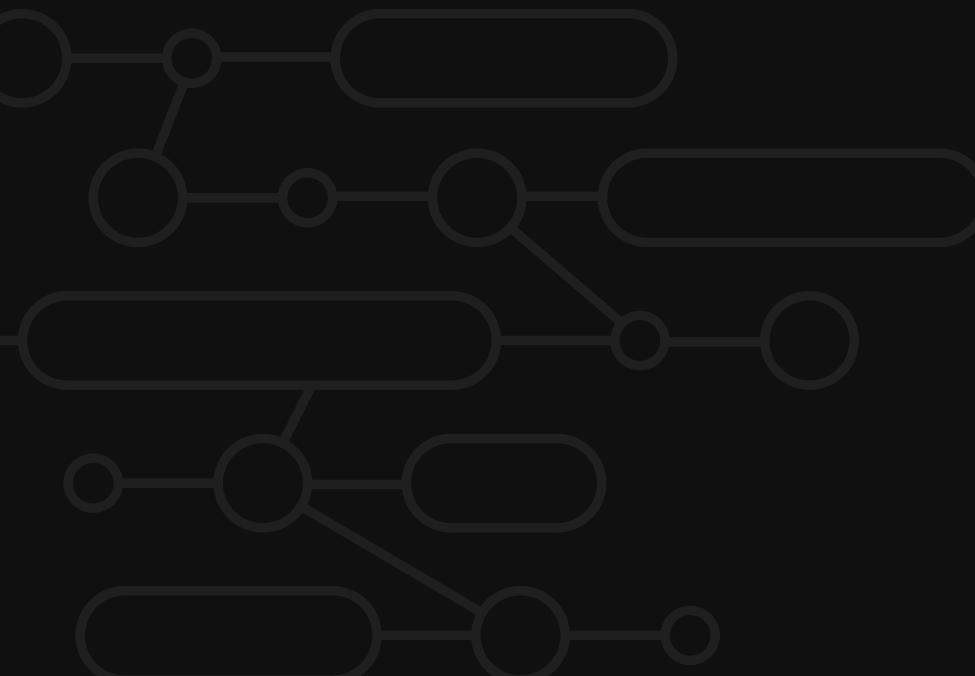




DAY 1:

# ROBOCAMP

BASIC CIRCUITS





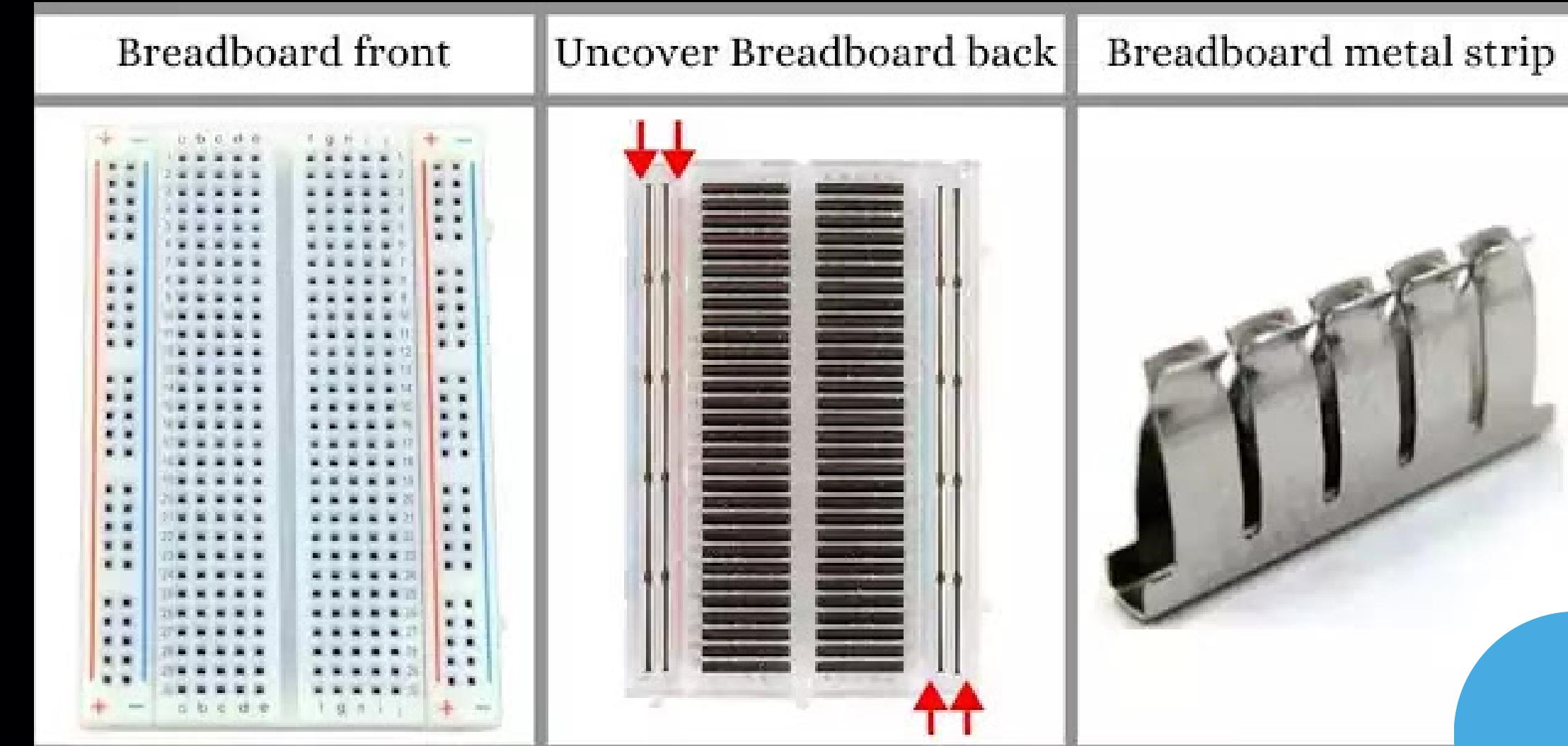
# BASIC CIRCUITS

- Breadboarding
- Basic Components
  - Resistors
  - Capacitors
  - Diodes
  - LED
  - LDR
  - Transistors
- Basic Logic Gates using Transistors



# BREADBOARDING

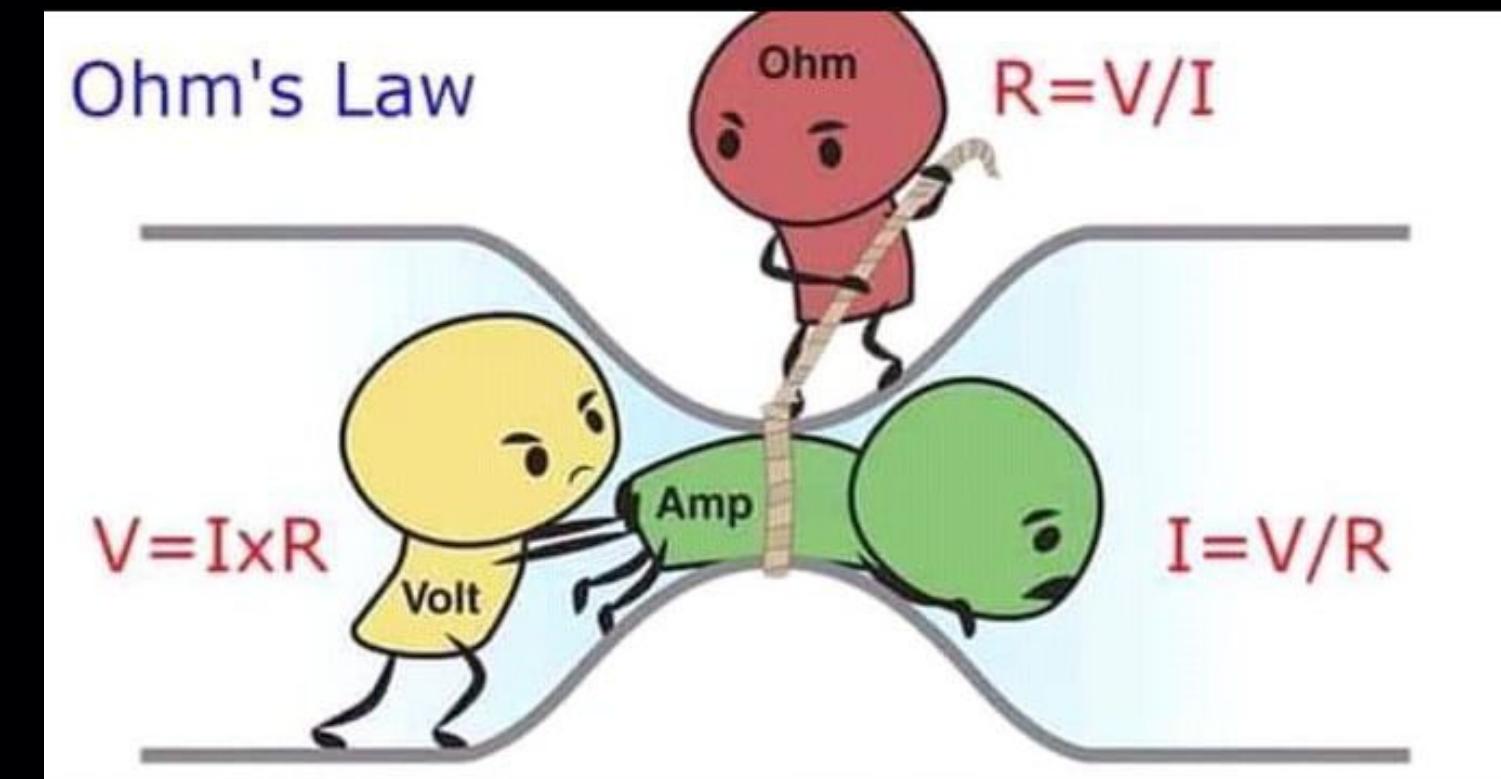
- Used for rapid Prototyping
- Quick Construction of Circuit
- Saves Cost and Time





# RESISTORS

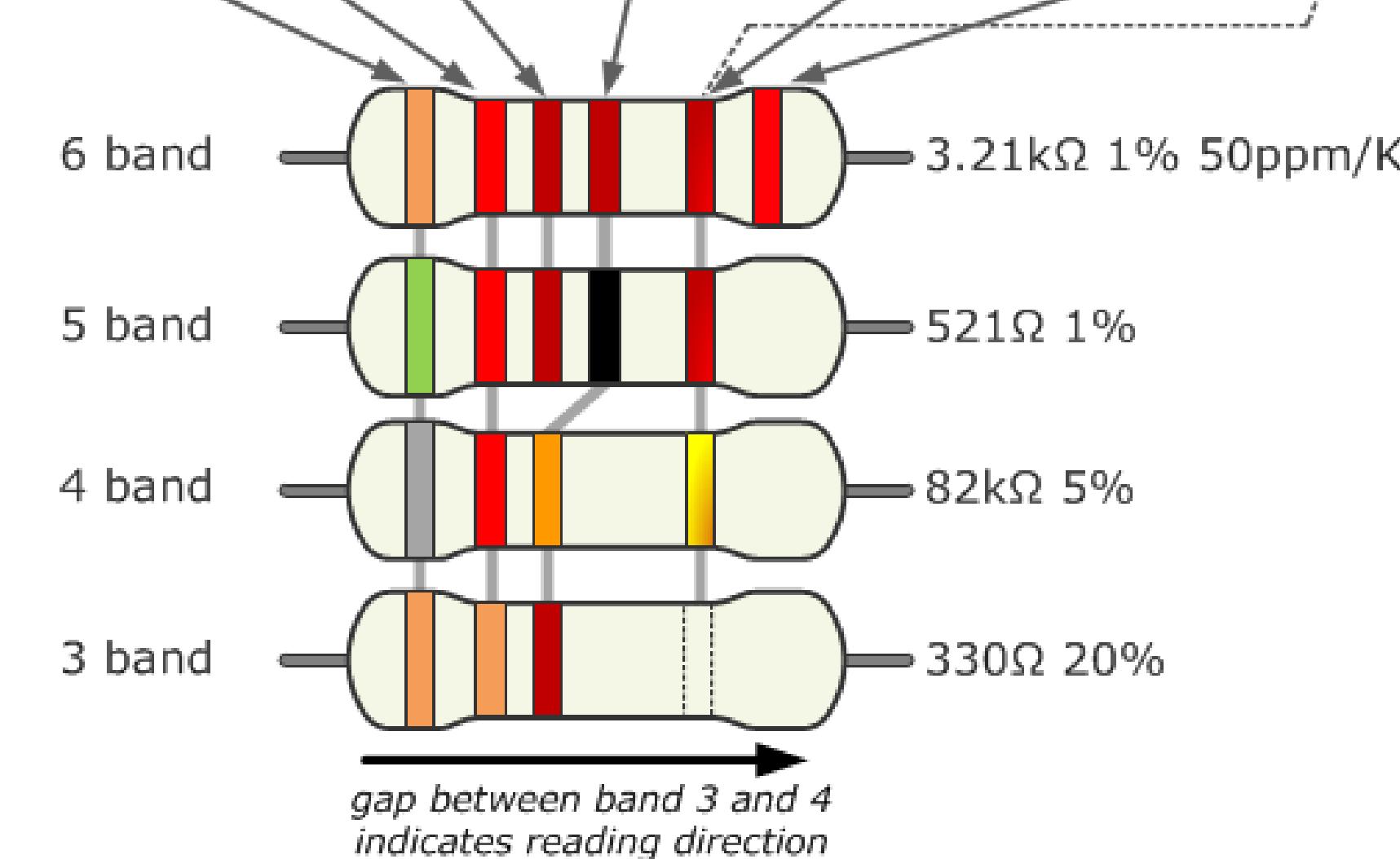
- Limits the flow of current in the wire
- $V$  (Voltage) =  $I$  (Current) \*  $R$  (Resistor)
- Every wire has resistance
- Resistance depends upon the type and dimension of material





