

ECEN 325 - 512

BJT Amplifier Configurations

Date: 11/14/2023

Contributors:

Dominic Treadwell | UIN: 720004254

Joaquin Salas | UIN: 731000141

Measurements

1. Figures 4(a) and 5(a)

a. V_{RB2} , V_{RE} , V_{RC} , $V_{o,dc}$, and I_C

Figure 4(a) - $V_{RB2} = 2.061V$, $V_{RE} = 1.357V$, $V_{RC} = 2.052V$, $V_{o,dc} = 2.942V$, $I_C = 1.965mA$

Figure 5(a) - $V_{RB2} = 2.169V$, $V_{RE} = 1.519V$, $V_{RC} = 2.249V$, $V_{o,dc} = 2.248V$, $I_C = 1.449mA$

b. Measure A_V , R_i , R_o

Figure 4(a) - $A_V = 27db$

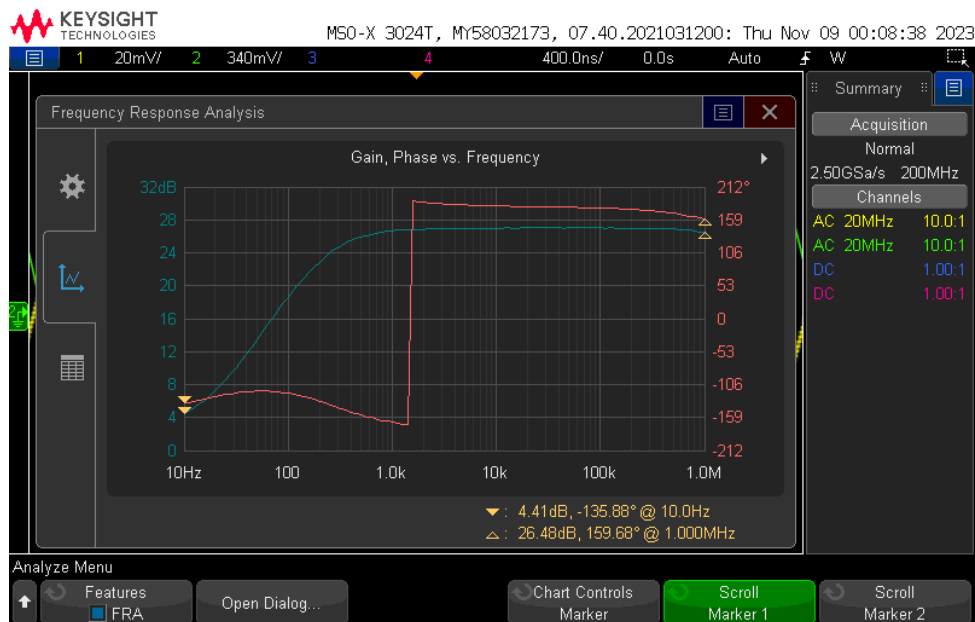


Figure 5(a) - $A_V = 27.58db$



Figure 4(a) - $R_i = 8149.69$ ohms

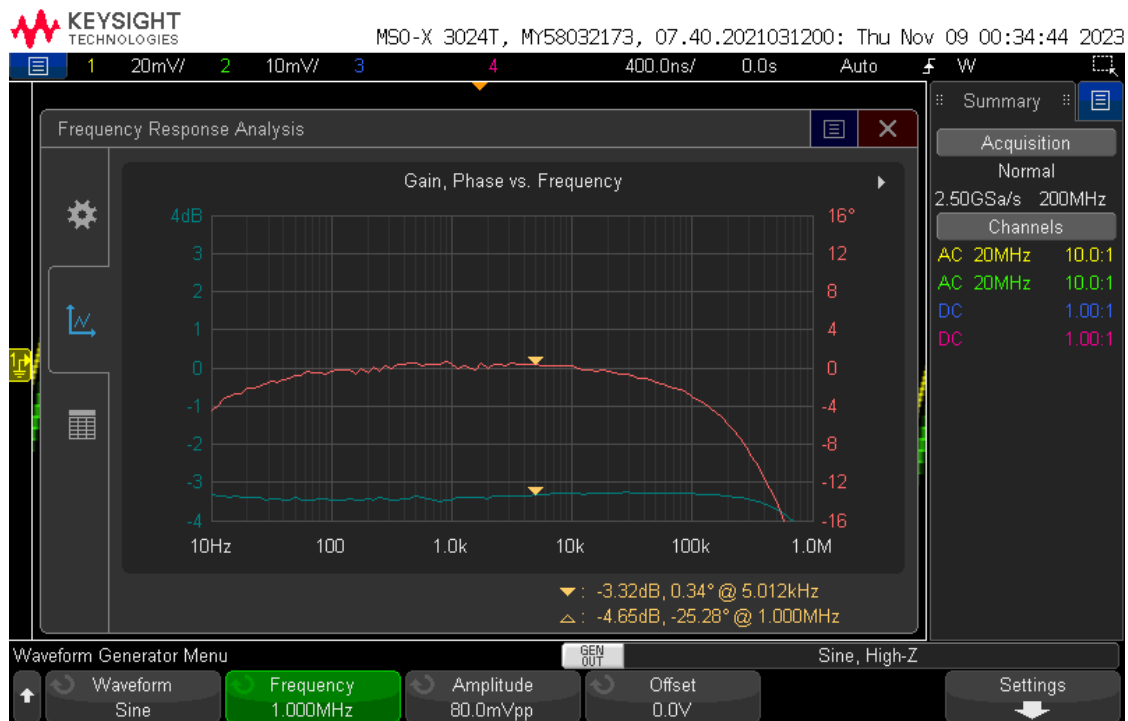


