



Different Types of Resistors

1. Fixed Resistors
2. Variable Resistors
3. Specialty Resistors

1. Fixed Resistors

- Carbon Composition Resistors

- Features: High energy surge tolerance, wide resistance range.
- Power Ratings: Typically 1/8W to 2W.
- Construction: Made from a mixture of carbon powder and a binding material, molded into a cylindrical shape with axial leads.
- Applications: General-purpose, high-voltage applications, surge protection.

- Film Resistors (Carbon Film, Metal Film, Thick Film, Thin Film)

- Features: Precision, stability, low noise.
- Power Ratings: Typically 1/8W to 1W.
- Construction: A thin layer of conductive material (carbon or metal) is deposited on a ceramic substrate.
- Applications: Precision electronic circuits, signal processing.

- Wire-Wound Resistors

- Features: High power dissipation, low temperature coefficient, high accuracy.

- Power Ratings: Typically 1W to 200W or higher.
- Construction: A wire made of a resistive material (such as Nichrome) wound around a ceramic or fiberglass core.
- Applications: High power applications, current sensing, power supplies.
- Metal Oxide Resistors
 - Features: High stability, high temperature resistance.
 - Power Ratings: Typically 1/4W to 5W.
 - Construction: A metal oxide film is deposited on a ceramic rod.
 - Applications: Power supplies, motor control, high-temperature environments.

2. Variable Resistors

- Potentiometers
 - Features: Adjustable resistance, used for tuning and calibration.
 - Power Ratings: Typically 0.1W to 1W.
 - Construction: Three-terminal device with a resistive element and a movable wiper that adjusts the resistance.
 - Applications: Volume controls, tuning circuits, adjustable power supplies.
- Rheostats
 - Features: Adjustable resistance, capable of handling higher currents than potentiometers.

- Power Ratings: Typically 5W to 100W.
- Construction: Similar to potentiometers but designed to handle higher power, often with a sliding contact over a resistive wire.
- Applications: Light dimmers, motor speed controls, heater controls.
- Trimmers (Trimpots)
 - Features: Small, adjustable, used for fine-tuning.
 - Power Ratings: Typically 0.1W to 0.5W.
 - Construction: Miniature potentiometers designed for occasional adjustments.
 - Applications: Calibration of circuits, fine-tuning of signal processing components.

3. Specialty Resistors

- Thermistors
 - Features: Temperature-sensitive resistance, available in NTC (negative temperature coefficient) and PTC (positive temperature coefficient) types.
 - Power Ratings: Typically 0.1W to 1W.
 - Construction: Ceramic materials that change resistance with temperature.
 - Applications: Temperature sensing, overcurrent protection, temperature compensation.
- Varistors



- Features: Voltage-dependent resistance, used for surge protection.
- Power Ratings: Typically 0.1W to 1W.
- Construction: Semiconductor materials that change resistance with applied voltage.
- Applications: Surge protection, transient voltage suppression.
- Light Dependent Resistors (LDR)
 - Features: Light-sensitive resistance, resistance decreases with increasing light intensity.
 - Power Ratings: Typically 0.1W to 1W.
 - Construction: Cadmium sulfide or similar photoconductive material.
 - Applications: Light sensing, automatic lighting controls, alarm systems.
- Precision Resistors
 - Features: High accuracy, low temperature coefficient.
 - Power Ratings: Typically 1/8W to 1W.
 - Construction: Similar to film resistors but with tighter tolerances.
 - Applications: Precision circuits, instrumentation, measurement devices.
- Current Sense Resistors
 - Features: Low resistance, designed to measure current flow.

Different Types of Resistors



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- Power Ratings: Typically 1/8W to 5W.
- Construction: Often metal foil or wire-wound with very low resistance values.
- Applications: Power management, current sensing in power supplies, battery management systems.

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