4.8 Thermal Runaway :

The maximum power that a transistor can dissipate without getting damaged, depends largely on the maximum temperature that a collector - base junction can withstand. The rise in the collector - base junction takes place due to two reasons :

- Due to increase in the ambient temperature and
- Due to the internal heating.

Out of them the internal heating process is cumulative as explained below :

(i) An increase in collector current I_C increases the power dissipated in the collector-base junction of the transistor.

(ii) This will increase the temperature of C-B junction.

(iii) As the transistor has a negative temperature coefficient of resistivity, increased junction temperature reduces the resistance.

(iv) The reduced resistance will increase the collector current further.

This becomes a cumulative process which will finally damage the transistor due to excessive internal heating. This process is known as "Thermal Runaway".

How to avoid the thermal runaway ?

- Never exceed the collector current beyond a certain maximum value specified by the manufacturer.
- Never exceed the internal power dissipation above the maximum permissible value.
- Use heat sink.