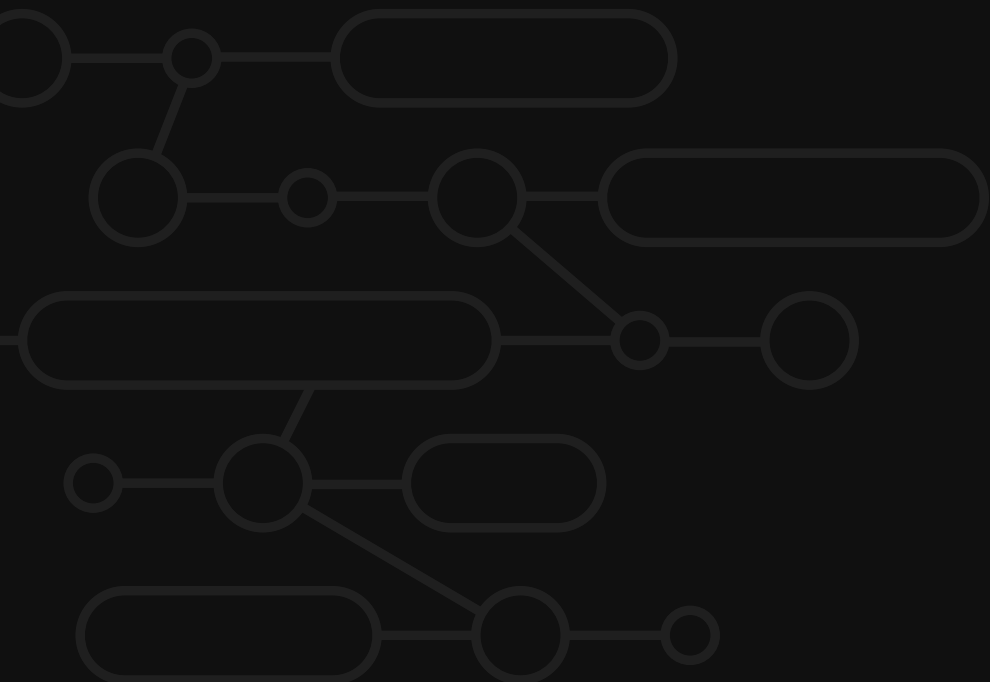




DAY 1:

ROBOCAMP

B A S I C C I R C U I T S

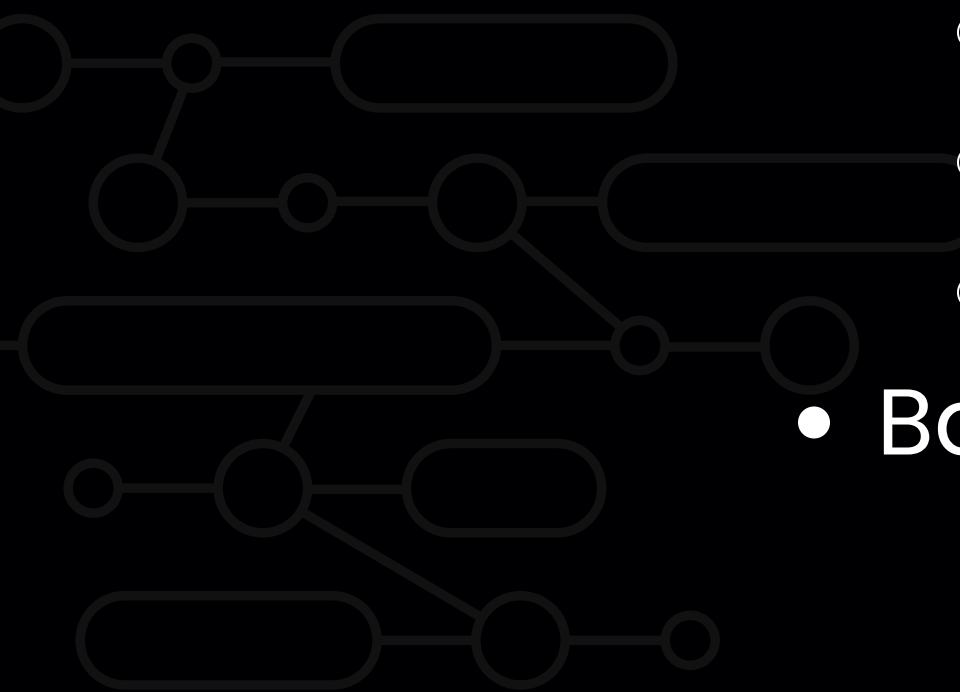




BASIC CIRCUITS



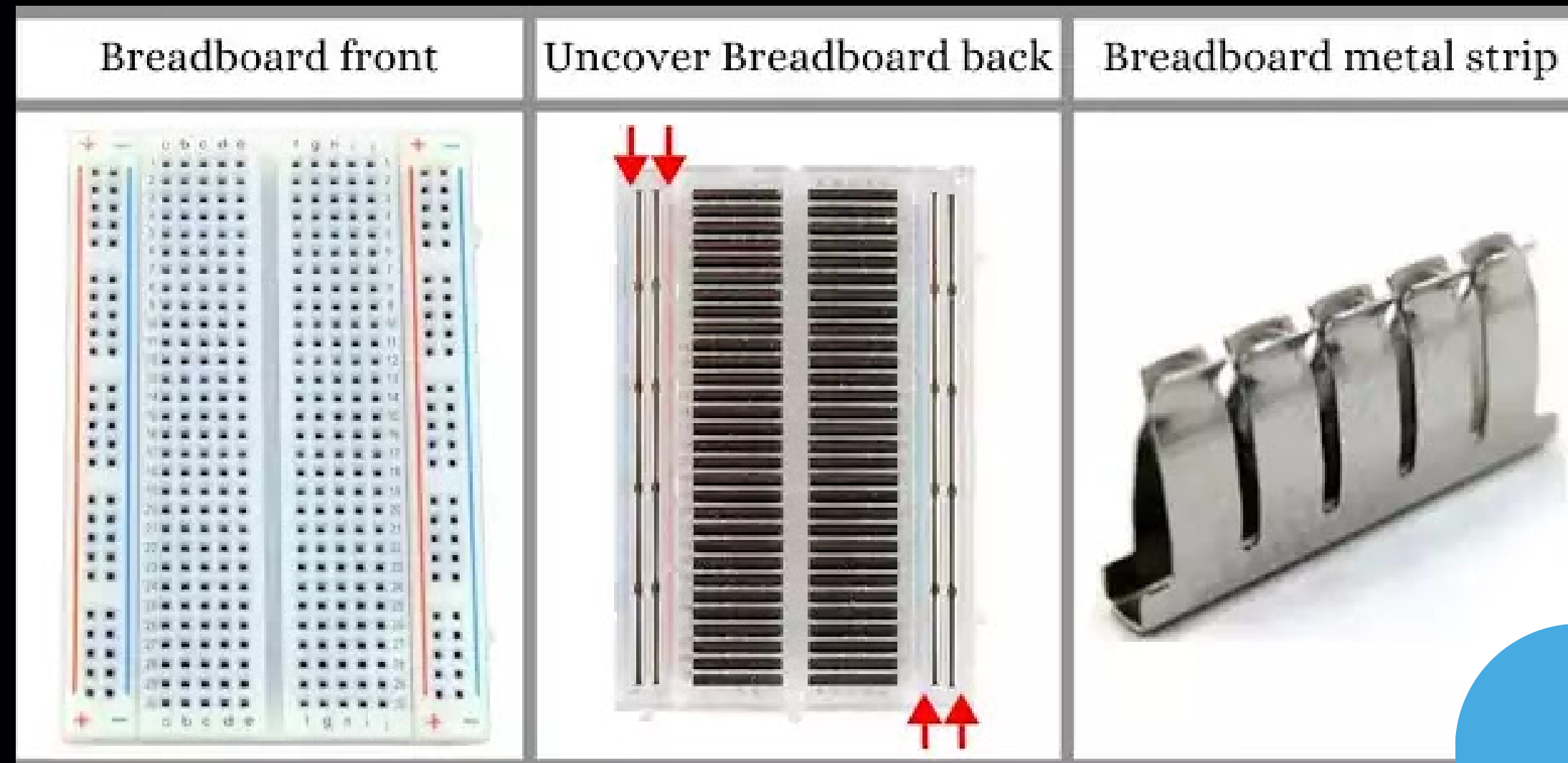
- Breadboarding
- Basic Components
 - Resistors
 - Capacitors
 - Diodes
 - LED
 - LDR
 - Transistors
- Basic Logic Gates using Transistors





BREADBOARDING

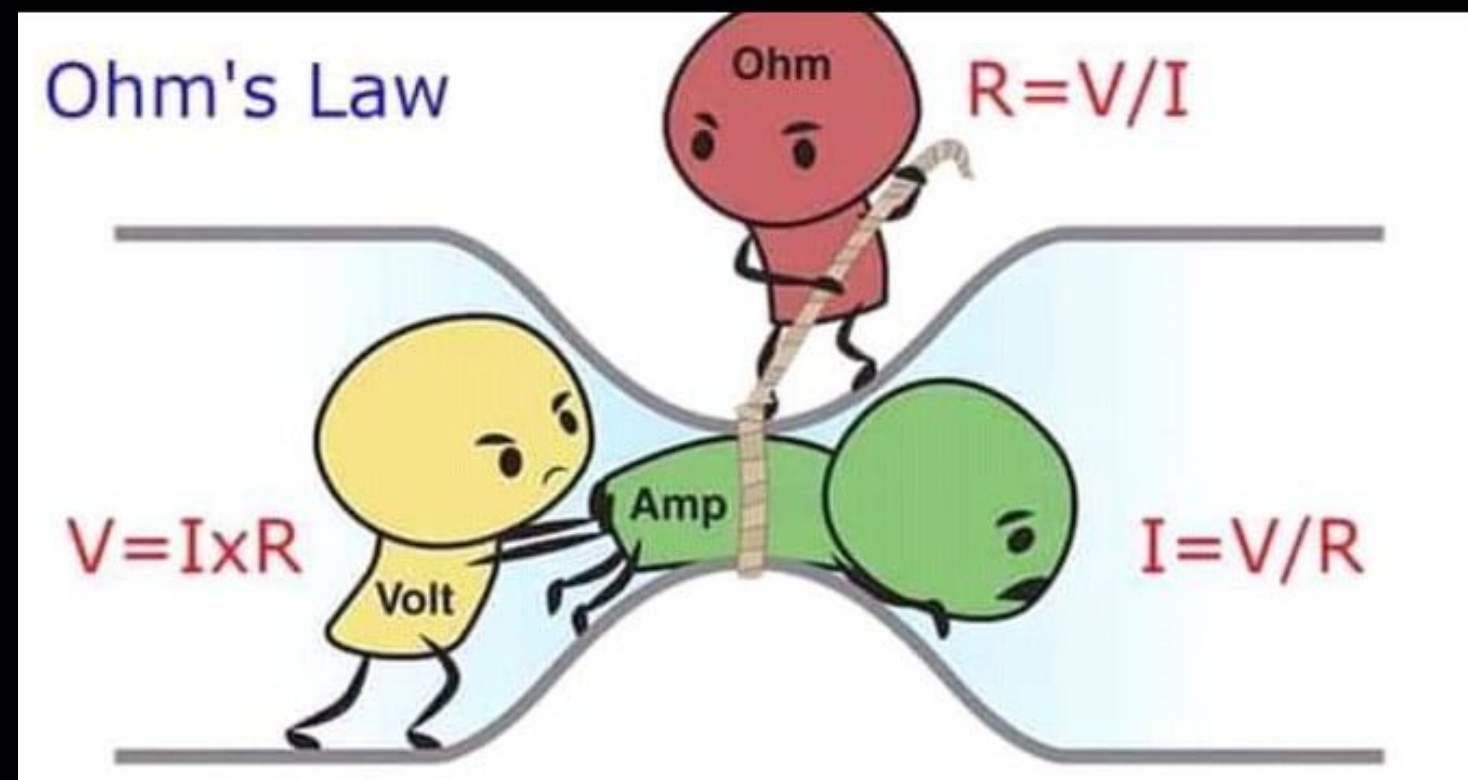
- Used for rapid Prototyping
- Quick Construction of Circuit
- Saves Cost and Time