# RESISTORS

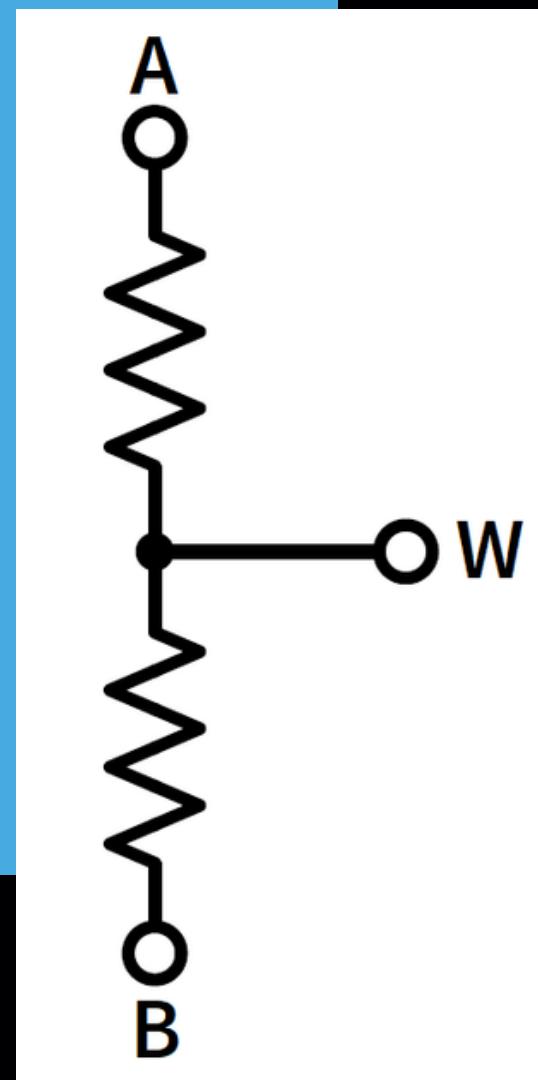
	Color	Significant figures			Multiply	Tolerance (%)	Temp. Coeff. (ppm/K)	Fail Rate (%)
Bad	black	0	0	0	x 1		250 (U)	
Beer	brown	1	1	1	x 10	1 (F)	100 (S)	1
Rots	red	2	2	2	x 100	2 (G)	50 (R)	0.1
Our	orange	3	3	3	x 1K		15 (P)	0.01
Young	yellow	4	4	4	x 10K		25 (Q)	0.001
Guts	green	5	5	5	x 100K	0.5 (D)	20 (Z)	
But	blue	6	6	6	x 1M	0.25 (C)	10 (Z)	
Vodka	violet	7	7	7	x 10M	0.1 (B)	5 (M)	
Goes	grey	8	8	8	x 100M	0.05 (A)	1(K)	
Well	white	9	9	9	x 1G			
Get	gold				3rd digit only for 5 and 6 bands	x 0.1	5 (J)	
Some	silver					x 0.01	10 (K)	
Now!	none						20 (M)	





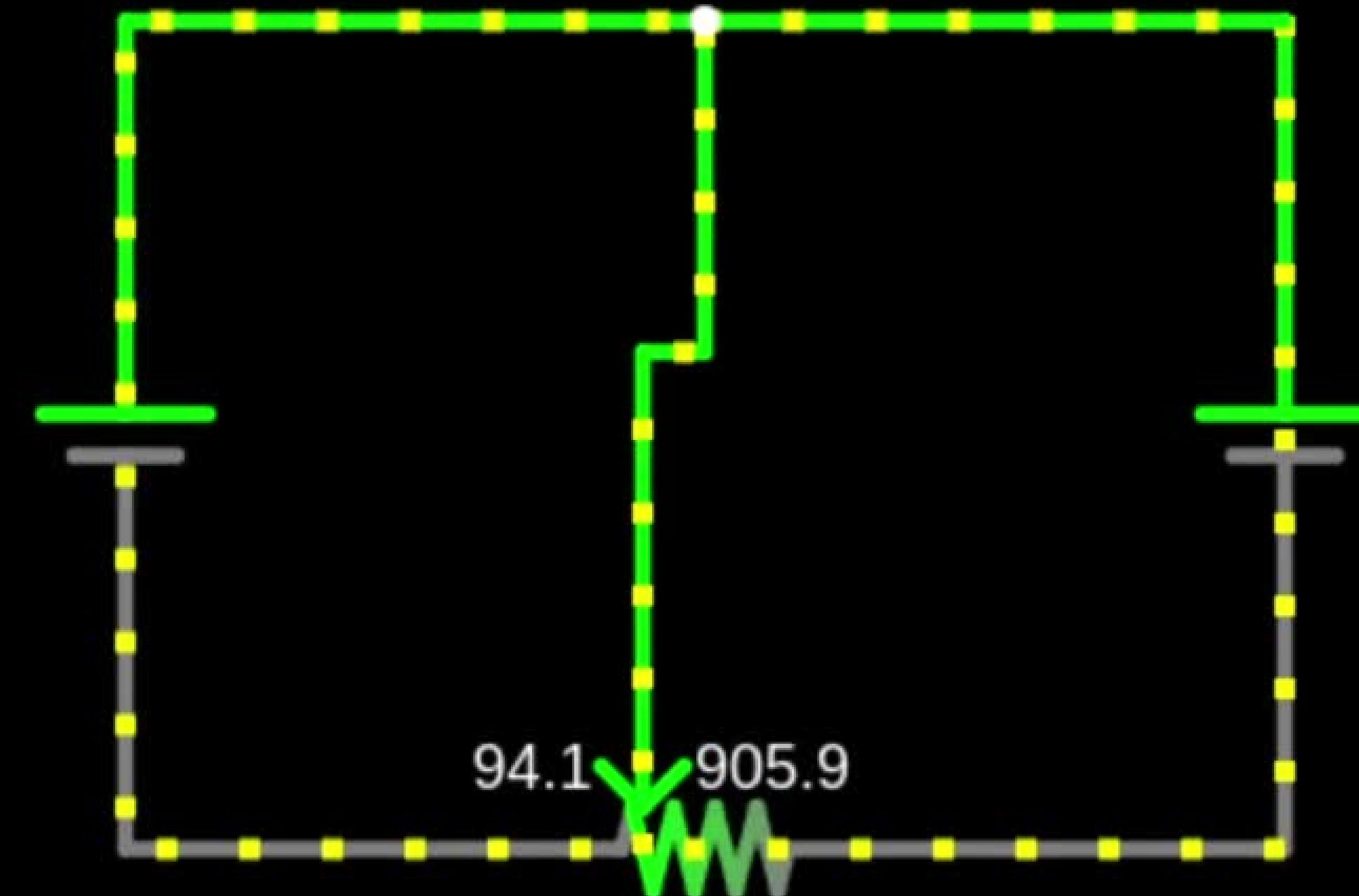
# POTENTIOMETER

- Three Terminal Device
- Outside Pin have fixed resistance
- Resistance between middle pin and outside pin change depending upon the movement of pot





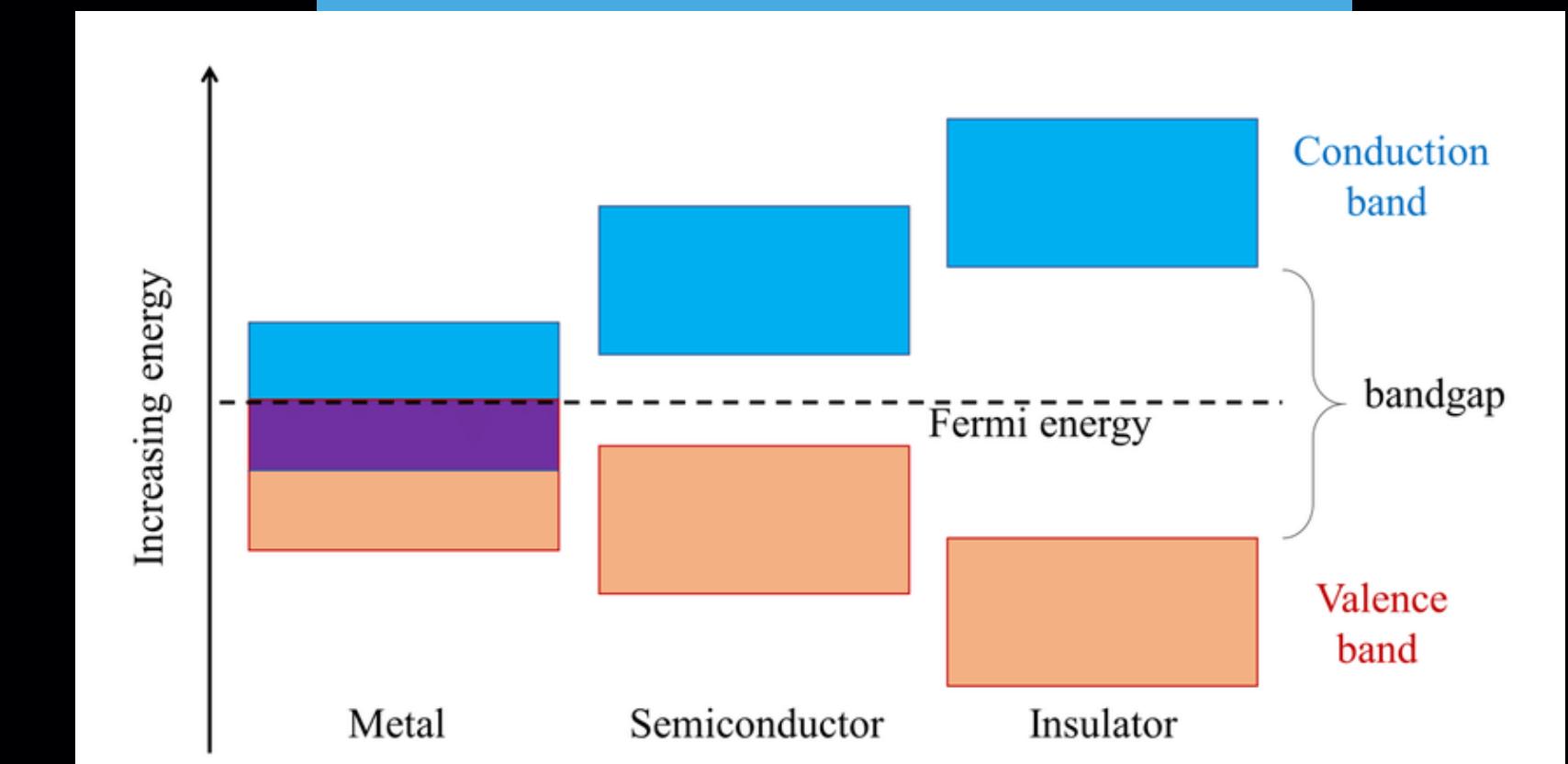
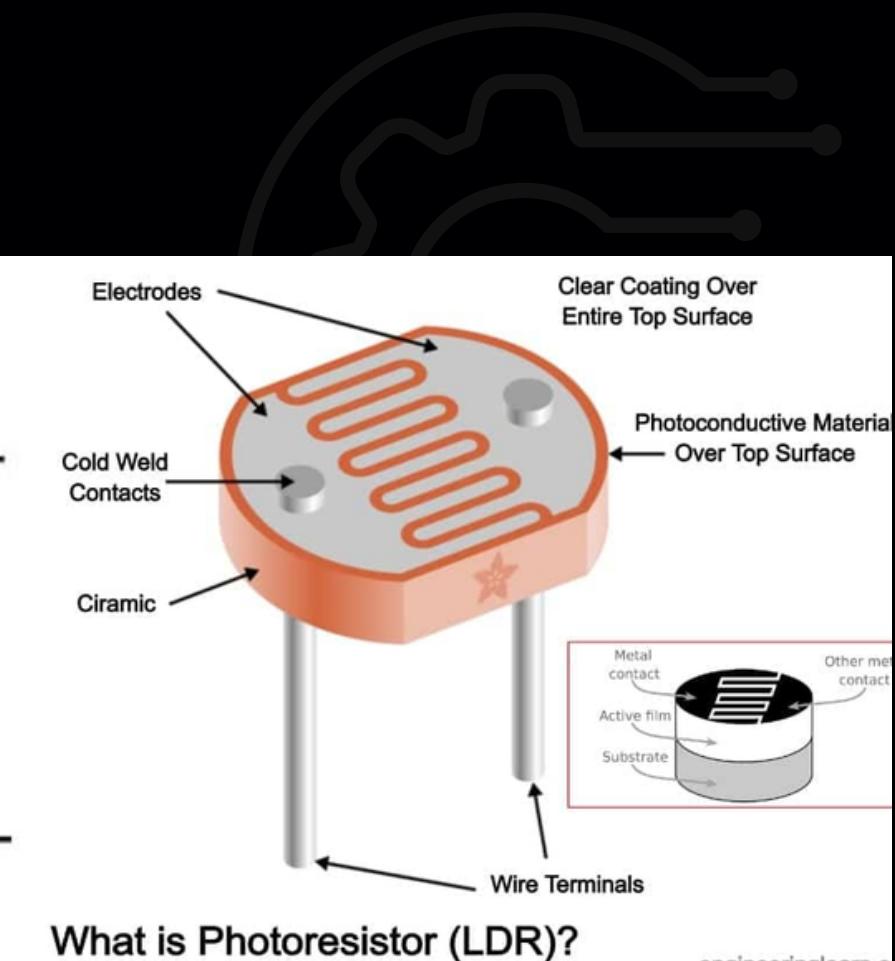
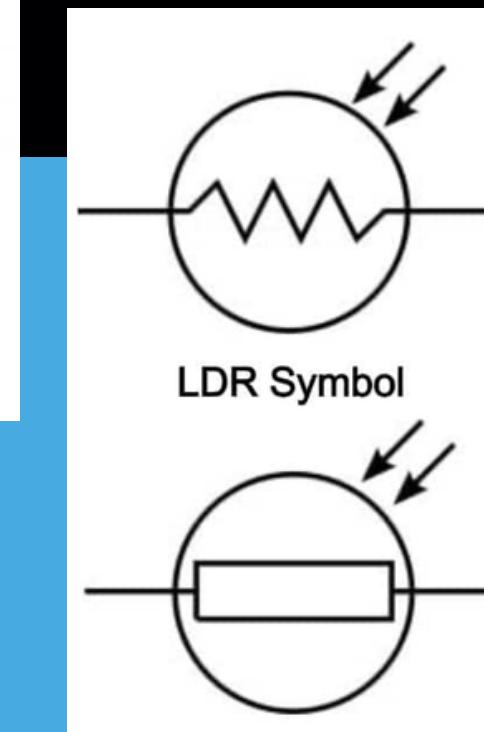
# POTENTIOMETER





