

Exp.4: Clipping &Clamping Circuits

Part 1:Clipping Circuits

1- Objectives:

- To become familiar with the function and operation of clippers.

2- Circuit elements:

- Function generator.
- Oscilloscope.
- Silicon & Germanium diode.
- Resistor 1 K Ω .
- DC. Power supply unit (1.5 V).

3- Procedure:

Part 1: Parallel Clippers

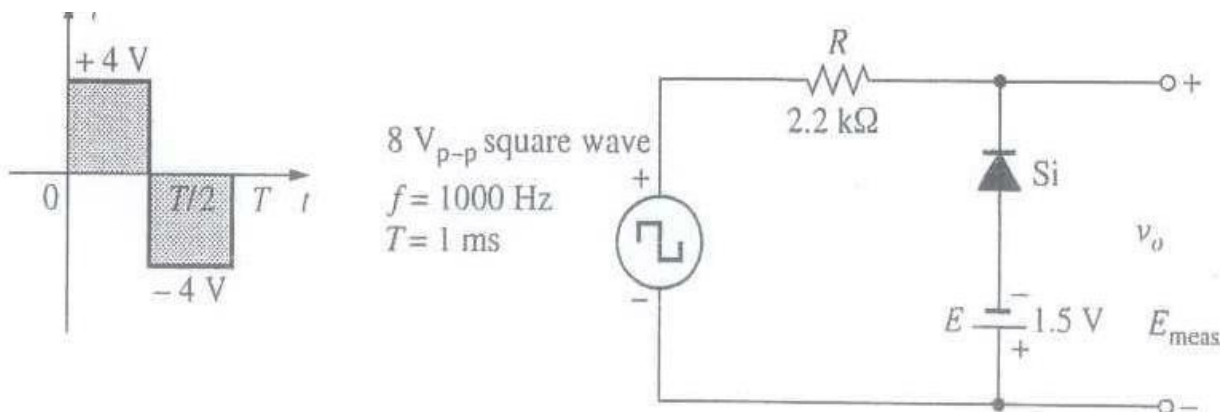


Fig 1

1- Connect the circuit as shown in figure 1. Note that the input is an $8\text{ V}_{\text{p-p}}$ square wave at a frequency of 1000 Hz.

2- Calculate the voltage V_o when the applied square wave is $+4\text{ V}$.

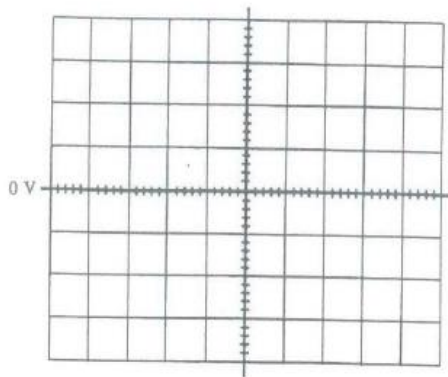
(Calculated) $V_o = \underline{\hspace{2cm}}$

3- Repeat (2) when the applied square wave is -4 V .

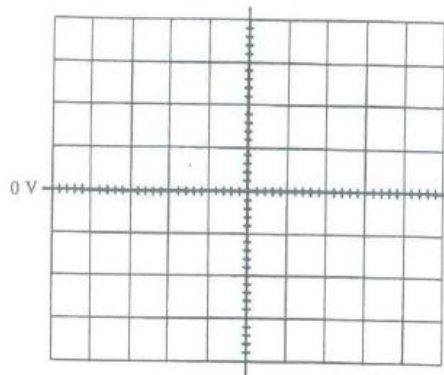
(Calculated) $V_o = \underline{\hspace{2cm}}$

4- Sketch the expected waveform for V_o .

Calculated:



Measured:



5- Compare with the predicted results.

6- Reverse the battery of fig 1, and calculate the level of V_o when $V_o = +4\text{ V}$.

(Calculated) $V_o = \underline{\hspace{2cm}}$

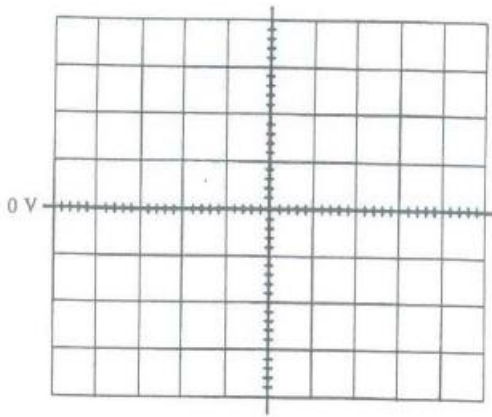
7- Repeat (6) when the applied square wave is -4 V.

