University of Anbar
College of Engineering
Dept. of Electrical Engineering

Lab. Name: Electronic I
Experiment no.: 4
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Experiment #4- Part#2

Diode Applications 1

Clipping and Clamping Circuits

Procedure

1. Connect the clipping circuit shown in Fig.7, and apply a 20Vpp sinusoidal input waveform with frequency of 1 kHz at the input. Display and sketch both input and output signals.

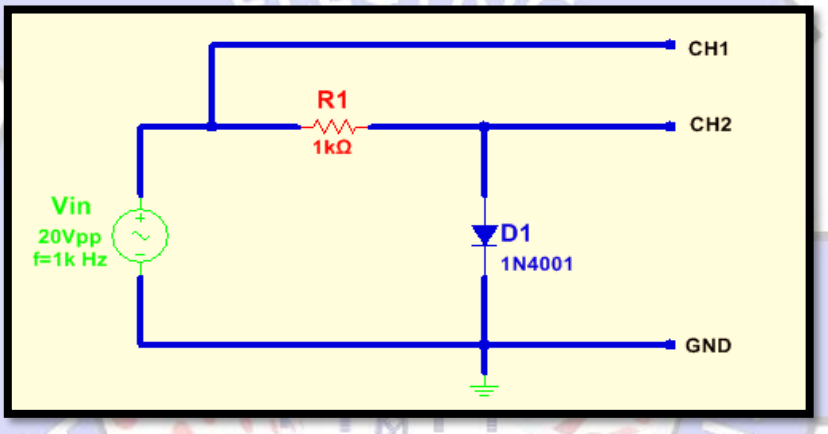

Figure 7: Practical Unbiased Parallel Clipping Circuit

2. Connect the biased parallel clipping circuit shown in Fig.8, and apply a 20Vpp sinusoidal input waveform with frequency of 1 kHz at the input. Display and sketch the input and the output waveforms.

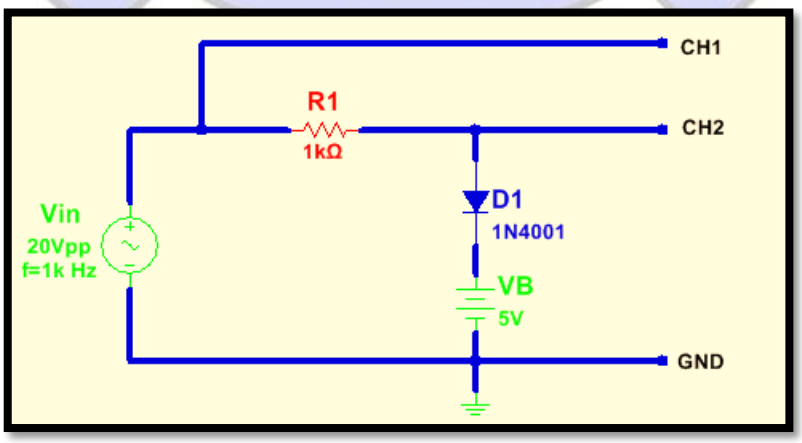

Figure 8: Practical Biased Parallel Clipping Circuit

3. Connect the series clipping circuit shown in Fig.9, and apply a 20Vpp sinusoidal input waveform with frequency of 1 kHz at the input. Display and sketch the input and the output waveforms.

