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Description automatically generated

Department Of electrical and computer Engineering

ENEE2103 CIRCUITS AND ELECTRONICS LABORATORY

Experiment No.6 Prelab

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I. DIODE CHARACTERISTICS

Diagram

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|  |  |  |  |
| --- | --- | --- | --- |
| VS | VR | VD | ID |
| 0 | almost zero | almost zero | 0A |
| 0.2 | 0.007mV | 199.93mV | 684.15nA |
| 0.4 | 3.23mV | 396.77mV | 32.71uA |
| 0.6 | 56.46mV | 543.54mV | 564.59uA |
| 0.8 | 193.28mV | 606.72mV | 1.933mA |
| 1 | 361.16mV | 638.84mV | 3.612mA |
| 1.5 | 819mV | 681mV | 8.19mA |
| 2 | 1295.32mV | 704.68mV | 17.79mA |
| 2.5 | 1778.88mV | 721.12mV | 17.79mA |
| 3 | 2266.29mV | 733.71mV | 22.66mA |

After reversing the diode, on paper: the diode will act as open circuit sense it is reversed because the voltage on the anode is more than the voltage on the cathode. Practically on PSpice a small amount of current (almost zero) will go through the current which is called reverse saturation current.

**II. RECTIFICATION**

1. HALF - WAVE RECTIFICATION.

Diagram

Description automatically generated

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Description automatically generated

Last cycle:

Graphical user interface

Description automatically generated

Using cursor VP=4.4685V and T=5ms equal to the source.

VDC=0.318Vm=0.318x4.4685=1.42V

After reversing the diode, the rectifier will pass the negative waves as shown below

Graphical user interface, chart, histogram

Description automatically generated

After putting the capacitor

Diagram, schematic

Description automatically generated

Graphical user interface, chart

Description automatically generated

Last cycle:

Graphical user interface

Description automatically generated with medium confidence

Vlrp-p=4.4273-3.6310 =0.7963 (From Slides) (Max and Min Value)

VDC=4.4272-0.5x0.7963 =4.028V

The Value of the capacitor was set to 47uF.

1. FULL-WAVE RECTIFICATION:

A picture containing diagram

Description automatically generated

Graphical user interface, chart

Description automatically generated

Last cycle:

Graphical user interface

Description automatically generated with low confidence

T=t0/2 =1/2000x2=0.25ms

Vp=3.978V

VDC=0.636Vp=2.52V

The 2.2uF capacitor connected:

Graphical user interface

Description automatically generated

VlrPP= 3.653 -3.443=0.0210V

VDC=8.6038-0.5x0.0210=8.3218V

Vlrms=vlrpp/2sqrt3=0.0210/2x1.732=8.87x10-3

r%=vlrms/Vdc=0.23%

the ripple is small, so the simulation of the graph was close to DC

**III. other applications:**

1. clipping: VDC=0

Diagram, schematic

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VDC= 0V

A picture containing diagram

Description automatically generated

VDC= 1.5V

Graphical user interface

Description automatically generated with medium confidence

VDC= 3.5V

A picture containing graphical user interface

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1. Clamping:

VDC= 0V

Graphical user interface, chart

Description automatically generated

VDC= 1.5V

Chart

Description automatically generated

VDC= 3.5V

Chart

Description automatically generated with medium confidence

1. VOLTAGE MULTIPLIER CIRCUITS

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green is the voltage across C4, blue is the voltage across C5, red is the voltage across C6

Chart

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C1+C3

A picture containing graphical user interface

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