

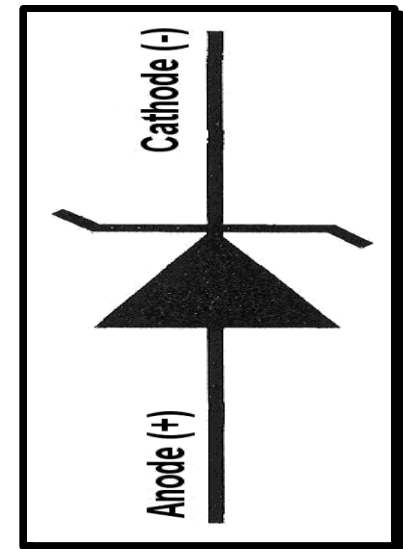
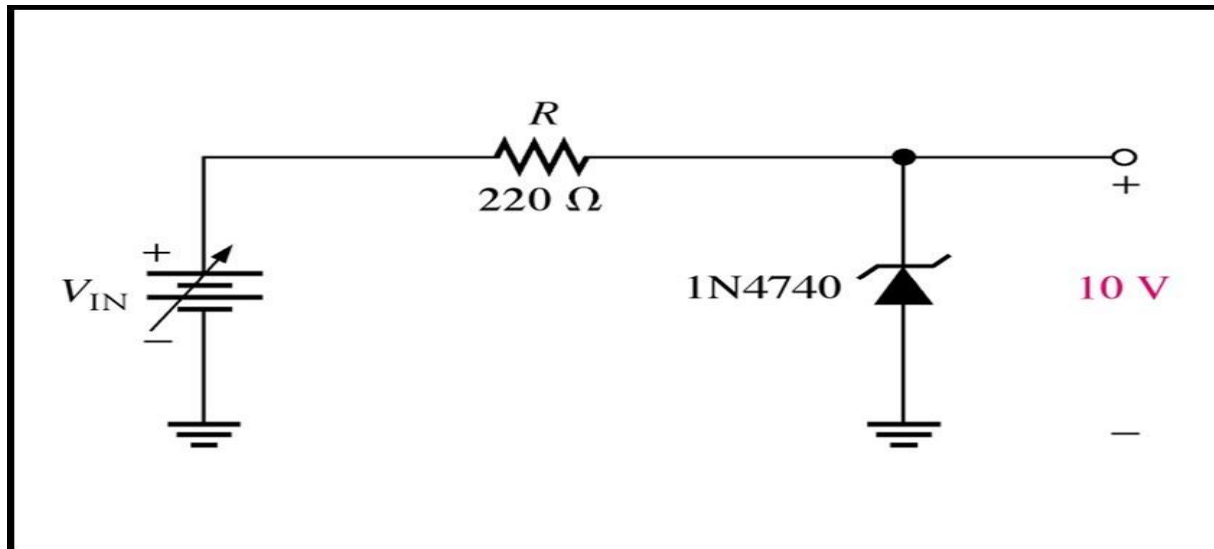
ECE132: Basic Electrical and Electronics Engineering Lab

Experiment 10:

To study VI char of a Zener diode and its application as a voltage regulator.

Introduction

The **zener diode** is a silicon pn junction devices that differs from rectifier diodes because *it is designed for operation in the reverse-breakdown region*. The breakdown voltage of a zener diode is set by carefully controlling the level during manufacture. The basic function of **zener diode** is to maintain a specific voltage across it's terminals within given limits of line or load change. Typically it is used for providing a stable reference voltage for use in power supplies and other equipment.



This particular zener circuit will work to maintain 10 V across the load.

