Vias types and applications

What is the difference between via and thermal via ?

Thermal vias : it is a hole located under a surface mounted heat source to allow heat transfer through it which allow the heat to be transferred away from the component and usually made of good, conducted heat materials to transfer and dissipate heat effectively

Vias : it is a small hole drilled into the PCB, filled with conductive material, typically made of copper to electrically connect different layers of the PCB and allow signals to pass from one layer to another, providing connectivity between traces on multiple layers

Types of vias ?

1. Through hole via

This type of via go through all the pcb layers and connect all layers together and it's required simple design and easy to manufacture which makes it one of the most common used types of vias

2. Micro via

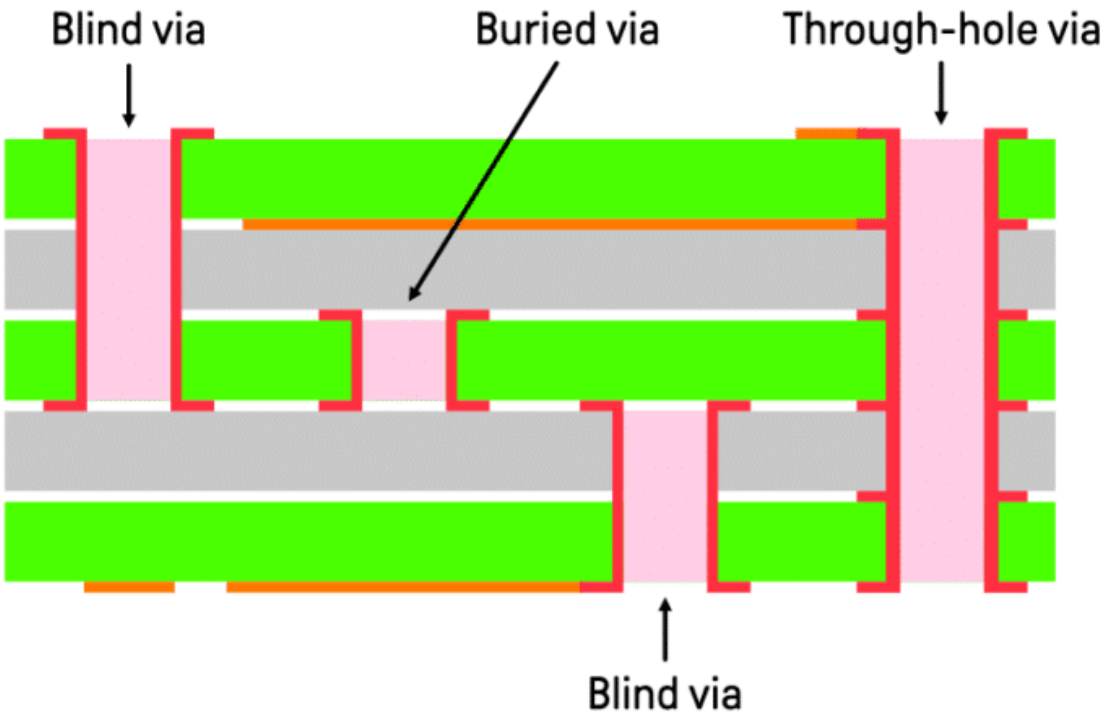
This type of via doesn't go all the way through like the through hole via but it only connects some layers together no all layers , this vias is small in size and often made using Lazer drilling rather than mechanical drilling

3. Blind via

This type of via connect the outer layer of the pcb to one or more inner layer and doesn't go all the way through also , this type is used to connect inner layers with outer layers without penetrating to the opposite side of the board

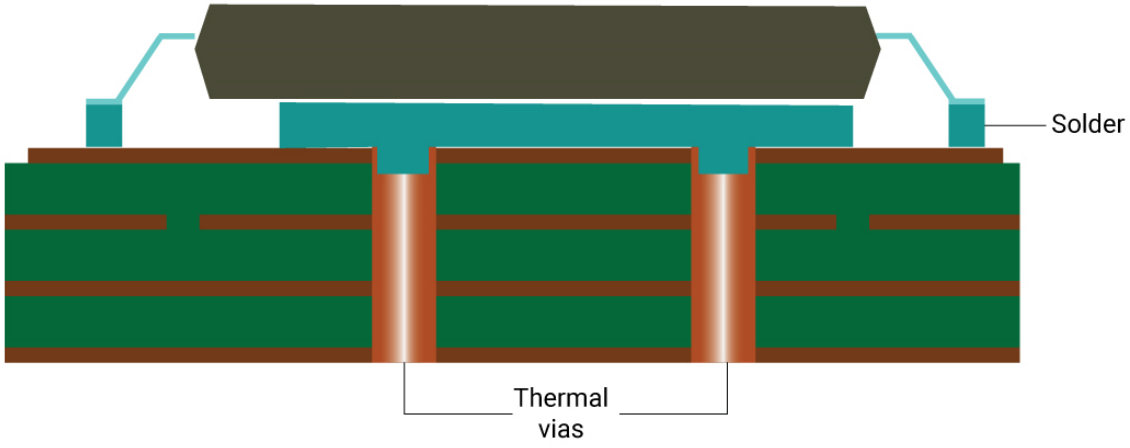
4. Buried via

this type of vias connect two or more inner layers together and doesn't connect to the outer layers and it's not visible from the surface and typically used in high density pcb



Placing and management of thermal vias ?

Through hole vias is typically a through hole vias and filled with conductive epoxy to function as a heated pipe transferring the heat from the component on the surface into the inner layers.



By placing more vias this will reduce the thermal resistance and allow faster heat transfer .

Each via has an inductance characteristic and to lower the inductance of vias they should be connected in parallel to the ground plane.

To decrease the heat resistance even more wider and long vias should bet used .