

ECE 214 - Lab #7 — Villard DC Voltage Multiplier

29 March 2016

Introduction: The diode is introduced. There are many variations of the DC–DC voltage multiplier. The Villard voltage multiplier discussed in class is used to convert a 10 V DC input voltage to an output voltage of 16 V DC.

Pre-Lab:

1. The Villard voltage multiplier is shown in Figure 1.

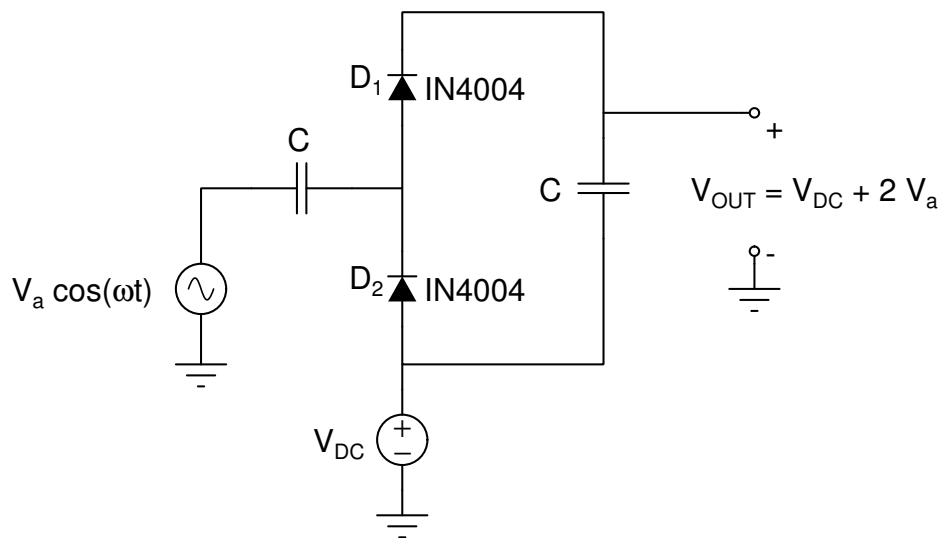


Figure 1: Villard voltage multiplier circuit.

2. Use MicroCap to design a Villard voltage multiplier that takes a 10 V DC input along with a sinusoidal input with an amplitude V_a and produces a DC output voltage of 16 V DC. Use a frequency between 1 - 50 kHz for the sinusoidal source.
3. How long does it take for the output voltage to reach a steady-state value? How does this value compare with the frequency of the sinusoidal source?

Lab Procedure:

1. Build the Villard voltage multiplier circuit you design in the Pre-Lab.
2. Measure the DC output voltage. Is it what you expect? If not, redesign the circuit to provide a 16 volt DC output.
3. Measure the “ripple” at the DC output voltage. What is the amplitude and frequency of the AC “ripple?”

Post-Lab:

Analyze your design; describe how it works; compare simulated with experimental results; and state conclusions. Will cascading additional voltage multiplier stages increase the output voltage? If so, what is the maximum output voltage that can be achieved with the components used in your design?