



BASICS OF ELECTRONICS

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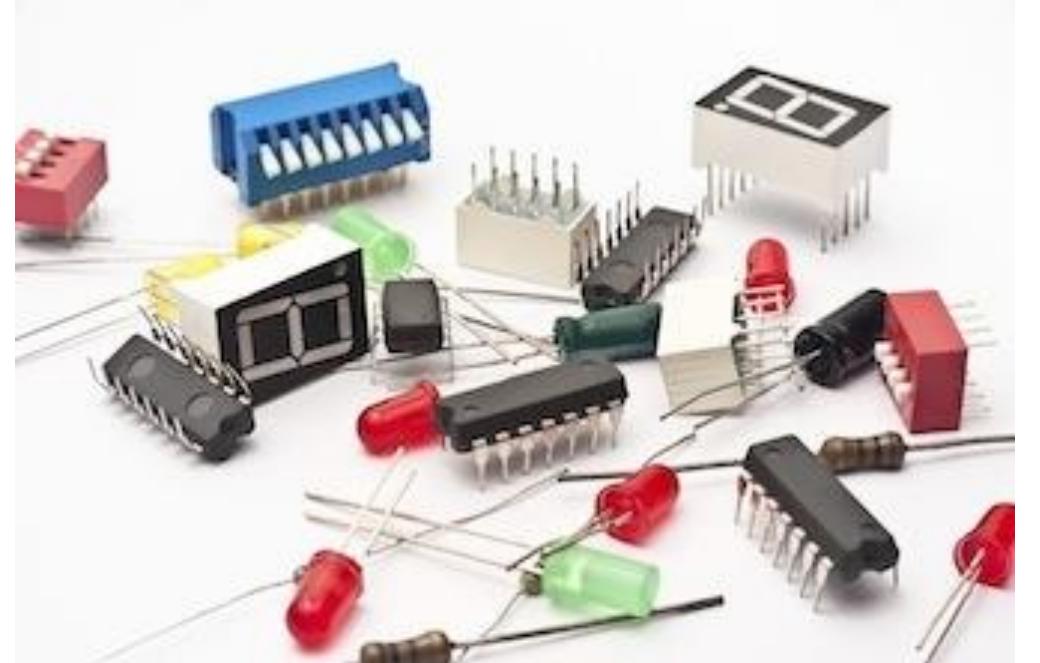
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AGENDA

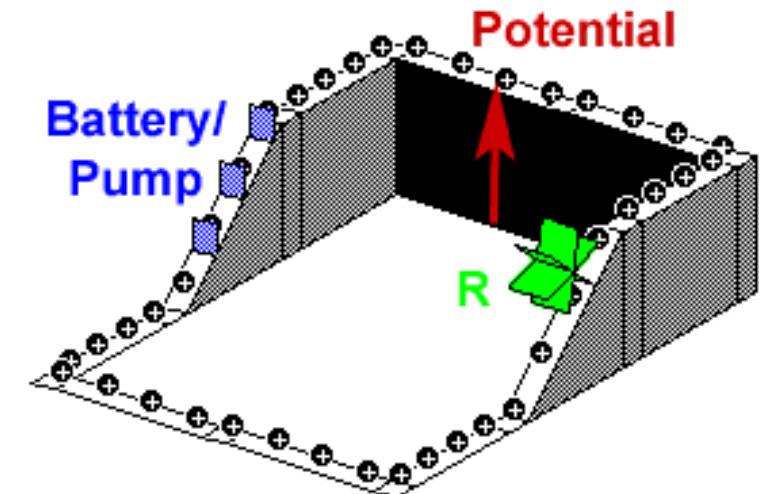
- Resistors – introduction, working, types, calculation
- Capacitor – introduction, working , types
- Transistor
- rectifier



