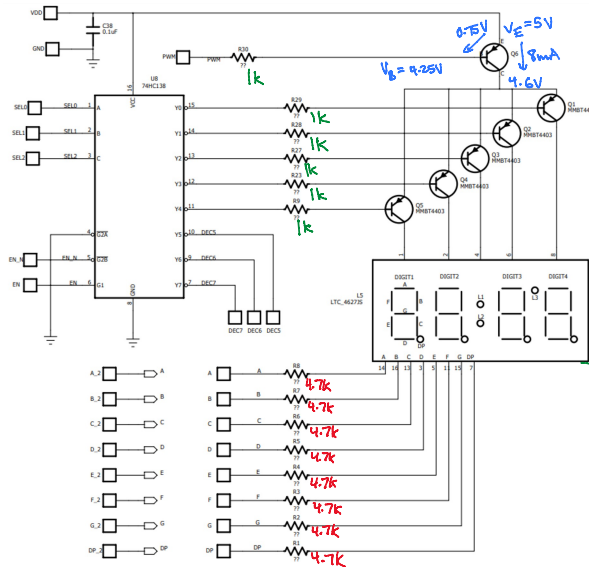


Lab 2 Calculation

Monday, October 11, 2021 17:31



$$\beta = 10$$

$$I_c = \beta I_B$$

$$I_B = \frac{I_c}{\beta} = \frac{8mA}{10} = 0.8mA$$

$$R_{30} = \frac{V_B}{I_B} = \frac{4.25V}{0.8mA} = 5.3k\Omega \approx 1k$$

$$V_C = 4.6V$$

$$V_{CE} = 0.4V$$

$$I_B = \frac{V_B}{R_{30}} = \frac{4.25V}{1k\Omega} = 4.25mA$$

$$\beta = \frac{I_c}{I_B} = \frac{8mA}{4.25mA} = 1.88$$

$$V_E = 4.6V$$

$$V_B = 3.9V$$

$$I_E = 8mA$$

$$\beta = 10$$

$$I_E = (\beta + 1) I_B$$

$$I_B = \frac{I_E}{(\beta + 1)} = \frac{8mA}{11} = 0.73mA \approx 1mA$$

$$R = \frac{V}{I_B} = \frac{5V}{0.73mA} = 6875\Omega \approx 1k\Omega$$

$$I_B = \frac{V}{R} = \frac{5V}{1k} = 5mA$$

$$\beta = \frac{I_E}{I_B} - 1 = \frac{8mA}{5mA} - 1 = 0.6$$

$$V_{in} = V_{cc} = 5V$$

$$I_{max_rating} = 25mA$$

$$R = \frac{V}{I} = \frac{5V}{25mA} = 200\Omega$$

$$V_{in} = V_{cc} = 5V$$

$$I_{avg} = 1mA$$

$$R = \frac{V}{I} = \frac{5V}{1mA} = 5000\Omega$$

When the gain is under 100 it makes the BJT in saturation mode, otherwise it would be in the active region. This causes a switching effect on the BJT. The result of the of the BJT's gain in this case is $\beta = 0.6$ and $\beta = 1.88$.