

## Resistance - Ohm's Law

A resistor is anything that reduces the ability of electrons for flow easily. A light bulb filament provides resistance. Electrical potential is required to go through resistance. This is why there is a difference in voltage before and after a resistor. In most cases, electrical potential energy is converted to heat, the reason why resistance causes heat.

A resistor is a specially designed electronic component. This type of resistor used a semi-conductor to provide resistance.

Ohm's Law provides a relationship between voltage (V), current (A) and resistance ( $\Omega$ ). Ohms law is given as:

$$R = \frac{V}{I}$$

It is however more convenient to work with the following:

$$V = I \times R$$

V = voltage (potential difference) (V - volts)

I = current (A - amperes)

R = resistance ( $\Omega$  - ohms)

$$V = I \times R$$

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$$\frac{V}{R} = \frac{I \times R}{R}$$

$$\frac{V}{R} = I$$

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$$\frac{V}{I} = \frac{I \times R}{I}$$

$$\frac{V}{I} = R$$

$$R = \frac{V}{I}$$

eg current would you expect to flow through a 50  $\Omega$  resistor if a potential difference of 12 V is applied to the resistor?

$$V = 12 \text{ V}$$

$$I = ? \text{ (A)}$$

$$R = 50 \text{ } \Omega$$

$$I = \frac{V}{R}$$

$$I = \frac{12 \text{ V}}{50 \text{ } \Omega}$$

$$I = 0.24 \text{ A}$$