RESISTANCE

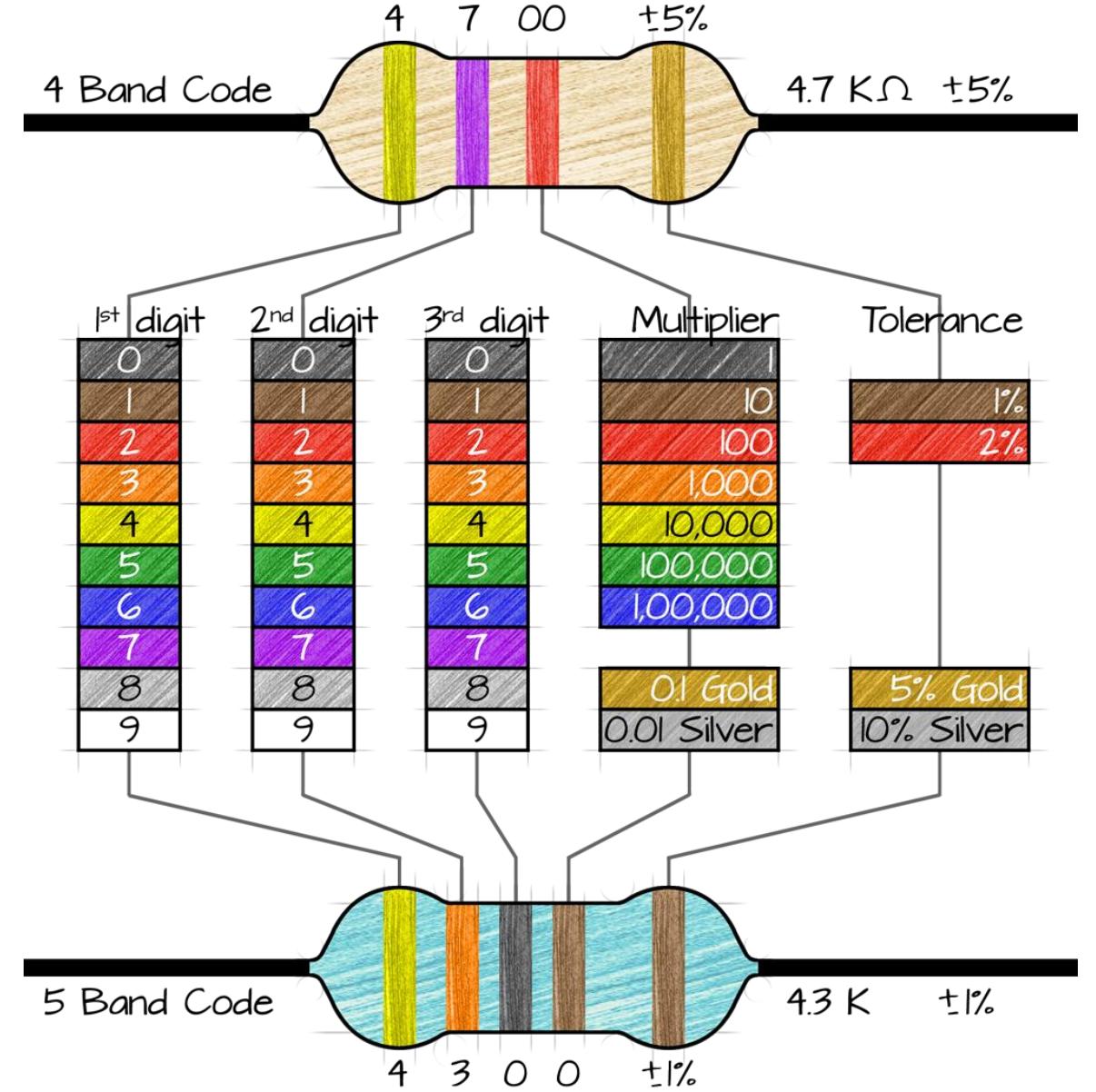


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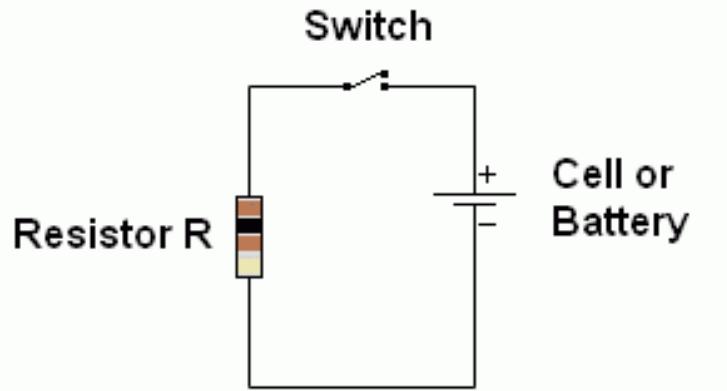
CALCULATE RESISTANCE

- Black
- Brown
- Red
- Orange
- Yellow
- Green
- Blue
- Violet
- Grey
- White

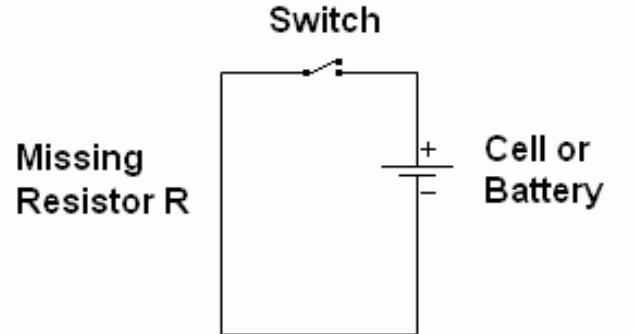


RESISTANCE - MEASURED IN OHMS

- In a simple circuit, the resistor limits the current to a small steady safe level.



- Without a current limiting resistor, the current is very large and possibly dangerous. There is a fire risk.
This is called a **short circuit**