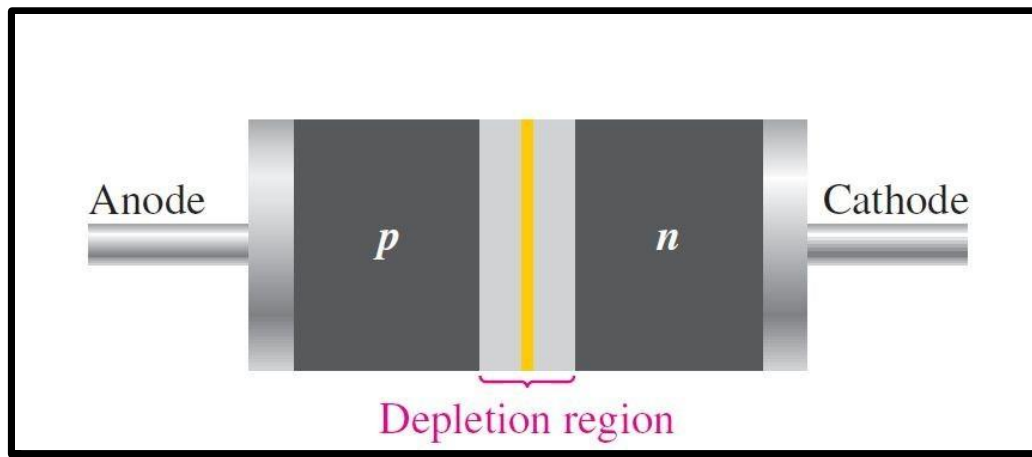
Construction of Zener

Zener diodes are designed to operate in reverse breakdown. Two types of reverse breakdown in a zener diode are *avalanche* and *zener*. The avalanche break down occurs in both rectifier and zener diodes at a sufficiently high reverse voltage. **Zener breakdown** occurs in a zener diode at low reverse voltages.

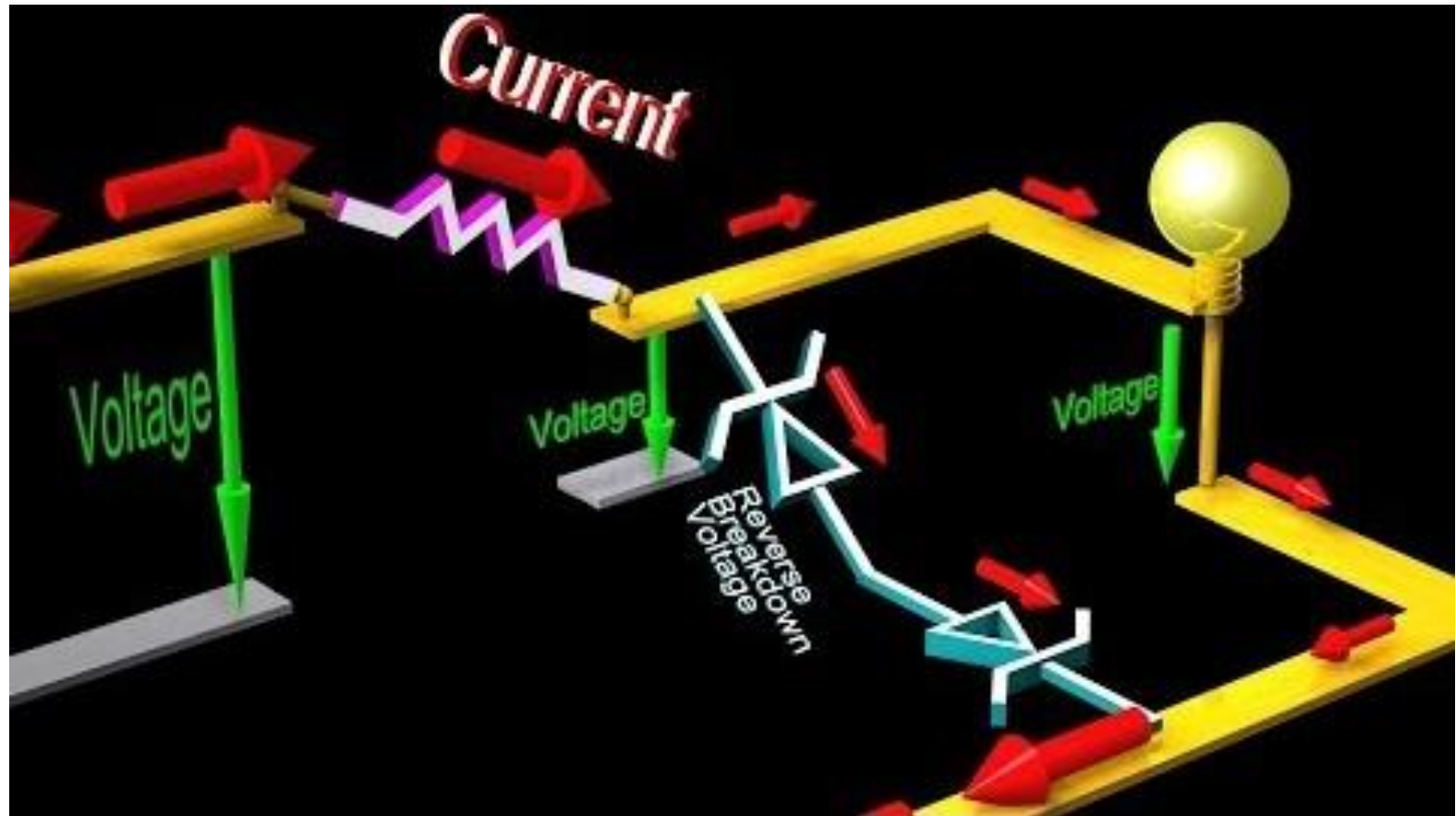
A zener diode is heavily doped to reduced the breakdown voltage. This causes a very thin depletion region.