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



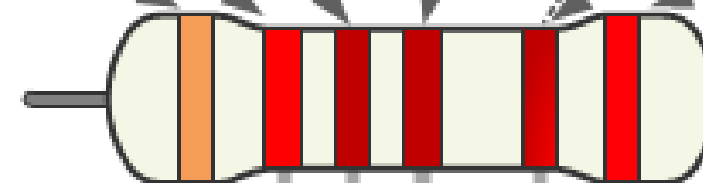


RESISTORS

www.resistorguide.com

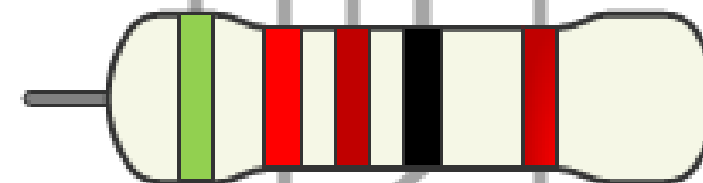
	Color	Significant figures			Multiply	Tolerance (%)	Temp. Coeff. (ppm/K)	Fail Rate (%)
Bad	black	0	0	0	x 1		250 (U)	
Beer	brown	1	1	1	x 10	1 (F)	100 (S)	1
Rots	red	2	2	2	x 100	2 (G)	50 (R)	0.1
Our	orange	3	3	3	x 1K		15 (P)	0.01
Young	yellow	4	4	4	x 10K		25 (Q)	0.001
Guts	green	5	5	5	x 100K	0.5 (D)	20 (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			3th digit only for 5 and 6 bands	x 0.1	5 (J)		
Some	silver				x 0.01	10 (K)		
Now!	none					20 (M)		