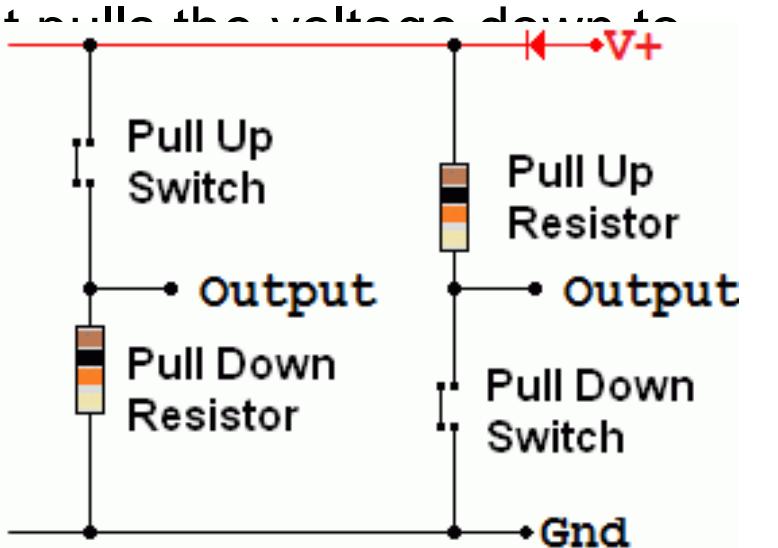


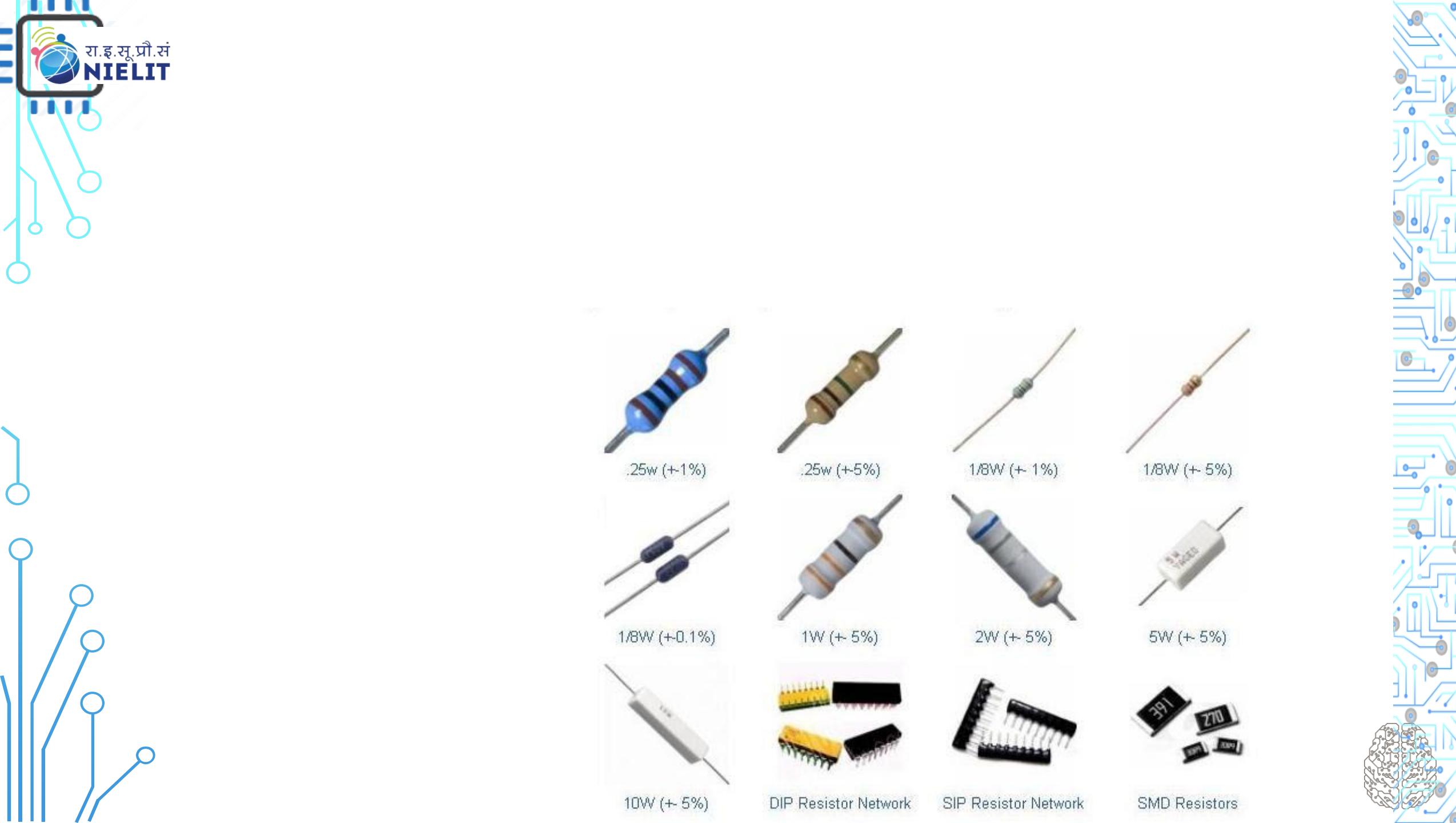
WHAT RESISTORS DO

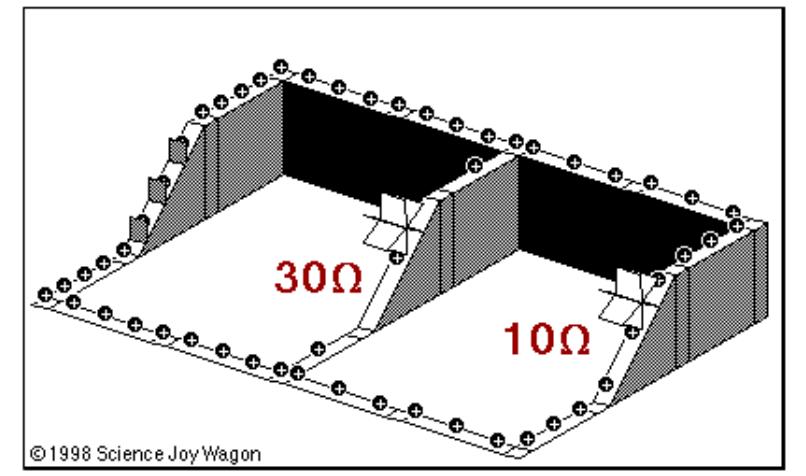
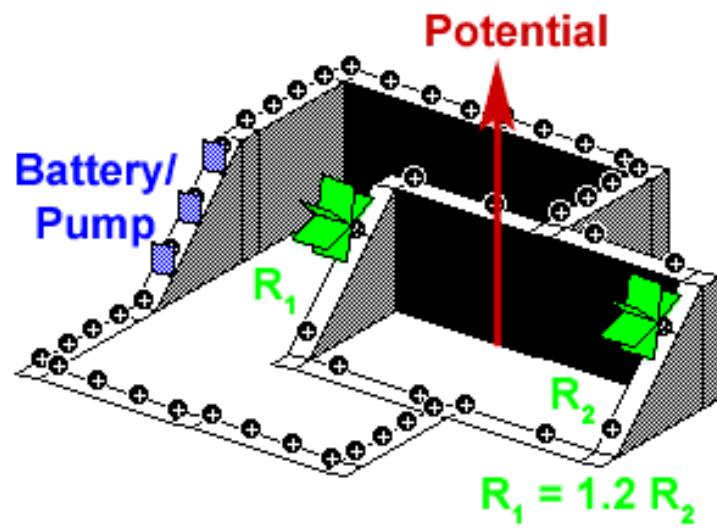
- Resistors limit the current flowing to a smaller safe level.
- Voltage dividers can use potentiometers to make volume controls.
- A timing resistor is used in conjunction with a capacitor to make a timing circuit.
- A **pull-up resistor** increases the voltage, usually close to the positive power supply voltage.
- A **pull-down resistor** drops the voltage close to zero or perhaps to the negative power supply voltage.

