

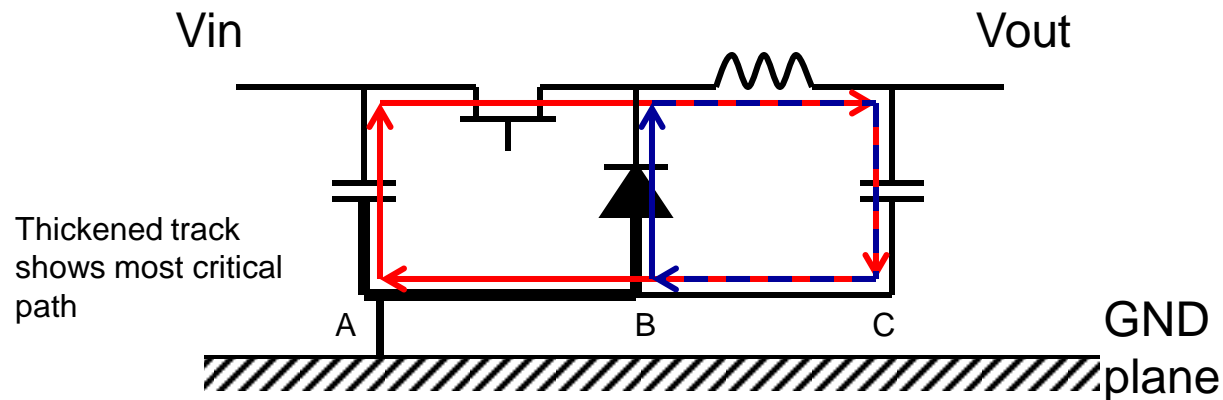
# Layout Hints and Tips: Buck



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# Ground Connection

- Return Current Paths
  - Keep high current paths away from Ground plane



Coloured arrows show the circulating currents in the power paths.

Nodes A and B should be as close together as physically possible, with C close to them too.

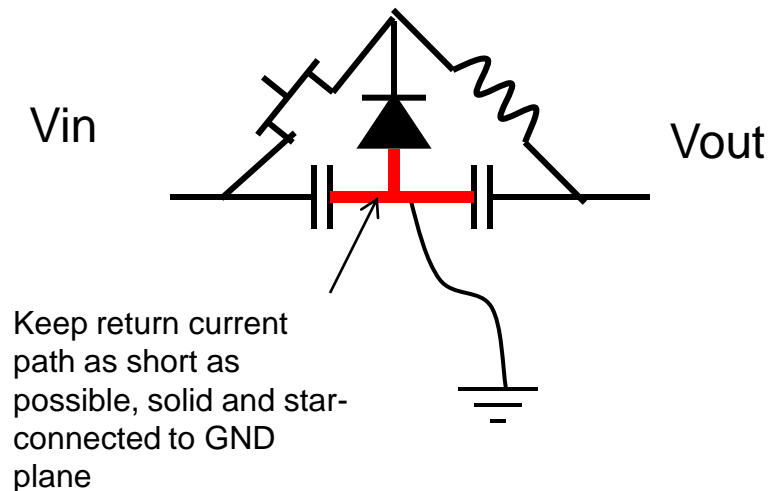
These three nodes should be connected on the top side of the board by a thick return current track.

The return current track should be star connected to the GND plane at one point.

The loop from the switch node – inductor – output cap – diode – back to the switch node should be kept as tight as possible also.

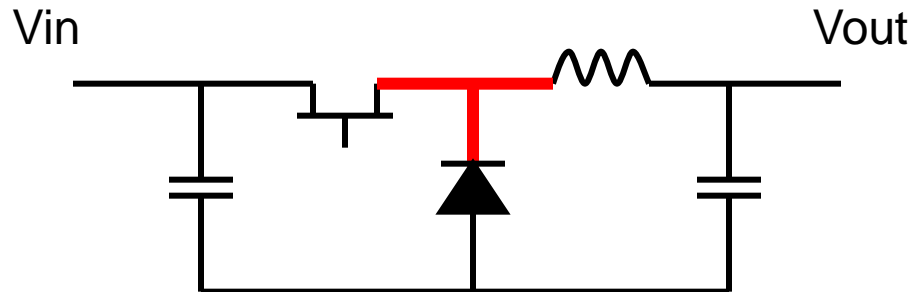
# Component Layout

- Place the switching reg, input and output caps, diode and inductor first and get the physical positions correct before placing any other components close by.
- Track these key power paths before adding other components.
- Getting the physical position of these components and the tracking right should be a priority. If you compromise because of CAD package issues, PCB shape etc. Then be prepared for noise, EMI etc.



# Switch Node

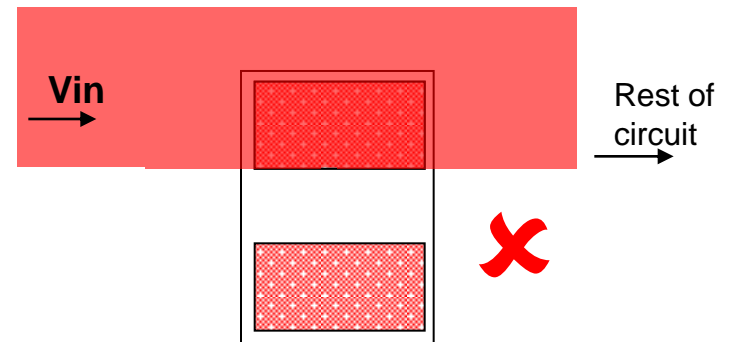
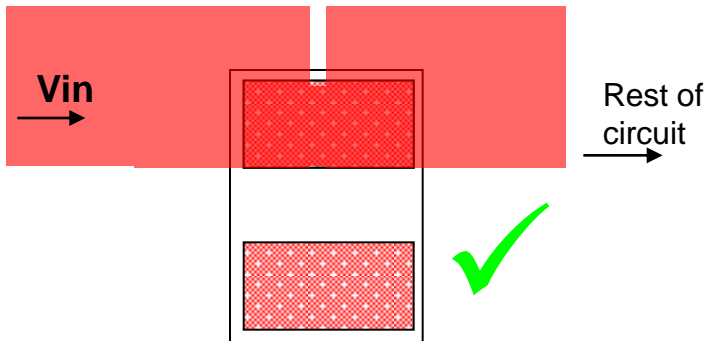
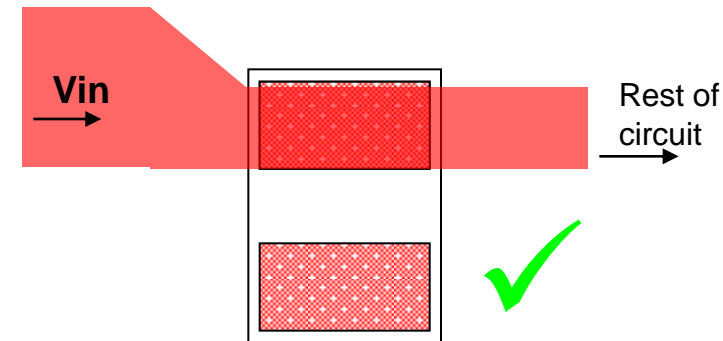
- The highest  $dV/dt$  edges are on the switch node from the switch pin to the diode and inductor. This track should be as short as possible. It should have a reasonable thickness to minimise stray inductance but try to keep the area of this track to a minimum
- The GND plane and power planes should be cut away under this track to avoid capacitive coupling. Can also be a good idea to cut these planes away from under the inductor too.



Keep this track as short as possible, thick enough to avoid stray inductance, but also minimise area to EMI. Cut away GND and power planes under this track (and inductor)

# Capacitor Connections

- Ensure all current from the input supply is decoupled by  $C_{in}$  and all output current is decoupled by  $C_{out}$ . Do this by making sure the  $V_{in}$  and  $V_{out}$  tracks pass directly through the Cap pads and no currents can bypass the pads.



- This is the same for output caps also.
- Take feedback after output caps
- Put feedback resistors near feedback pin and keep feedback track away from inductor and switching node