



BAŞKENT UNIVERSITY
ELECTRIC & ELECTRONICS ENGINEERING

EEM 214 ~ ELECTRONICS–I
LABORATORY
REPORT

Experiment Name : Diode Characteristics
Experiment Number : 2

Student Name : [REDACTED]
Student Number [REDACTED]
Experiment Date/Day: 17 / 3 / 2006
Laboratory Number:

Honor Pledge:

I did this preliminary work or lab report by myself and I have neither cheat from anybody nor let anybody cheat from me at the any part of this work.

Student Signature:

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1-)

Forward Biased		Reverse Biased	
V _{diode}	0.6648 V	V _{diode}	1

When we forward biased our silicon diode we get 0.6648 V value.(Normal range for silicon diode is between 0.500 V and 0.900 V) So there is no problem when diode is forward biased.When we reverse biased our silicon diode we read '1' value.It means open circuit.Thus,our silicon diode passed tests.

2-)

Diode Volts	Current in mA
.35	0.0024 mA
.40	0.0108 mA
.45	0.0252 mA
.50	0.0845 mA
.55	0.255 mA
.60	0.628 mA
.65	1.230 mA
.70	6.204 mA
.75	11.888 mA
.80	25.338 mA
.85	48.87 mA
.90	88.38 mA

We saw the i-v characteristic of silicon diode in forward bias region.Approximety 0.70 volt silicon diode allow the current to flow in the circuit.Hence,after this value,current across the diode rapidly increase.Under this voltage (0.70V) diode is off condition but a low current flow across the diode and circuit.

3-)

Silicon Diode 1N4148		
I _f	V _f	r _f
40mA	0.8344 V	
50mA	0.8504 V	

$$r_{\text{bulk}} = \frac{\Delta V}{\Delta I}$$

$$\Delta V = 0.8504 - 0.8344 = 0.016 \text{ V}$$

$$\Delta I = 10 \text{ mA}$$

$$\Delta V / \Delta I = 0.016 \text{ V} / 10 \text{ mA} = 1.6 \Omega$$

4-)

Source Voltage	Silicon Diode 1N4148	
	V_{resistor} (measured)	I_{diode} (calculated)
0	0	0
-1	- 2.97 mV	- 2.97 nA
-2	- 3.31 mV	- 3.31 nA
-3	- 3.50 mV	- 3.50 nA
-4	- 3.69 mV	- 3.69 nA
-5	- 3.88 mV	- 3.88 nA
-10	- 4.66 mV	- 4.66 nA
-15	- 5.24 mV	- 5.24 nA
-20	- 5.57 mV	- 5.57 nA
-25	- 5.83 mV	- 5.83 nA

$$I_{\text{diode}} = V_{\text{resistor}} / 1\text{M} \text{ (Current is same on resistor and diode)}$$

6-)

When V_{in} voltage is negative,because of the diode V_{out} voltage is zero.When V_{in} voltage positive there is a 0.8V smaller then V_{out} voltage.The reason is silicon diode's voltage ($\approx 0.7\text{V}$).