DRIVES

Development and Research on Innovative Vocational Education Skills

SENSOR FUSION EXPERT

SFE.U1.E3 IMPORTANT ELECTRICAL COMPONENTS

Electronics and Electricity Principles

JUNE 2021, Version 1

Co-funded by the Erasmus+ Programme of the European Union

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LEARNING OBJECTIVES

The student is able to …

SFE.U1.E2.PC1	The student is able to define important electrical components and understand their main characteristics.
SFE.U1.E2.PC2	The student can identify each component and know how to distinguish them from each other.
SFE.U1.E2.PC3	The student knows the working principle of some basic electronic components.

ELECTRICAL COMPONENTS

Electrical components are fundamental to the design of circuits.

These components have several characteristics, however, in this module, we will focus essentially on the most important ones.

ELECTRICAL COMPONENTS

Here's a list of the most important components that we'll look at later:

- Resistances
- Enablers
- Diodes
- LED
- Transistors
- Inductors
- Potentiometer
- Integrated Circuit

RESISTORS

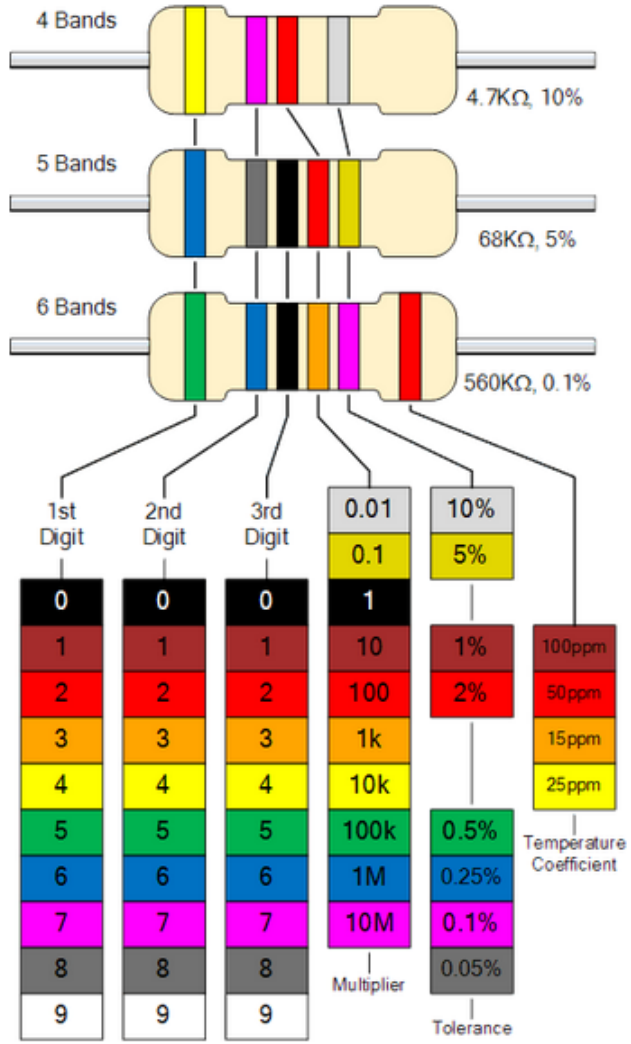
Resistors

- The function of resistors is to prevent electricity from passing through a particular circuit.
- Resistors, in their physical appearance, are represented by colors and these colors represent the resistor value.
- The purpose of a resistor is to control the voltage and current in a given circuit.