Figure 5(a) - $R_i = 6517.23$ ohms

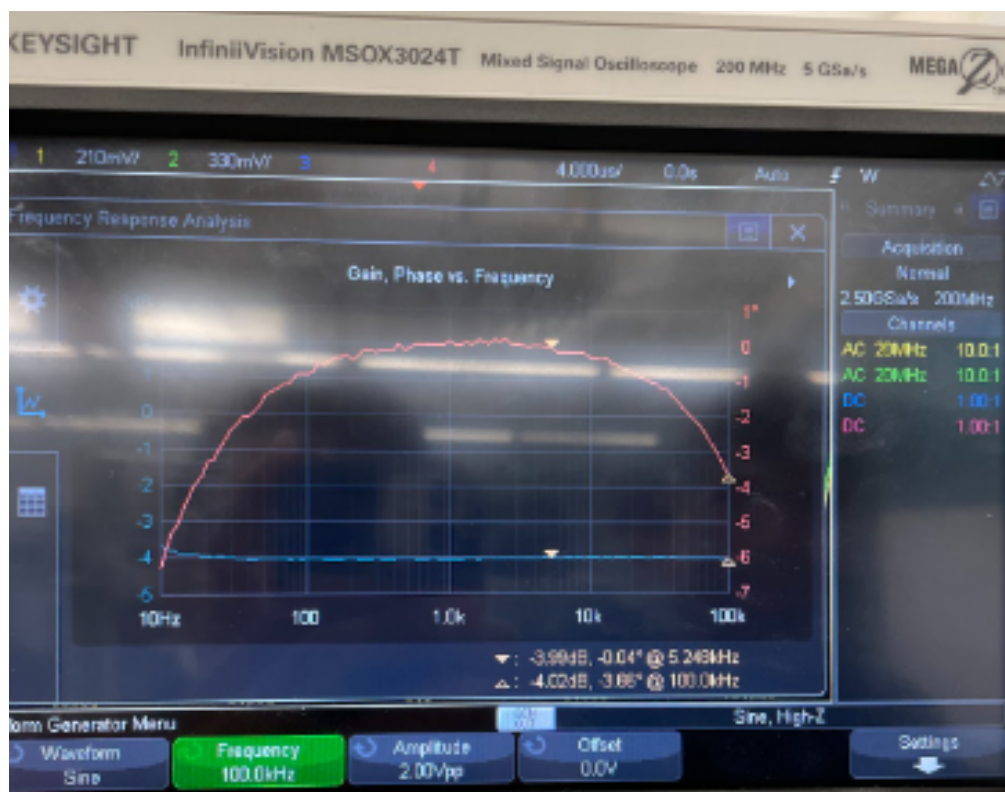


Figure 4(a) - $R_o = 1506.01$ ohms

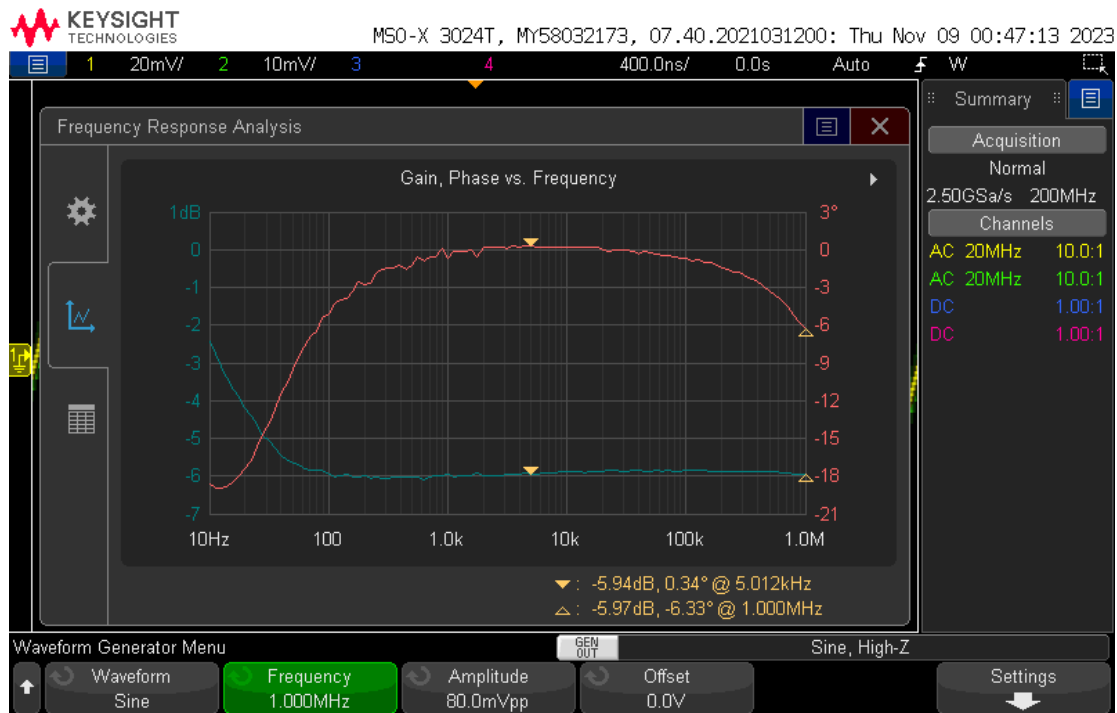


Figure 5(a) - $R_o = 1489.89$ ohms



c. Time-domain waveform, total harmonic distortion (THD)

Figure 4(a)

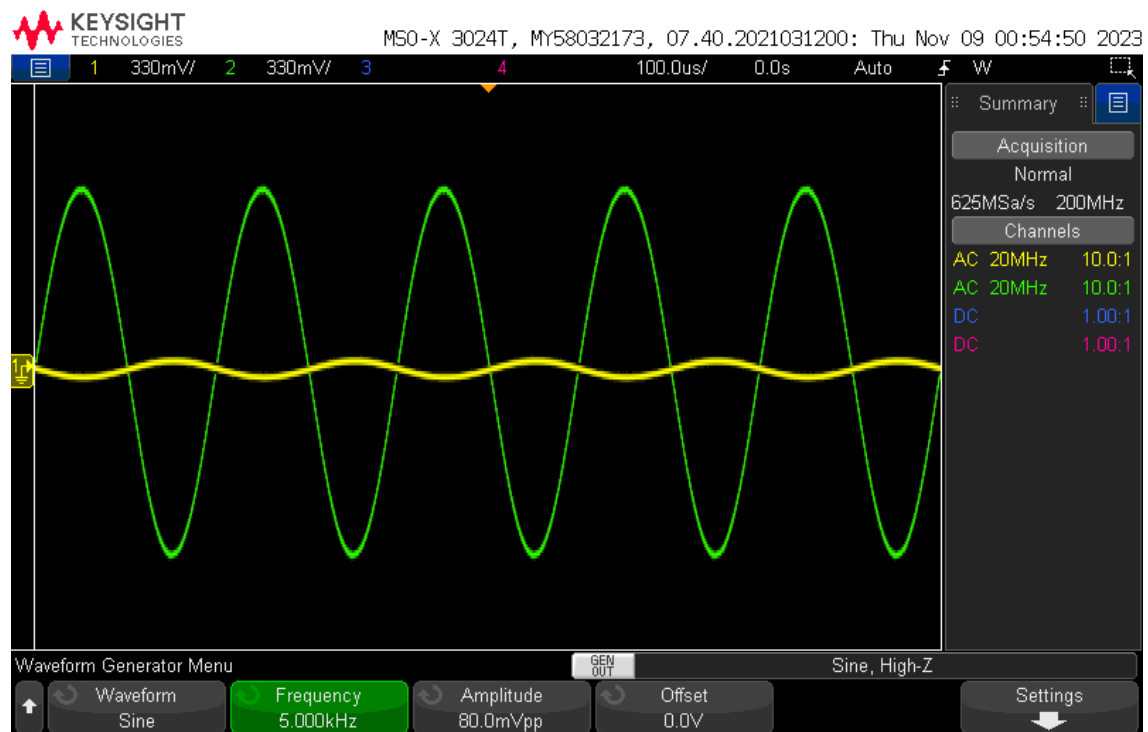


Figure 5(a)



