



Daffodil International University (DIU)
Department of Electrical and Electronic Engineering

EEE 422: Measurement and Instrumentation Lab

EXPERIMENT NO: 03

NAME OF THE EXPERIMENT: STUDY OF VOLTAGE DOUBLER CIRCUIT

Objective:

To study the application of diodes in voltage doubler circuits.

Theory:

A voltage multiplier, whose output dc voltage is double the peak a.c. voltage, is called a voltage doubler. Fig 1 shows a half wave voltage doubler.

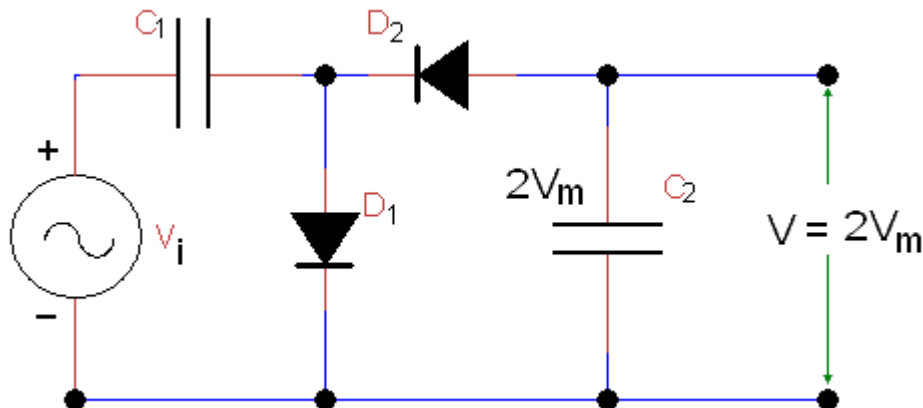


Fig 1: Voltage Doubler Circuit

During the positive half cycle of the input signal, the diode D_1 conducts and the diode D_2 is cut off, charging the capacitor C_1 up to the peak rectified voltage i.e.; V_m . During the negative half cycle, diode, D_1 is cut off and the diode D_2 conducts charging capacitor C_2 . It may be noted that during the negative half cycle, the voltage across capacitor C_1 is in series with the input voltage. Therefore, the total voltage presented to capacitor C_2 is equal to $2V_m$ during the negative half cycle.

On the next positive half cycle, the diode D_2 is non- conducting and the capacitor will discharge through the load. If no load is conned across the capacitor C_2 , both capacitors stay charged at their full values (i.e.; C_1 to V_m and C_2 to $2V_m$). It may be noted that both the diodes D_1 and D_2 have a peak inverse voltage (PIV) of $2V_m$ at each.

List of Equipment:

p-n junction diode(1N4003)	two pieces
Capacitor ($10\mu\text{F}$)	two pieces
Signal generator	one piece
Oscilloscope	one piece
Multimeter	one piece
Chords and wire	as required

Circuit diagram and input output waveform:

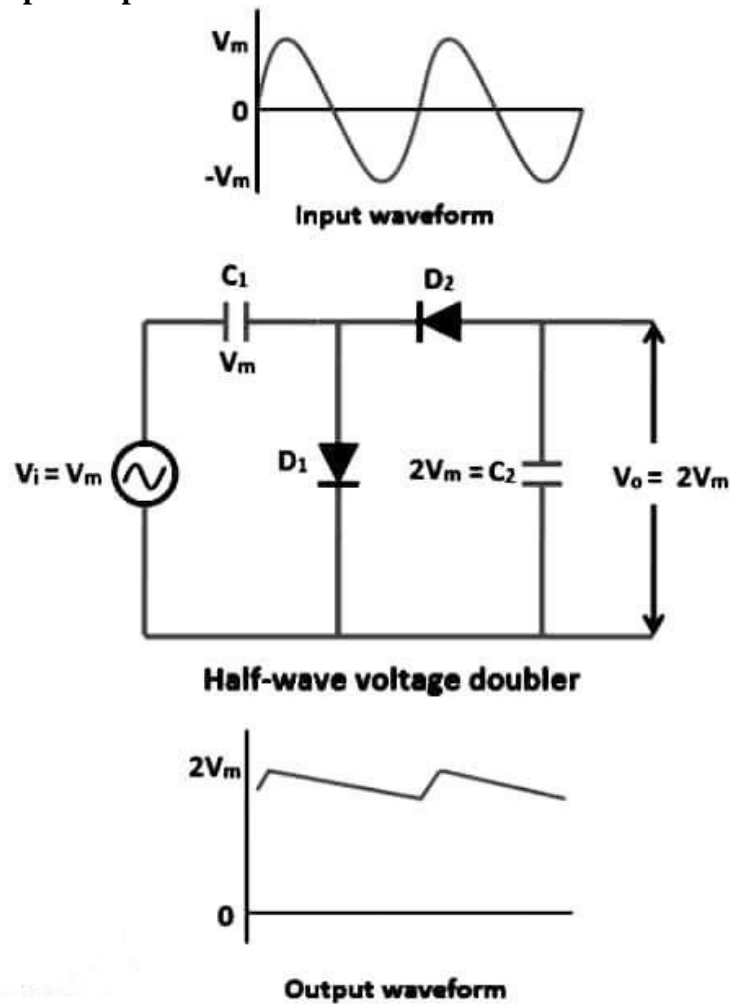


Fig 2: Circuit diagram and input-output waveform of voltage doubler circuit.

Procedure:

1. Construct the circuit shown in Fig. 2 and observe input signal, V_i and output signal, V_o simultaneously on the oscilloscope.
2. Sketch both input and output signal according to the data of oscilloscope.
3. Measure and record the output voltage using multimeter.
4. Reverse the direction of diodes and observe the output signal V_o .
5. Connect a resistor across the capacitor C_2 and observe the output signal V_o .
6. Observe the changes in output by reversing the knob of the oscilloscope.

Report:

1. What is the basic difference between a doubler and a clamper circuit?
2. Discussion