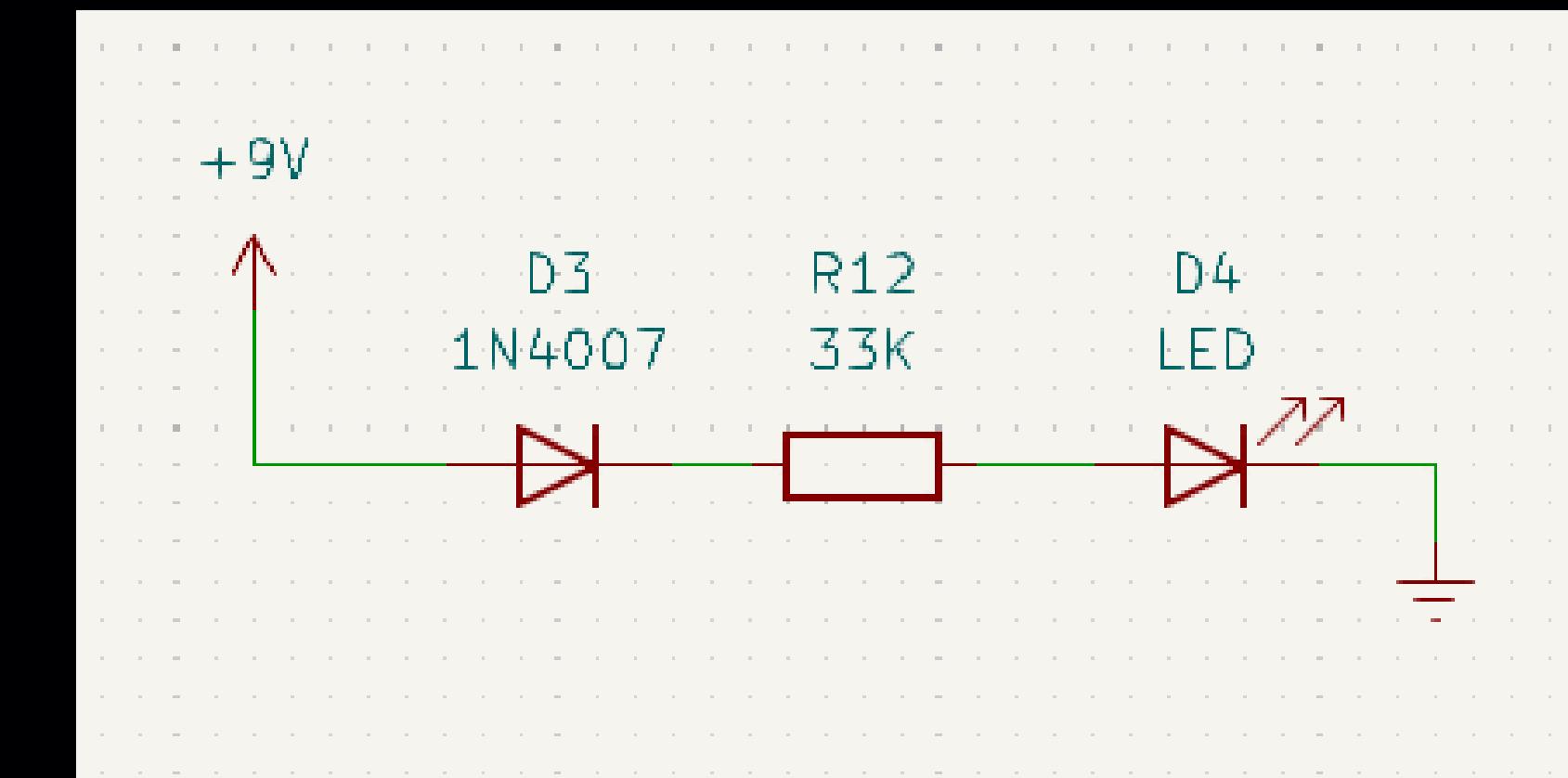
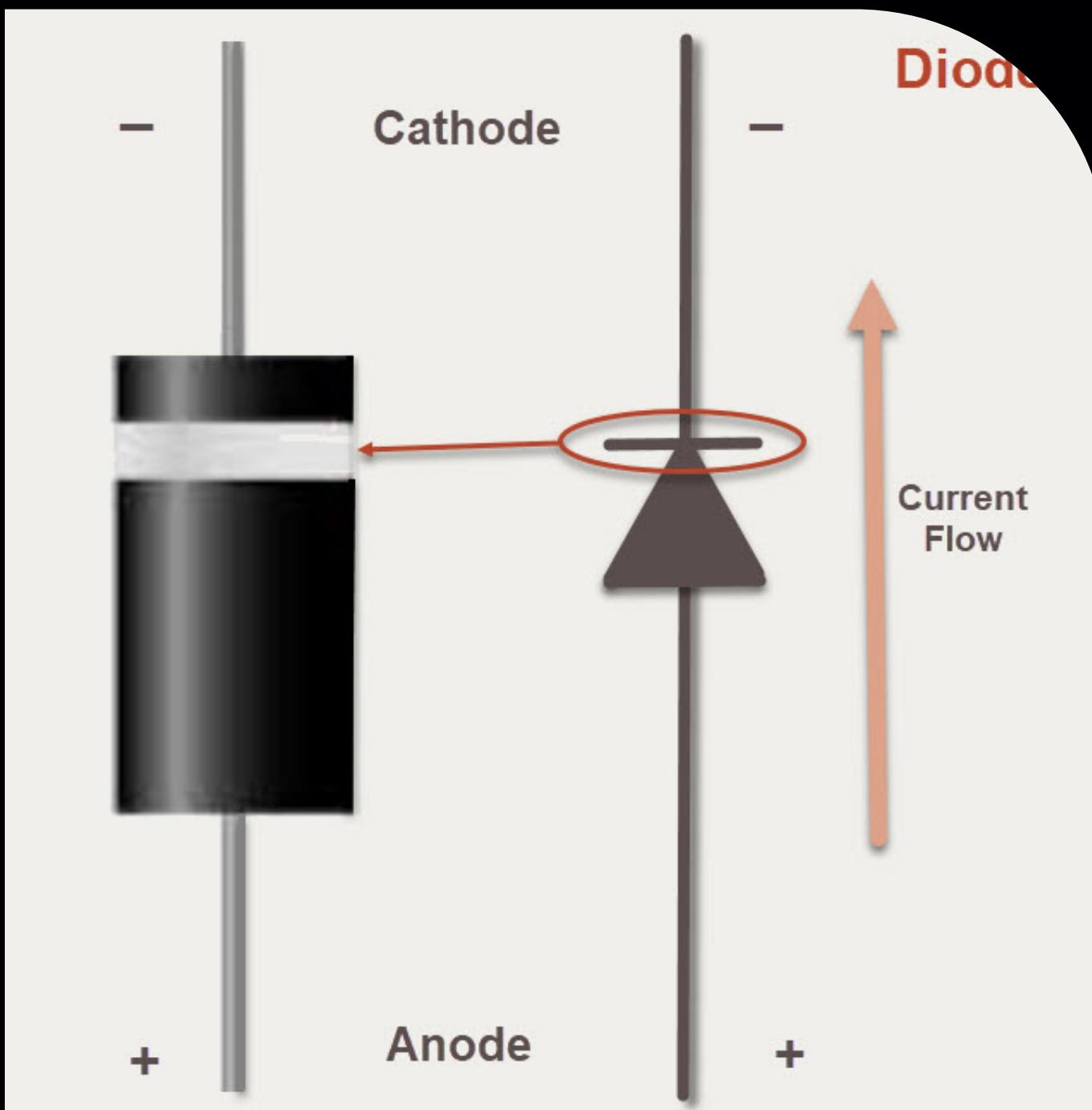
# PHOTO RESISTORS (LDR)

- Light Dependent Resistors
- Two conducting electrons separated by a semiconducting material
- When light strikes on the semiconducting material the Electrons move towards conducting band
- They do so because they absorb energy from incoming photon



