

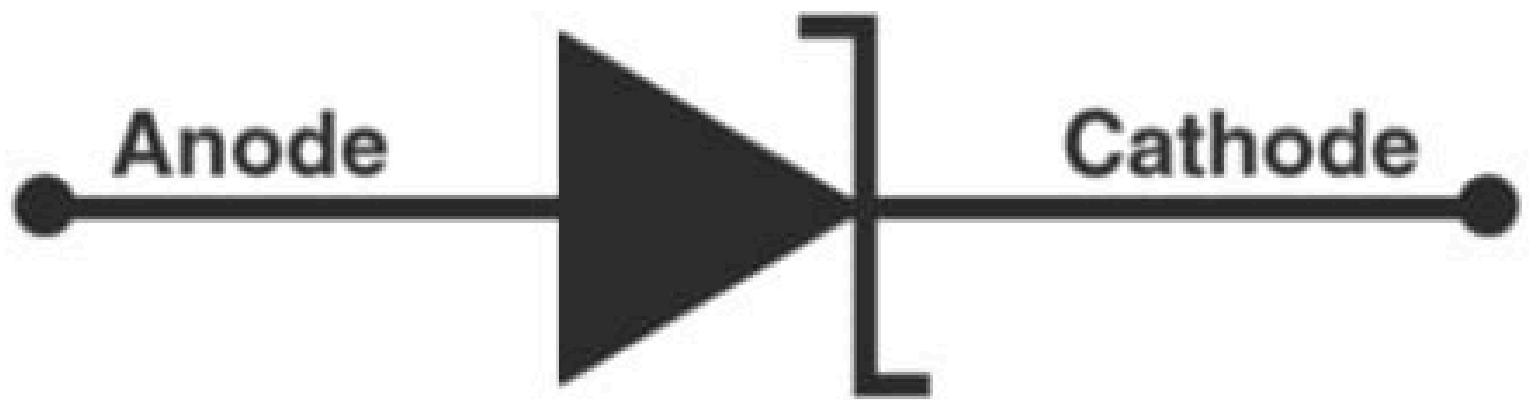


ZENER DIODE

# DEFINITION

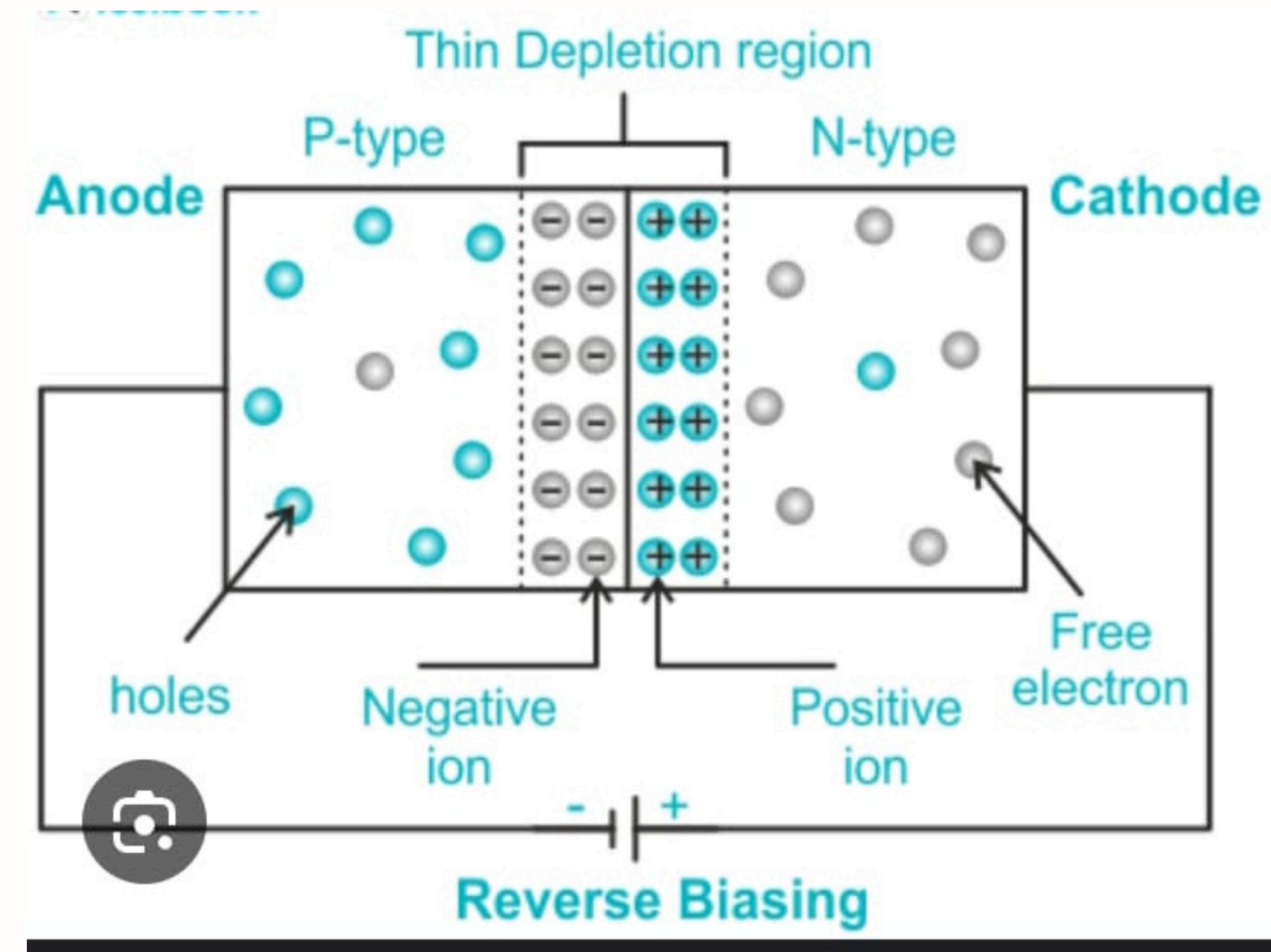
Zener diode is a special type of p-n junction diode that works in reverse bias.

