

# Lab 3

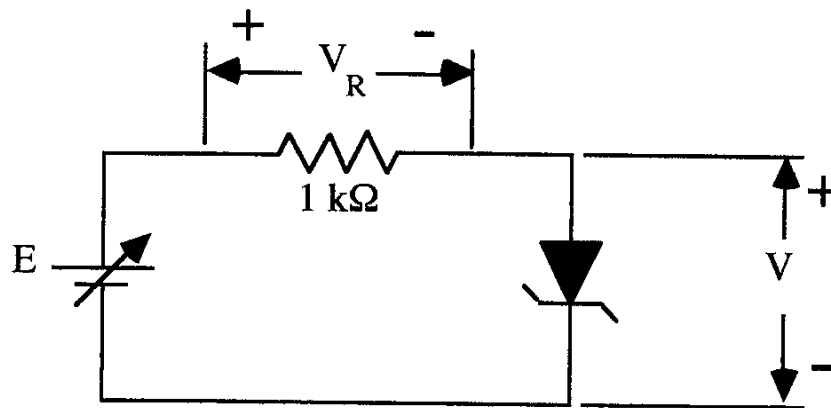
## Zener Diodes

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## Objective

- Construct the I-V characteristic of a zener diode
- Demonstrate the use of zener diodes as voltage regulators
- Measure the line regulation and output resistance of a zener diode regulator

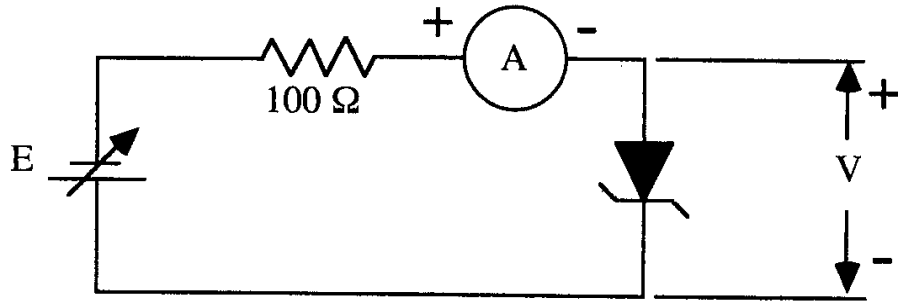
## Results



**Figure 2**

Table 1

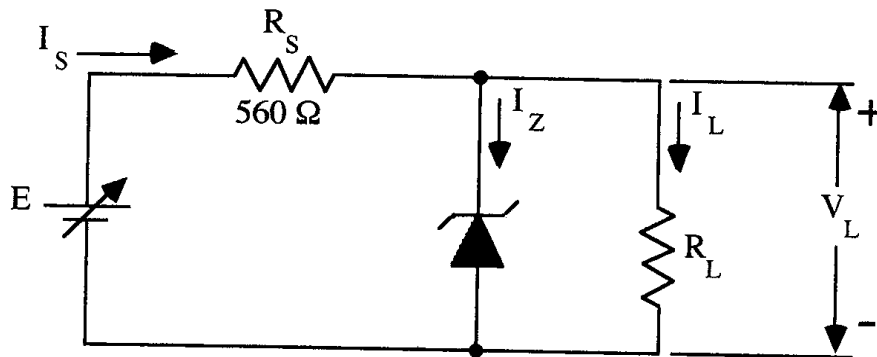
V <sub>d</sub>	E	V <sub>r</sub>	I
0.1V	.11V	0V	0A
0.3V	.3V	0V	0A
0.5V	.5V	0V	0A
0.6V	.62V	0V	0A



**Figure 3**

Table 2

I	V
50uA	
100uA	
1mA	
5mA	
10mA	
15mA	
20mA	
30mA	



**Figure 4**

Table 3

E	V <sub>L</sub>
10V	6.7V
11V	6.7V
13V	6.7V
15V	6.7

Table 4  
(E=10V)

<b>RL</b>	<b>VL</b>	<b>IL</b>	<b>Is</b>	<b>Iz</b>	<b>Pz</b>
10K	6.7V	.67mA	5.89mA	5.22mA	35mW
8.2K	6.7V	.81mA	5.89mA	5.08mA	34.03mW
6.8K	6.7V	.99mA	5.89mA	4.90mA	32.83mW
4.7K	6.7V	1.43mA	5.89mA	4.46mA	29.88mW
2.2K	6.7V	3.05mA	5.89mA	2.84mA	19.03mW

### **Analysis**

The use of a zener diode with reverse break-down biasing can be useful in regulating voltage supply to a variable resistance load. When the resistance load changes, the supplied voltage does not since it is compensated for by the zener diode. The same holds true for when the resistance load is constant and the voltage supply changes: the load-supplied voltage remains constant.

### **Conclusion**

A zener diode is useful in constructing voltage-regulation circuits for either constant-supply/variable-load systems, or variable-supply/constant-load systems.