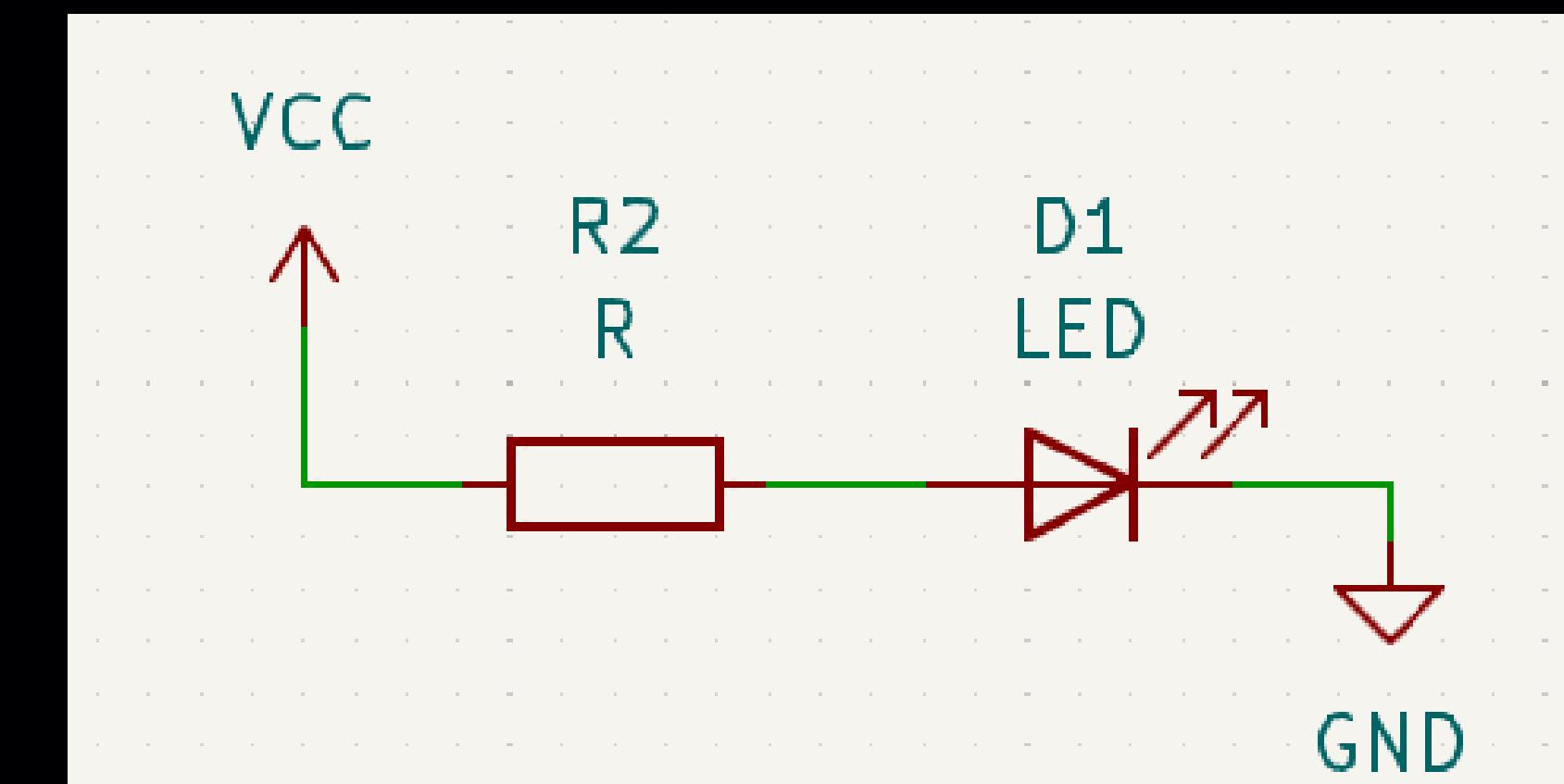
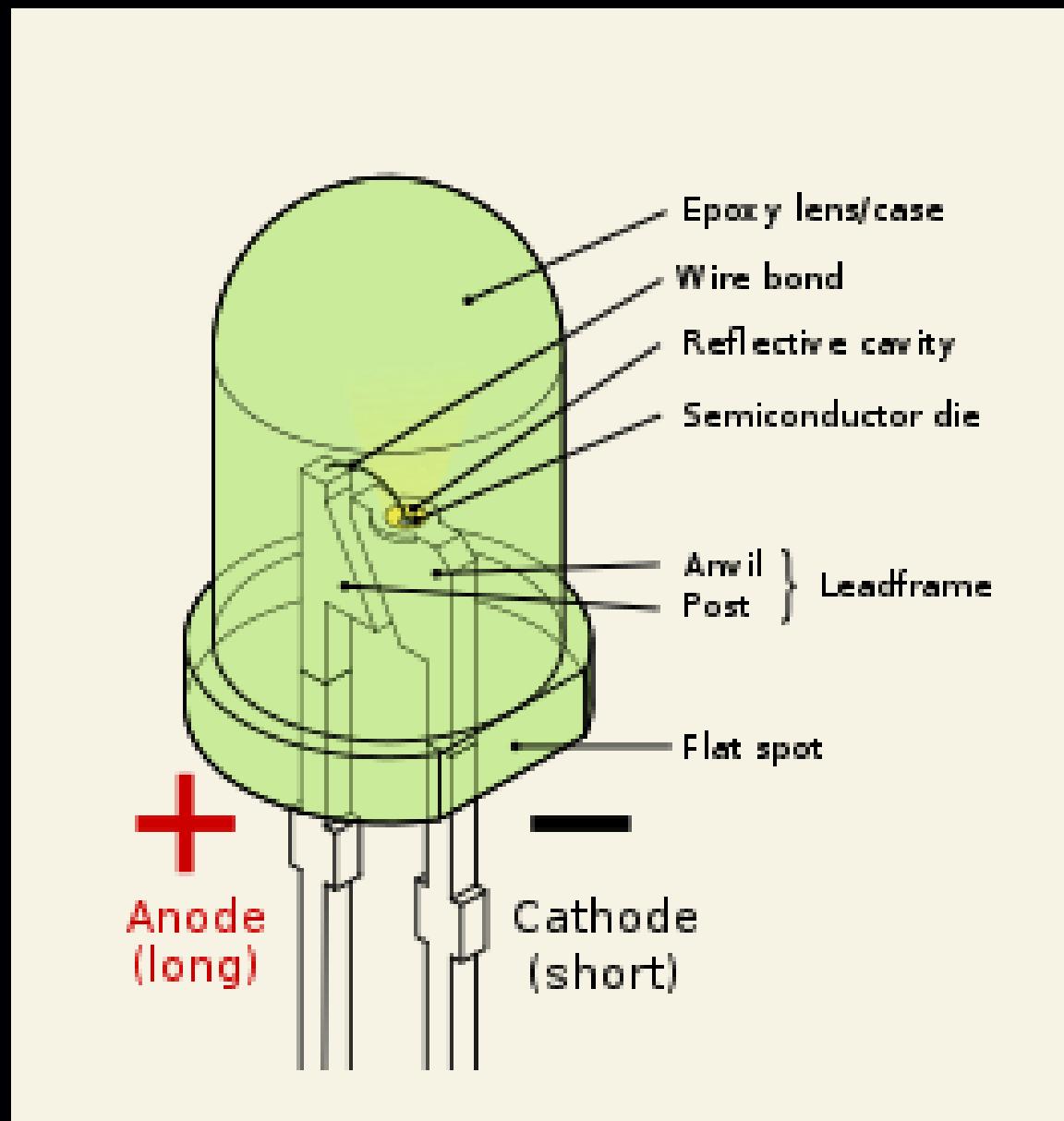


# DIODES





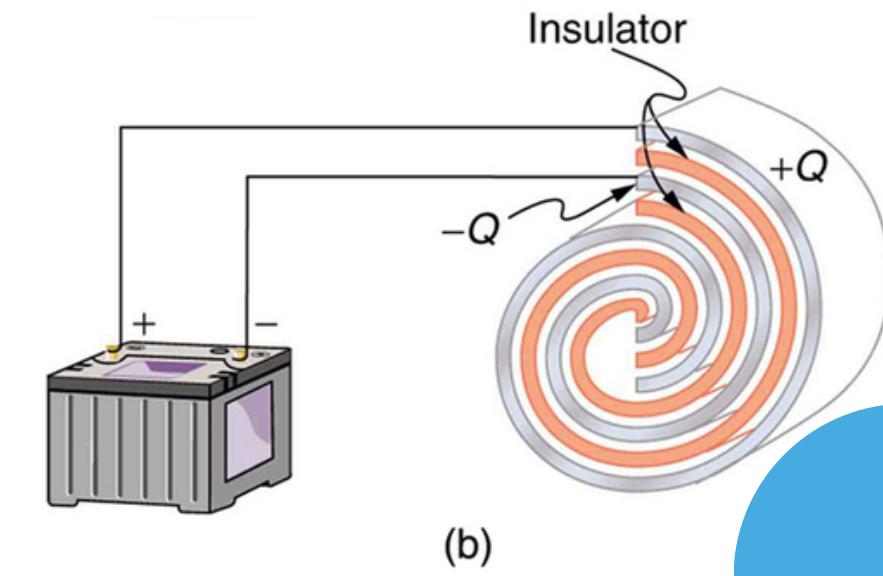
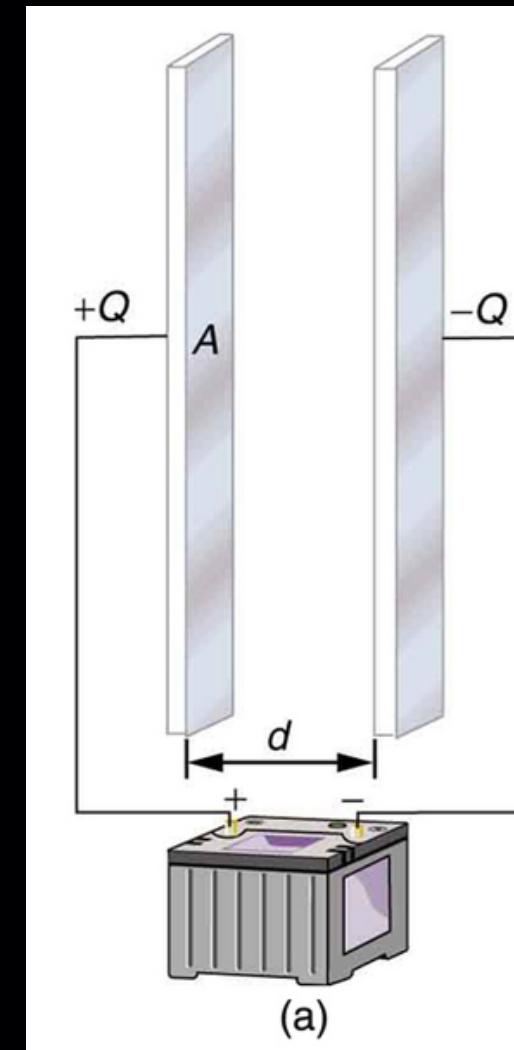
# LED





# CAPACITORS

- Device that stores Electric Charge.
- Measured in the value of Capacitance  $Q(\text{charge})=C(\text{capacitance})*V(\text{Voltage})$ .
- Construction Consists of dielectric material between two conducting materials.
- Figure (a) is a parallel plate capacitor.
- Figure (b) has rolled plates.
- Can act as both sink and source.