6 band



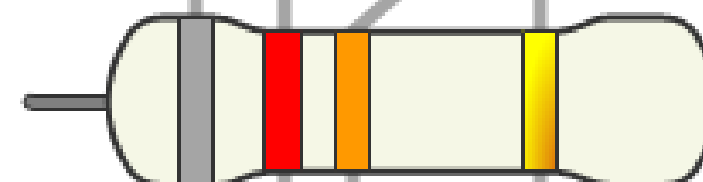
3.21k Ω 1% 50ppm/K

5 band



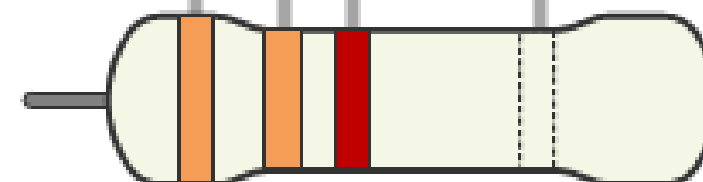
521 Ω 1%

4 band



82k Ω 5%

3 band



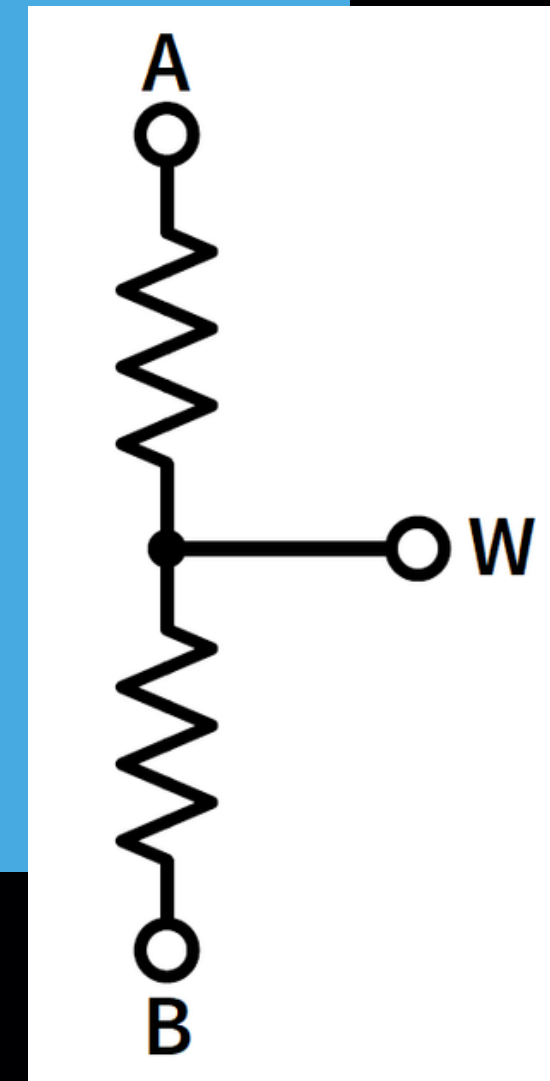
330 Ω 20%

gap between band 3 and 4
indicates reading direction



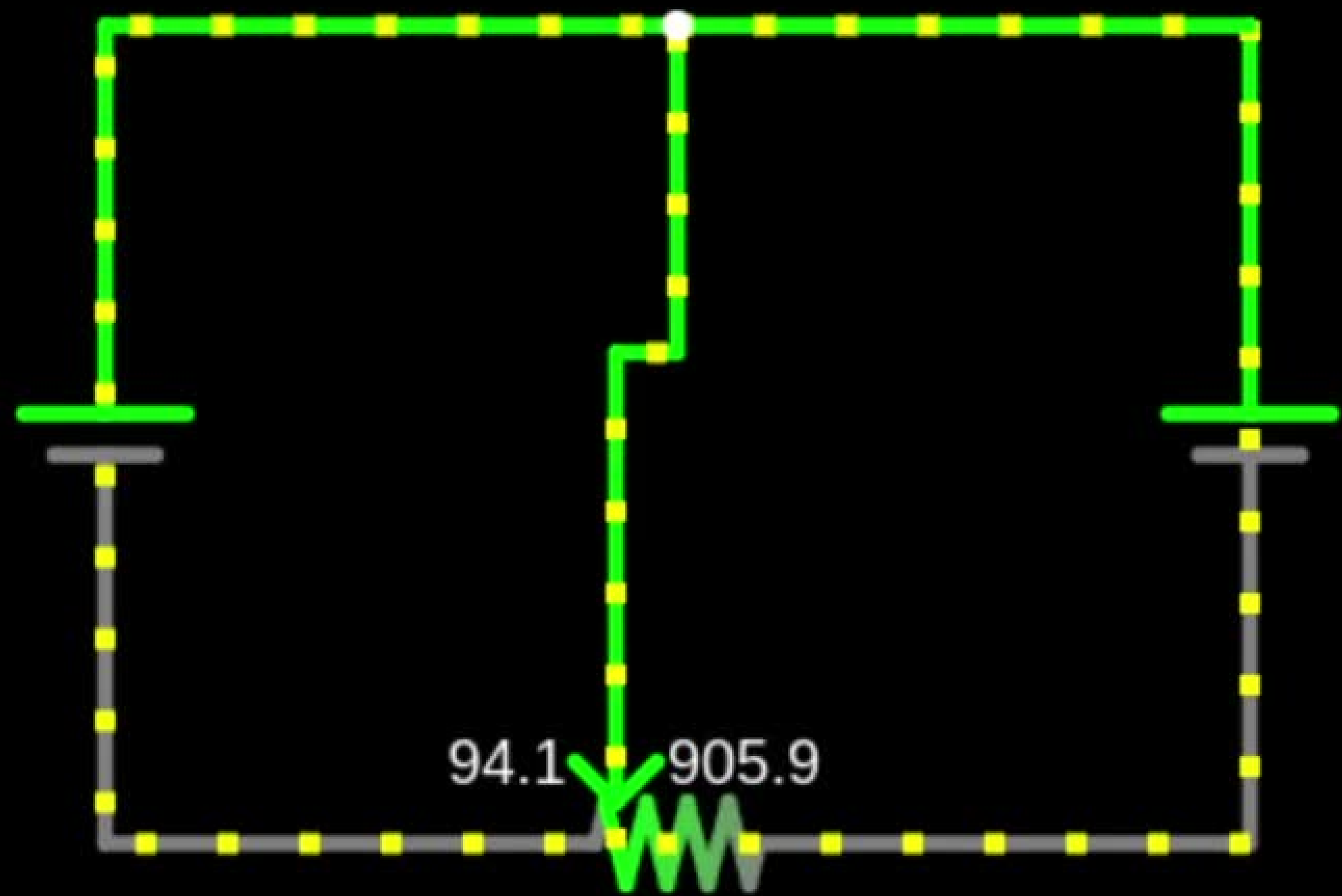
POTENTIOMETER

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





POTENTIOMETER

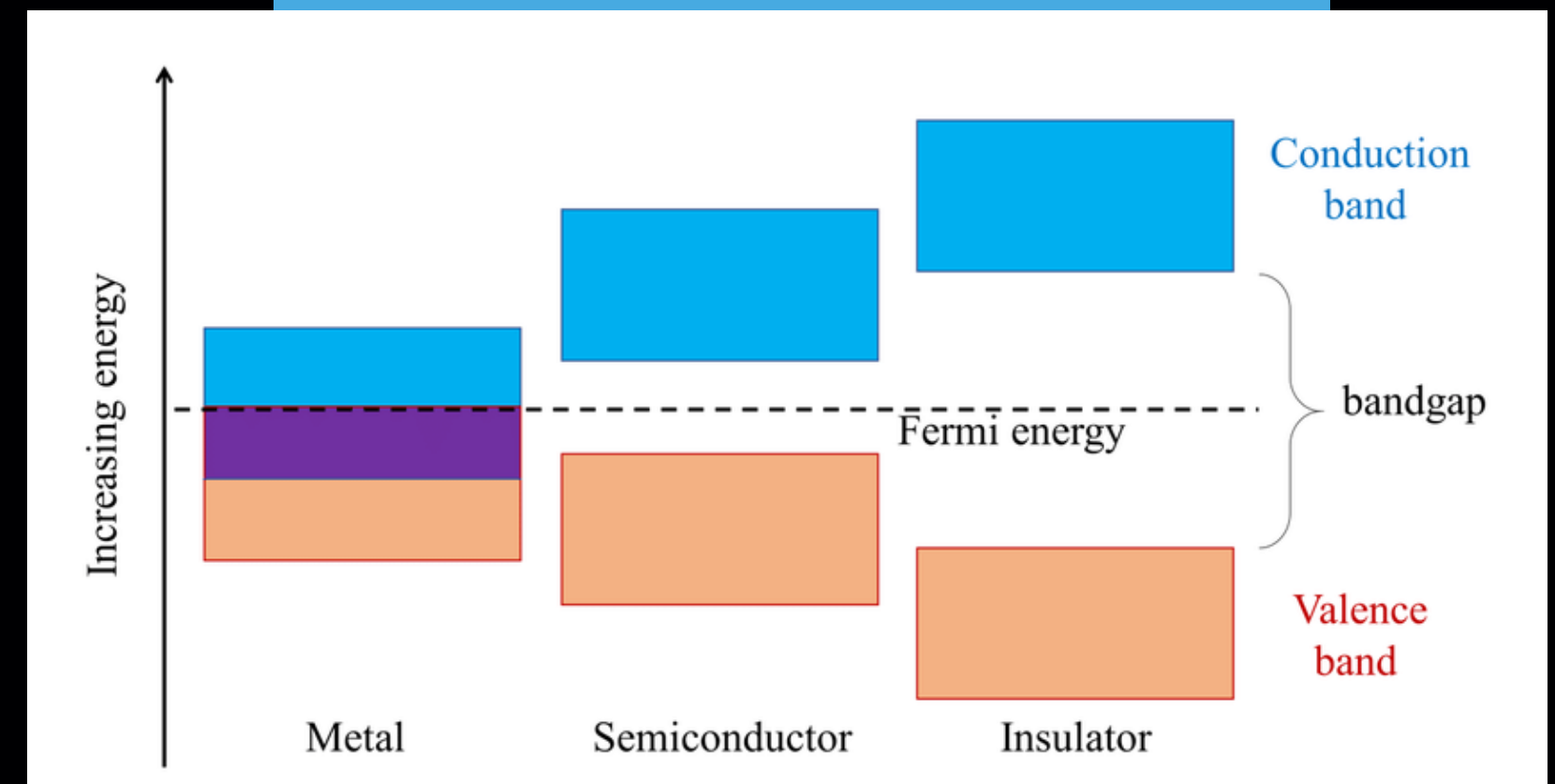
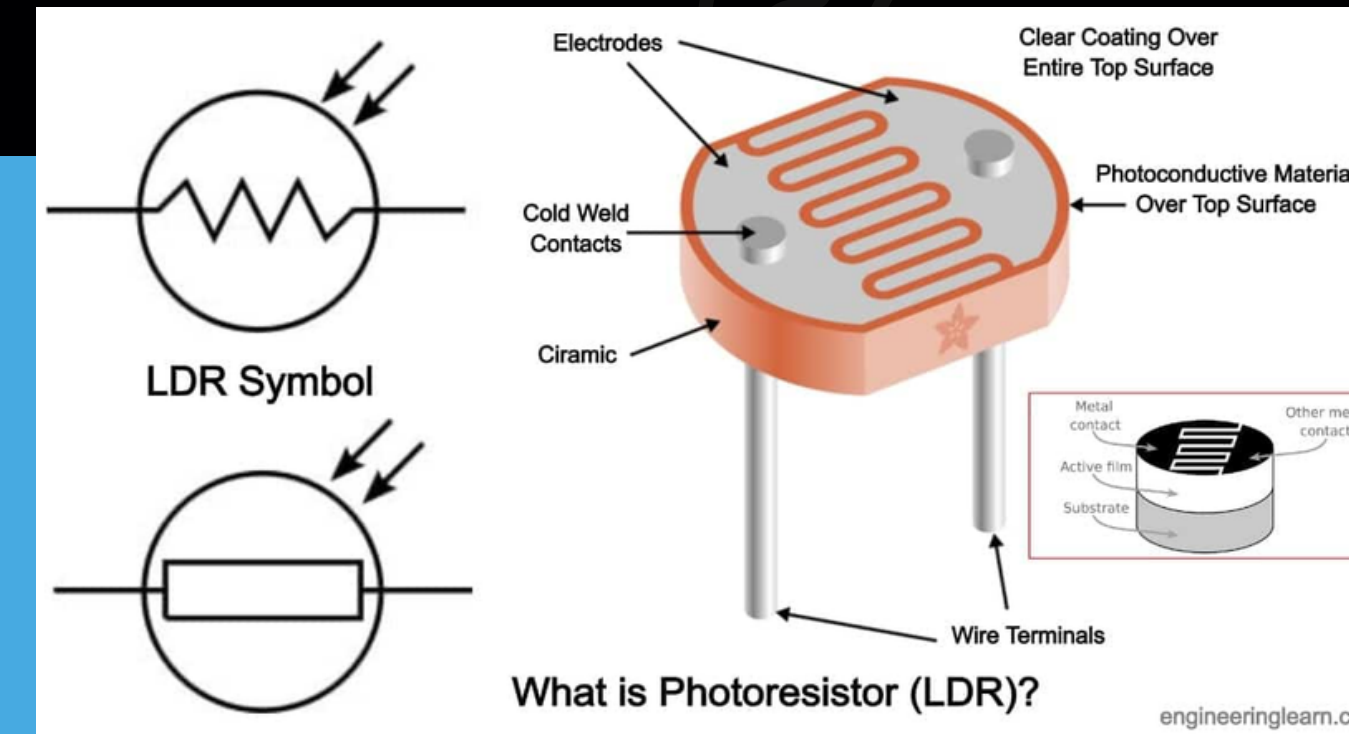


WIRING



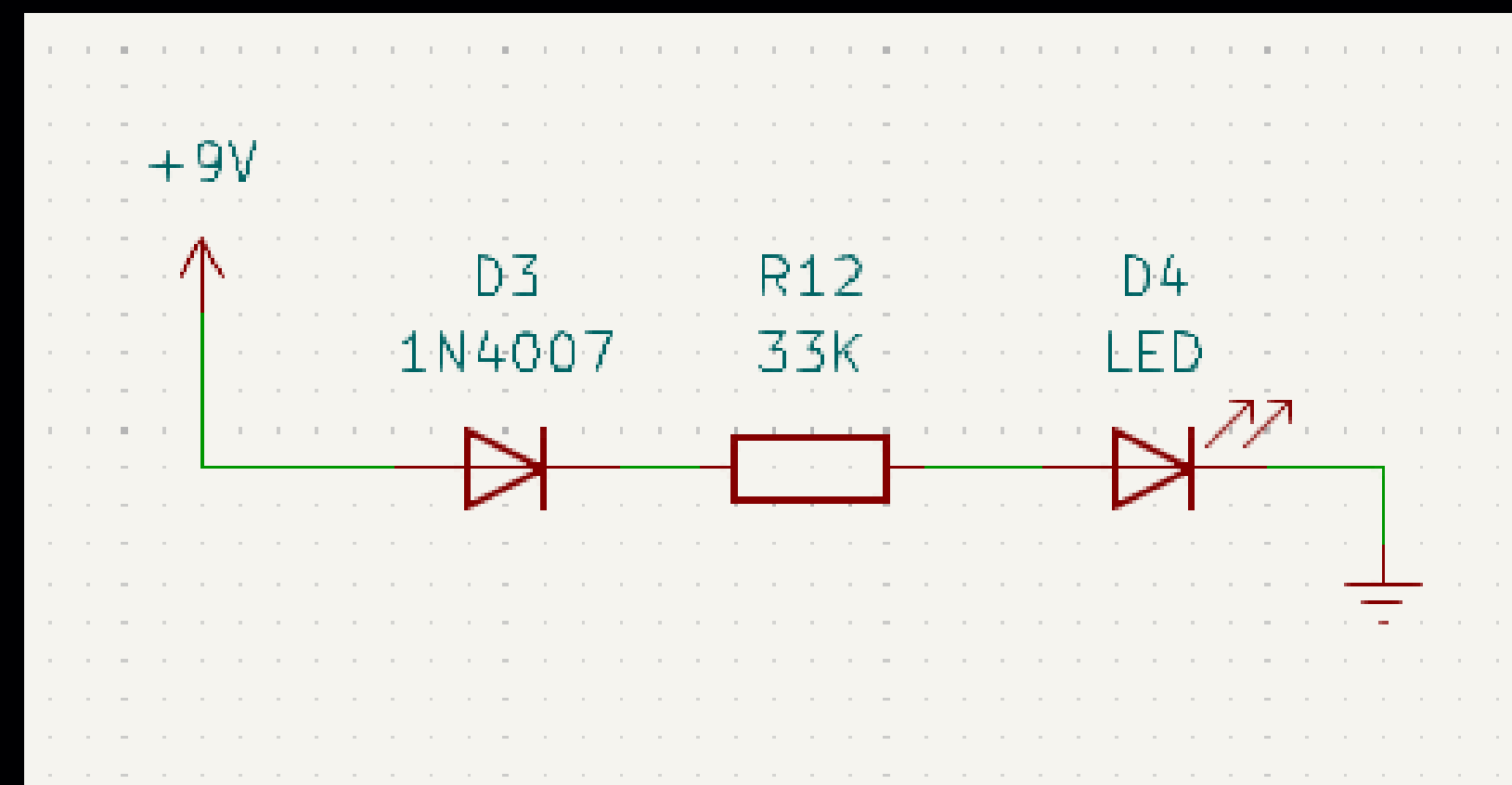
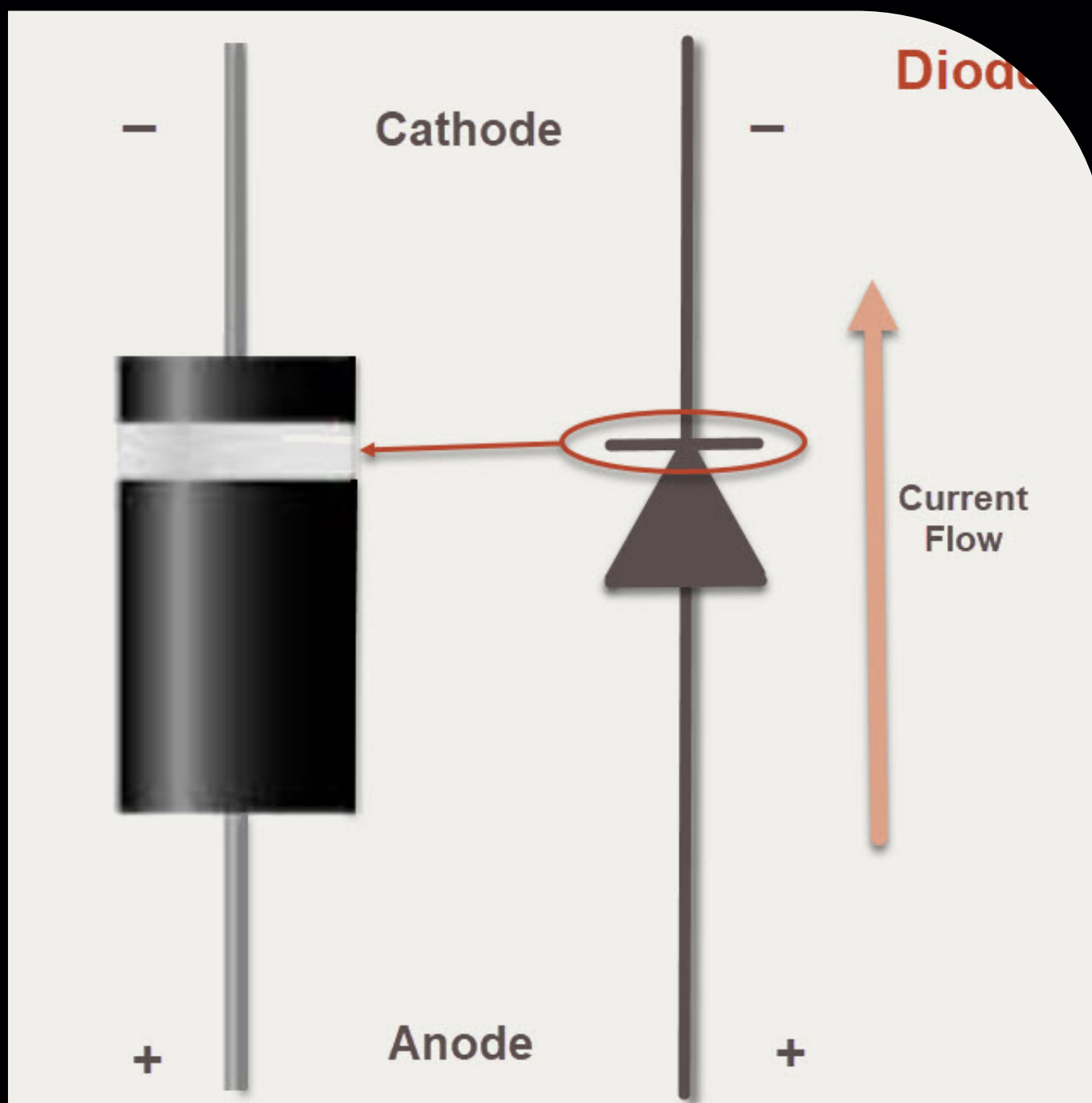
PHOTO RESISTORS (LDR)

- Light Dependent Resistors
- Two conducting electrodes 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