Figure 4(a) - THD = 6.48%

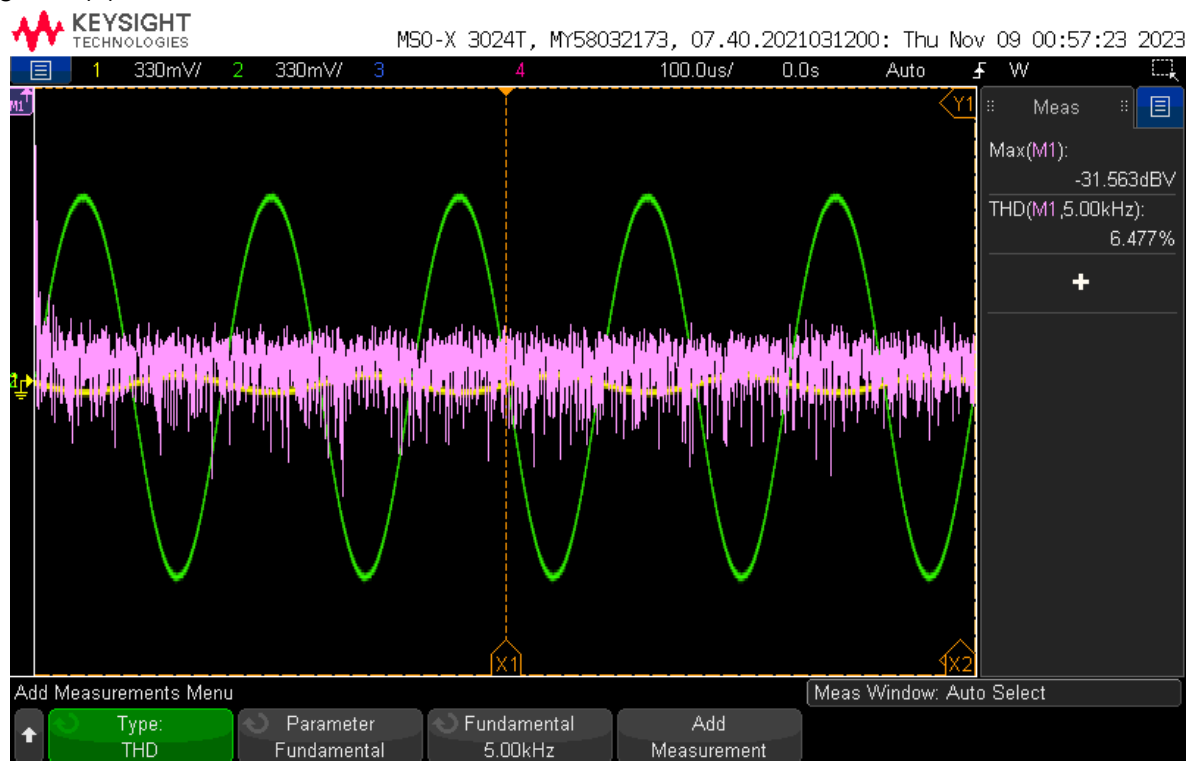