WHAT RESISTORS DO

- switch is like a resistor. When it's on, the resistance is very close to zero. When it's off, the resistance is very close to infinity.
- the pull-down resistor pulls the voltage down to zero. If the pull-up switch is pressed, it pulls the voltage up to whatever the + supply is.
- the pull-up resistor pulls the voltage up to whatever the + supply is. If the pull-down switch is pressed, it pulls the voltage down to zero.

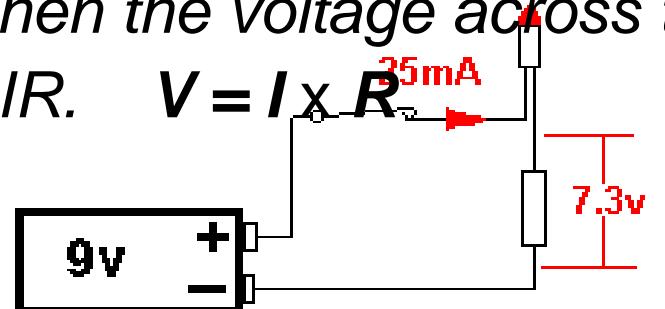




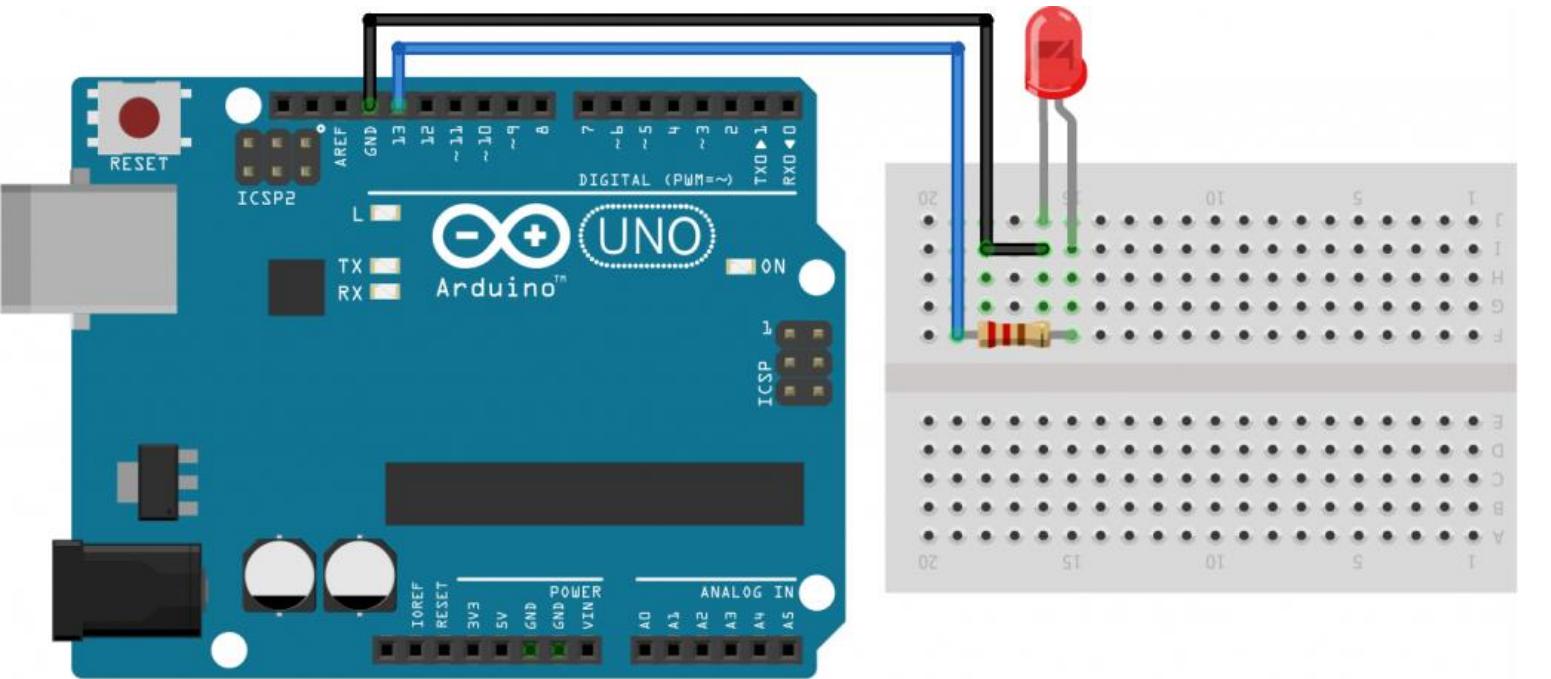


OHM'S LAW

- *The electric potential difference between two points on a circuit (ΔV) is equivalent to the product of the current between those two points (I) and the total resistance of all electrical devices present between those two points (R).*
*Often referred to as the **Ohm's law** equation, this equation is a powerful predictor of the relationship between potential difference, current and resistance.*
- Suppose a resistance having a value of R ohms carries a current of I amperes. Then the voltage across the resistor is equal to the product IR .