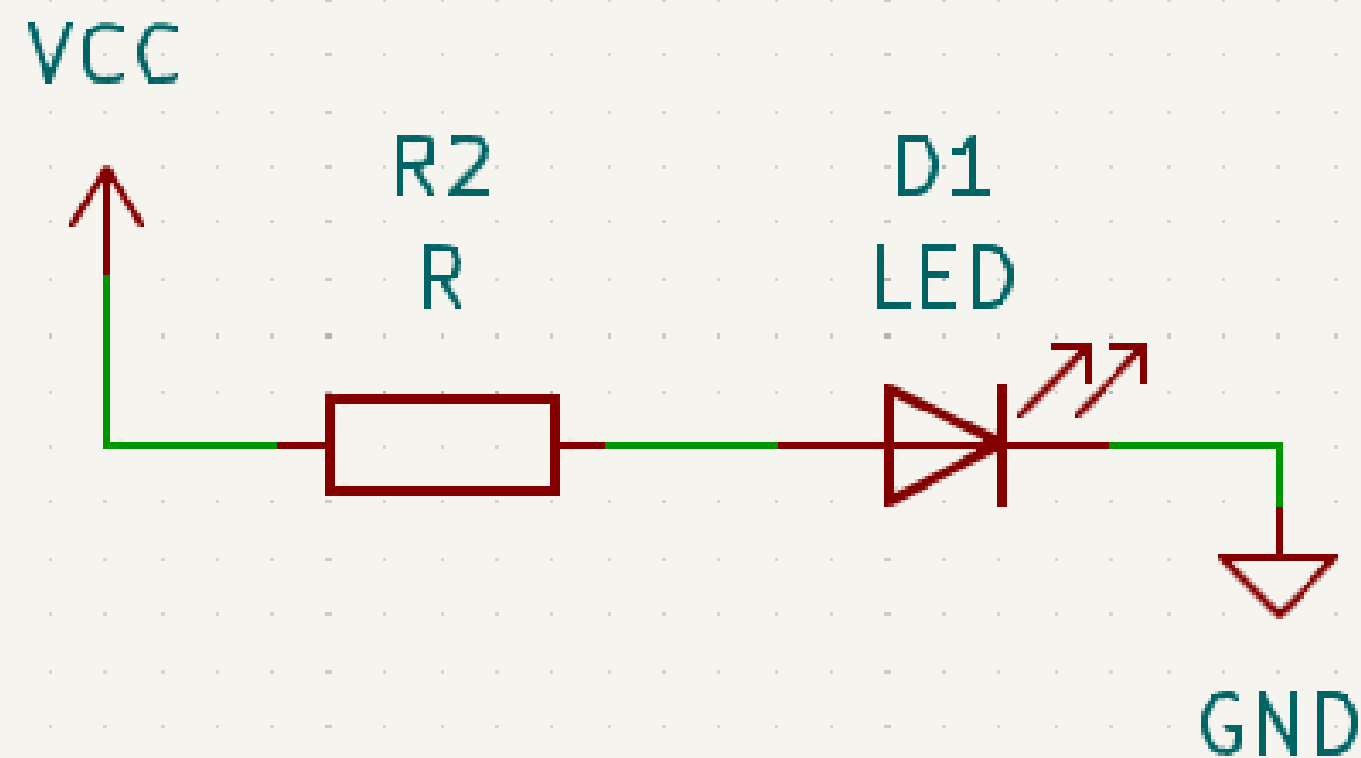
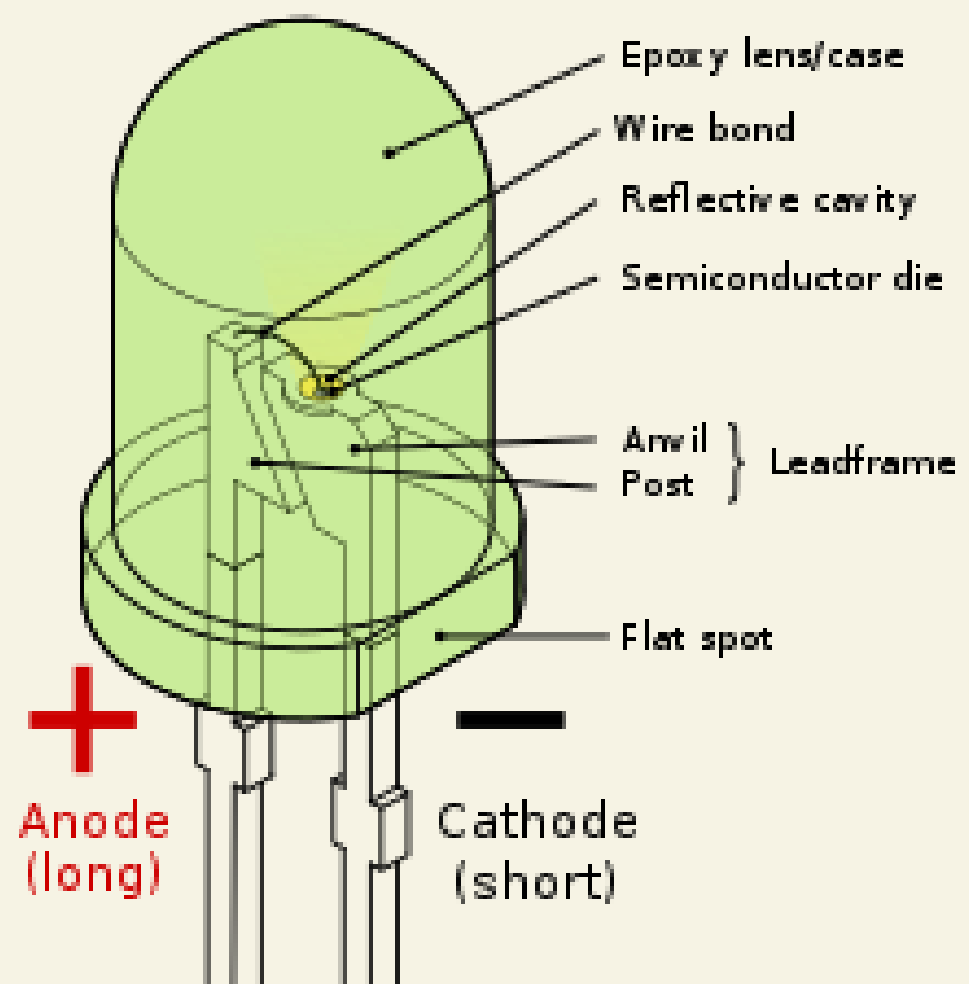


DIODES





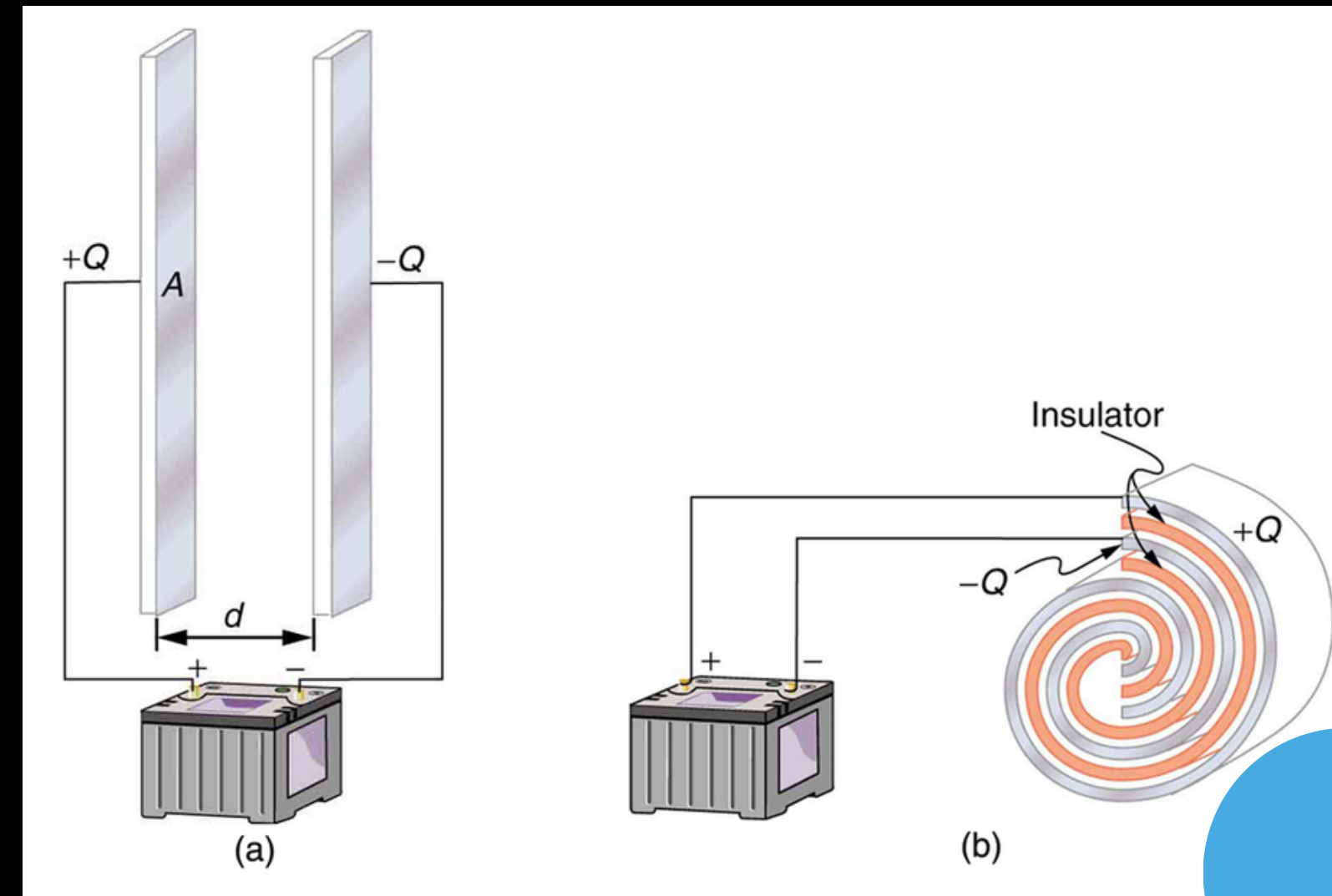
LED





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

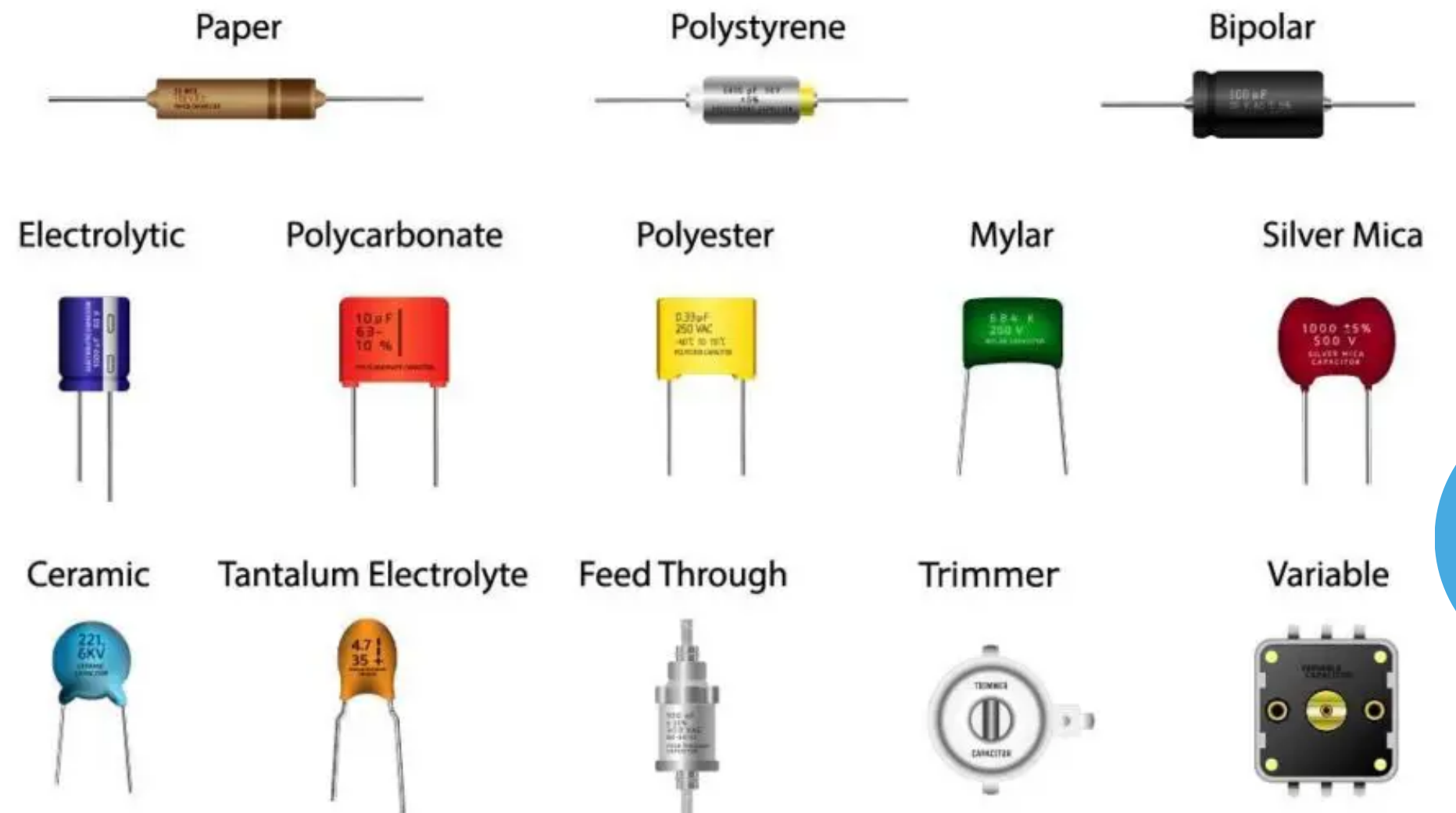
Based on Polarity.