It maintains a constant voltage (called Zener voltage) after breakdown



# WORKING PRINCIPLE

- Forward Bias: Works like a normal diode.
- Reverse Bias: When voltage reaches Zener voltage ( $V_z$ ), it conducts and keeps voltage constant.
- Used for voltage regulation and circuit protection



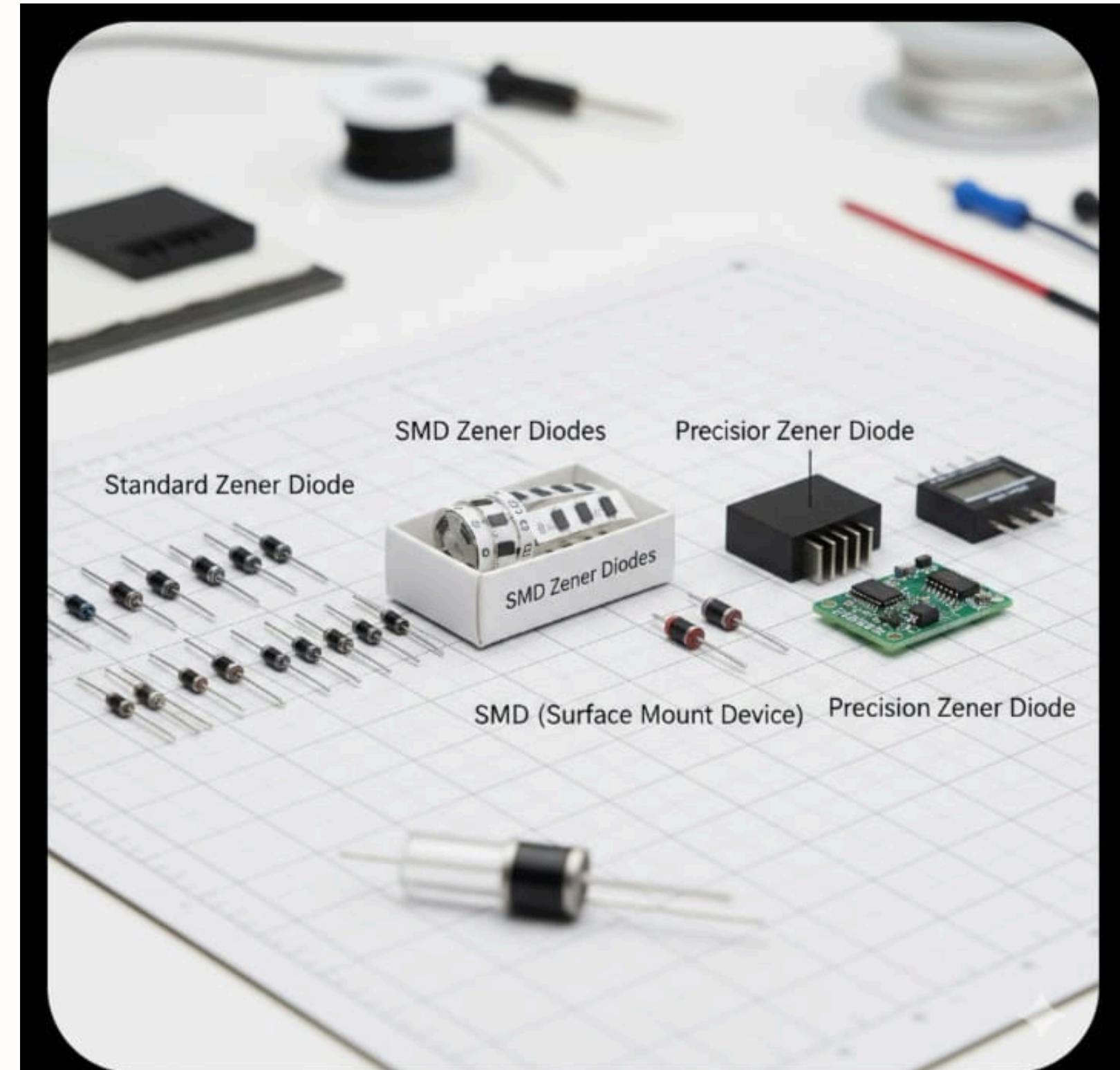
# KEY FEATURES

- Fixed reverse breakdown voltage.
- Provides stable voltage output.
- Used as voltage regulator and protection device.
- Needs a series resistor to limit current

# TYPES OF ZENER DIODE

1. Standard Zener Diode – (Common in circuits)
2. SMD (Surface Mount) – Small and compact.
3. Precision Zener – Temperature stable.
