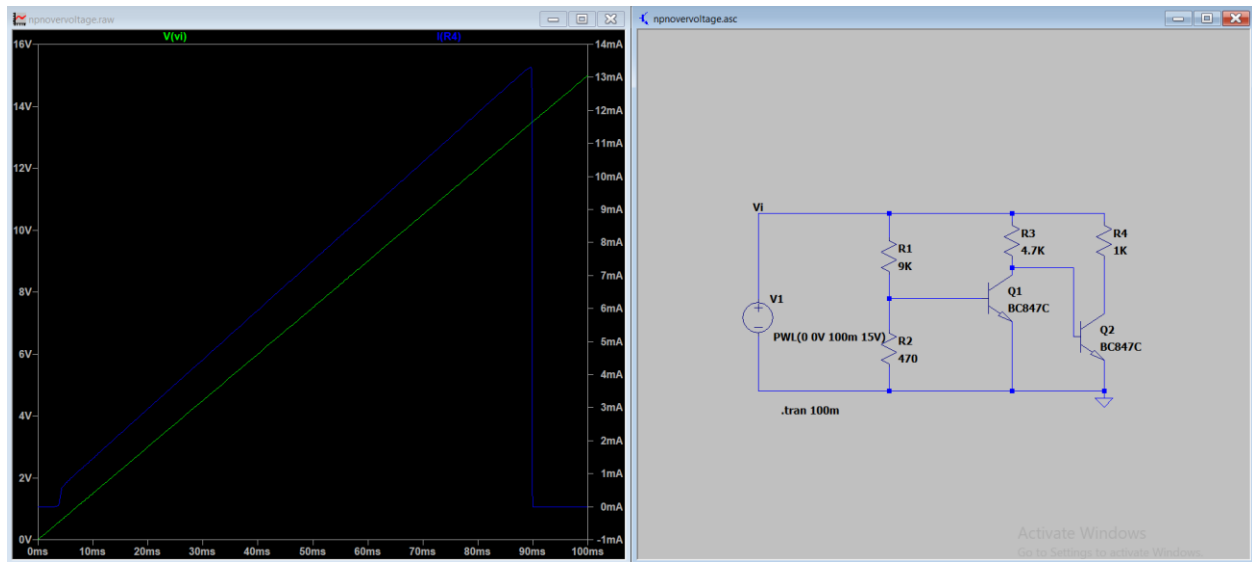


Task 2: Circuit Implementation and Simulation

By: Yahia Ahmed Saber

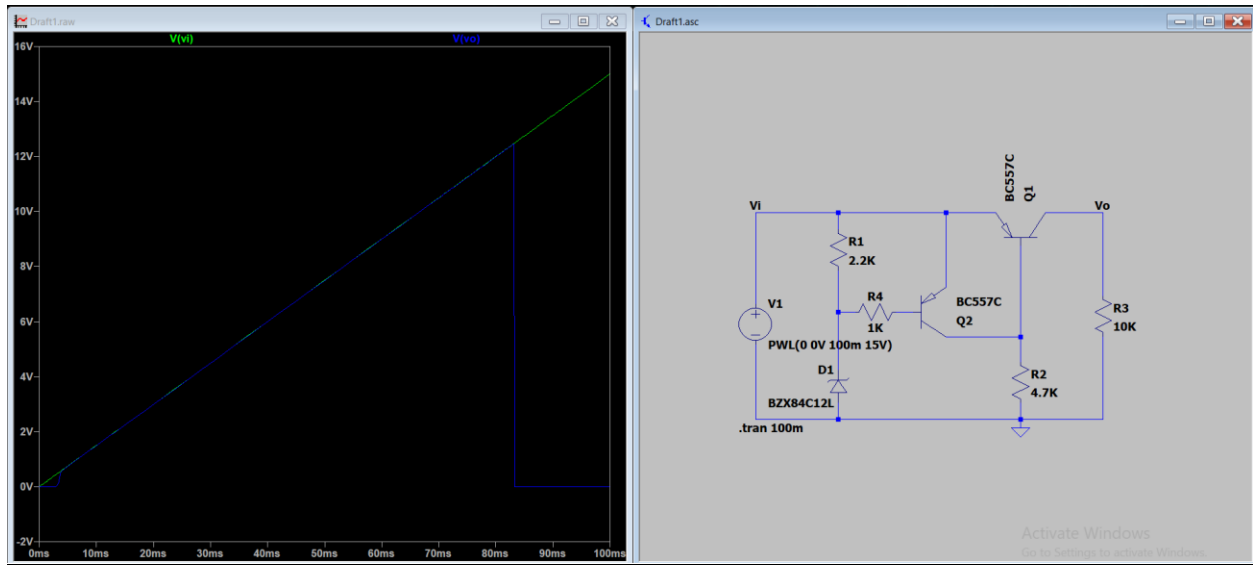
NPN BJT overvoltage protection circuit:



To turn the NPN transistors on and off, a voltage divider (R1 & R2) is used so that when a certain voltage limit is crossed, Q1 is turned on and Q2 is turned off leading to the circuit being cut.

In the simulation above, the green line represents the input voltage and the blue line represents the current flowing through the load (R4). At a certain voltage (around 13.5V), the load current drops from around 13.3 mA to almost zero which means in cases of overvoltage where input voltage exceeds 13.5V, the circuit is cut.

PNP BJT overvoltage protection circuit:



When input voltage reaches overvoltage threshold, the zener diode will turn on and therefore turning Q2 on. Q2 will conduct and voltage reaches Q1 which will then turn off and cut the circuit.

In the simulation above, the green line represents the input voltage and the blue line represents the output voltage. At a certain voltage (around 12.5 V), the output voltage drops down to zero which means in cases of overvoltage where input voltage exceeds 12.5V, the circuit is cut.