- Polar
- Non-Polar

Based on Dielectric.

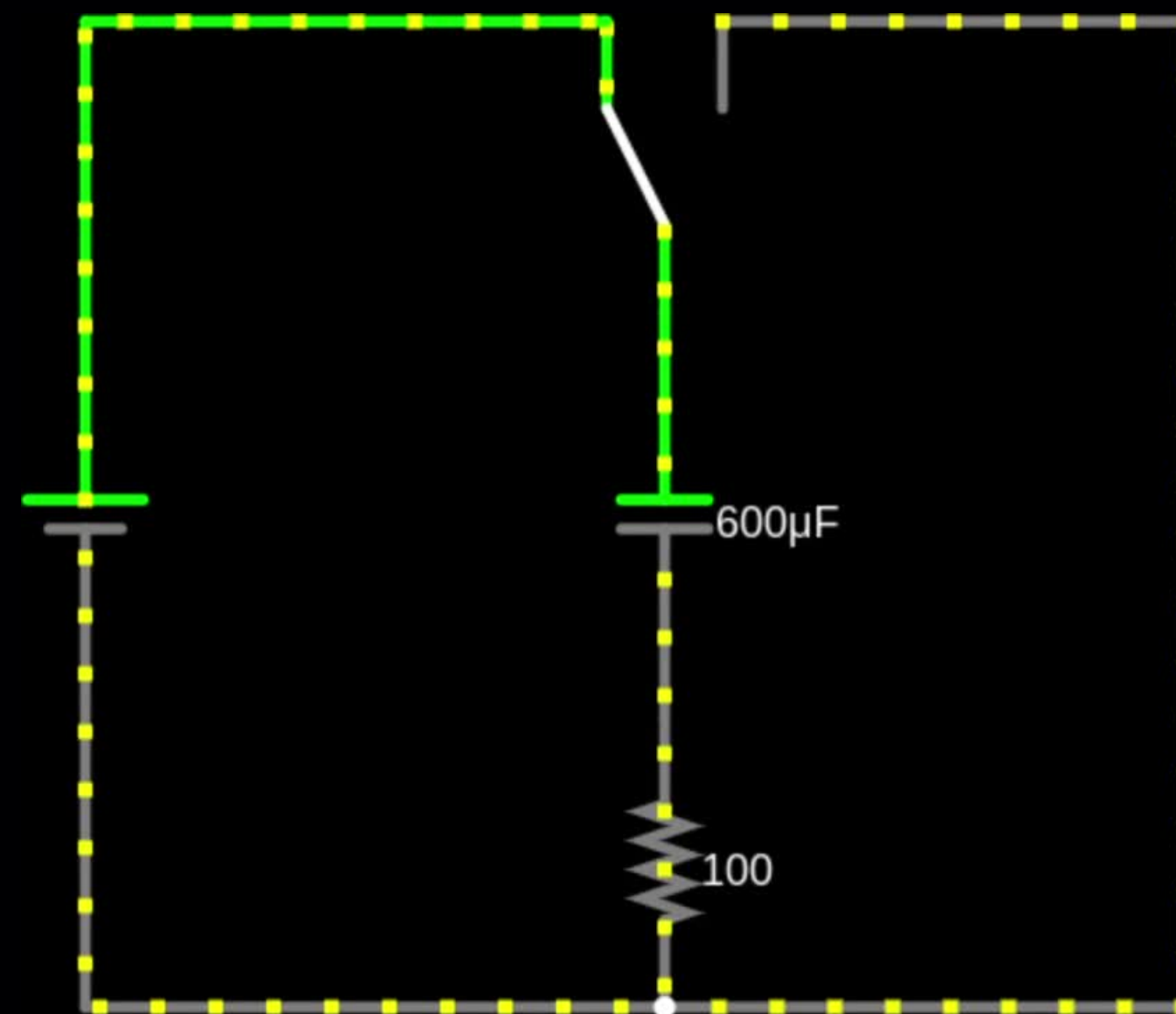
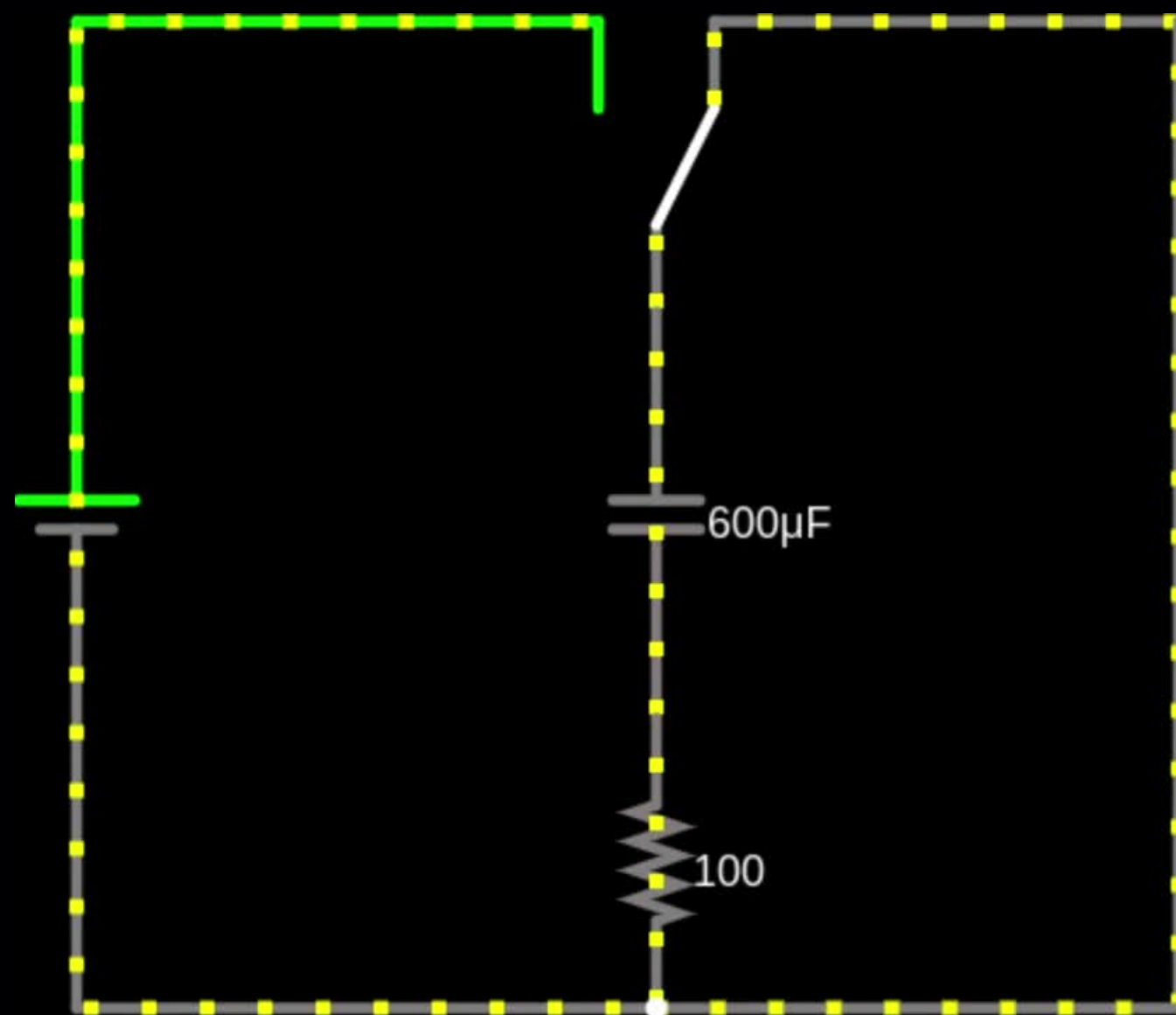
- Electrolytic
- Ceramic
- Tantalum

