Bridge Rectifier

Materials:

- 2 Series Mixed Series Oscilloscope (MSO)
- 120 VAC to 9 VAC transformer
- Resistor (1)
- Diodes (4)
- Capacitors (4)
- Breadboard
- Jumper wires

Procedure:

R = 10 kΩ Diode PN: IN4007

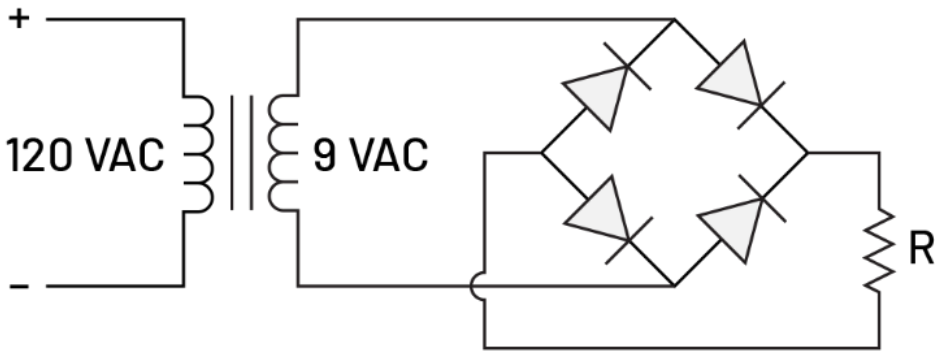


Figure 1. Bridge rectifier circuit diagram.

1. Build the half wave rectifier circuit shown in Figure 1. using the corresponding resistor value. When placing the diode, make sure the polarity of the diodes matches the schematic in Figure 1. On the diagram, trace the current path for when the input sine wave is positive and trace another path for when it is negative.

2. Once the circuit it built and the transformer connection is verified, connect the channel 1 probe to the output of the transformer. View the waveform on the 2 Series MSO by adjusting the horizontal scale to view a few periods of the waveform and adjusting the vertical scale to see the full amplitude of the sine wave.

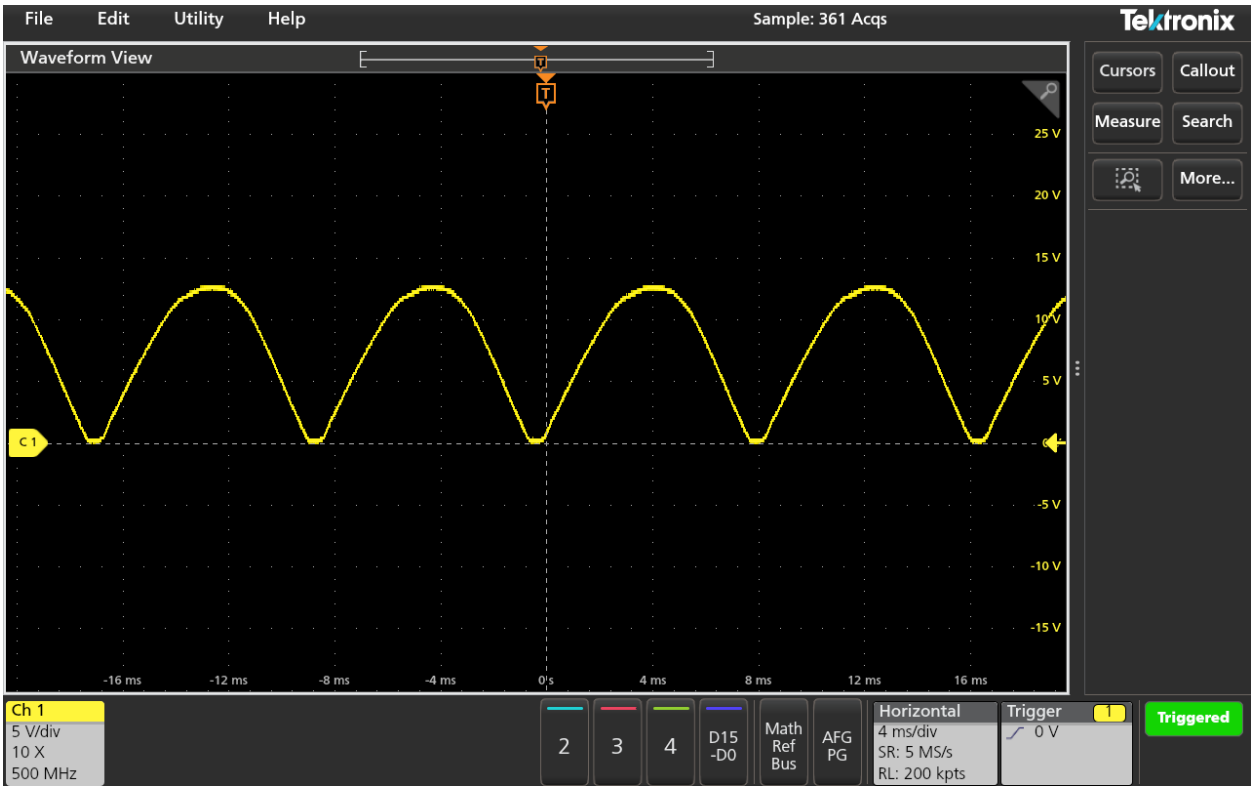
3. Remove the channel 1 probe from the output of the transform to the load resistor (R). Note: because the probe grounds are tied together, the input and out cannot be probed at the same time without the use of a differential probe. Observe the rectifier output on the scope. Compare to what was shown when the output of the transformer was probed. This rectifier is rectifying a 60 Hz input, would this rectifier work at higher frequencies?

4. Add a smoothing capacitor in parallel to the load resistor (R) to smooth out the DC output. Try a few different capacitor values and measure the ripple voltage. The ripple voltage is the difference between the maximum amplitude of the output waveform and the minimum. Use the cursors to measure the ripple voltage for three different capacitor values and record them in Table 1.

Capacitor Value	Ripple Voltage

Table 1. Smoothing capacitor values and the resulting ripple voltage in the output.

Instructor's Notes:



0924 1KW-74104-0