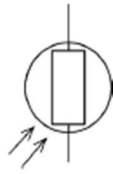


Circuit Devices

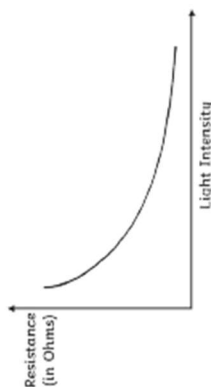
LDR – Light Dependent Resistor



An LDR is dependent on light intensity. In bright light the resistance falls and at night the resistance is higher.

Uses of LDRs: outdoor night lights, burglar detectors.

Light Dependent Resistor (LDR)

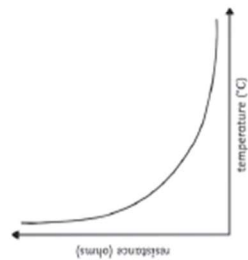


Thermistor



A thermistor is a temperature dependent resistor. If it is hot, then the resistance is less. If it becomes cold, then the resistance increases.

Uses of thermistors: temperature detectors.



Series and Parallel Circuits

Series Circuits

Once one of the components is broken then all the components will stop working.

Potential difference – the total p.d. of the supply is shared between all the components.

$$V_{\text{total}} = V_1 + V_2$$

Current – wherever the ammeter is placed in a series circuit the reading is the same.

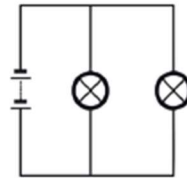
$$I_1 = I_2 = I_3$$

Resistance – In a series circuit, the resistance will add up to make the total resistance.

$$R_{\text{total}} = R_1 + R_2$$

Parallel Circuits

They are much more common - if one component stops working, it will not affect the others. This means they are more useful.



Potential Difference – this is the same for all components.

$$V_1 = V_2$$

Current – the total current is the total of all the currents through all the components.

$$I_{\text{total}} = I_1 + I_2 + I_3$$

Resistance – adding resistance reduces the total resistance.

Circuit symbols

Series and parallel circuits, and current

Potential difference and resistance

Ohmic and Non-Ohmic conductors

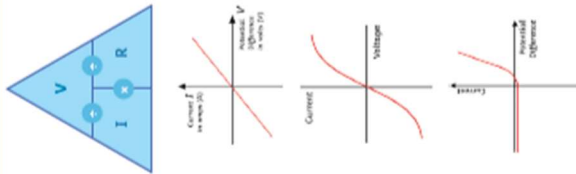
Resistance

voltage (V) = current (A) × resistance (Ω)

$$V = IR$$

Graphs of I-V Characteristics for Components in a Circuit

1. Ohmic conductor: the current is directly proportional to the potential difference - it is a straight line (at a constant temperature).
2. Filament lamp: as the current increases, so does the temperature. This makes it harder for the current to flow. The graph becomes less steep.
3. Diode: current only flows in one direction. The resistance is very high in the other direction which means no current can flow.



Current and Circuit Symbols

Current: the flow of electrical charge.

Potential difference (voltage): the push of electrical charge.

Resistance: slows down the flow of electricity.

cell		closed switch		fuse	
resistor		ammeter		LDR	
battery		voltmeter		LED	
variable resistor		bulb		thermistor	
open switch		diode			