Capacitor Types





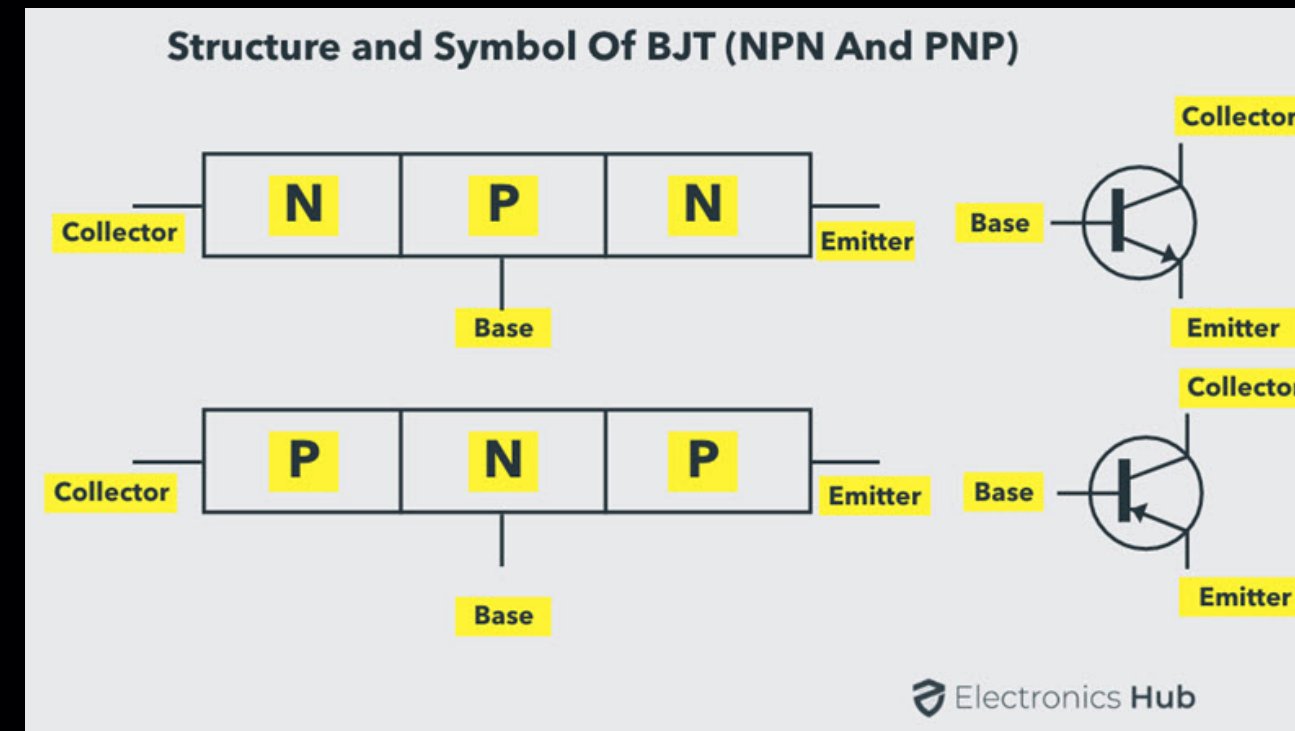
CHARGING AND DISCHARGING A CAPACITOR



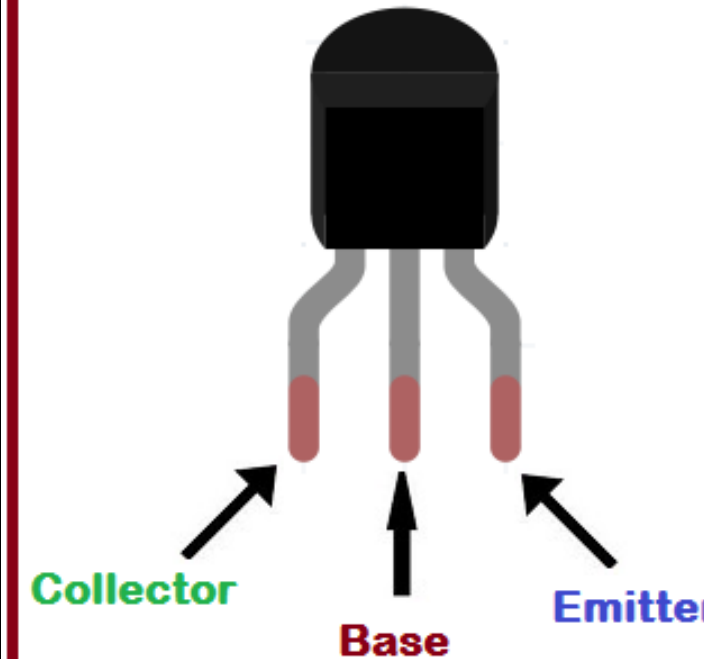


TRANSISTOR

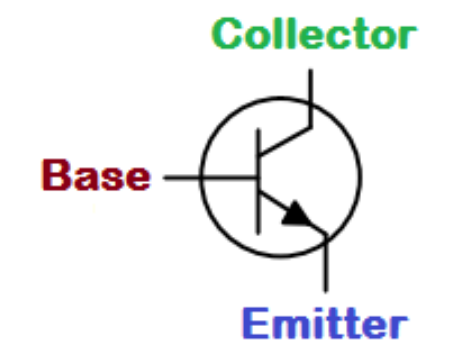
- 3-Terminal Device
- Active Device of the circuit.
- Can work as an amplifier.
- Can work as a switch.
- Two types:
 - Bipolar Junction Transistor(BJT)
 - Field Effect Transistor(FET)



