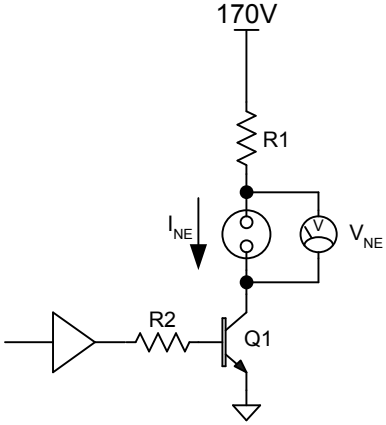
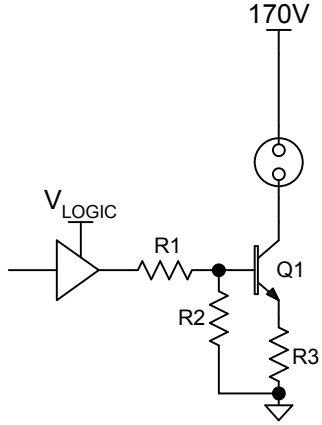


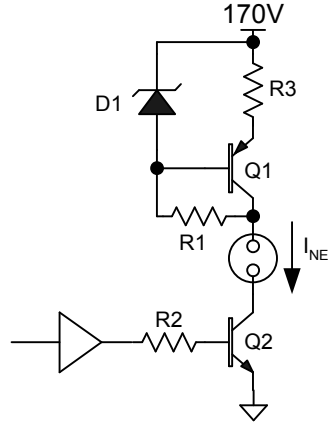
Simple saturated NPN drive. R1 dissipates most of the waste heat, the voltage across Q1 is usually nearly zero. One limiting resistor shared by all digits, but current varies with changes in 170 rail. I_{R1} needs to be much greater than (I_{R1} / 100) to satisfy Q1 h_{FE}.

$$I_{NE} = \frac{170 - V_{NE}}{R1}$$



Low side constant current linear drive. Q1 dissipates all of the waste heat, voltage on R3 is usually very low compared to the voltage across Q1. Requires a current sink for each segment. This will not work with MOSFETs. I_{R1} needs to be about (I_{R3} / 100) to satisfy Q1 h_{FE}.

$$I_{NE} = \frac{\left(\frac{V_{LOGIC} \times R2}{R1 + R2}\right) - 0.65V}{R3}$$



High side constant current linear drive. Q1 dissipates all of the waste heat, voltage on R3 is usually very low compared to the voltage across Q1. Multi segment displays can share Q1 and the segment drives can be either NPN or MOSFET saturated switches. I_{R1} needs to be about (I_{R3} / 100) to satisfy Q1 h_{FE}.

$$I_{NE} = \frac{V_{D1} - 0.65V}{R3}$$