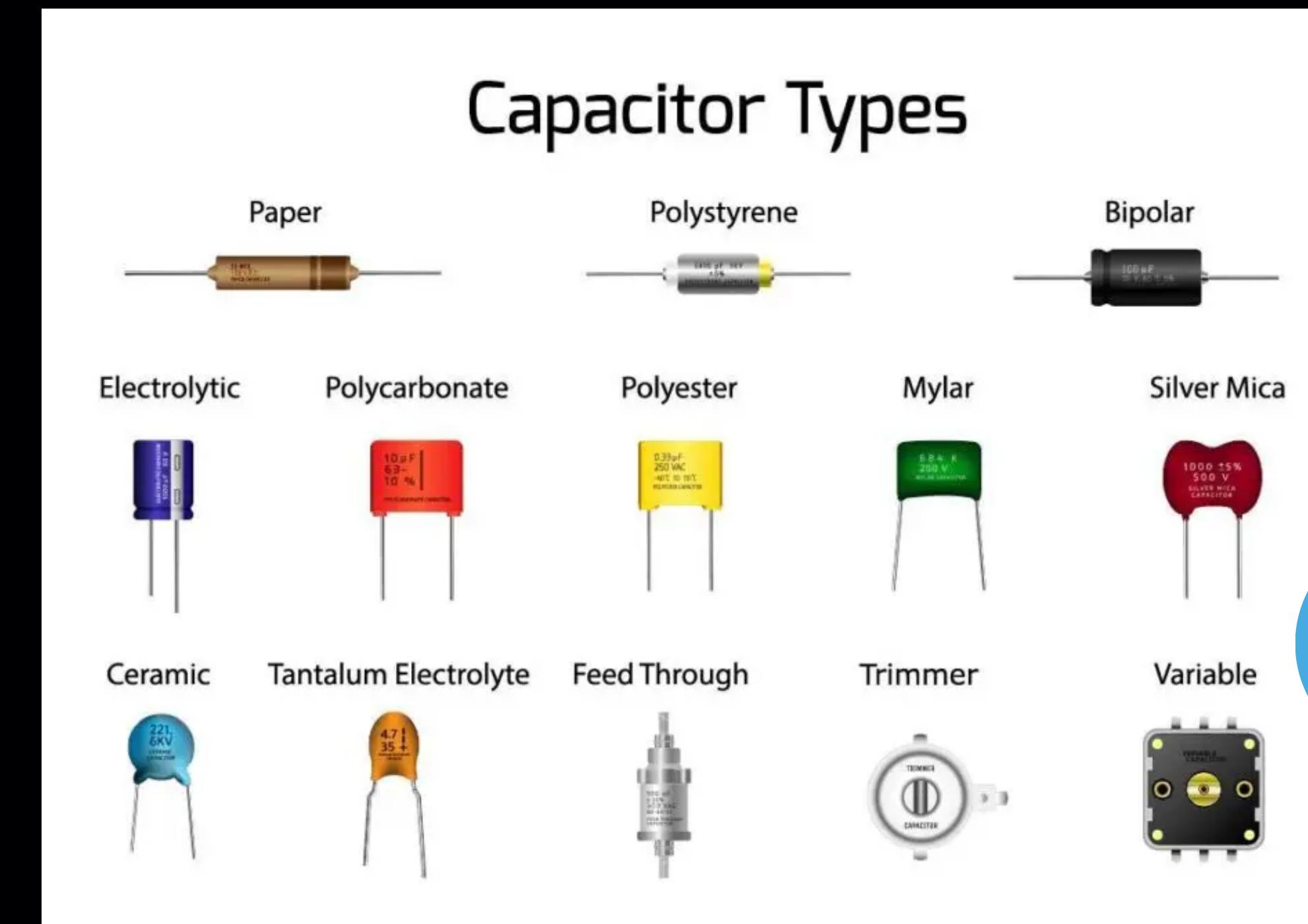
# TYPES OF CAPACITOR

## Based on Polarity.

- Polar
- Non-Polar

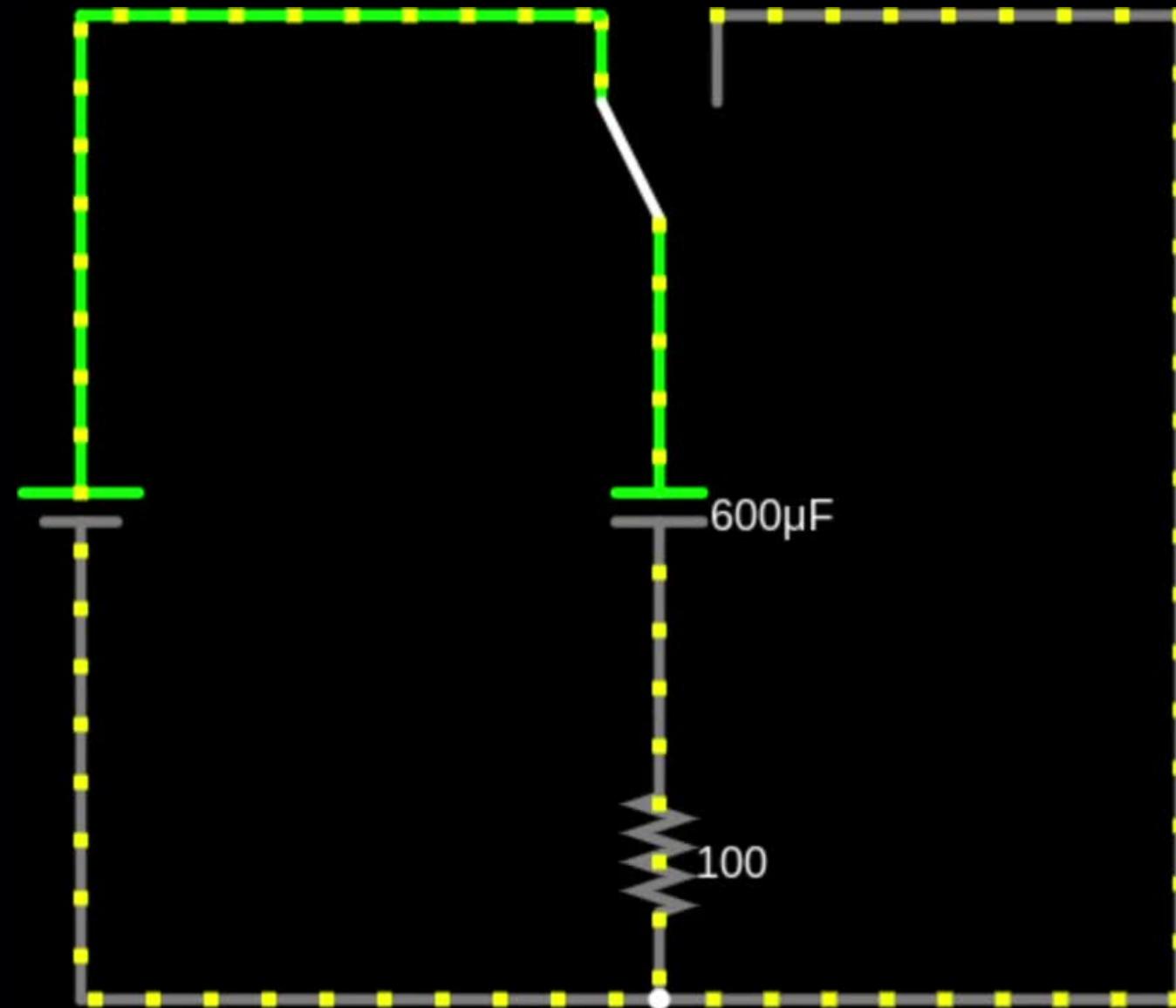
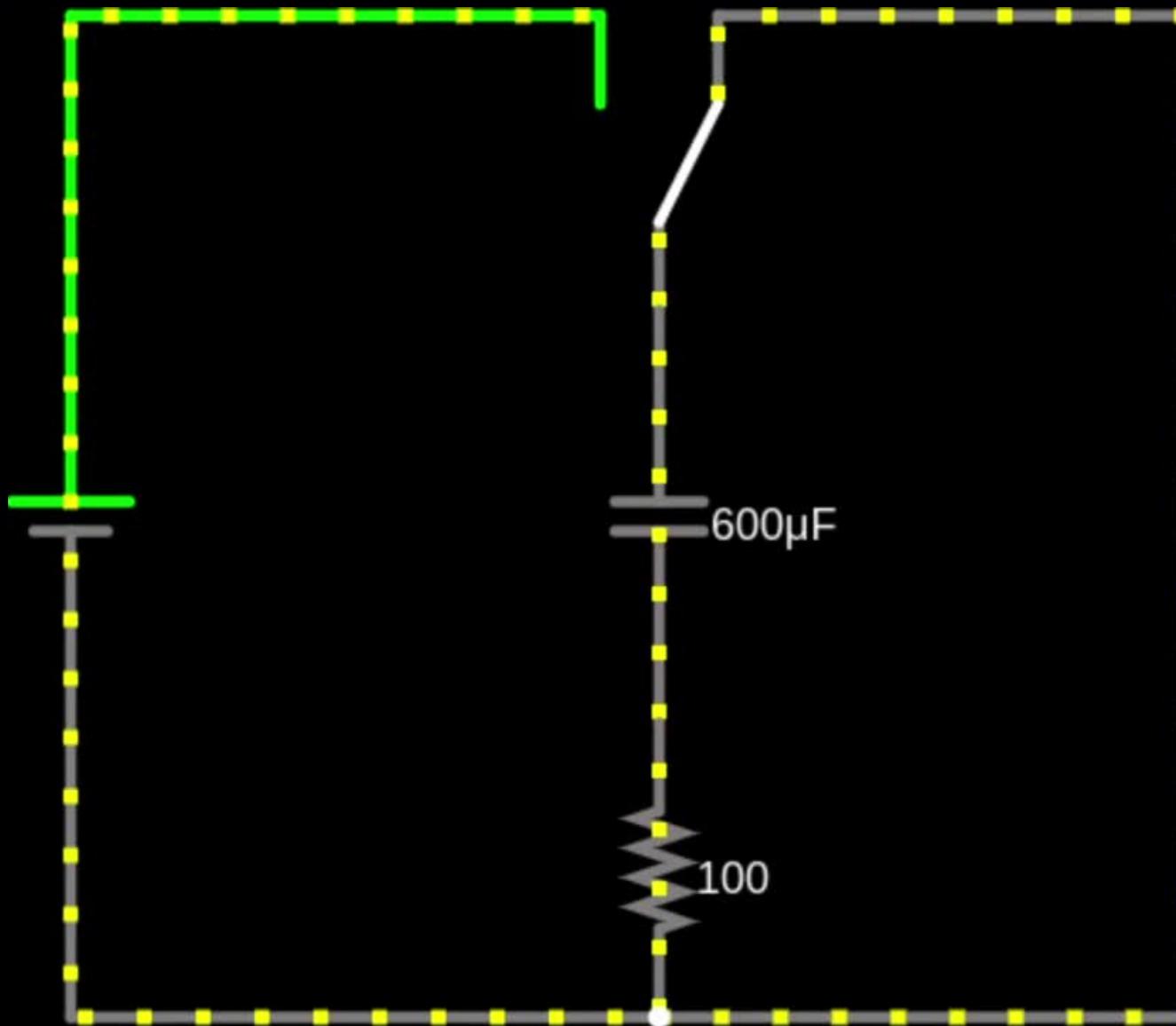
## Based on Dielectric.