BC547 Pinout



BC547 Animation



Symbolic Representation

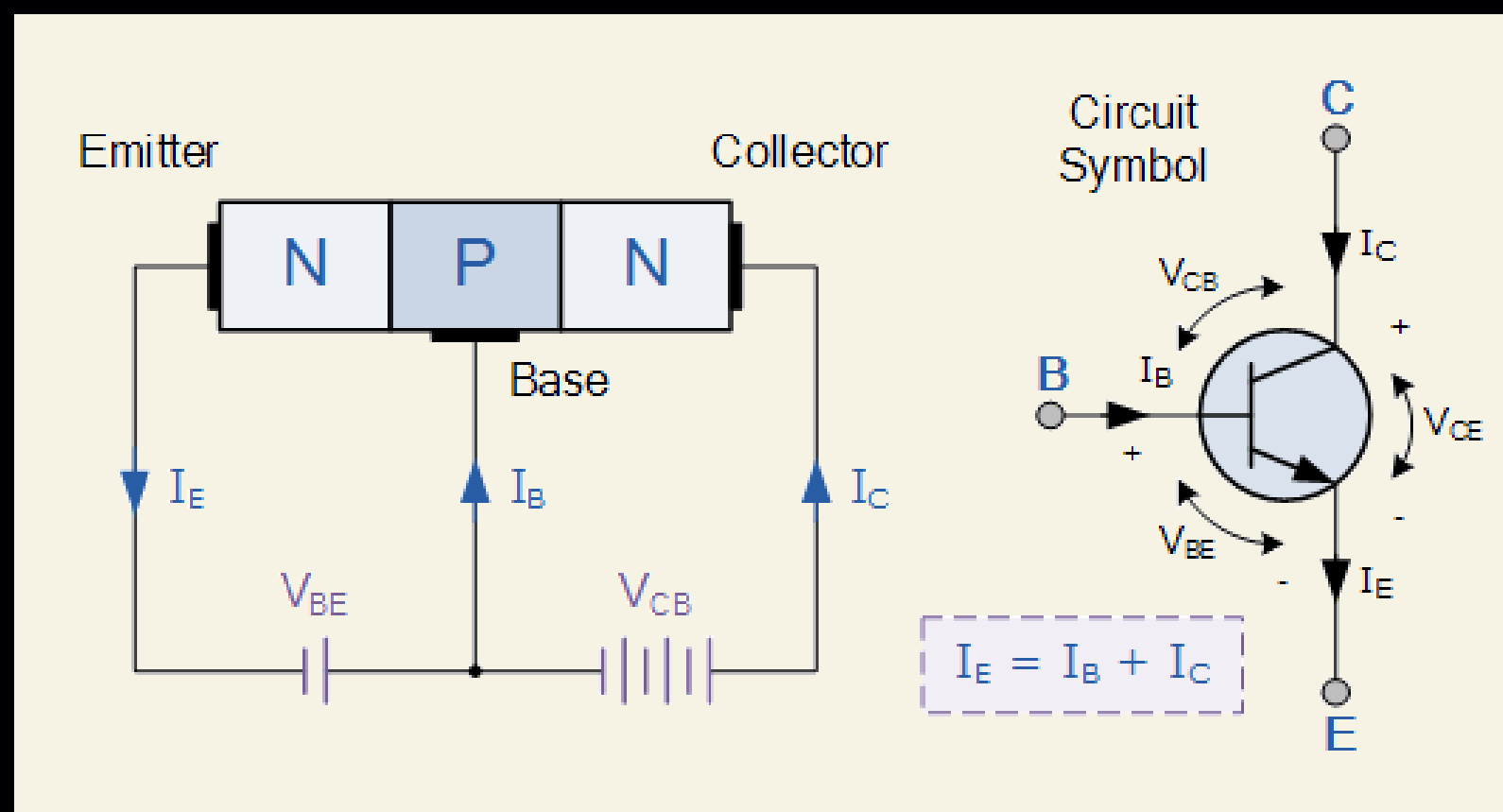


BC547

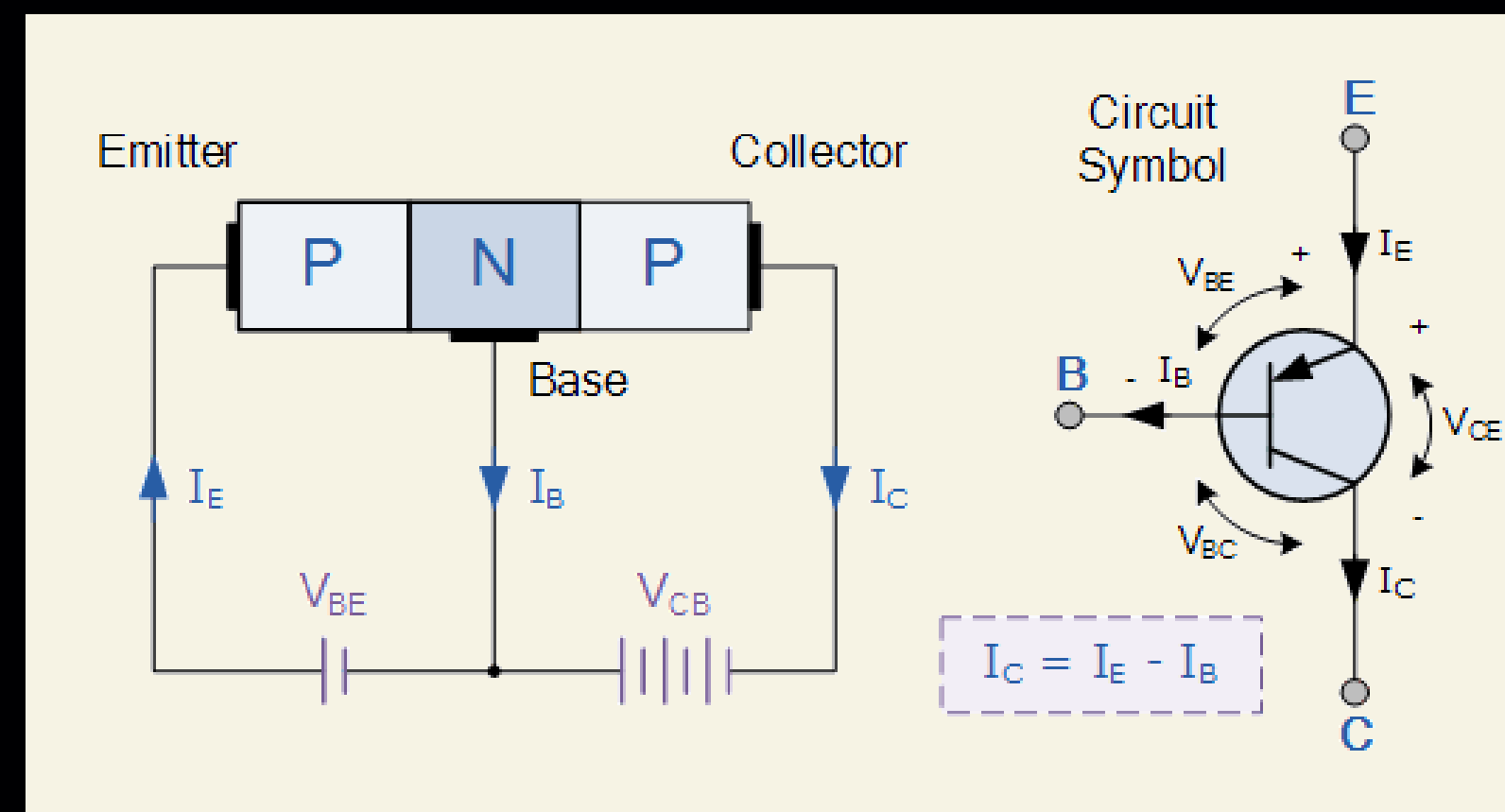


TRANSISTOR

NPN

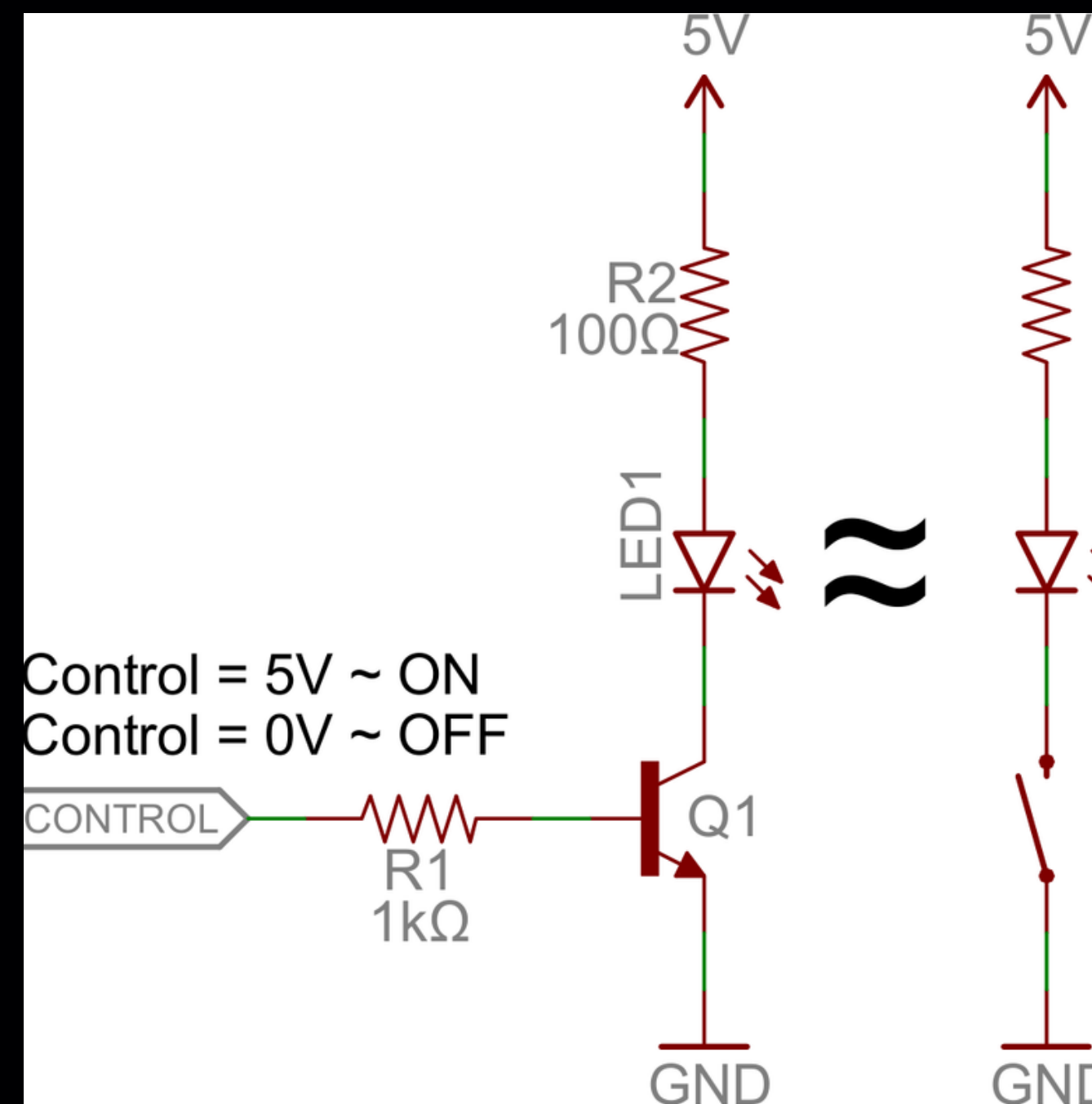
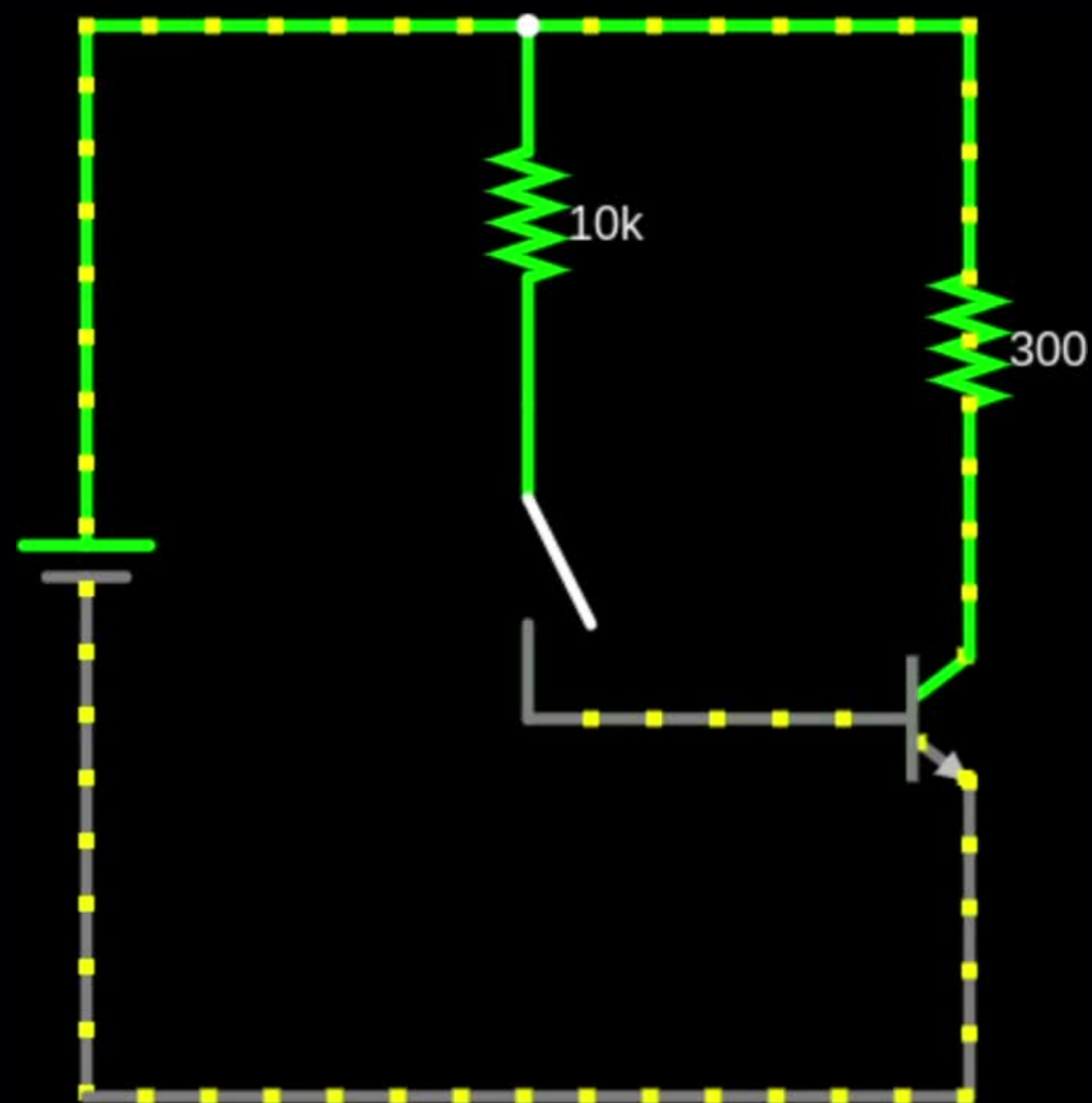