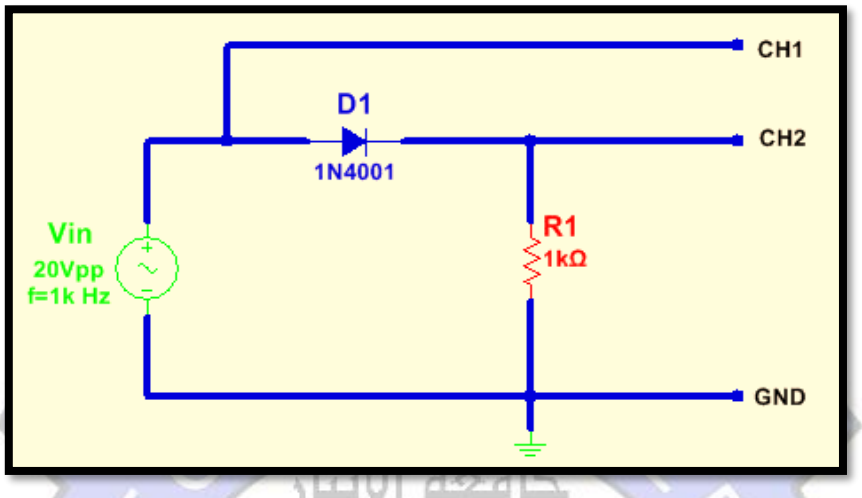

Figure 9: Practical Unbiased Series Clipping Circuit

4. Connect the biased series clipping circuit shown in Fig.10, and apply a 20Vpp sinusoidal input waveform with frequency of 1 kHz at the input. Display and sketch the input and the output waveforms.

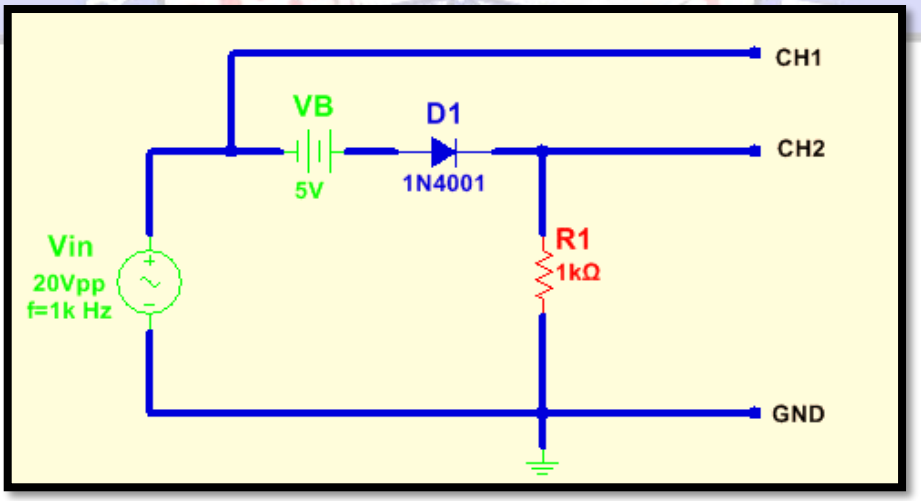

Figure 10: Practical Biased Series Clipping Circuit

5. Connect the clamping circuit shown in Fig.11, and apply a 10Vpp sinusoidal input waveform with frequency of 1 kHz at the input. Display and sketch the input and the output waveforms.