(Calculated) $V_o = \underline{\hspace{2cm}}$

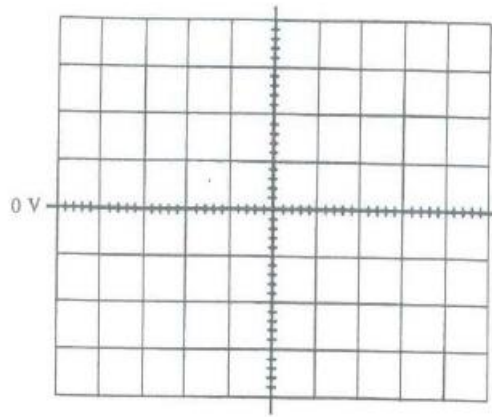
8- Sketch the expected waveform for V_o .

9- Compare with the predicted results.

Calculated:



Measured:



Part 2: Series Clippers

- 1- Connect the circuit as shown in figure 3. Note that the input is an 8 V_{p-p} square wave at a frequency of 1000 Hz.

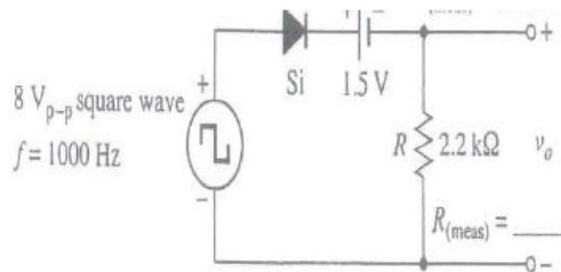


Fig 3

- 2- Calculate the voltage V_o when the applied square wave is +4 V.

(Calculated) V_o = _____

- 3- Repeat (2) when the applied square wave is -4 V.

(Calculated) V_o = _____

- 4- Sketch the expected waveform for V_o.

- 5- Compare with the predicted results.

- 6- Reverse the battery of fig 1, and calculate the level of V_o when V_o = +4 V.

(Calculated) V_o = _____

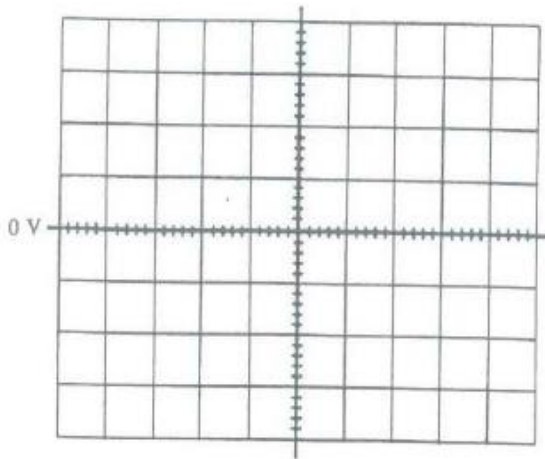
- 7- Repeat (6) when the applied square wave is -4 V.

(Calculated) V_o = _____

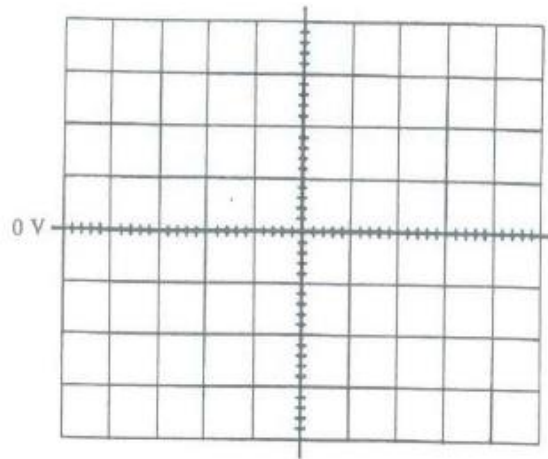
8- Sketch the expected waveform for V_o .

9- Compare with the predicted results.

Calculated:



Measured:



Part 2: Clamping Circuits

1- Objectives:

- To become familiar with the function and operation of clampers.

2- Circuit elements:

- Function generator.
- Oscilloscope.
- Silicon diode.
- Resistor 10 K Ω .
- Capacitor 1 μ F.
- DC. Power supply unit (1.5 V).

3- Procedure:

Part 1: Clampers (Effect of R)

1- Determine the time constant ($\tau = RC$) for the network of fig 1.