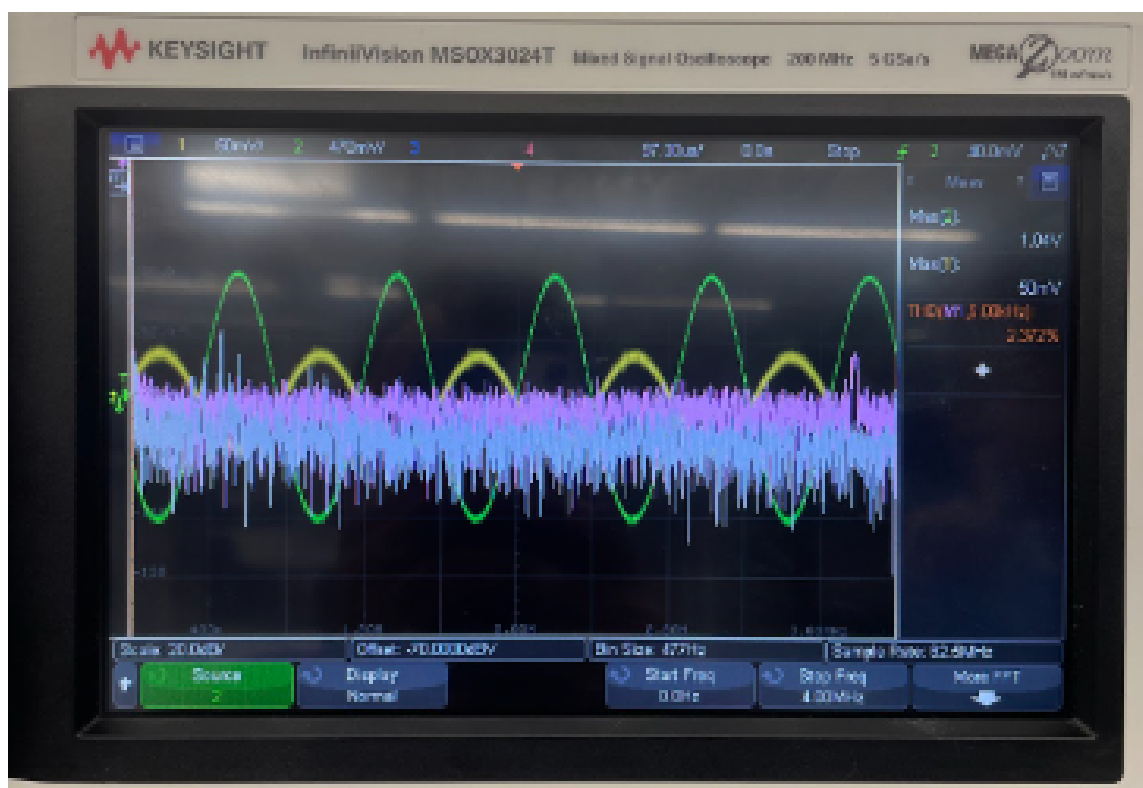
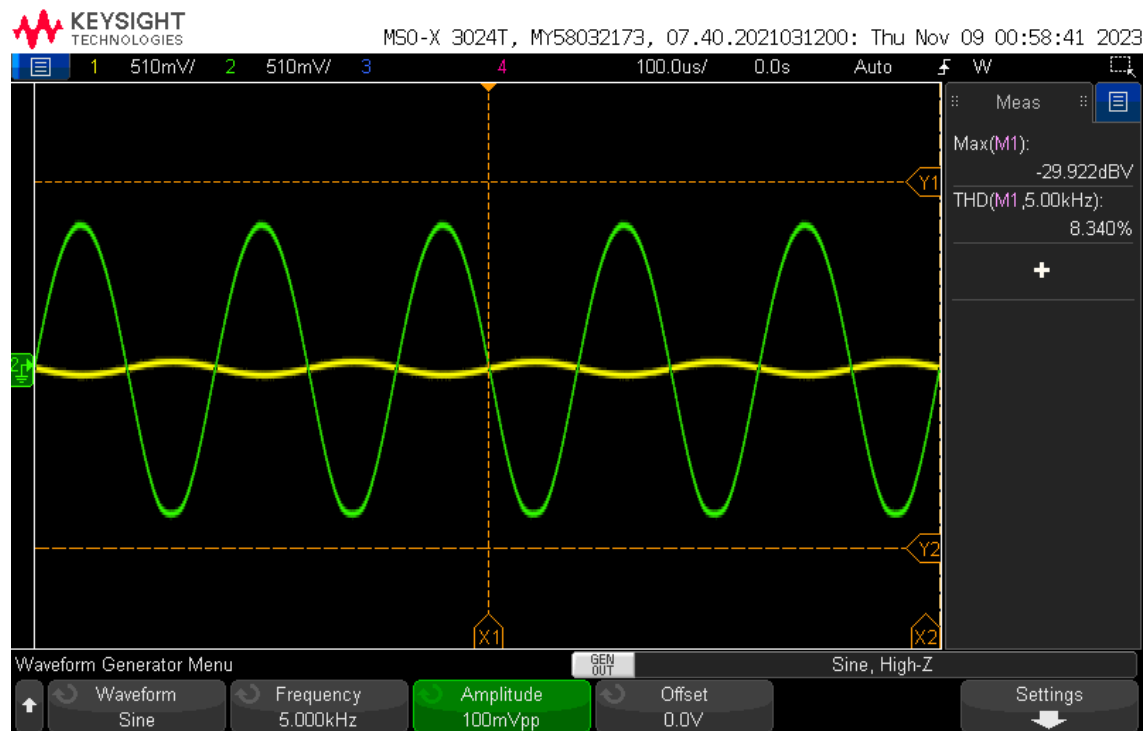