PNP



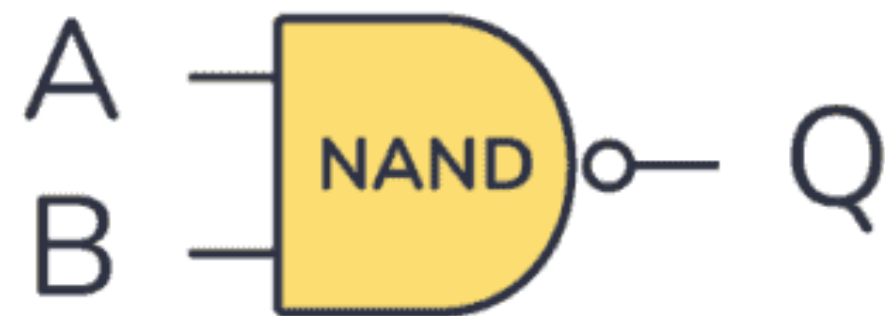


TRANSISTOR AS A SWITCH

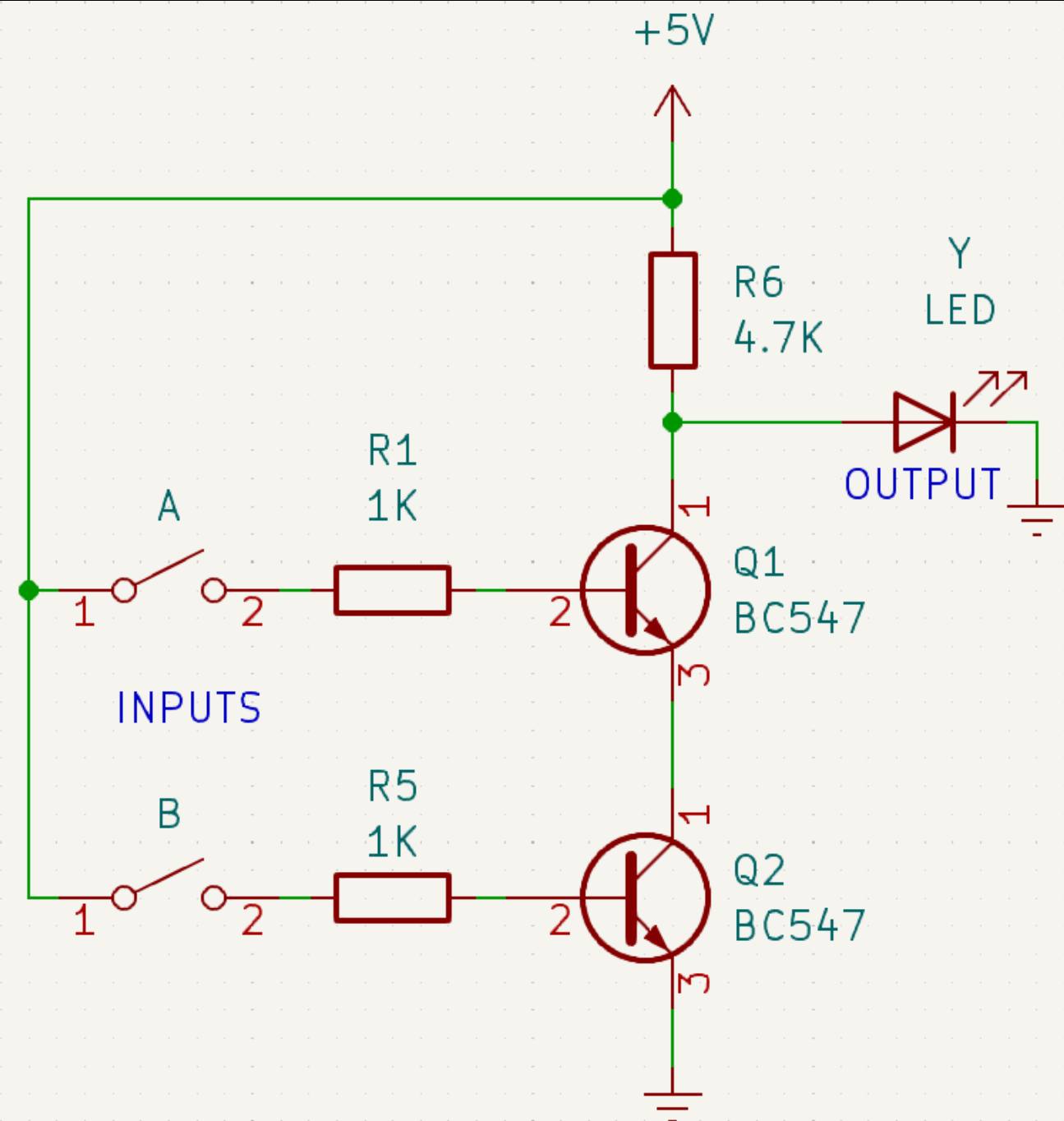




LOGIC GATES USING TRANSISTOR

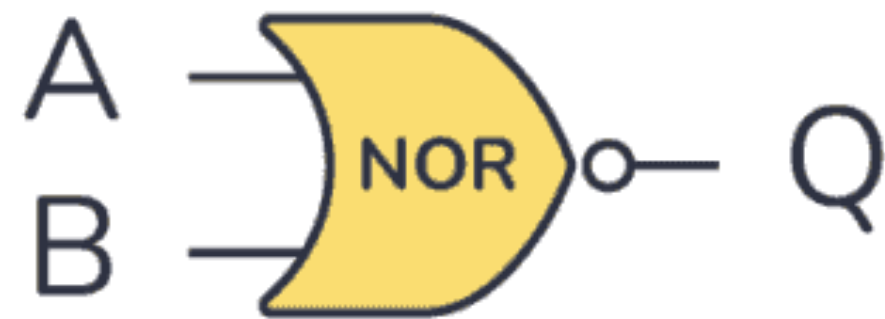


A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

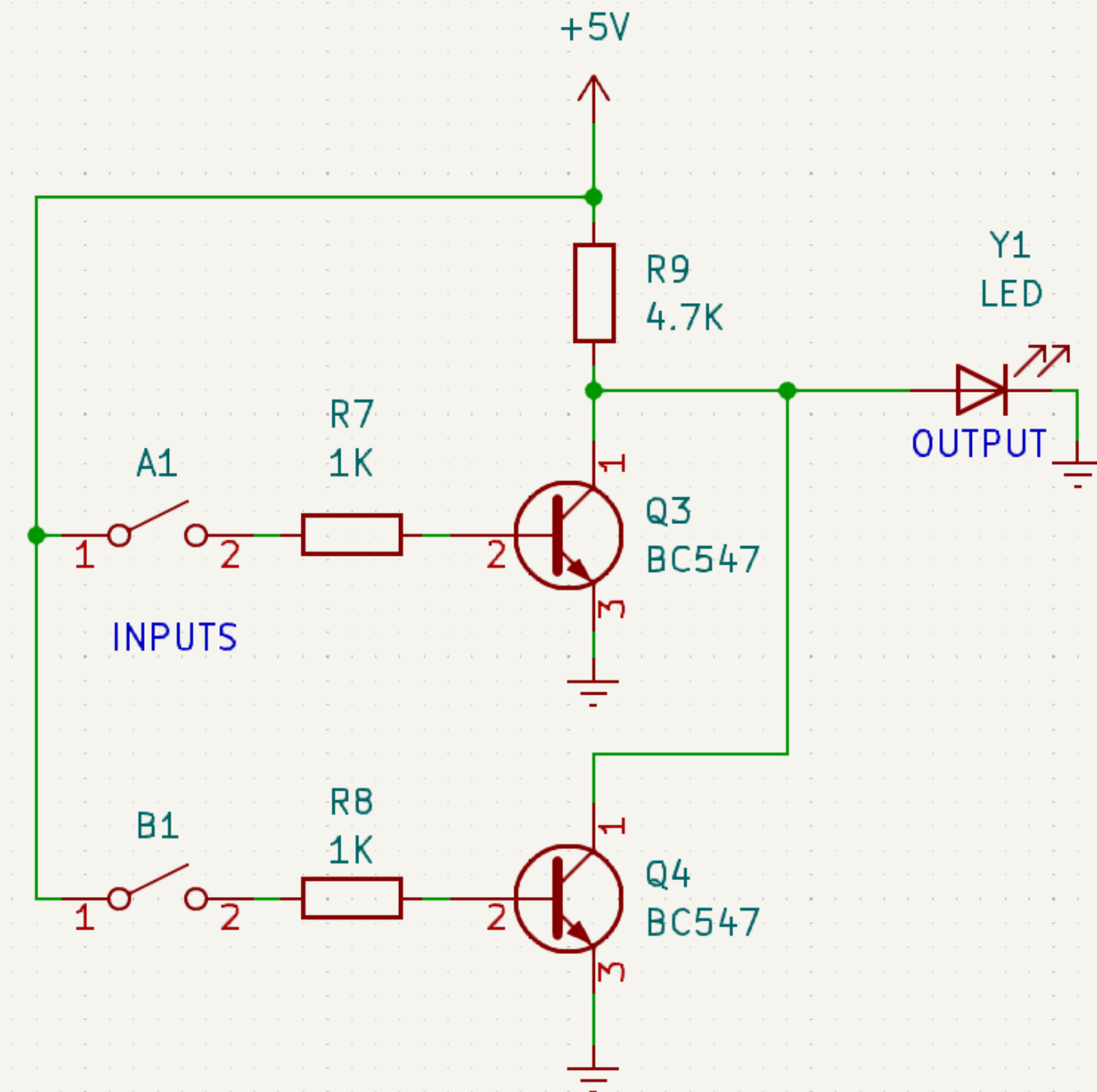




LOGIC GATES USING TRANSISTOR



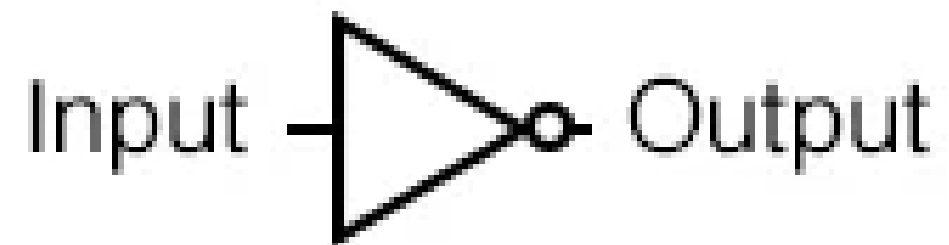
A	B	Q
0	0	1
0	1	0
1	0	0
1	1	0



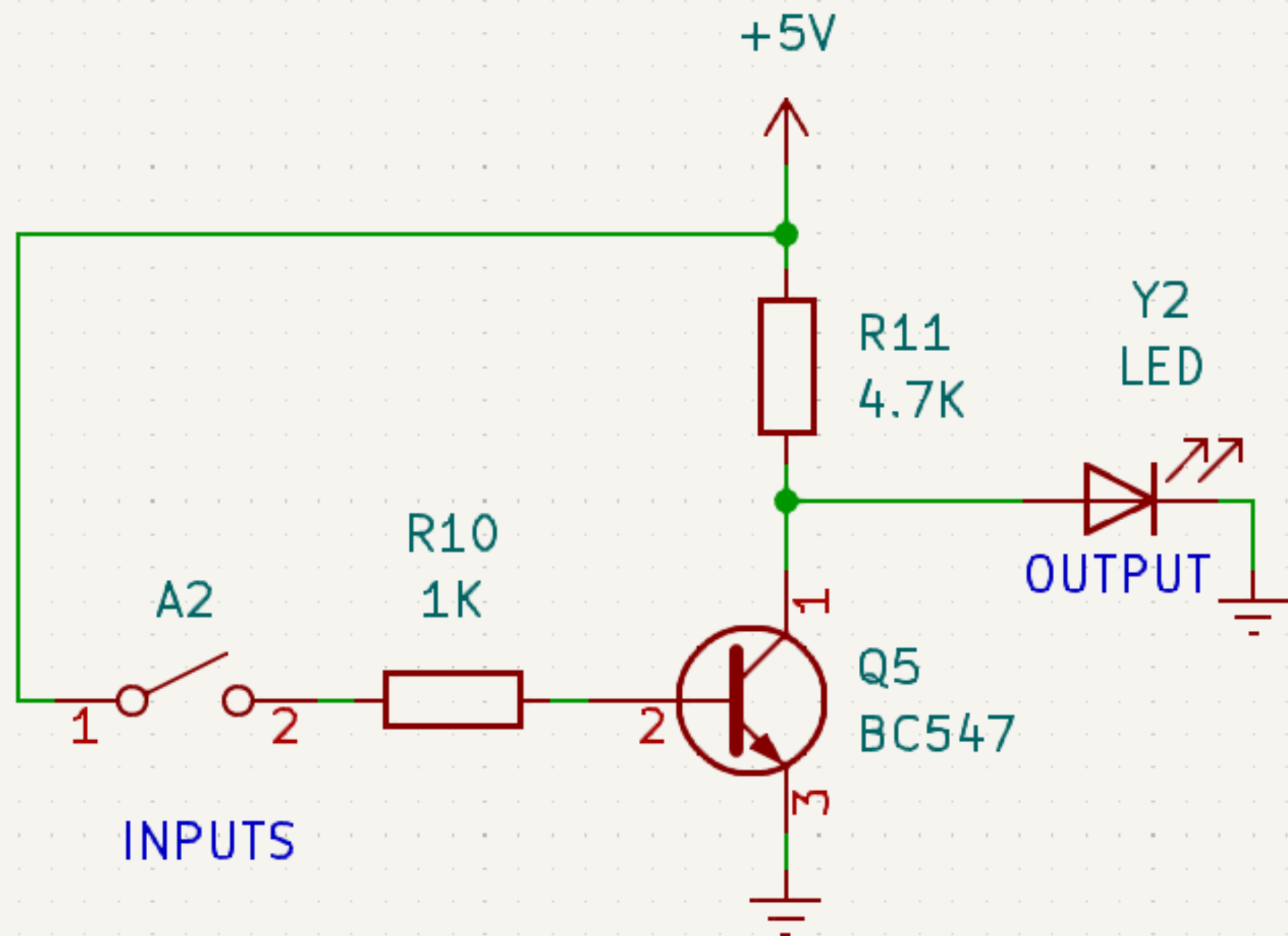


LOGIC GATES USING TRANSISTOR

NOT gate truth table

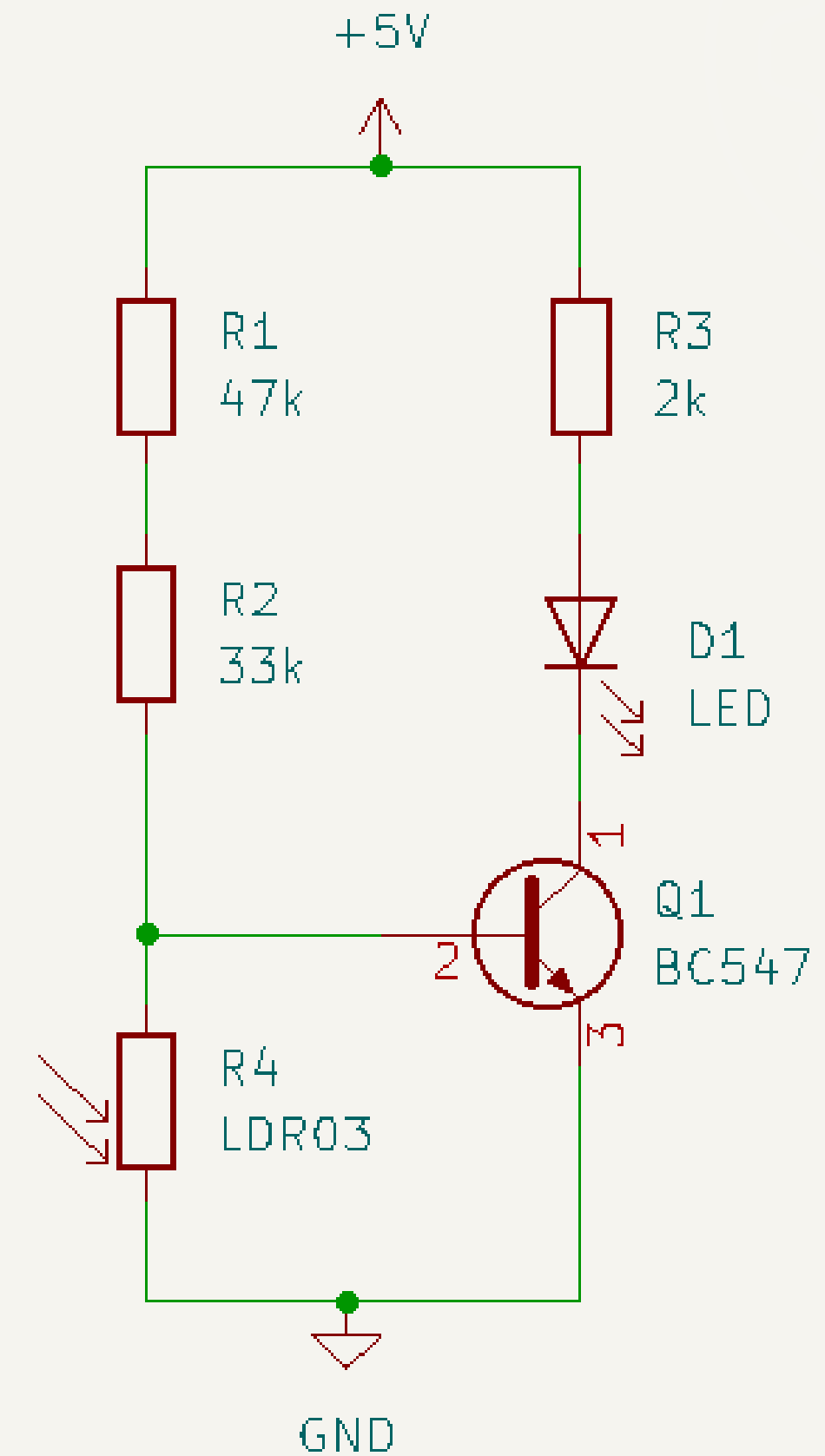


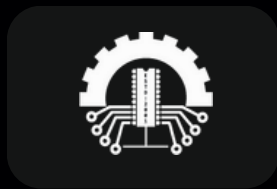
Input	Output
0	1
1	0





APPLICATION OF LDR





THANK YOU