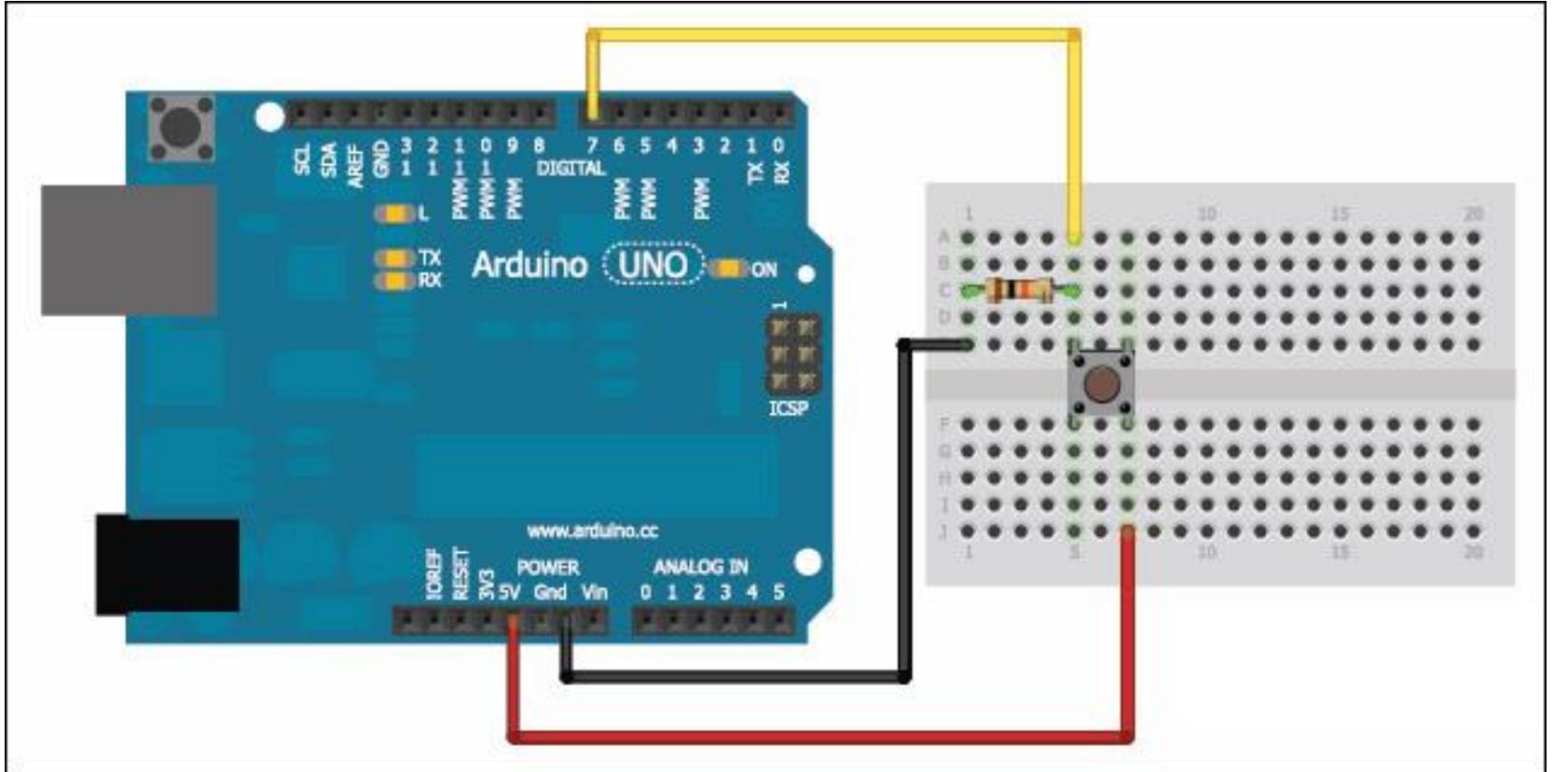


LED INTERFACING

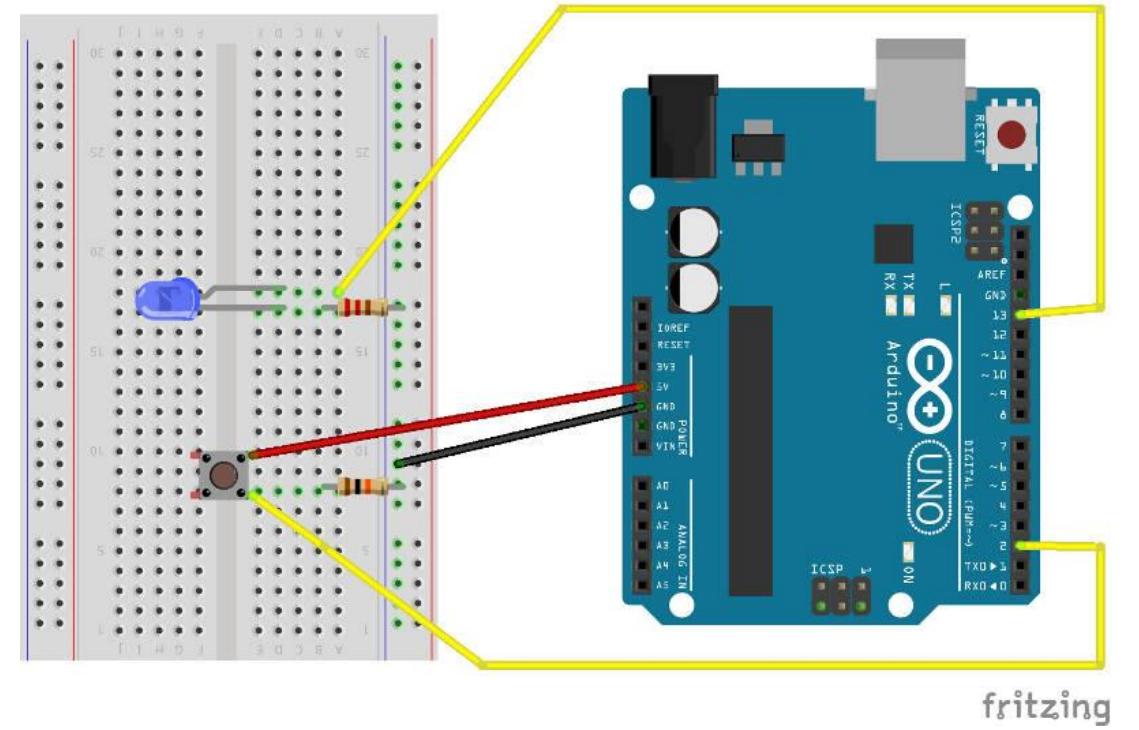
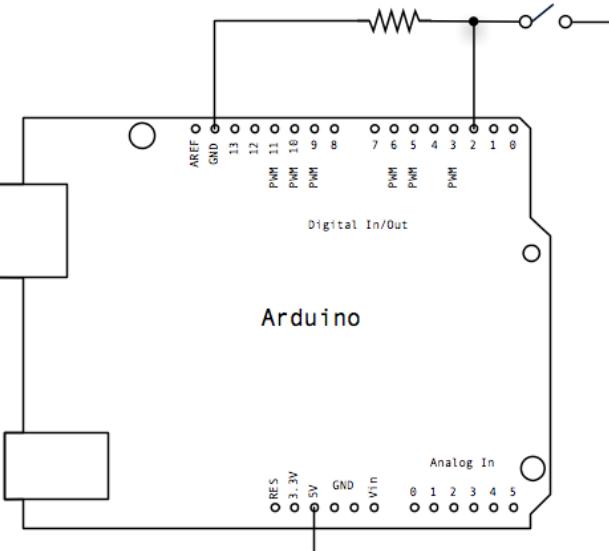