- Electrolytic
- Ceramic
- Tantalum





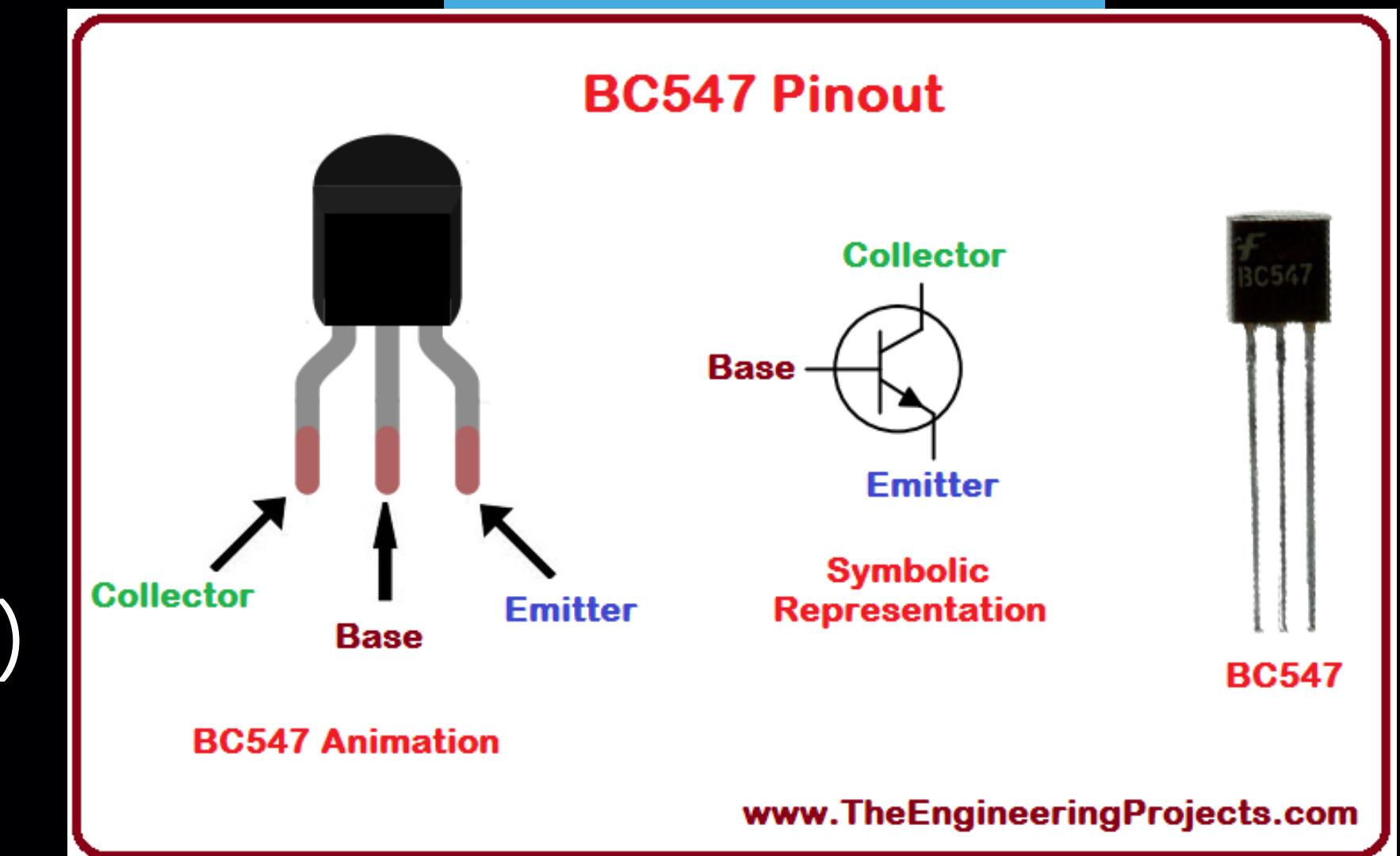
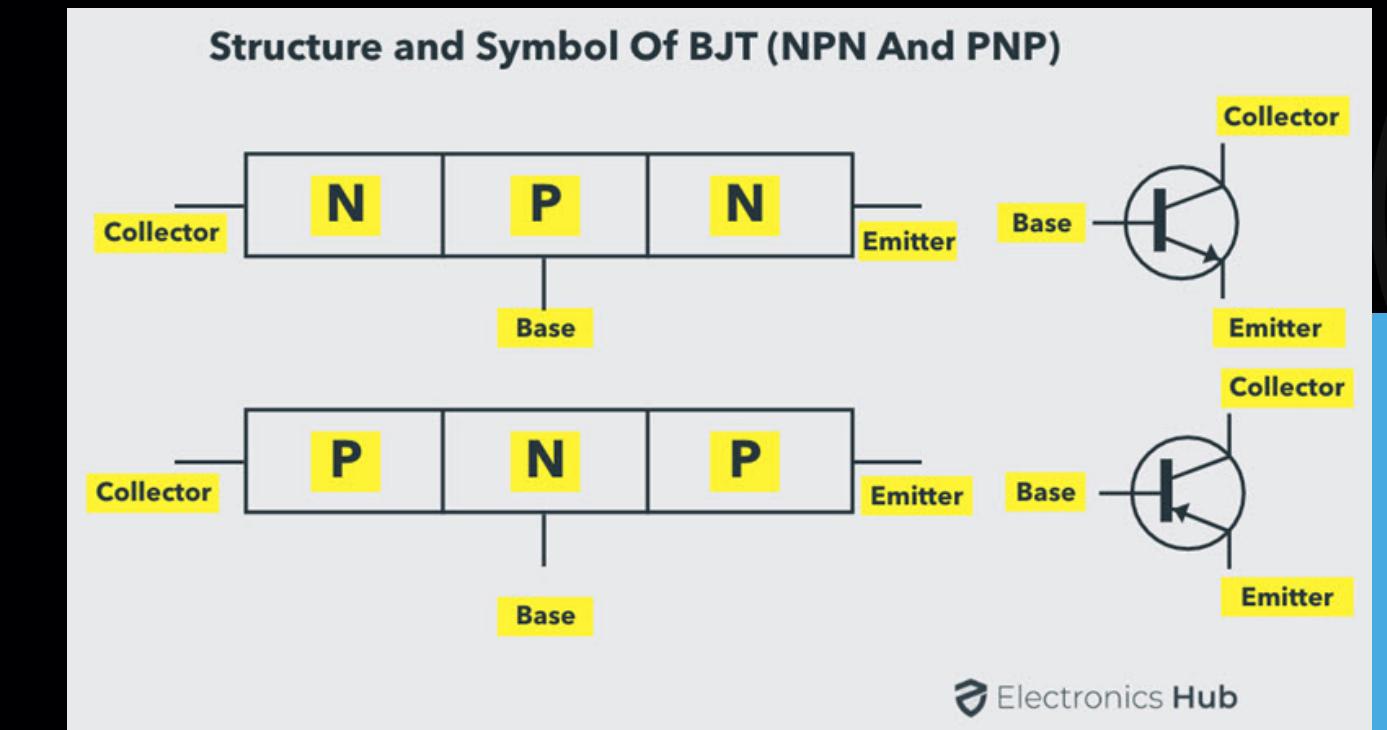
# CHARGING AND DISCHARGING A CAPACITOR

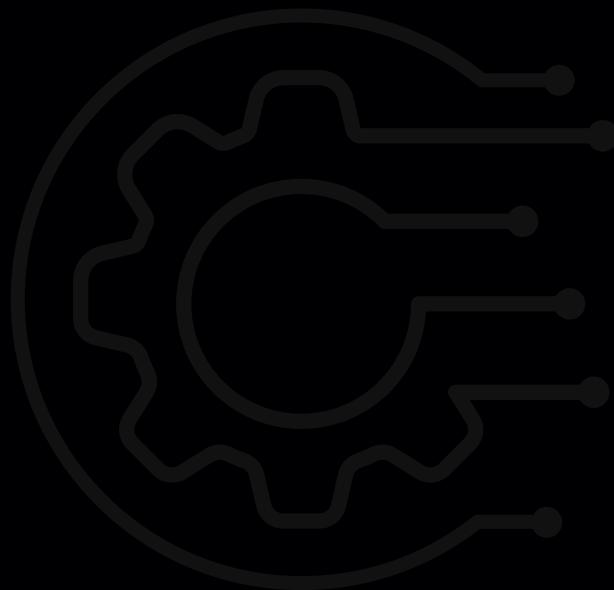




# TRANSISTOR

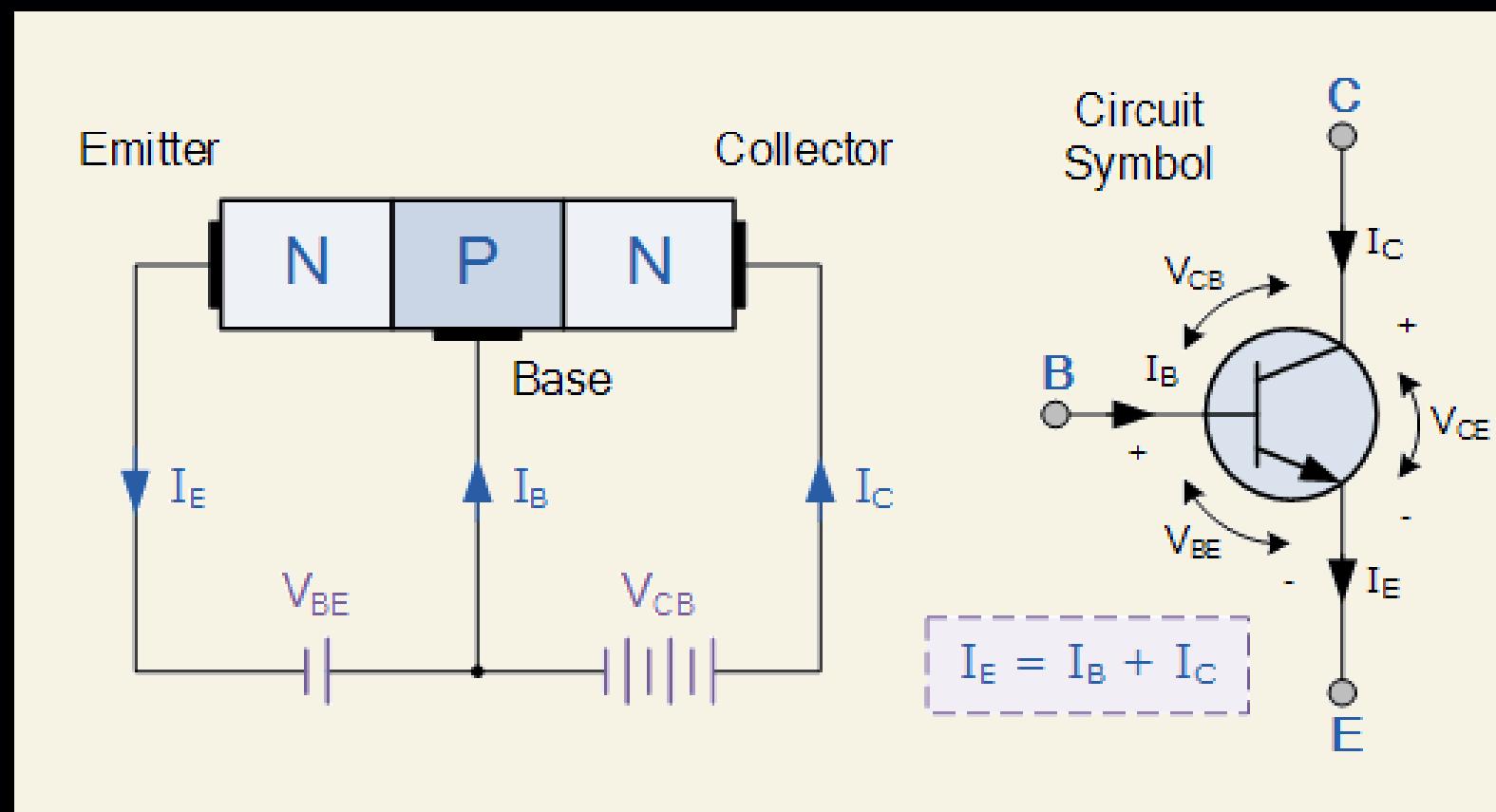
- 3-Terminal Device
- Active Device of the circuit.
- Can work as an amplifier.
- Can work as a switch.
- Two types:
  - Bipolar Junction Transistor(BJT)
  - Field Effect Transistor(FET)