Figure 5(a) - THD = 2.37%



d. Clipping levels at V_o

Before Clipping: 100mV



After clipping: 115mV

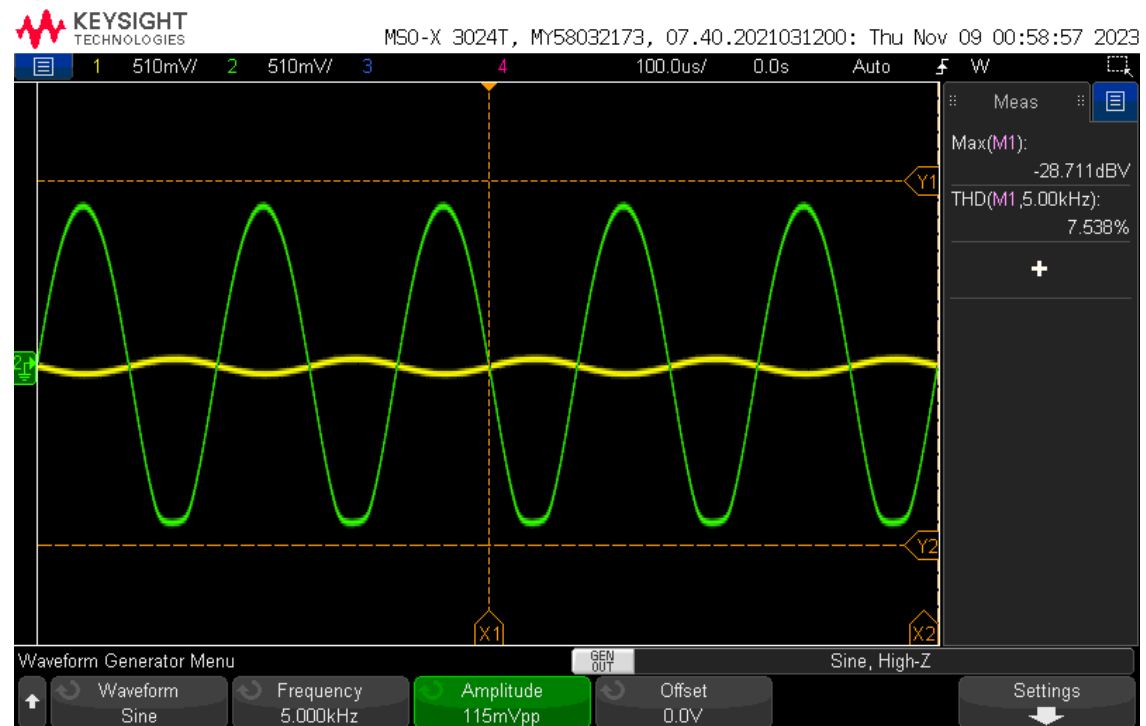
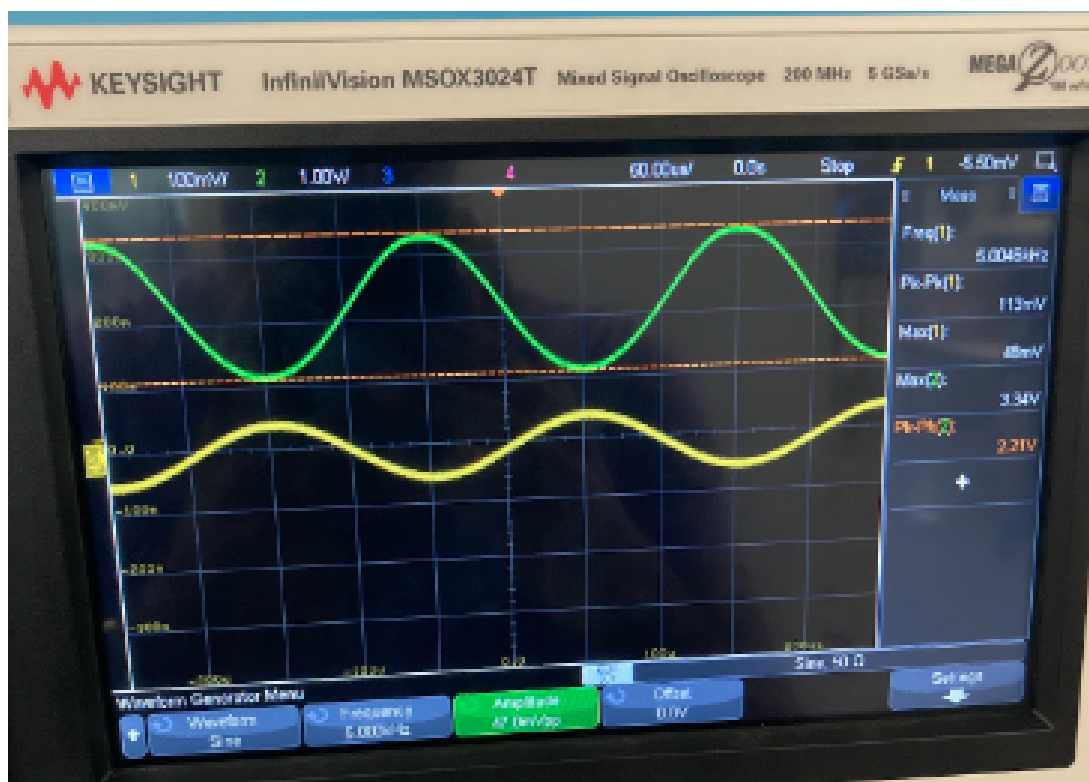


