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Introduction

The report for lab 4 i.e., Diodes took place on 3 March 2021.Appendix at the end is the prelab Assignment.

Objective

The main goal of this lab is to know the ability of the diode to change the shape of a waveform. There are three different circuit models that were tested in this lab. These three different situations only have difference in resistance values, And the consecutive other tests are just an increment of resistance value by 10Ω. And the last circuit is to investigate how the output signal is being affected from the previous circuit.

Circuit under Test

This experiment consists of three circuits which are created to have different waveforms of the output which reacts according to the input voltage. In the first part the circuit is built with 4 diodes(1N4148), some resistors, and a signal generator.

Diagram, schematic

Description automatically generated

E2.) The second part of this experiment consists of the same circuit as the above but has an increase of 10V compared to the above case.

Diagram, schematic

Description automatically generated

E3.) In the third step we add 4 capacitors to the above circuit, this is done to bypass every DC voltage Tap of the circuit.

Diagram, schematic

Description automatically generated

Experimental Result

The results from the circuits E1, E2, E3 are collected in both the channels of the oscilloscope to get the input and output voltage. The red colored wave represents input voltage, and the green colored wave represents output voltage.

E1.)Chart, line chart

Description automatically generated

GRAPH E1(a): Input and output waveform (red wave is input and green wave is output).

A picture containing chart

Description automatically generated

GRAPH E1(b): X-Y display mode.

E2.) Repeat the first step after adding the voltage divider resistance which is 10 time larger.

A picture containing green, laser

Description automatically generated

Graph E2(a): Input and output waveform (red wave is input and green wave is output).

A picture containing green

Description automatically generated

GRAPH E2(b): X-Y display mode.

E3.) Switch off the current and bypass each tap with 10micro F electrolytic capacitor. Electrolytic capacitors are polarized.

Chart

Description automatically generated

Graph E3(a): Input and output waveform (red wave is input and green wave is output).

A picture containing chart

Description automatically generated

GRAPH E3(b): X-Y display mode.

Conclusion Remark

C1. Based on graph p3(b), the output voltage waveform forms a triangular waveform. This is due to the graph p3(b) looking like a smooth curve and the sinusoidal waveform resembles the input voltage, which is constant then increase slope and then back to the constant.

C2. Graph p1 and p3(b) are similar in the graphical form. The only difference is the p1’s graph looks higher compared to the p3(b)’s graph when the size of the graph is changed it looks the same.

C3. Graph p1 and graph p5 and graph p6(b) looks similar but with minor difference like some have smooth areas and some have sharp, and some are higher, and some are lower which can be changed with help of the resolution in the oscilloscope.

C4. Graph p1 and graph p6(b) looks similar and graph p1 and graph p7(b) also looks similar.

So, in common we can say that graph p6(b) and graph p7(b) also look similar.

Appendix: prelab-Assignment

P1, p2, p3, and p4 are attached at the end of the report

P5

Chart

Description automatically generated

Graph p5(a) : Input and output voltage waveforms.

A picture containing chart

Description automatically generated

Graph p5(b): input and out characteristic of the wave shaping circuit.

P6

A picture containing laser

Description automatically generated

Graph p6(a) : Input and output voltage waveforms.

A green insect on a black surface

Description automatically generated with low confidence

Graph p6(b): input and out characteristic of the wave shaping circuit.

P7

Chart

Description automatically generated

Graph p7(a) : Input and output voltage waveforms.

Chart

Description automatically generated with low confidence

Graph p7(b): input and out characteristic of the wave shaping circuit.