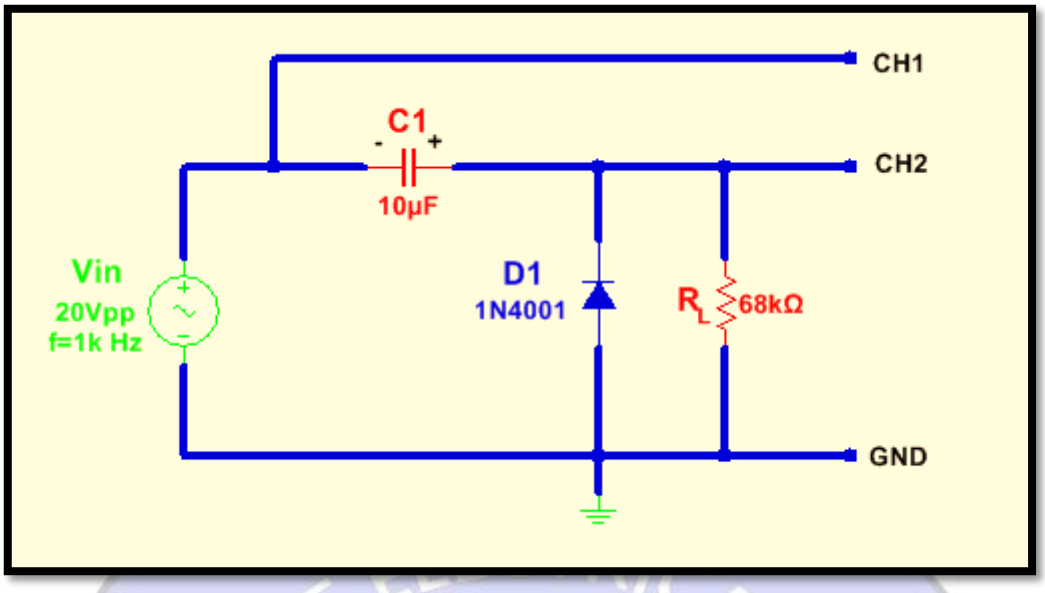

Figure 11: Practical Unbiased Positive Clamping Circuit

6. Repeat step 5 after applying a square wave of 10Vpp amplitude and 1 kHz frequency.
7. Connect the biased positive clamping circuit shown in Fig.12, and apply a 10Vpp sinusoidal input waveform with frequency of 1 kHz at the input. Display and sketch the input and the output waveforms.

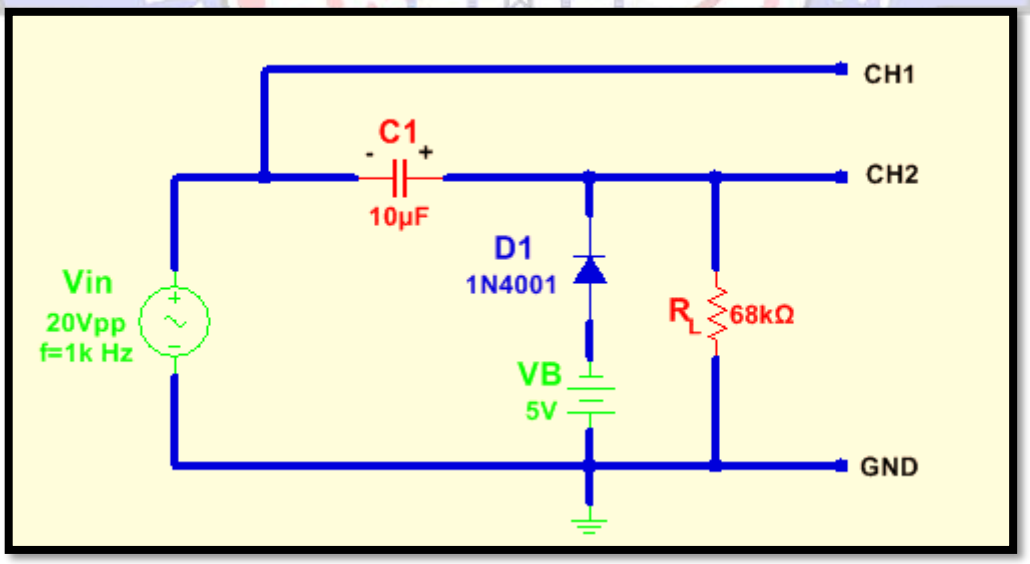

Figure 12: Practical Biased Positive Clamping Circuit

8. Repeat step 7 after applying a square wave of 10Vpp amplitude and 1 kHz frequency.

Calculations and Discussion

1. What is the effect of the diode voltage drop on the output of the clipping circuit in Fig.4? Compare the waveforms with those obtained when assuming ideal diodes.
2. If the diode in the circuit of Fig.2 was reversed, then sketch the output waveform in this case and explain briefly the operation of the circuit.
3. Design a clipping circuit that will limit the output voltage to 5V when applying an input sinusoidal waveform with a peak value of 10V. Assume available diodes with voltage drop of 0.5V. Sketch the output waveform of the circuit.
4. Sketch the output waveform for the clipping circuit of Fig.1, if a load resistance RL of value1 kΩ is connected at the output terminals in parallel with the diode.
5. Discuss how diode limiters and diode clampers differ in terms of their function.
6. Design a clamper circuit that shifts the DC level of an input sinusoidal waveform by +6V if the peak value of the input signal is 3V, and its frequency is 500 Hz. Assume diode voltage drop is 0.6V.
7. What is the effect of reducing the load resistor on the output of the clamper circuit shown in Fig.5 if the input signal is a square wave?
8. What is the difference between a positive clamper and a negative clamper? Explain with the aid of circuit diagrams and output waveforms.