

ELC 3414: Electronic Design

Lab 6: Current Sources**Objective**

The goal of this lab is to design and measure the performance characteristics of two bias current sources (current sinks) commonly found in analog integrated circuits.

Procedure

Use an LM3146 transistor array to design a current mirror circuit having a reference current value of 1 mA. Assume a supply voltage for the reference portion of the circuit of 15 volts. Measure and plot the output current versus the collector to emitter voltage of the current sink over the range of 0 to 20 volts. Determine the output resistance of the current sink.

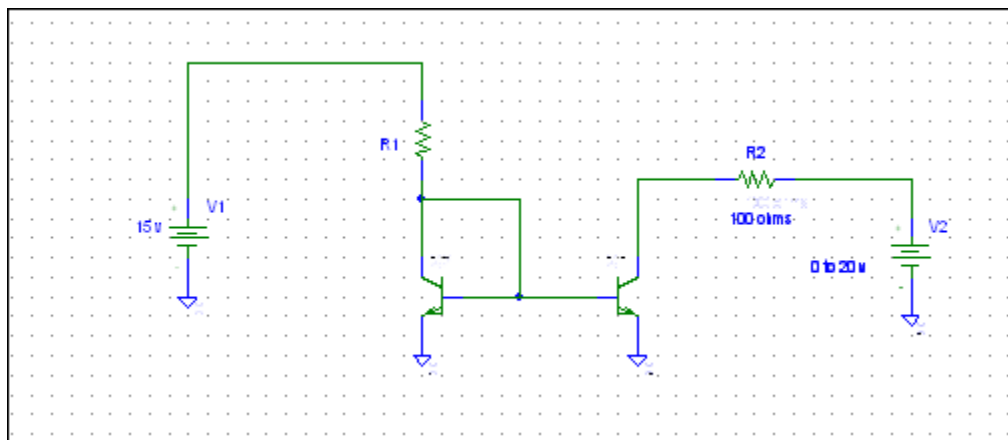


Figure 1. Current mirror circuit.

Repeat the above procedure for the Wilson current sink shown in Figure 2.

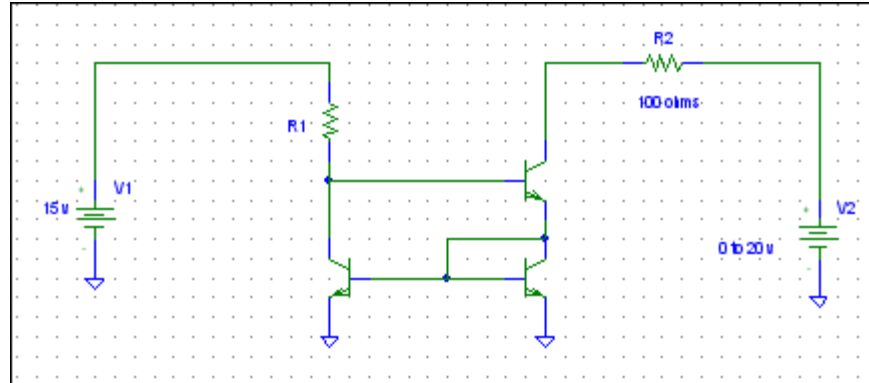


Figure 2. Wilson current sink circuit.

The data sheet for the transistor array may be found at the following site: www.datasheetcatalog.com/datasheets_pdf/L/M/3/1/LM3146.shtml. Pay close attention to the note on the data sheet concerning the voltage relationship between the substrate (pin 13) and the voltage on the collector of any of the transistors in the package.

The 100 ohm resistor in each circuit is included to provide a means for measuring the current. You can measure the voltage across the resistor to get the output current.

Deliverables

Submit an Excel file that contains:

- All of your data
- 3 plots: each circuit individually and one combined
- Equivalent output resistance of each sink
- Conclusions (only a couple of sentences)