tradeoff: In my opinion, my design could be simpler. To illustrate, instead of using four MOSFETS, perhaps I could use two to achieve the same affect.