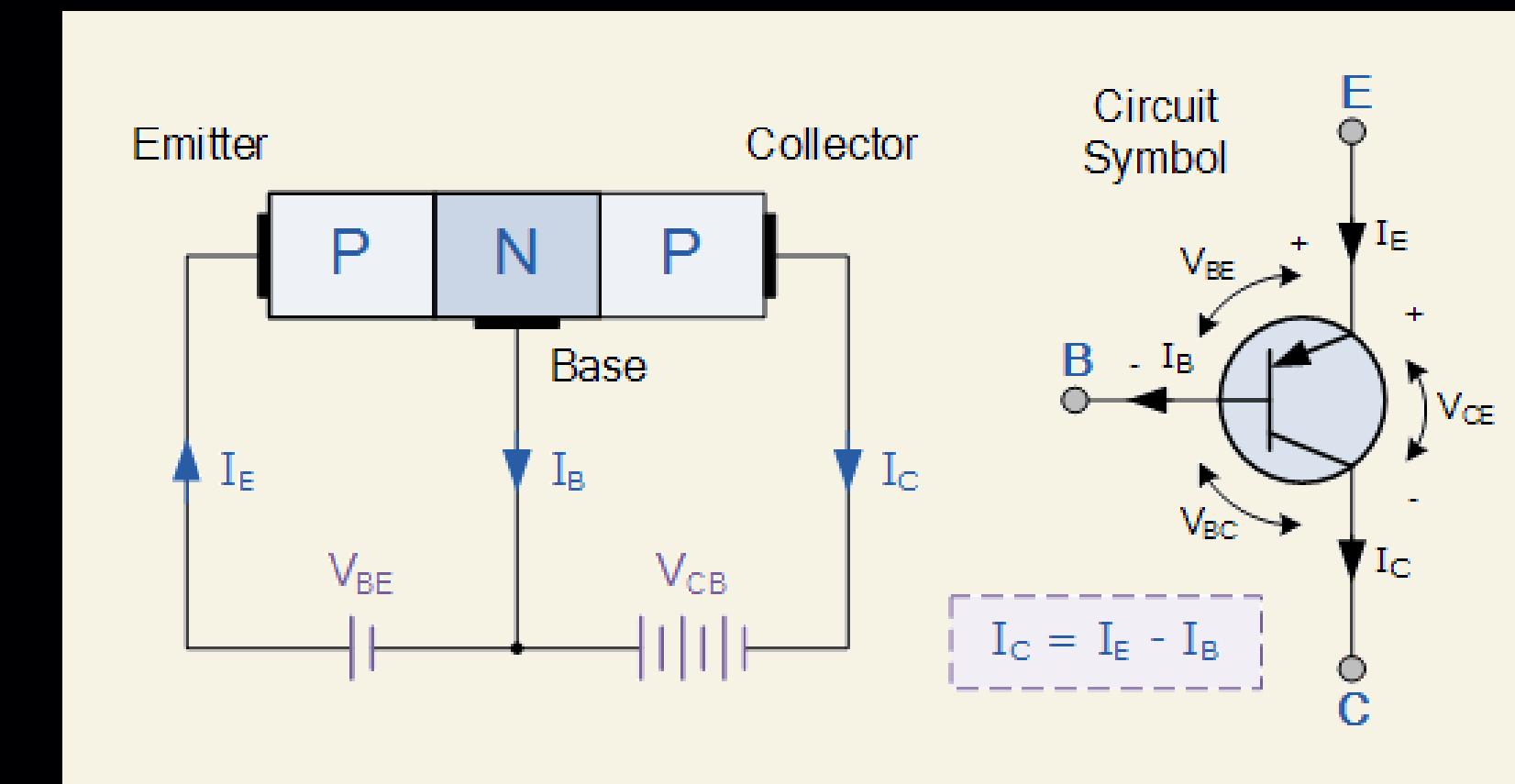


# TRANSISTOR

## NPN

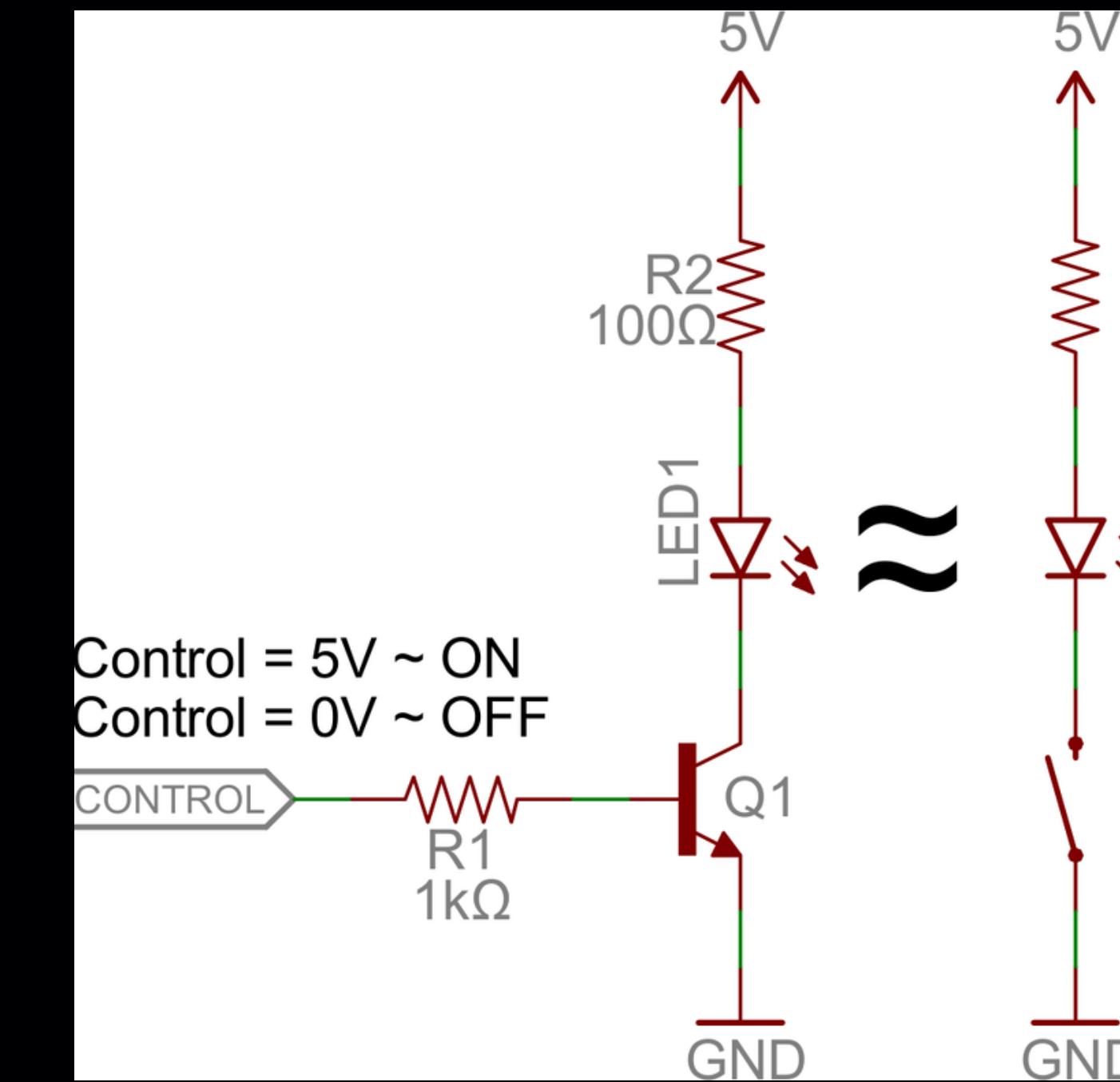
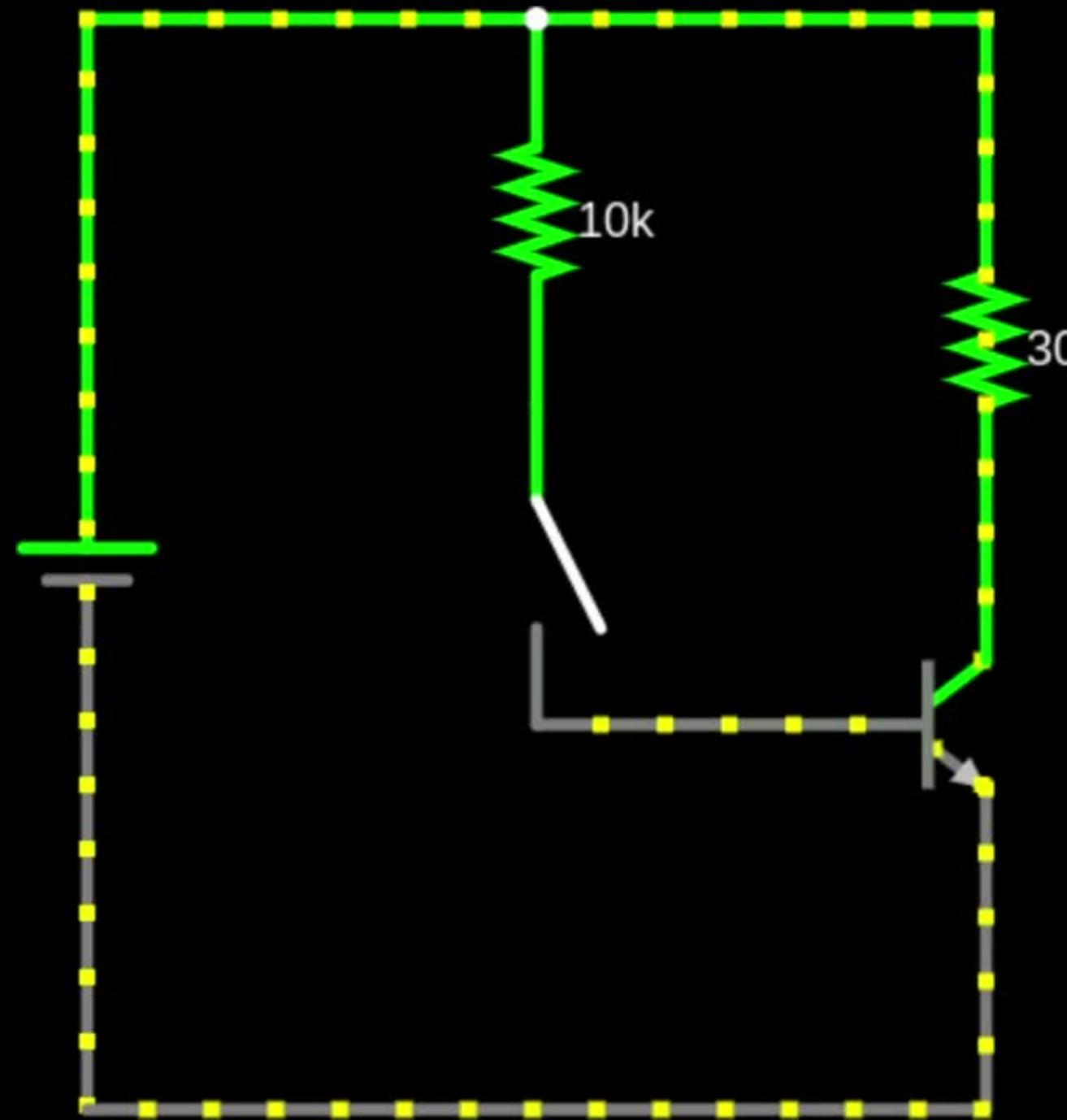


