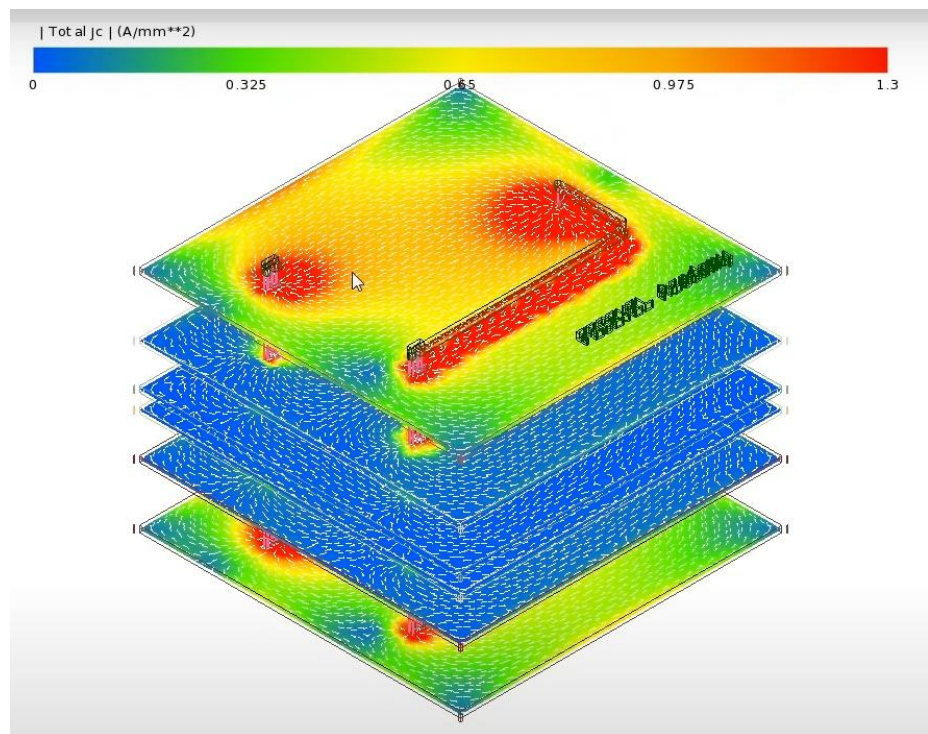


Via stitching and Copper pours

Signal transition:

When transitioning a signal between 2 layers using a via, the current at the via can propagate or spread like water spilling out of a container. Stitching vias here act as drains that pull the return current through it offering a low impedance return path and guides the return flow through a more defined path.



As more and more vias are added around the signal transition via we can better contain the propagation of the return current, However, for most signal traces one stitching via is enough. For thicker traces that carry higher current, or for routing power, a general rule of thumb is to place 4 stitching

vias around the signal transition via, and for more component dense boards, it is recommended to use via fences.

Via fences:

Via fences are essentially just a path of closely spaced vias along a track used to contain the return current of that track and keep it just below or above the track depending on the configuration of the board. However, the space between the vias should be no more than a certain distance depending on the frequency of the fenced signal as to not excite any resonance between the vias and cause the signal to travel through the via fence and couple into neighboring tracks.

Copper pours:

Coupled with via stitching, copper pours help reinforce the signal integrity of high frequency signals, isolate components from internal EMI, and distribute heat more efficiently when used with via fences, and thermal vias.

Copper pours can also be used to prevent ground loops by connecting all ground connections to a single grounded polygon.

Considerations:

Copper pours and via stitching is a very handy tool that can be used to optimize your design, but most often they aren't essential and do not improve the board characteristics to a significant degree. Additionally, the rules and regulations you must follow to apply these techniques could very easily be

violated in your design hurting your board performance even more than before.

To sum up, only use via stitching and copper pours if all else fails or if your goal is to optimize your board to a near perfect level.