fritzing

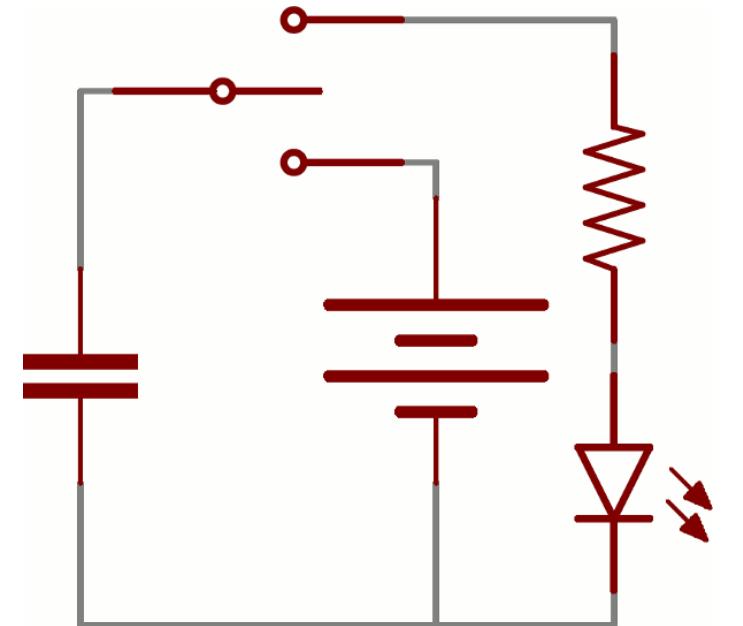
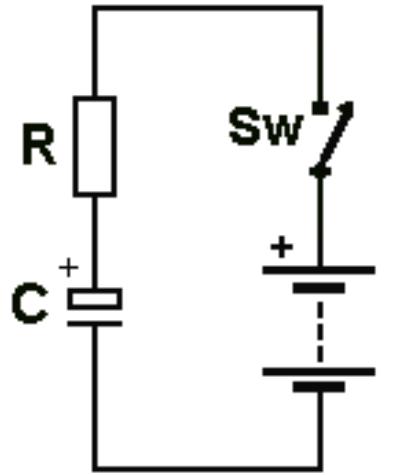
BUTTON INTERFACING