The zener diodes breakdown characteristics are determined by the doping process

Zeners are commercially available with voltage breakdowns of **1.8 V** to **200 V**.

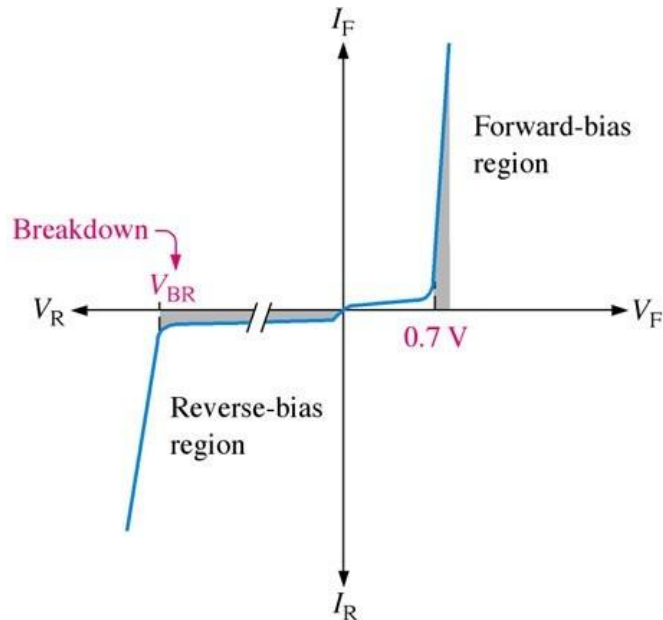


Working Principle

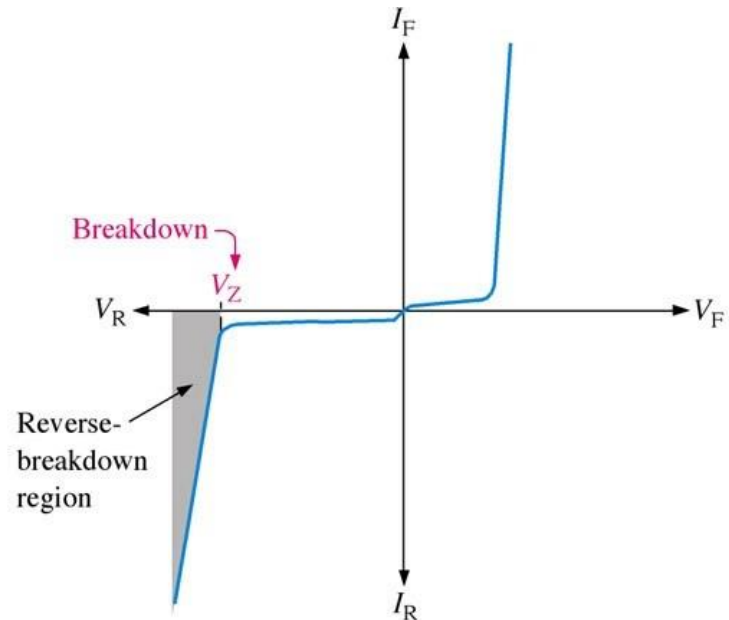


Characteristics of Zener

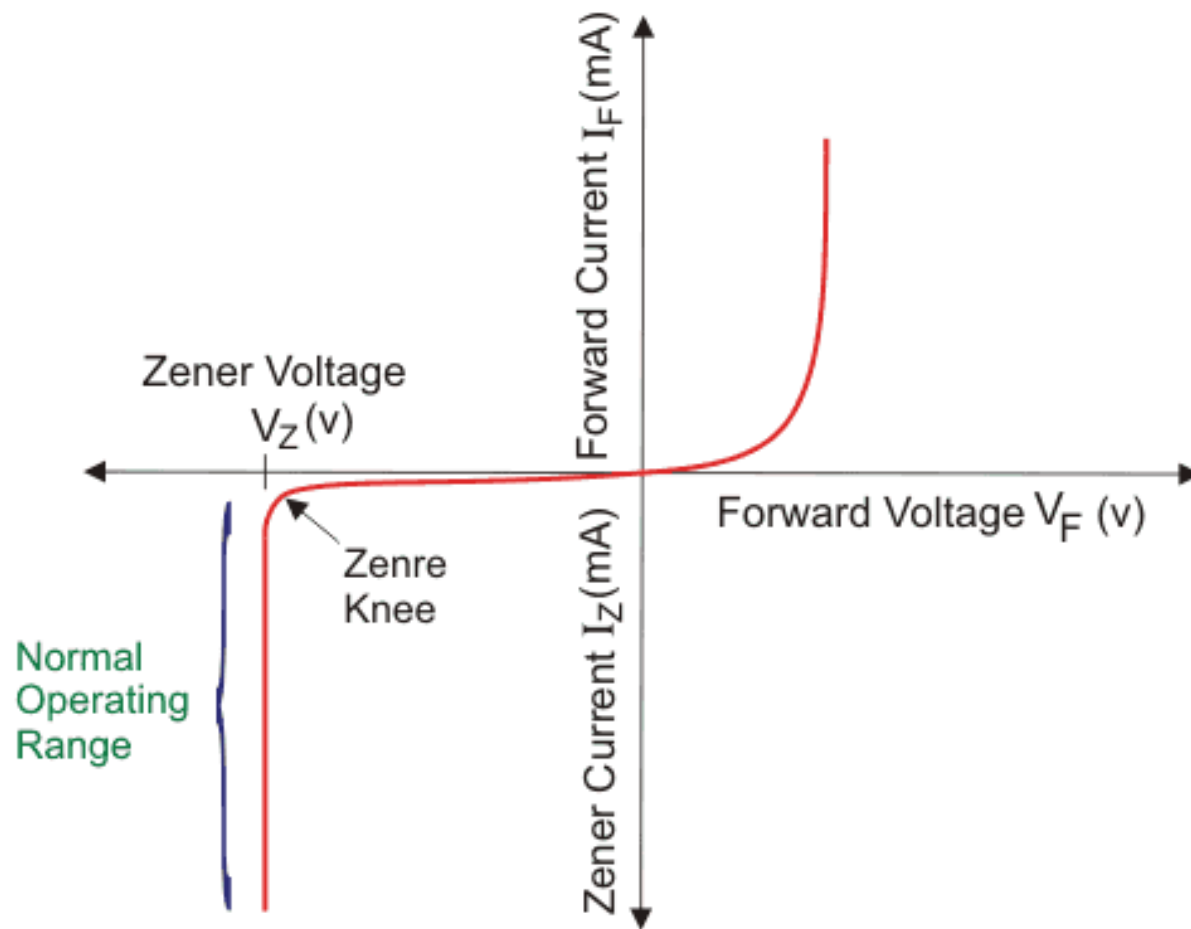
A **zener diode** is much like a normal diode. The exception being is that it is placed in the circuit in reverse bias and operates in reverse breakdown. This typical characteristic curve illustrates the operating range for a zener. Note that it's forward characteristics are just like a normal diode.