## PNP



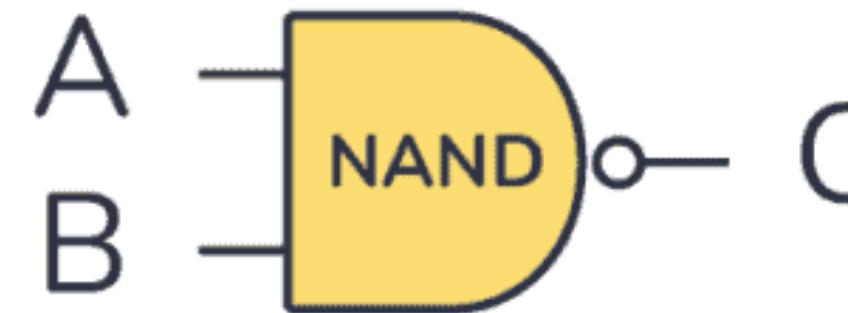


# TRANSISTOR AS A SWITCH

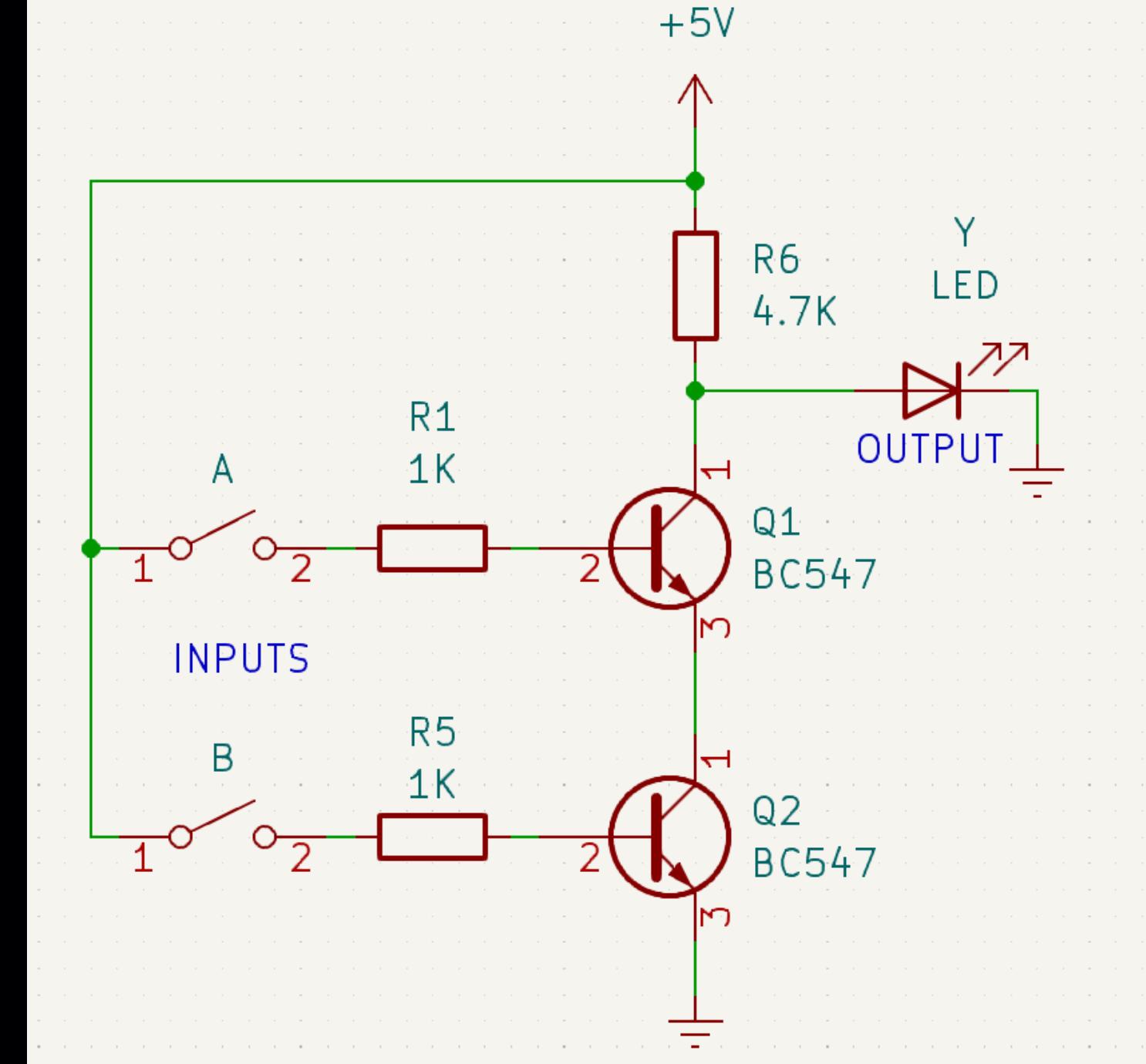




# LOGIC GATES USING TRANSISTOR



A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

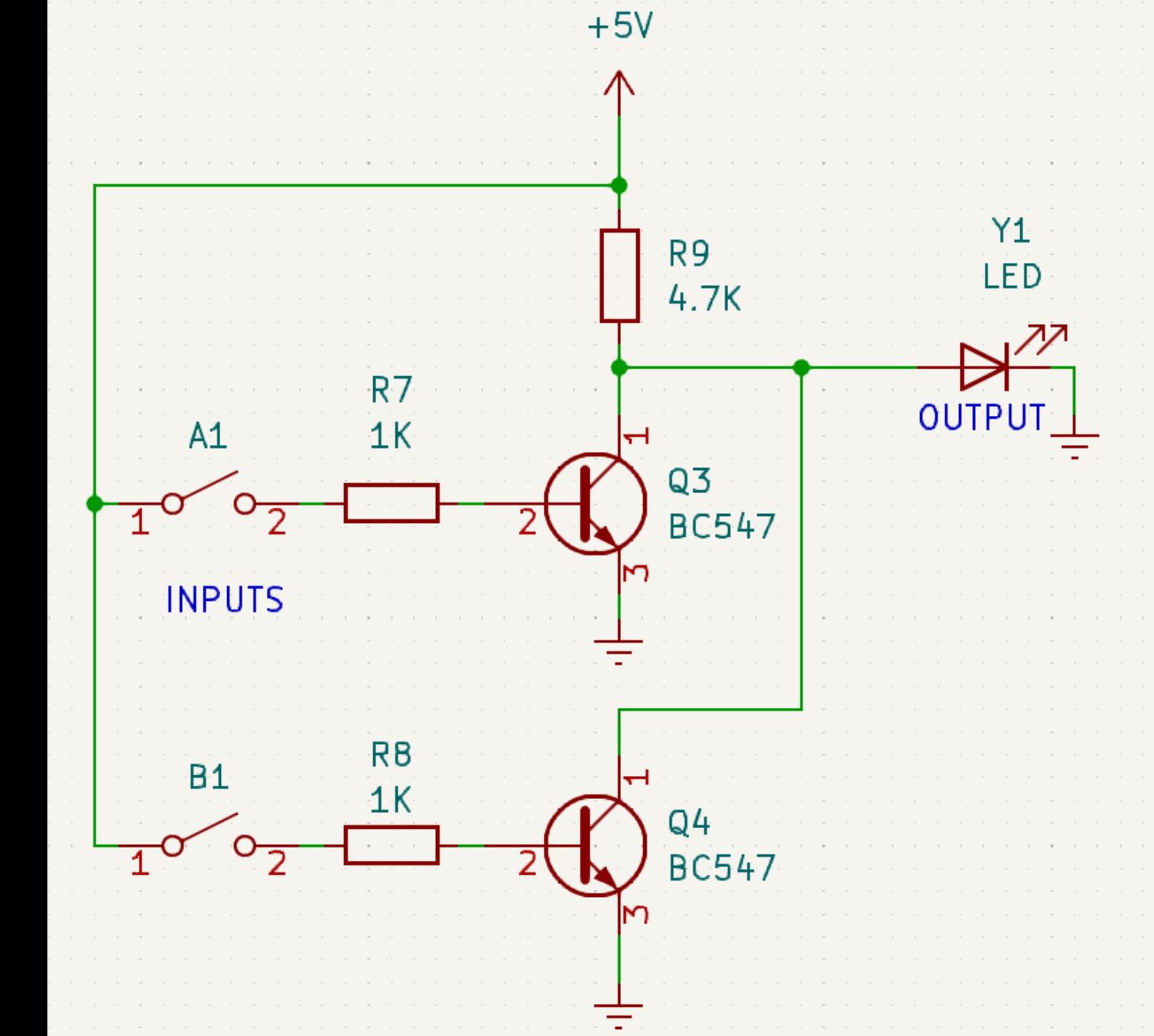




# LOGIC GATES USING TRANSISTOR



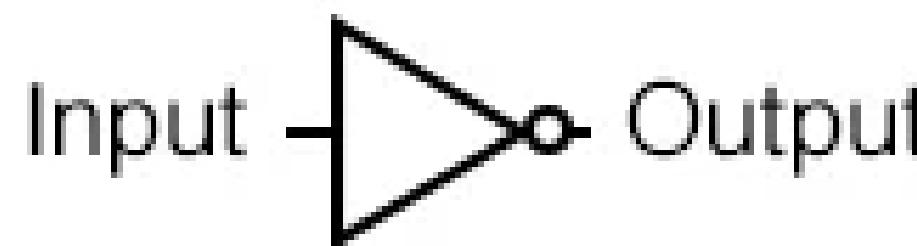
A	B	Q
0	0	1
0	1	0
1	0	0
1	1	0



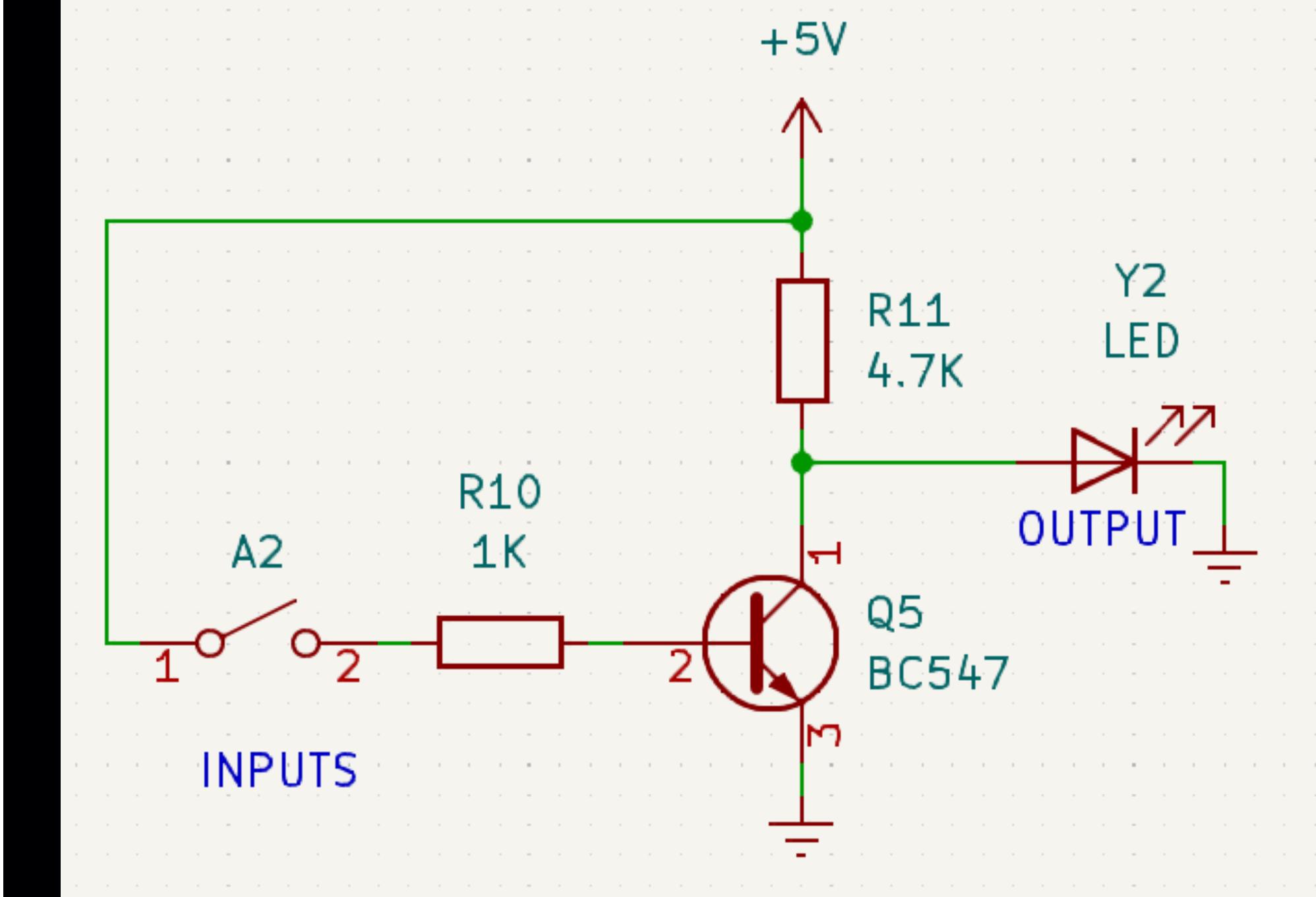


# LOGIC GATES USING TRANSISTOR

NOT gate truth table

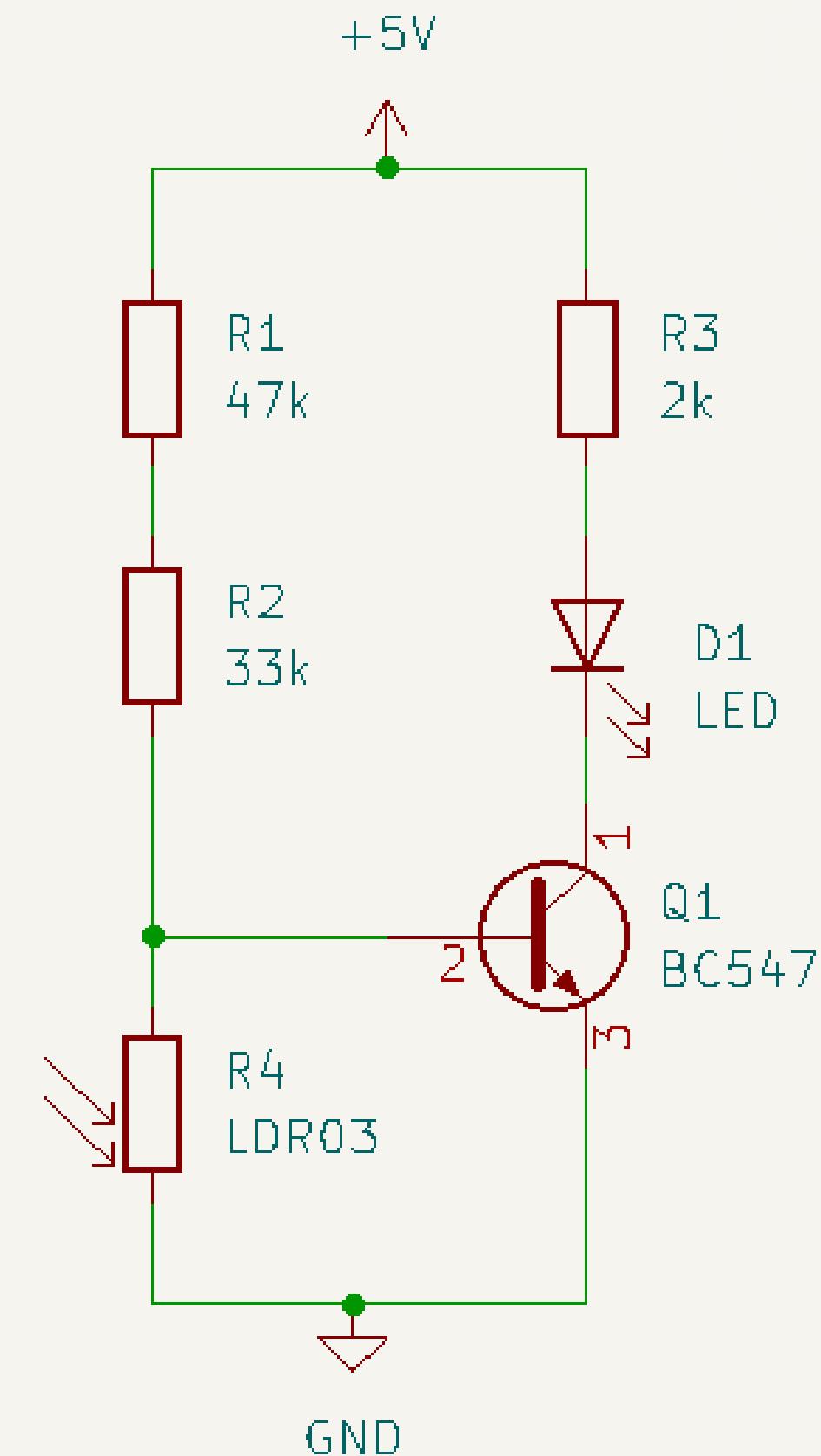


Input	Output
0	1
1	0





# APPLICATION OF LDR



THANK YOU

