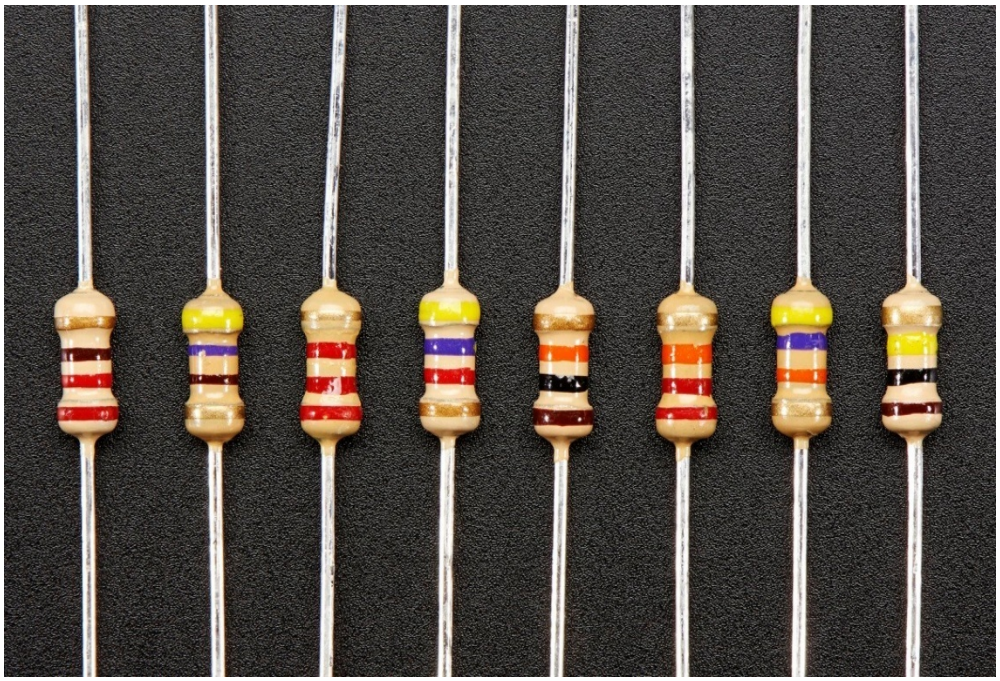
Analog Electronic Componenets

- Basic Analog Electronic Components are as follows:
  - Resistors
  - Capictors
  - Diodes
  - Inductors
  - Transistors etc.,

Resistors

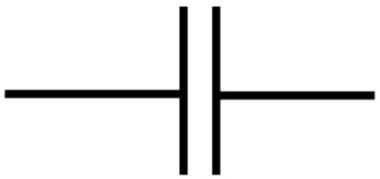
- *Definition* : A resistor limits the flow of the electric current when voltage is applied.
- Interfacing of LEDs, buzzer etc., with the port pins of the micro controller through current limiting of resistors is a typical example for the usage of resistors.