RESISTORS

Calculation of Resistor Cores

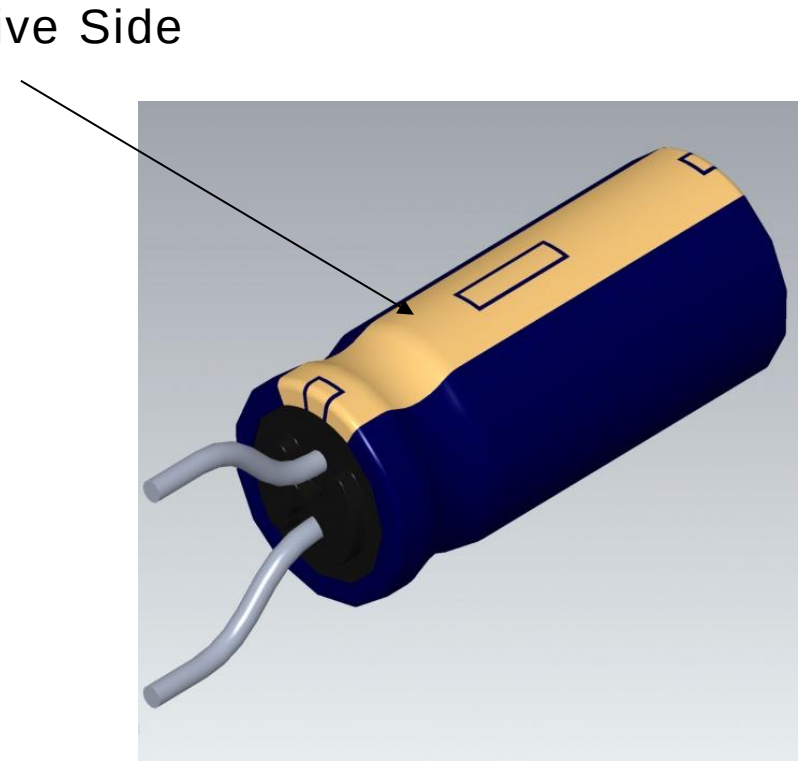
- To calculate the resistors there are several colors, and each color has a value in a certain position.
- The important units in resistors are K (Kilo) and M (Mega).



CAPACITORS

Capacitors

- The function of the capacitor is to store energy.
- The unit of measure is in F (Farads).
- Capacitors are polarized and are usually properly marked.
- The dashed list means it is the negative side of the enabler.
- This information is presented on the plate for insertion of the correct side of the capacitor.



Diodes

- The diode is intended to protect electronic devices.
- It's like a kind of entryway for electricity.
- At one end, the diode has very low resistance, and at the other end it has very high resistance.
- The diode is polarized, so if it is placed upside down it can damage the components.

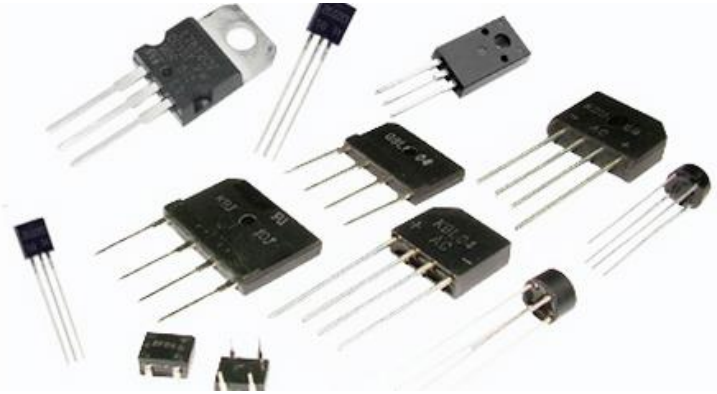
LED

Light Emitting Diode

- The principle of the LED is when electricity flows through it, it emits light.
- There are LEDs in different colors and sizes.
- They are often used to indicate whether a circuit is flowing correctly.

Transistor

- A transistor is a semiconductor whose function is to change current in a pair of terminals.
- So, a transistor is capable of:
  - Amplifying an electronic signal
  - Switch an electronic signal



Transistor

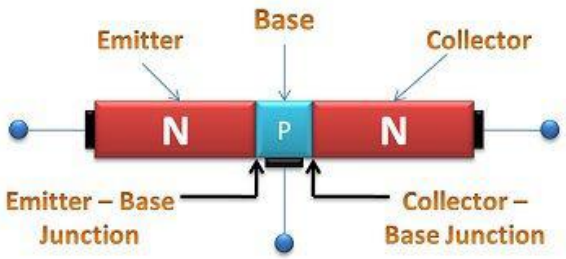
- There are two types of transistors, but both are composed of 3 pins, namely:
  - O Collector
  - O Emmiter
  - A Base

