

Experiment No. 5
BJT Characteristics/Biasing Circuits
ECE 311

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Instructor: Professor SALETTA

1 Introduction

This lab will explore five different biasing circuits, and the affect of β on BJT transistors.

2 Procedure

- a. Test PNP and NPN transistors in a curve tracer
- b. Build and test five biasing circuits.

3 Equipment

- Oscilloscope
- 2N3404 and 2N3406
- Resistors

4 Observations

This section is more clearly broken into corresponding steps in the procedure.

4.1 Curve tracer

The calculated β of 220 agrees with the datasheet curve of between 200 and 250 at 25 degrees Celcius. When heated to around 125 degrees Celcius, the calculated β of 315 still agrees with the curve of between 300 and 350. The measured values on the handheld agreed with the datasheet.

4.2 Measurement of Circuit Q Point

4.2.1 NPN Fixed bias

	V_B	V_C	V_E
NPN	678.9 mV	8.934 V	0 V

4.2.2 PNP Fixed bias

	V_B	V_C	V_E
PNP	-710.4 mV	-9.237 V	0 V

4.2.3 NPN 4-R Bias

	V_B	V_C	V_E
NPN	3.674 V	9.659 V	2.987 V

4.2.4 PNP 4-R Bias

	V_B	V_C	V_E
PNP	-3.669 V	-9.773 V	-2.948 V

4.2.5 NPN-PNP Bias

	V_B	V_C	V_E
NPN	3.674 V	9.683 V	2.987 V
PNP	9.683 V	5.588 V	10.39 V

5 Conclusions

The purpose of this lab was achieved. A number of biasing circuits were tested. The β of a BJT was measured.

