



## Table of Contents



- [Linear resistance:](#)
- [Non-linear resistance:](#)
- [Applications of Resistors:](#)
- [FAQs on Resistor](#)

### **Definition:**

The resistor is a passive electrical component that creates resistance in the flow of electric current.

Resistor is a [passive component](#).

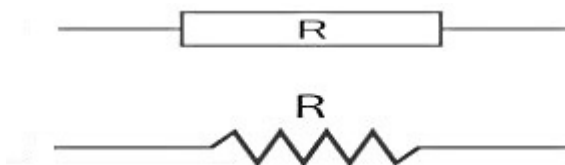
### **What is Resistance?**

It is the property of a material that opposes the flow of electric current through it.

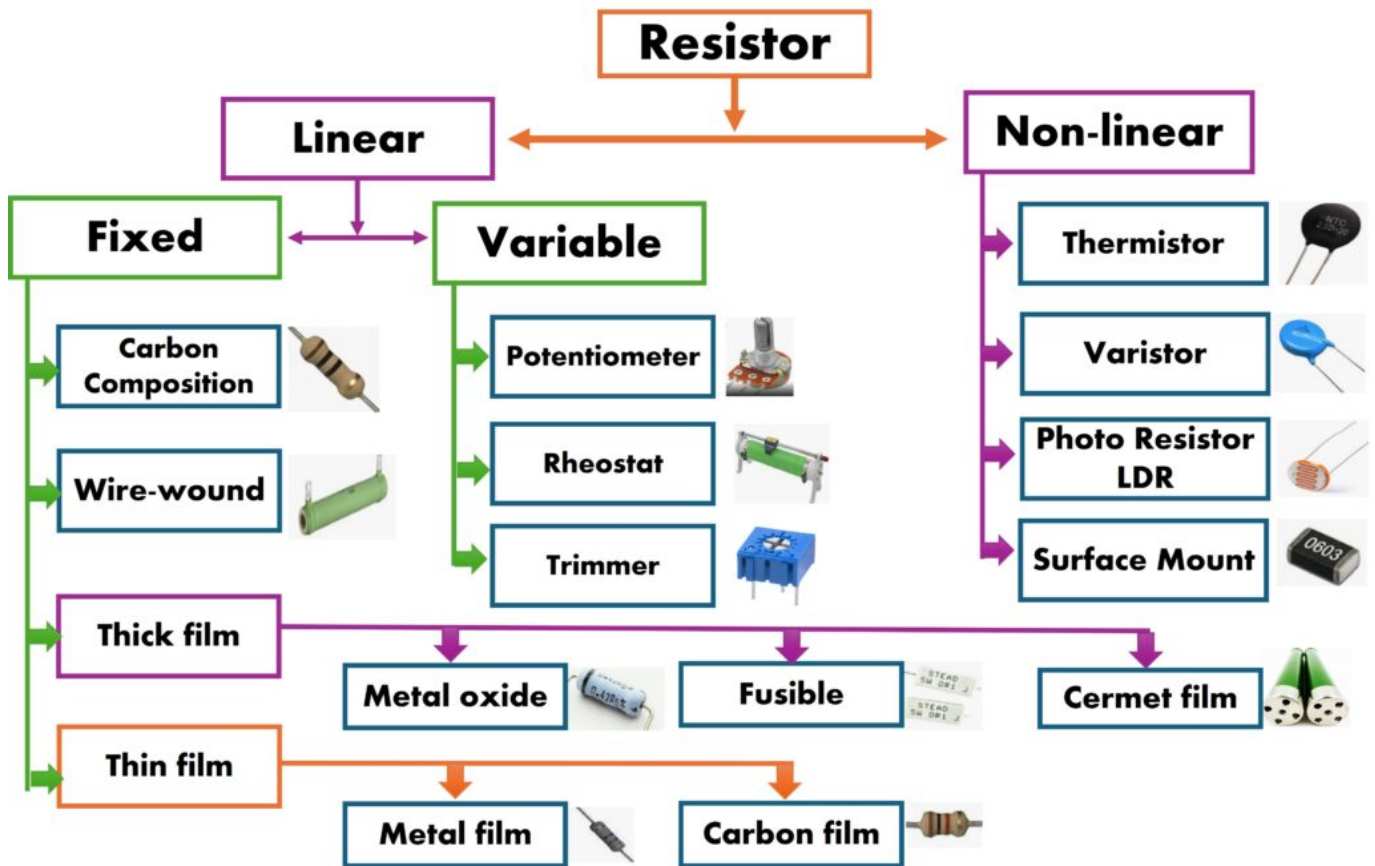
### **SI Unit of Resistance:**

It is measured in Ohms( $\Omega$ ) and denoted by 'R'.

### **Symbols:**



### **Types of Resistor:**



## Linear resistance:

Linear resistance refers to the behaviour of a resistor whose resistance remains constant regardless of the current flowing through it and whose characteristics remain constant when variables like voltage and temperature change.

### Fixed Resistor:

A fixed resistor is one whose resistance value is set and cannot be changed or varied under normal operation.

**Examples:** Carbon Composition Resistor, Metal Oxide Resistor, Wire-Wound resistor, etc.

### Variable Resistor:

A variable resistor is a resistor whose resistance value can be adjusted manually, allowing it to vary within a specific range.



**Examples:** Potentiometer, Rheostat, Trimmer, etc.

## **Non-linear resistance:**

A nonlinear resistor is one that does not obey Ohm's law. The non-linear resistor's I-V characteristic is not a straight line.

Whose characteristics can be changed when variables like voltage and temperature change.

## **Applications of Resistors:**

- **Current Limiting:** Protects components (e.g., LEDs) by restricting current flow.
- **Voltage Division:** Divides voltage into smaller values for sensors or circuits.
- **Temperature Sensing:** Used in thermistors to detect temperature changes.
- **Biasing Transistors:** Sets operating point in amplifiers and oscillators.
- **Power Dissipation:** Converts electrical energy into heat, protecting components.
- **Surge Protection:** Limits current surge to protect components.
- **Timing Circuits:** Controls timing in RC circuits for delays or oscillations.
- **LED Brightness Control:** Vary brightness by adjusting current with a potentiometer and many more.

## **FAQs on Resistor**

### **Q1. What is the main function of a resistor?**

The main function of a resistor is to limit or control the current and divide voltage in a circuit.

### **Q2. What are the types of resistors?**

Common types of resistors are:

- **Fixed Resistor**



- **Variable Resistor (Potentiometer)**
- **Thermistor**
- **LDR (Light Dependent Resistor)**

### **Q3. What is the unit of resistance?**

The unit of resistance is the **Ohm ( $\Omega$ )**.

### **Q4. Where is a resistor used?**

Resistors are used in **LED circuits, voltage dividers, amplifiers, and power supply circuits**.

### **Q5. What happens if a resistor is not used?**

If a resistor is not used where needed, **too much current** may flow and **damage components** like LEDs or transistors.

### **Q6. What is Ohm's Law related to resistor?**

Ohm's Law states that **Voltage (V) = Current (I) × Resistance (R)**. It helps to calculate how much current will flow through a resistor.

### **Q7. Can a resistor store energy?**

No, a resistor **does not store energy**. It only converts electrical energy into **heat** when current passes through it.

### **Q8. Why do we use resistors in LED circuits?**

We use resistors in LED circuits to **control the current flow** and **prevent the LED from burning**.