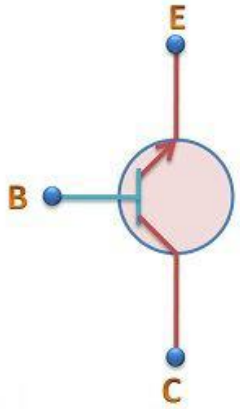
Transistor

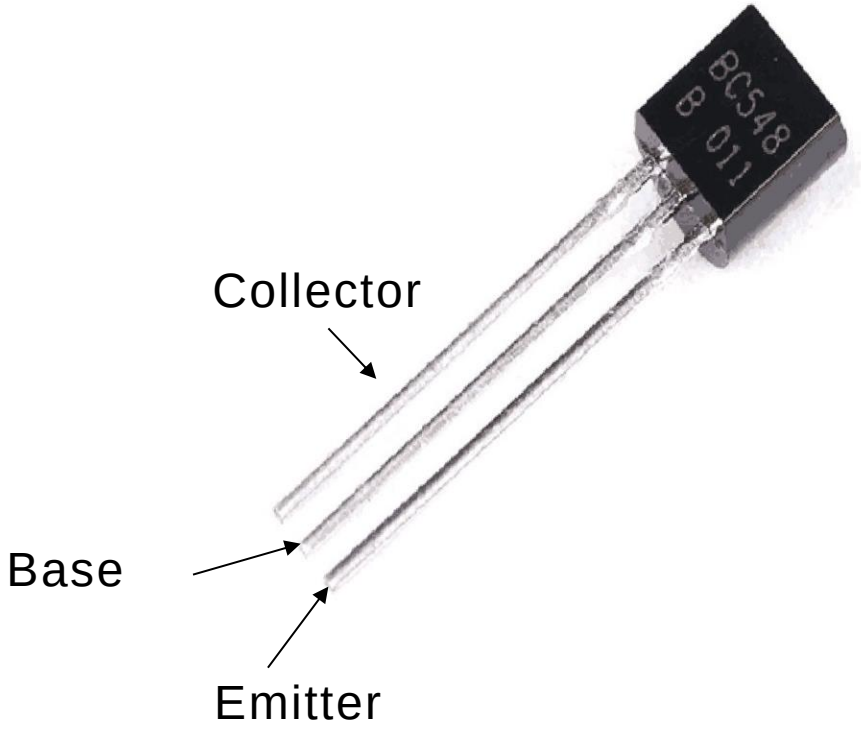
- The two types of existing transistors are:
  - BJT - Bipolar junction transistor
    - Useful for amplifiers or emitters
  - FET - Field-effect transistor
    - Useful for Engines
  - Both can be:
    - NPN: Not pointing in
    - PNP: Pointing in permanently

Transistor

- The two types of existing transistors are:
  - If it is NPN, the transistor has this arrangement:

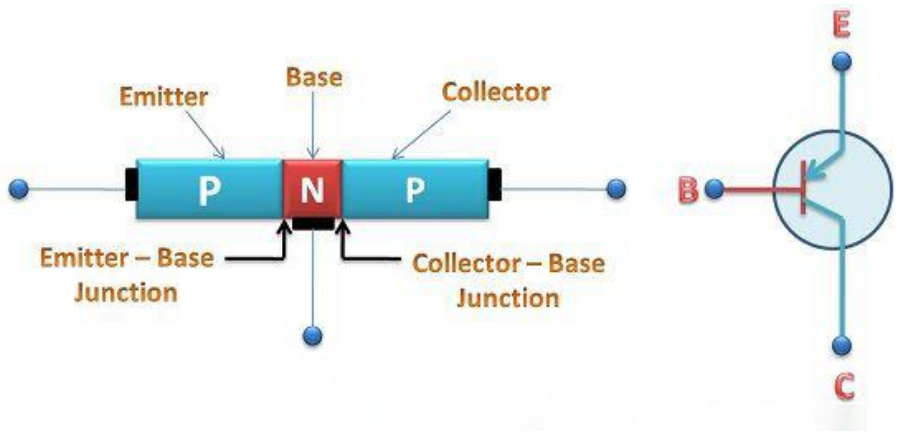


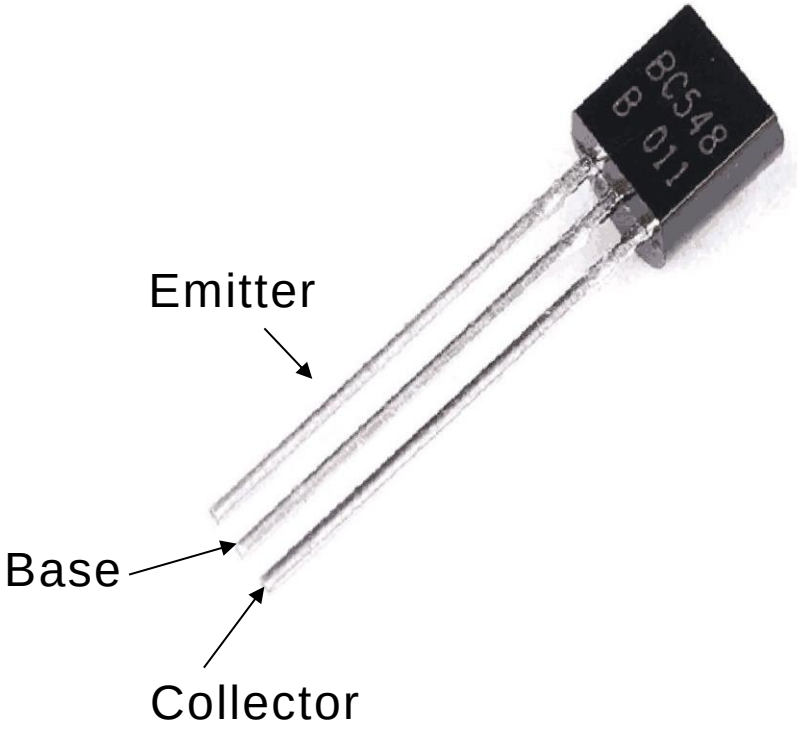




Transistor

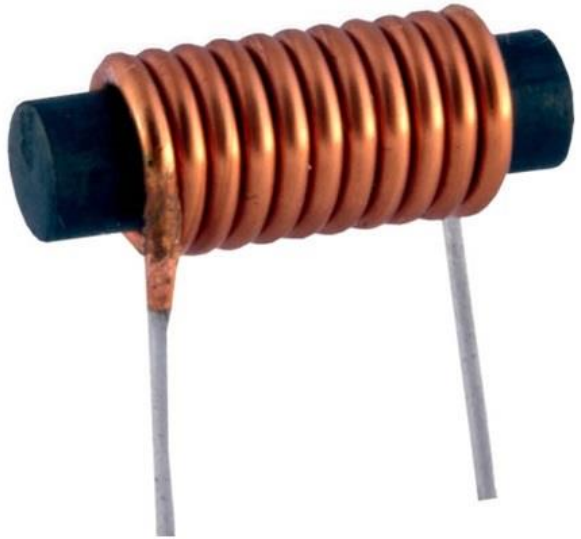
- The two types of existing transistors are:
  - If it is PNP, the transistor has this arrangement:





Inductors

- It's similar to an enabler;
- Stores energy through a magnetic field;
- It is limited in current output for the circuit in question;
- It can be used to reduce electrical current and as a kind of filter.



POTENTIOMETER

Potentiometer

- It is similar to a resistance, but has the advantage of being regulated.
- As it rotates, the resistance changes by increasing or decreasing the voltage.

INTEGRATED CIRCUIT

Integrated circuit

- An integrated circuit that contains numerous transistors and is capable of being a controller (processor) as far as a digital circuit is concerned.
- It has inputs to receive input data and outputs to output the processed information.

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Thank you for your attention

DRIVES project is project under **The Blueprint for Sectoral Cooperation on Skills in Automotive Sector**, as part of New Skills Agenda.

The aim of the Blueprint is **to support an overall sectoral strategy and to develop concrete actions to address short and medium term skills needs.**

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