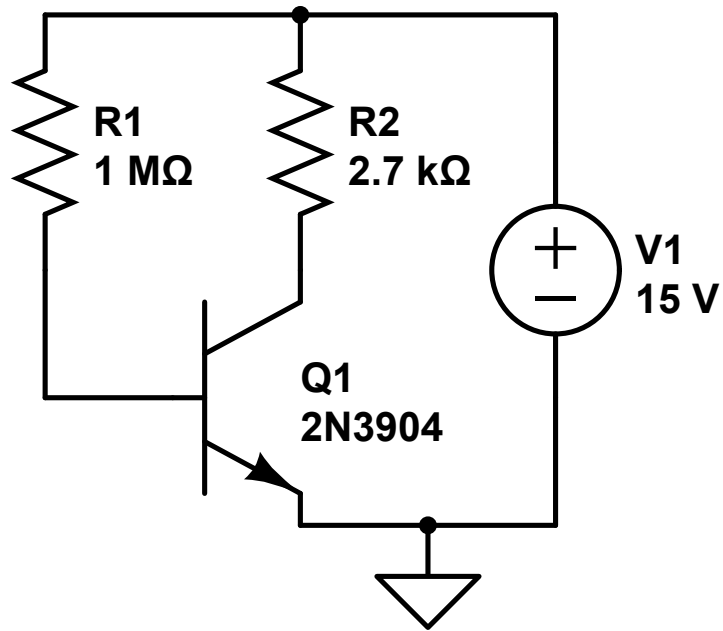


Figure 1: NPN Fixed Bias

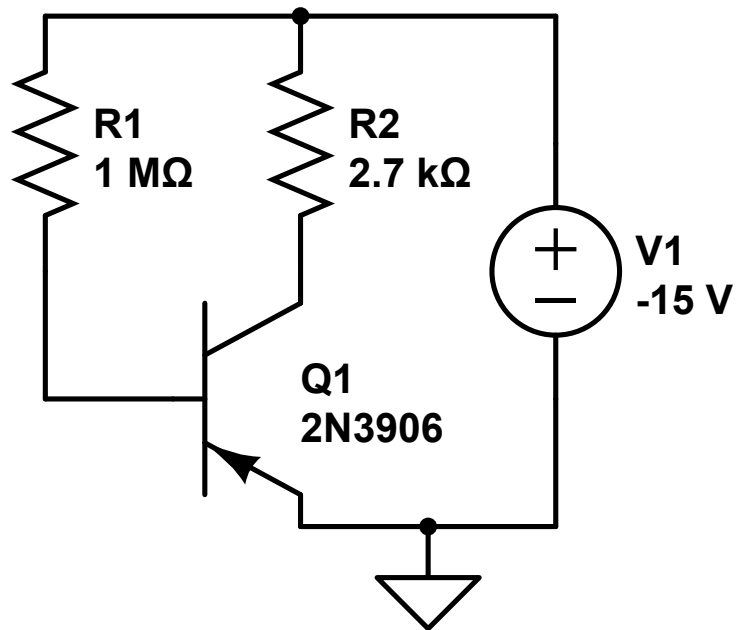


Figure 2: PNP Fixed Bias

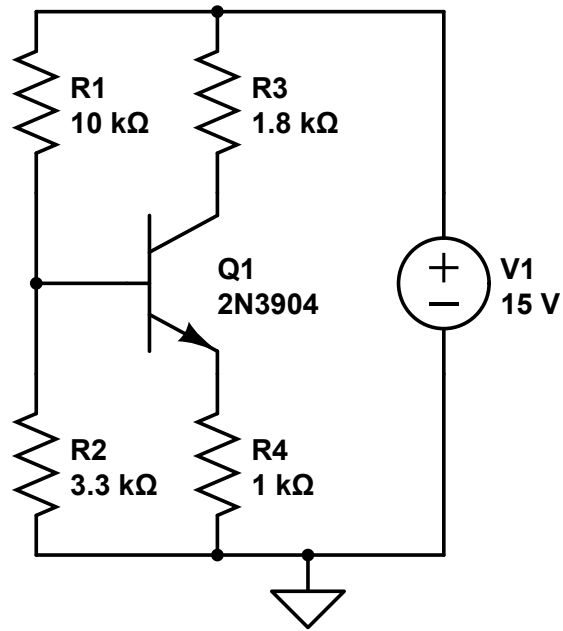


Figure 3: NPN 4-R Bias

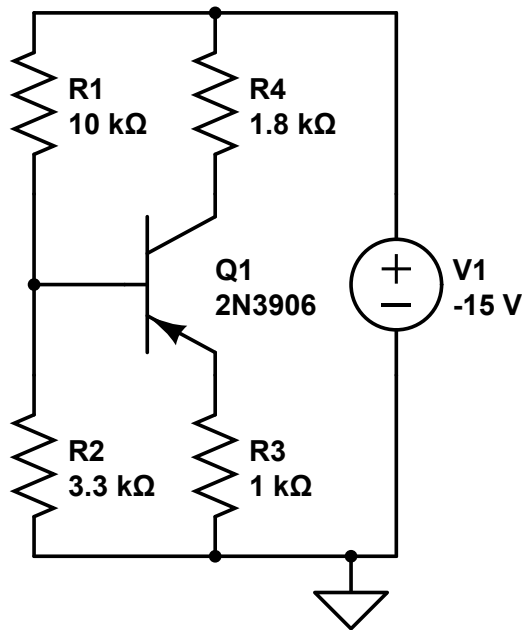


Figure 4: PNP 4-R Bias

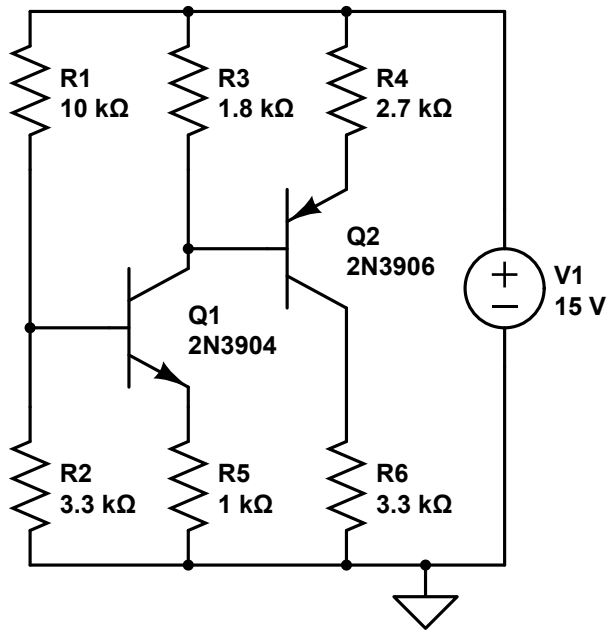


Figure 5: NPN-PNP Bias