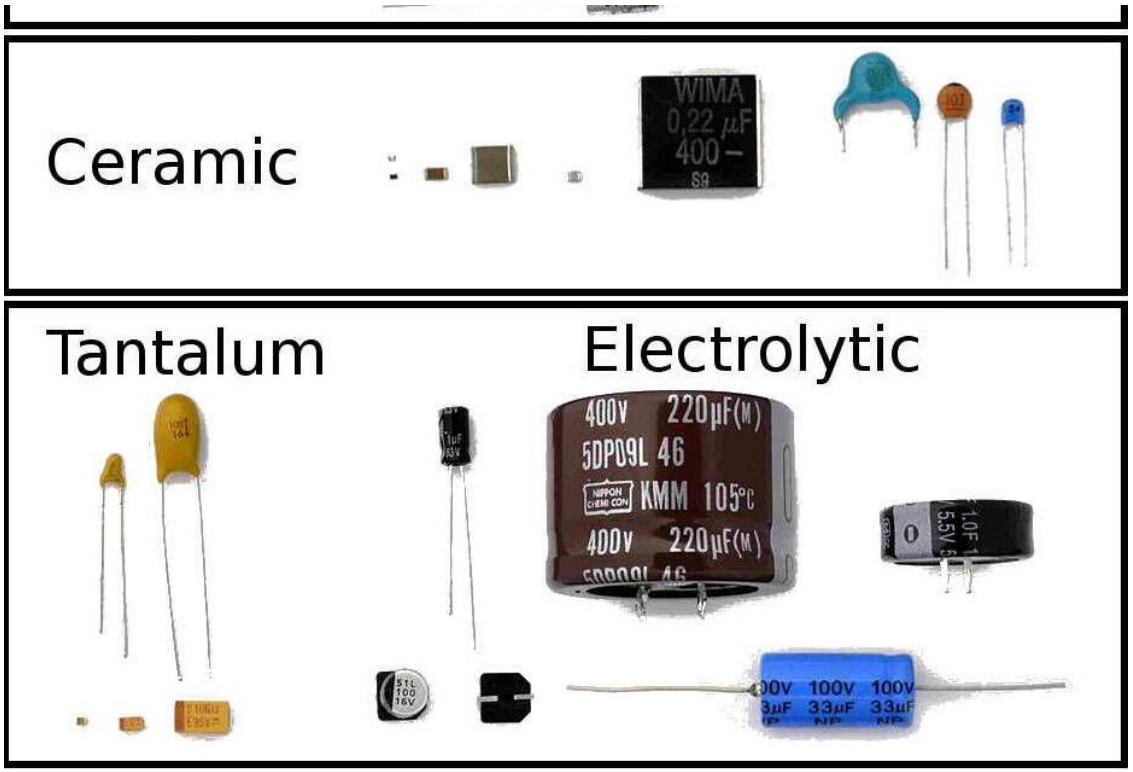
CAPACITORS

- A capacitor is a passive electronic component used to store energy electrostatically in an electric field.
- Capacitors are mainly used in signal filtering and Resonating circuits.
- The types of capacitors that are commonly used in embedded hardware design are :
  - Electrolytic capacitors.
  - Ceramic capacitors.
  - Tantalum capacitors etc.

Symbol:



- Example:
  - Reset circuit implementation.
  - Power supply decoupling.
  - Matching circuits for RF designs.



INDUCTORS

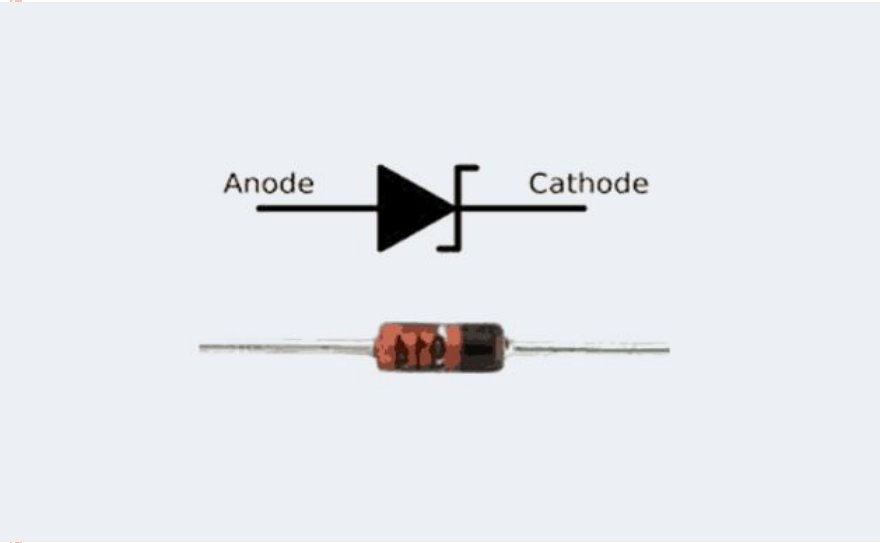
- An inductor a passive two terminal electrical component that stores energy in a magnetic field when electric current flows through it.
- Inductors are widely used for filtering the power supply from ripples and noise signals.
- The inductors with inductance value in the microhenry range are used in Embedded systems.

Air Core Inductor Symbol

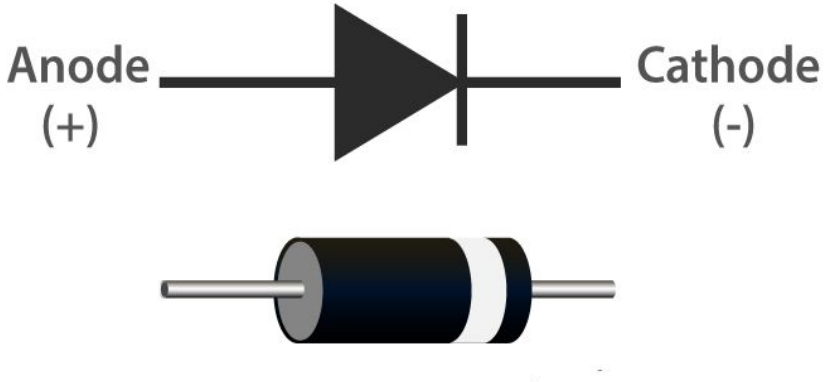
DIODES

- A diode is a semiconductor device that essenitally acts as a one-way switch for current.
- A P – N junction diode, schottky diode and zener diode are commonly used for embedded hardware components.
- A schottky diode is a semiconductor diode formed by junction of semiconductor with a metal, it has a low forward voltage drop and very fast switching action.
- A Zener diode is a semiconductor device that permits current to flow in forward direction.
- it also permits current in reverse direction, if the voltage is greater than the junction breakdown voltage.