Figure 5(a) Before Clipping at 40mV



Figure 5(a) After clipping at 47mV



2. Figures 6(a)

a. V_{RB2} , V_{RE} , and I_C

$$V_{RB2} = 2.19V, V_{RE} = 1.51V, I_C = 1.51mA$$

b. Measure A_V , R_i , R_o

$$A_V = -1.30db$$



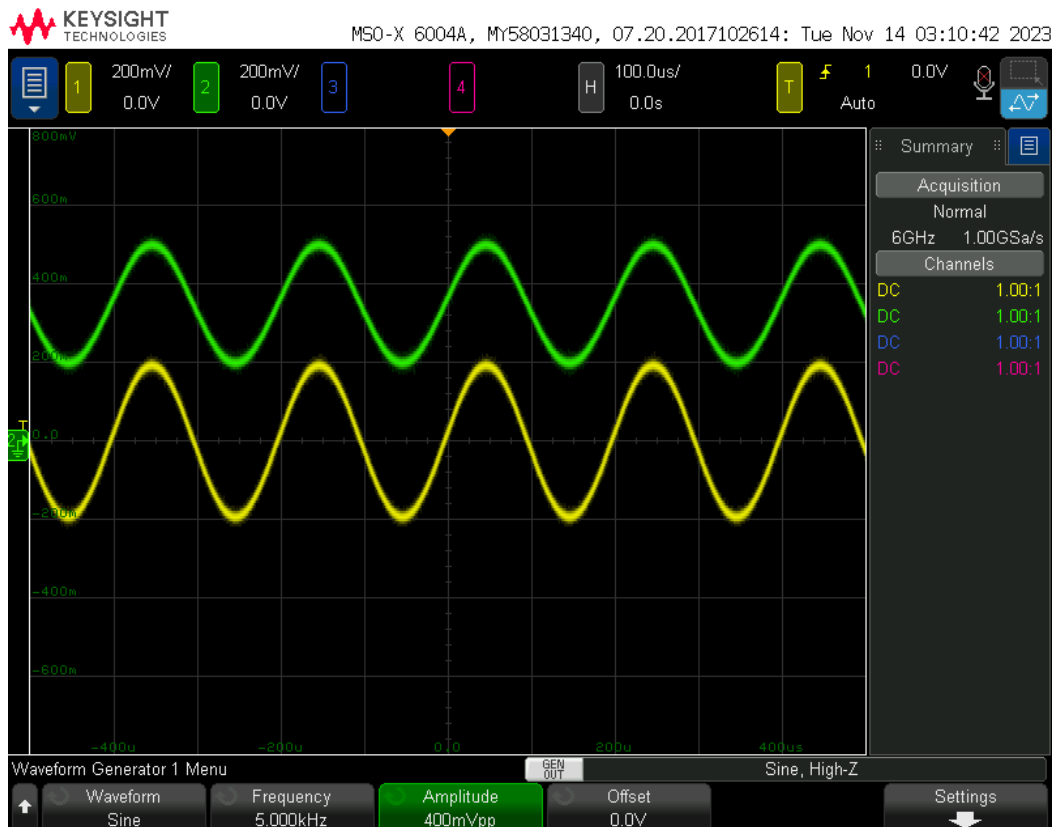
$$R_i = 8149.685 \text{ ohms}$$



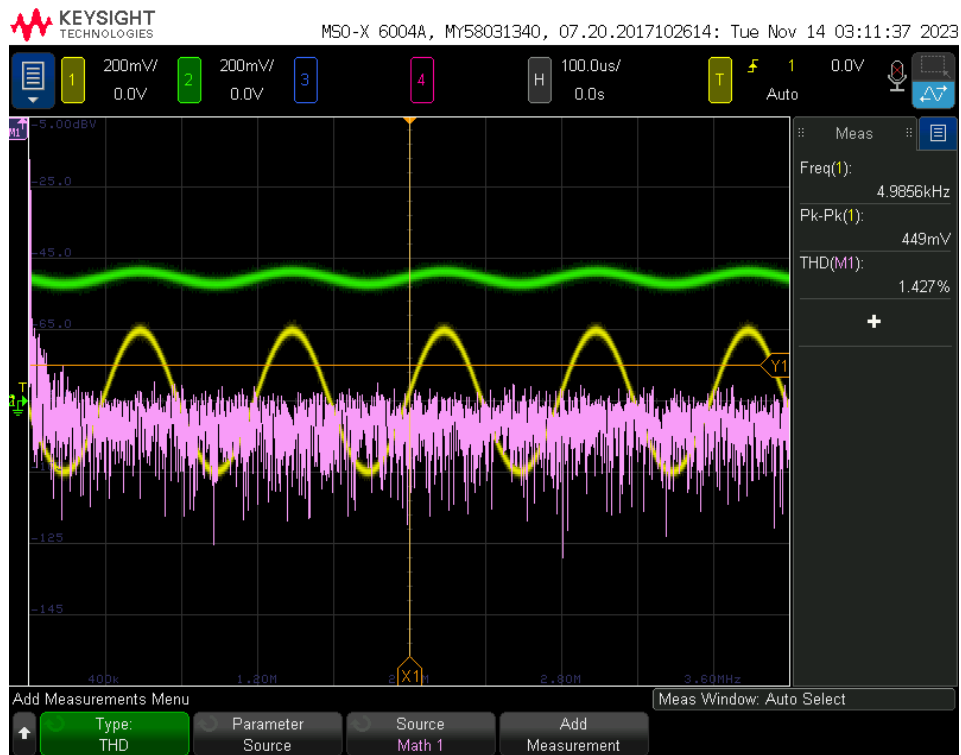
$R_o = 1418.287 \text{ ohms}$



c. Time-domain waveform, total harmonic distortion (THD)



THD



3. Figures 8(a)

a. V_{RB2} , V_{RE} , V_{RC} , $V_{o,dc}$, and I_C

$$V_{RB2} = 2.09V, V_{RE} = 1.499V, V_{RC} = 2.76V, V_{o,dc} = 2.24V, I_C = 1.84mA$$

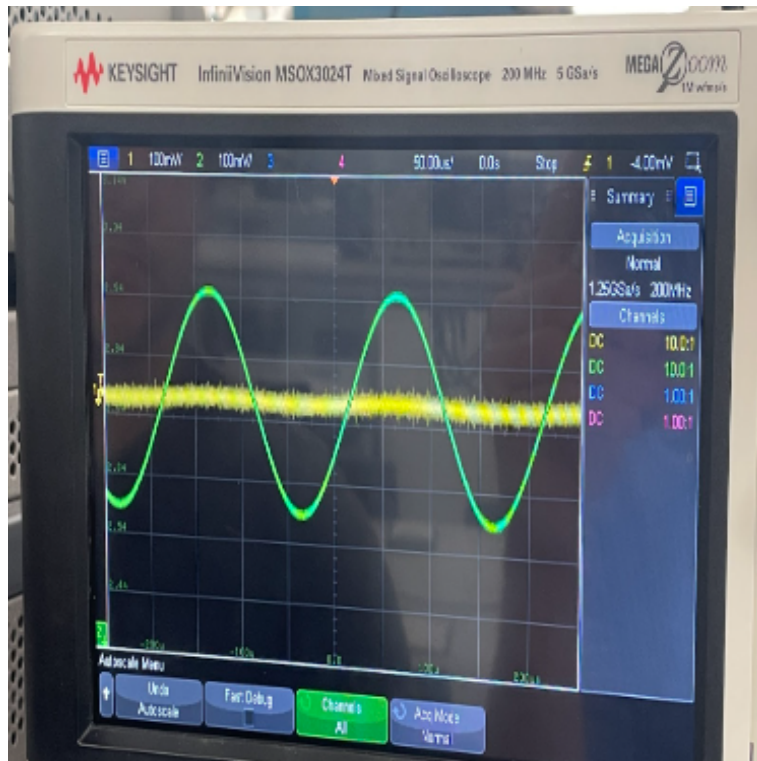
b. Measure A_V , R_i , R_o

$$A_V = 19.52 \text{ v/v}$$

$$R_i = 993.757 \text{ ohms}$$

$$R_o = 1517.241 \text{ ohms}$$

c. Time-domain waveform, total harmonic distortion (THD)



THD



Data Results:

All the data we collected during the experiment is found in a neat and orderly manner above. This experiment went well regarding that we were unable to finish the demonstration during the allocated time. However, we were able to make up later in the week the demos that we had missed and had overall success completing this lab.

Results:

This laboratory experiment presented a distinctive departure from our previous assignments, characterized by its extended duration, requiring us to divide the workload between two separate groups, each dedicating more than the three-hour period to complete it. Despite the considerable time investment, we managed to successfully complete the task, with our recorded data closely mirroring the simulated values. Naturally, a margin of error may exist due to the use of distinct values.