(a) The normal operating regions for a rectifier diode are shown as shaded areas.



(b) The normal operating region for a zener diode is shaded.



Simulation

Zener Diode - LINE Regulator

INSTRUCTION

EXPERIMENTAL TABLE

Zener Voltage(V_Z): V

Series Resistance(R_S): $K\Omega$

Load Resistance (R_L): $K\Omega$

Serial No.	Unregulated supply voltage(V_S) V	Load Current(I_L) mA	Zener Current(I_Z) mA	Regulated Output Voltage(V_O) V	% Voltage Regulation
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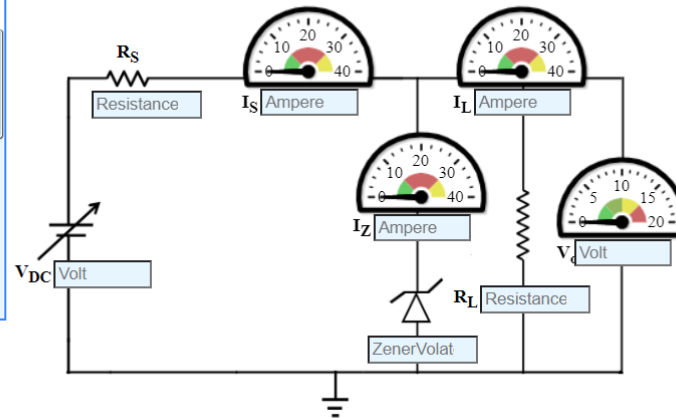
CONTROLS

DC volt : Volt
Zener Diode(V_Z) : Volt
Resistance(R_S) : Ohms
Resistance(R_L) : Ohms

Add to Table

Plot

Clear



THANKS TO ALL