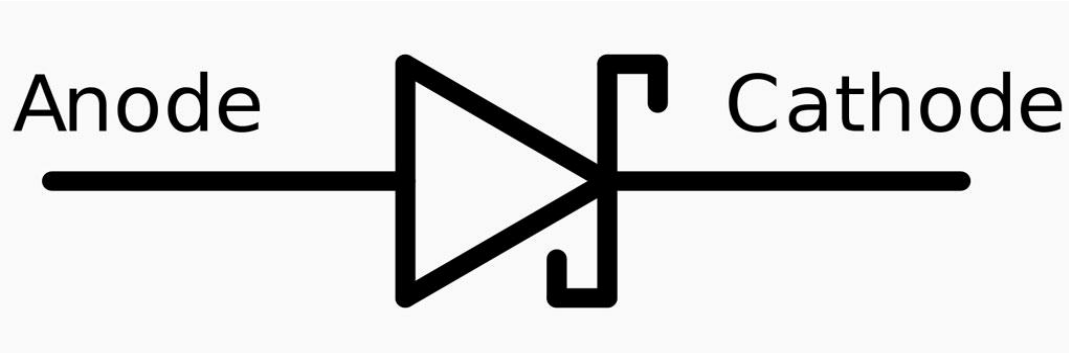
- The applications in which diodes are used are :
  - Reverse polarity protection
  - Voltage rectification.
  - Clamping of voltage to desired level etc.,



Zener diode



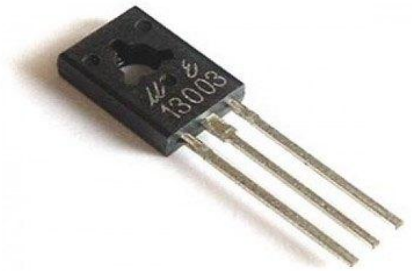
P-N junction diode



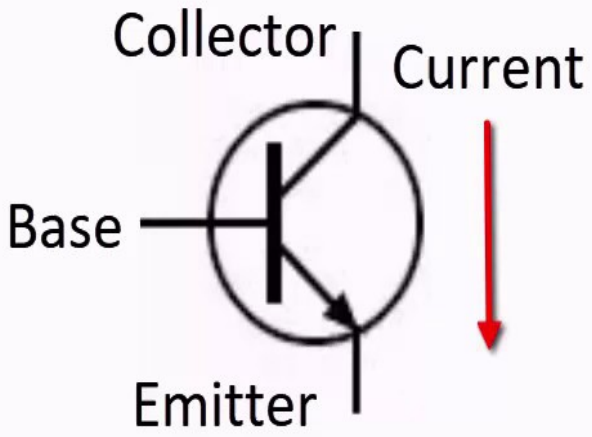
Schottky diode

TRANSISTORS

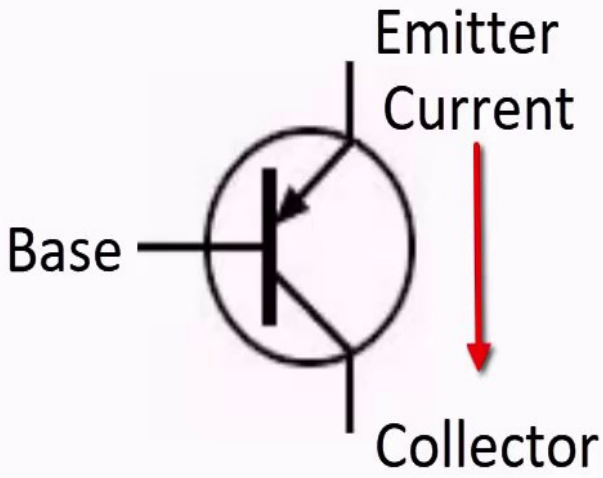
- A Transistor is a semiconductor device used to amplify or switch electronic signals and electrical power.
- In switching application, the transistor is either in ON or OFF state.
- In amplification operation, the transistor always in ON state.
- The common emitter configuration of NPN transistor is widely used in switching and driving circuits in embedded applications.
- Examples:
  - Relay,
  - Buzzers
  - Stepper motor driving circuits



PNP-Based Circuit



NPN Transistor



PNP Transistor

THANK YOU

Submitted By :
B.Manasa Durga
18B01A1204