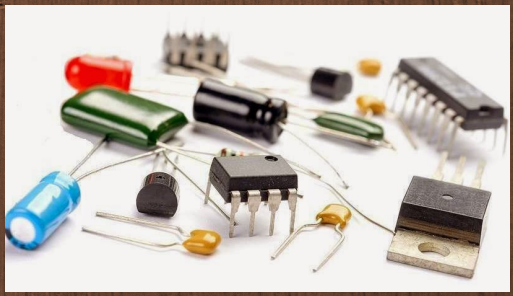
Electronics snippets- Capacitors



Voltage Rating of a Capacitor

- The voltage rating of a capacitor is the maximum amount of voltage that a capacitor can safely perform their operations.
- The maximum amount of voltage that can be applied to the capacitor without any damage to its insulating material is generally given in the data sheets by manufacturers.
- Generally this voltage is called as working voltage (WV) or DC working voltage (DC-WV).

- If high voltage is applied to the capacitor then the dielectric of a capacitor may break down, due to this reason the capacitor will damage by obtaining the arcing between the plates of a capacitor.
- So the designers must take care about the voltage rating when they are designing the capacitors.
- The working voltage of a capacitor depends on the factors that the dielectric material which is used between the capacitor plates, dielectric thickness and also depends on the type of circuit which is used.

- Different types of capacitors are available different voltage ratings.
- So the designer of a circuit must take care while choosing a capacitor for the circuit, Capacitor working voltage should be greater than the circuit operating voltage.
- For example if the circuit operating voltage is 5V then it is necessary to choose a capacitor with voltage rating of 5V or above.

- The DC working voltage of a capacitor is the maximum DC voltage which we can apply to the capacitor.
- But this DC voltage is not equal to the AC working voltage of a capacitor, because the AC voltage is the rms voltage of the capacitor.
- For example assume AC voltage of the capacitor is 100V rms but its actual peak voltage is 141V. (Vrms = Vm/√2).

- So we need to choose the capacitor in the circuit which is having the working voltage 50% greater than the maximum voltage applied to the circuit.
- For example, if you want to use a capacitor in the circuit which is operating at 100V AC then the capacitor working voltage should be at least 200V.
- Dielectric material will become damaged due to high supply voltages and high temperatures.

- So we never use a capacitor in the circuit which having the working voltages too much high than the capacitor voltage ratings.
- One more factor which influences the circuit operation is the dielectric leakage.
- This dielectric leakage will occurs in a capacitor due to the leakage current flowing through the dielectric of capacitor.