ARDUINO BUTTON INTERFACING

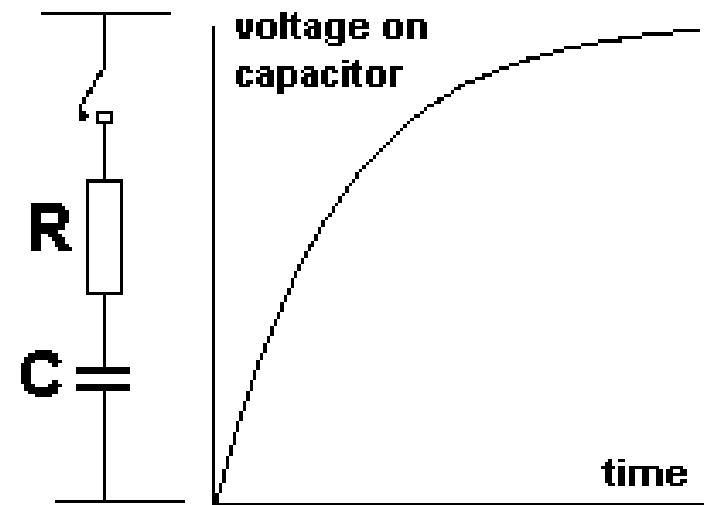


CAPACITOR



WORKING OF CAPACITOR

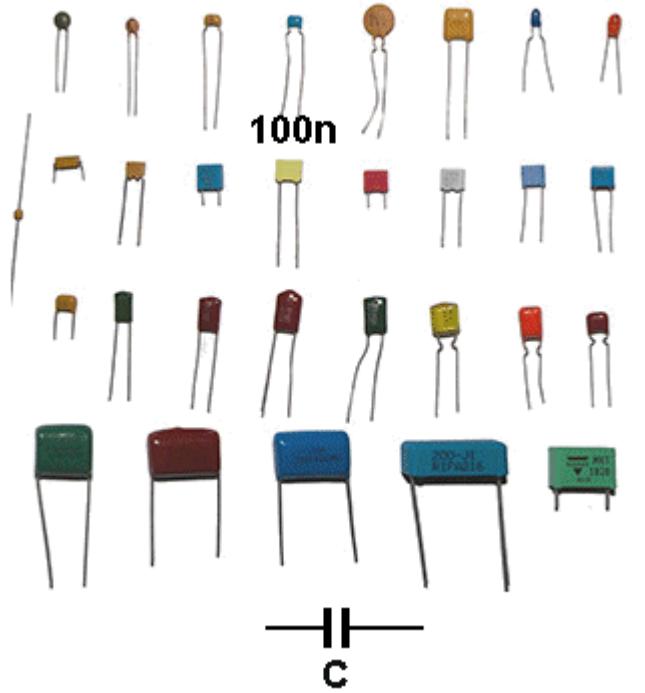
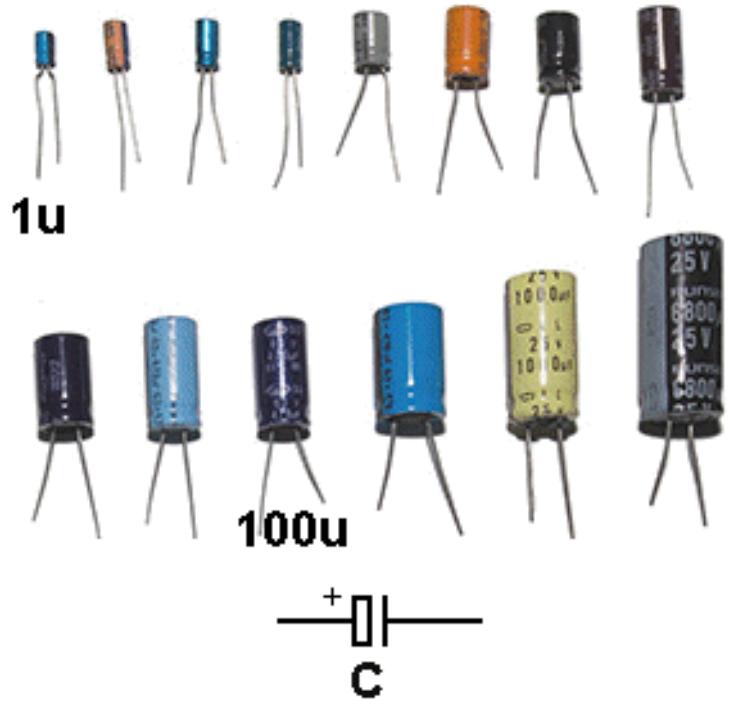
- capacitor is connected in series with a resistor and this makes the capacitor charge slowly.
- As the capacitor charges, the voltage across it INCREASES but the increase is not linear. The voltage increases quickly at the beginning but gets slower and slower



WORKING OF CAPACITOR

- Its **function** is to store the electrical energy and give this energy again to the circuit when necessary.
- In other words, it charges and discharges the electric charge stored in it.
- Besides this, the **functions of a capacitor** are as follows: It blocks the flow of DC and permits the flow of AC.

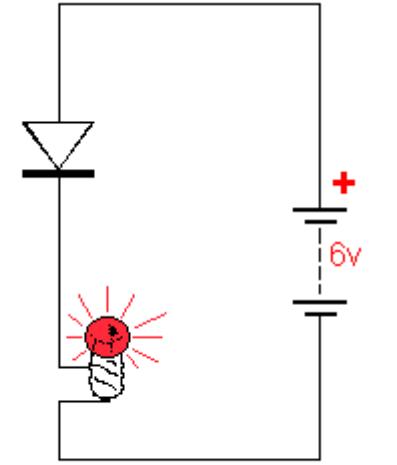
TYPE OF CAPACITOR



FUNCTIONS OF CAPACITOR

- It blocks the flow of DC and permits the flow of AC.
- It is used for coupling of the two sections.
- It bypasses (grounds) the unwanted frequencies.
- It feeds the desired signal to any section.
- It is used for phase shifting.
- It is also used for creating a delay in time.
- It is also used for filtration, especially in removing ripples from rectified waveform.
- It is used to get tuned frequency.
- It is used as a motor starter.
- It is also used in conjunction with a resistor to filter ripples in a rectifier circuit.

