

Experiment (1): BJT Amplifiers

COMMON EMITTER AMPLIFIER

OBJECTIVES

1. To measure the open-circuit voltage gain, loaded voltage gain, input resistance, and output resistance of the common emitter amplifier.
2. To evaluate the common emitter amplifier using the small-signal equivalent model.
3. To demonstrate the differences in voltage, gain and input resistance due to the removal of the emitter bypass capacitor.

COMPONENTS USED

1. Resistors (56k, 3.3k, 1k)
2. Capacitors (10μF and 47μF)
3. Signal generator
4. oscilloscope

PROCEDURES

1. Use Digital Multimeter (DMM) to measure the β of the transistor.
2. To measure the open-circuit voltage gain A_v of the common emitter amplifier, connect the following circuit in figure 1.1:

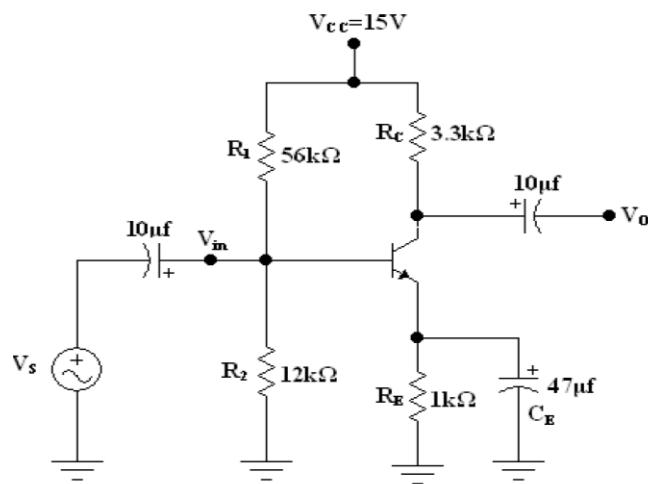


Figure 1.1

3. With the signal generator's frequency set to 10 kHz, and $V_s = 20\text{mVp-p}$. Measure and record the peak-to-peak output voltage V_O and the phase relationship between V_{in} and V_O . The open-circuit voltage gain A_V is V_O/V_{in} .
4. To measure the voltage gain from source-to-load, V_L/V_s of the common emitter amplifier, connect the circuit in figure 1.2.
5. With the signal generator's frequency set to 10 kHz, and $V_s = 50\text{mVp-p}$. Measure and record the peak-to-peak output voltage V_L and the phase relationship between V_{in} and V_L . The voltage gain from source to load is V_L/V_s .
6. Disconnect the emitter bypass capacitor C_E from the circuit shown in figure 1.2 and repeat procedure steps 3, and 5.

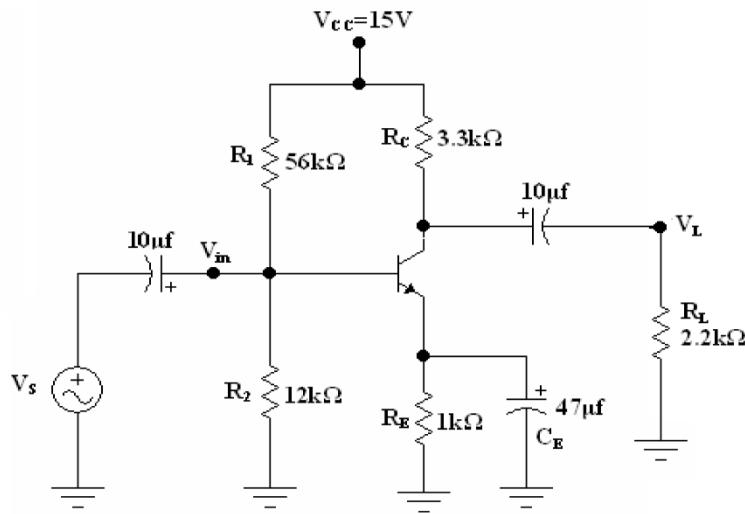


Figure 1.2