(calculated) $\tau =$ _____

5 $\tau =$ _____

2- Calculate the period of the applied signal and then determine half the period.

(calculated) $T = \underline{\hspace{2cm}}$

$T/2 = \underline{\hspace{2cm}}$

3- Using the result of 5τ and compare to $T/2$.

Part 2: Clampers (R, C, diode combination)

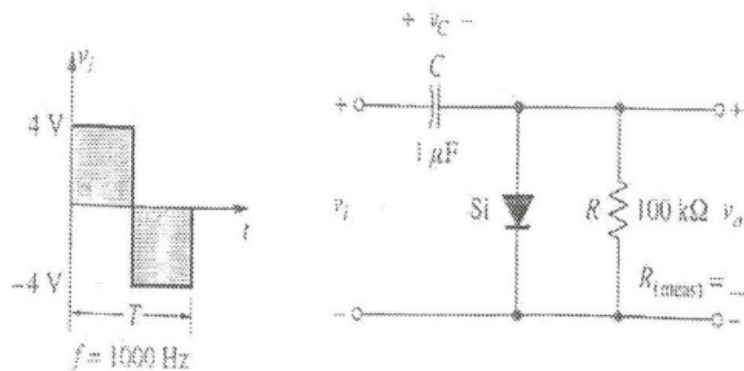


Fig 1

1- Connect the circuit as shown in figure 1. Note that the input is an $8 V_{p-p}$ square wave at a frequency of 1000 Hz.

2- Calculate the voltage V_C and V_o when the applied square wave is +4 V.

(Calculated) $V_C = \underline{\hspace{2cm}}$

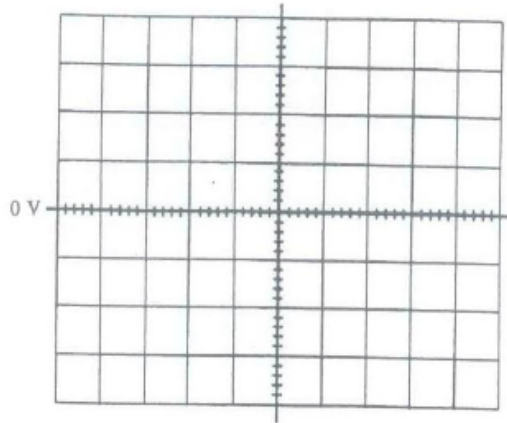
(Calculated) $V_o = \underline{\hspace{2cm}}$

3- Repeat (2) when the applied square wave is -4 V.

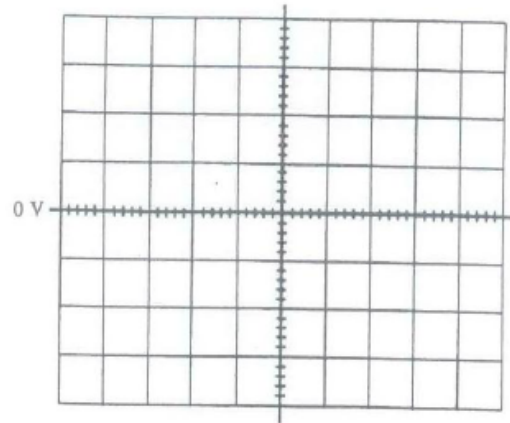
(Calculated) $V_o = \underline{\hspace{2cm}}$

4- Sketch the expected waveform for V_o .

Calculated:



Measured:



5- Compare with the predicted results.

6- Reverse the diode of fig 1, and calculate the level of V_C and V_o when $V_i = +4$ V.

(Calculated) $V_C =$ _____

(Calculated) $V_o =$ _____

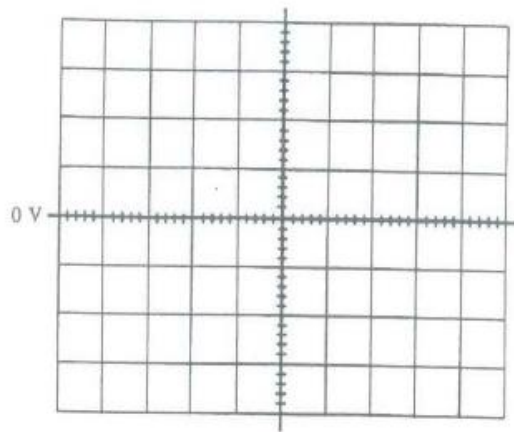
7- Repeat (6) when the applied square wave is -4 V.

(Calculated) $V_o =$ _____

8- Sketch the expected waveform for V_o .

9- Compare with the predicted results.

Calculated:



Measured:

