

RF Board Designs Common Guidelines

do

don't



Power planes

Distributed power planes between 2 ground planes decouples supply and ground & is a low impedance path at radio frequencies



Sensitive RF traces

Multi-layer boards allows for a continuous grounding strategy to isolate and minimize noise on sensitive traces



Transmission lines

Where possible, employ microstrip and stripline transmission lines. 4-layer PCBs make these types of transmission lines easier to implement.



Current loops

Add decoupling caps to ground as close to the pin as possible to minimize current loops.



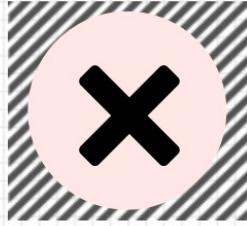
PCB parasitics

It is important to understand the RF characteristics of the PCB material used. Long traces look like inductors and pads over ground look like capacitors.



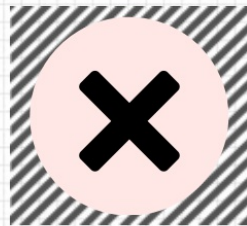
Thermal relief

The thermal relief pad should be connected to a component side ground connection which in turn is connected to the main ground plane layer by multiple vias.



Power planes

Running power planes to the edge of the card will create parasitic radiation. Instead, surround power plane with ground trace



Sensitive RF traces

Do not route return current paths under sensitive RF traces. Instead, use common low-impedance ground planes under sensitive RF traces.



Transmission lines

For 2-layer PCBs thickness should not exceed 30mils. Otherwise, the required width of the transmission line trace will become rather large



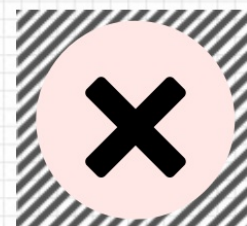
Current loops

Avoid captive coupling. Instead, ensure each port or pin has its own decoupling to ground through a dedicated ground via.



PCB parasitics

Vias in a typical thickness PCB can have parasitic capacitances of 0.5pF and parasitic inductance of 1.2nH. Ensuring that via spacing is of the order of $\lambda/30$.



Thermal relief

Avoid uneven thermal dissipation and parasitic inductance by placing several parallel vias in the thermal relief pads of components.



Schedule a technical discussion with our engineering team



"I'm an engineer, not sales"
"not that there's anything wrong with that"