4. Breakdown types: Zener (below 5.6V) & Avalanche (above 5.6V).

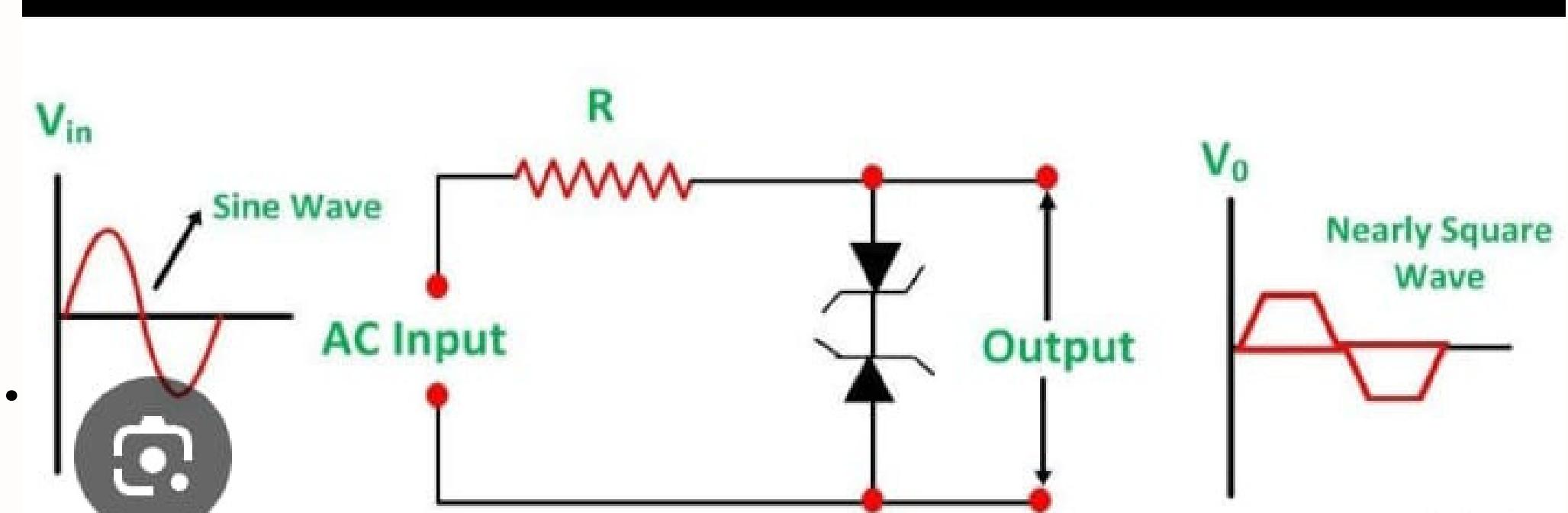
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# APPLICATIONS

Timmerman Industries

- Voltage regulators.
- Reference voltage sources.
- Over-voltage protection.
- Clipping and clamping circuits



# IMPORTENT POINTS

- Choose correct voltage & power rating ( $P = V_z \times I_z$ ).
- Avoid excess current.
- Temperature affects breakdown voltage

# SUMMARY

## ZENER DIODE

Zener diode is simple yet powerful.  
It keeps voltage stable and protects circuits.  
Widely used in voltage regulators and electronics

**THANK YOU**