DIODE

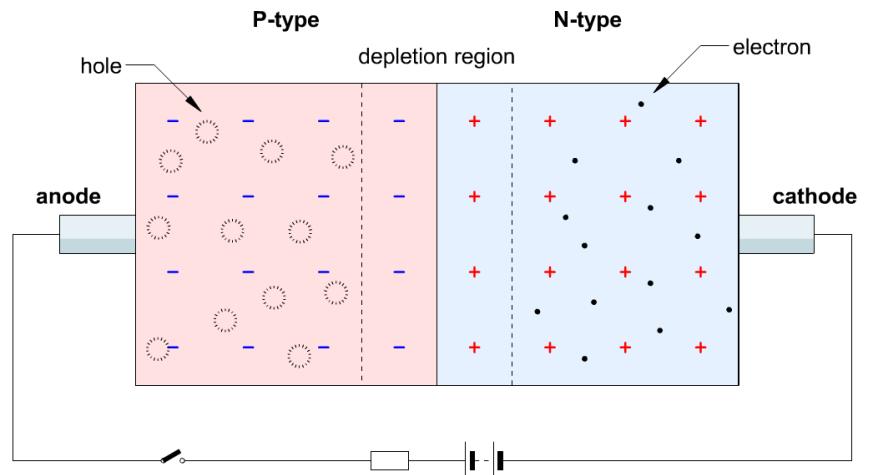


How a diode works



PN JUNCTION DIODE

- Battery connected across the p-n junction **makes** the **diode** forward biased, pushing electrons from the n-type to the p-type and pushing holes in the opposite direction.
- Electrons and holes cross the junction and combine. Photons (particles of light) are given off as the electrons and holes recombine

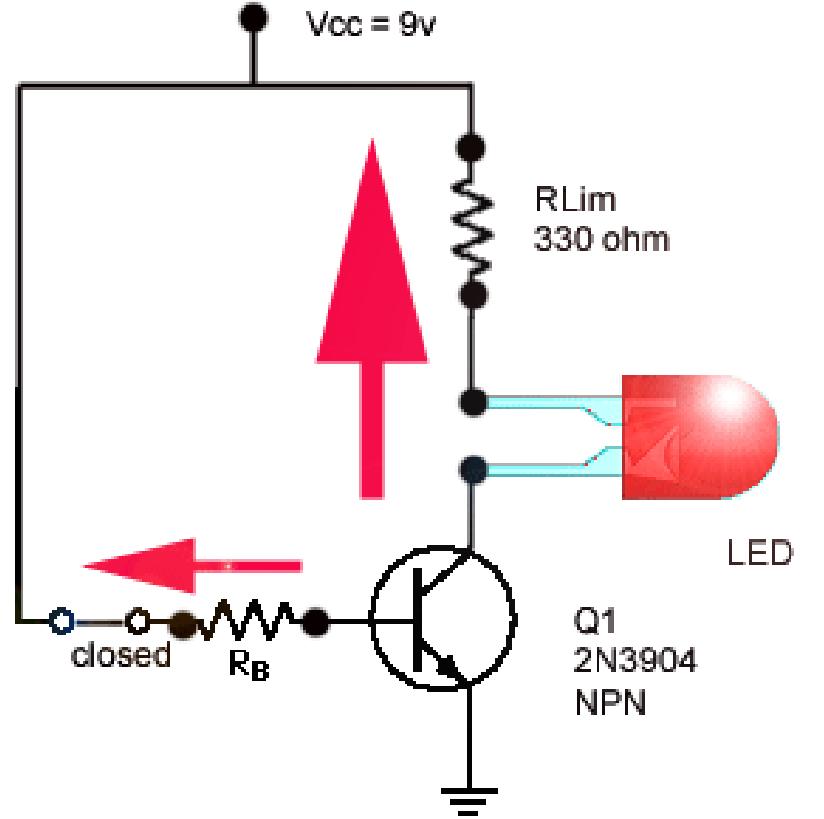
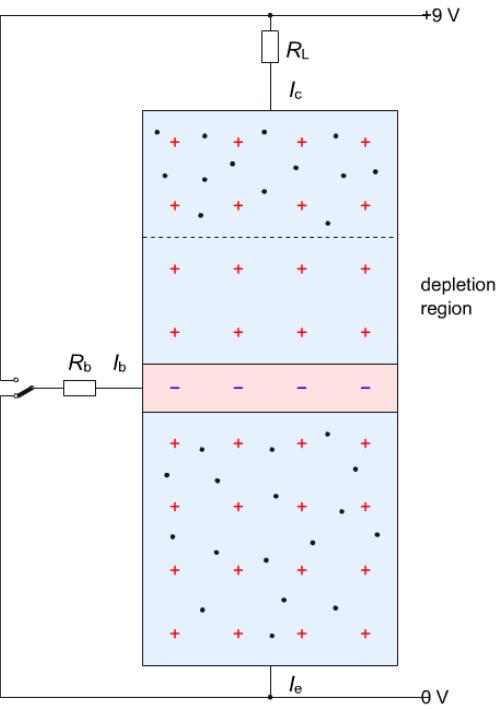


TYPE OF DIODE



Types of Diode

TRANSISTOR AS A SWITCH



RECTIFIER

