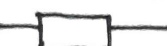


→ semi-conductor diode

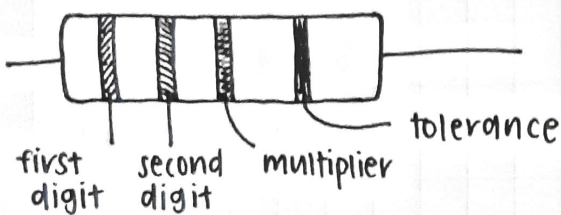
- allow current to flow in one direction but not the other
- symbol: 

RESISTORS

→ protect other components from being damaged by reducing excessively high currents in the circuit

→ symbol: 

→ tolerance bands (colour-coded)



→ calculating resistance

• series: $R_{total} = R_1 + R_2$

• parallel: $\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2}$

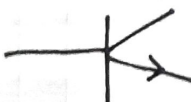
RESISTOR COLOUR CODE CHART

	DIGIT	MULTIPLIER	TOLERANCE
Black	0	$\times 10^0$	—
Brown	1	$\times 10^1$	—
Red	2	$\times 10^2$	—
Orange	3	$\times 10^3$	—
Yellow	4	$\times 10^4$	—
Green	5	$\times 10^5$	—
Blue	6	$\times 10^6$	—
Violet	7	$\times 10^7$	—
Grey	8	$\times 10^8$	—
White	9	$\times 10^9$	—
Gold	—	$\times 10^{-1}$	$\pm 5\%$
Silver	—	$\times 10^{-2}$	$\pm 10\%$

— x — Ω $\pm$ — %

TRANSISTORS

→ automatic switch

→ symbol: 

→ usually connected to base to prevent it from being damaged by too much current

→ sensing circuits

• moisture: 2 metal rods 

• light: light-dependent resistor 

• temperature: thermistor 

→ can use potentiometer / variable resistor to adjust sensitivity

• symbol:  ,  → only has 2 contacts