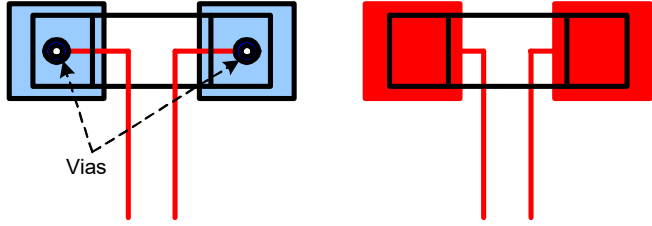
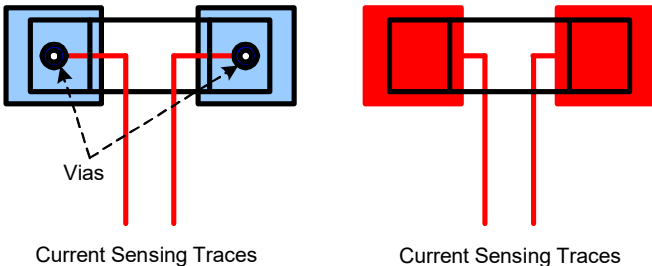


10. Layout

Pin Number	Pin Name	Layout Guidelines
Bottom Pad 33	GND	Connect this ground pad to the ground plane through a low impedance path. Use at least five vias to connect to the PCB ground planes to ensure sufficient thermal dissipation directly under the IC.
1	CSON	Run two dedicated traces with sufficient width in parallel (close to each other to minimize the loop area) from the two terminals of the battery current sensing resistor to the IC. Place the differential mode and common-mode RC filter components in the general proximity of the controller.
2	CSOP	Route the current sensing traces through vias to connect the center of the pads; or route the traces into the pads from the inside of the current sensing resistor. The following drawings show the two preferred ways of routing current sensing traces.  Current Sensing Traces Current Sensing Traces
3	VSYS	This signal pin provides feedback for the system bus voltage. Place the optional RC filter in the general proximity of the controller. Run a dedicated trace from the system bus to the pin and do not route near the switching traces. Do not share the same trace with the signal routing to the DCIN pin OR diodes and the CSOP trace.
4	BOOT2	Switching pin. Place the bootstrap capacitor in the general proximity of the controller. Use sufficiently wide traces. Avoid any sensitive analog signal traces from crossing over or getting close.
5	UGATE2	Run these two traces in parallel fashion with sufficient width. Avoid any sensitive analog signal traces from crossing over or getting close. Route the PHASE2 trace to the high-side MOSFET source pin instead of general copper.
6	PHASE2	Place the IC close to the gate terminals of the switching MOSFETs and keep the gate drive signal traces short for a clean MOSFET drive. The IC can be placed on the opposite side of the switching MOSFETs. Place the output capacitors as close as possible to the switching high-side MOSFET drain and the low-side MOSFET source, and use shortest PCB trace connection. Place these capacitors on the same PCB layer with the MOSFETs instead of on different layers and using vias to make the connection. Place the inductor terminal to the switching high-side MOSFET source and low-side MOSFET drain terminal as close as possible. Minimize this phase node area to lower the electrical and magnetic field radiation but make this phase node area large enough to carry the current. Place the inductor and the switching MOSFETs on the same layer of the PCB.
7	LGATE2	Switching pin. Run the LGATE2 trace in parallel with the UGATE2 and PHASE2 traces on the same PCB layer. Use sufficient width. Avoid any sensitive analog signal traces from crossing over or getting close.
8	VDDP	Place the decoupling capacitor in the general proximity of the controller. Run the trace connecting to the VDD pin with sufficient width.
9	LGATE1	Switching pin. Run the LGATE1 trace in parallel with the UGATE1 and PHASE1 traces on the same PCB layer. Use sufficient width. Avoid any sensitive analog signal traces from crossing over or getting close.

Pin Number	Pin Name	Layout Guidelines
10	PHASE1	Run these two traces in parallel fashion with sufficient width. Avoid any sensitive analog signal traces from crossing over or getting close. Route the PHASE1 trace to the high-side MOSFET source pin instead of general copper.
11	UGATE1	Place the IC close to the gate terminals of the switching MOSFETs and keep the gate drive signal traces short for a clean MOSFET drive. The IC can be placed on the opposite side of the switching MOSFETs. Place the input capacitors as close as possible to the switching high-side MOSFET drain and the low-side MOSFET source, and use shortest PCB trace connection. Place these capacitors on the same PCB layer with the MOSFETs instead of on different layers and using vias to make the connection. Place the inductor terminal to the switching high-side MOSFET source and low-side MOSFET drain terminal as close as possible. Minimize this phase node area to lower the electrical and magnetic field radiation but make this phase node area big enough to carry the current. Place the inductor and the switching MOSFETs on the same layer of the PCB.
12	BOOT1	Switching pin. Place the bootstrap capacitor in the general proximity of the controller. Use sufficient wide trace. Avoid any sensitive analog signal traces from crossing over or getting close.
13	ASGATE	Run this trace with sufficient width in parallel fashion with the ADP pin trace.
14	CSIN	Run two dedicated traces with sufficient width in parallel (close to each other to minimize the loop area) from the two terminals of the adapter current sensing resistor to the IC. Place the Differential mode and common-mode RC filter components in the general proximity of the controller.
15	CSIP	Route the current sensing traces through vias to connect the center of the pads or route the traces into the pads from the inside of the current sensing resistor. The following drawings show the two preferred ways of routing current sensing traces. 
16	ADP	Run this trace with sufficient width in parallel fashion with the ASGATE pin trace.
17	DCIN	Place the OR diodes and the RC filter in the general proximity of the controller. Run the VADP trace and VSYS trace to the OR diodes with sufficient width.
18	VDD	Place the RC filter connecting with the VDDP pin in the general proximity of the controller. Run the trace connecting to the VDDP pin with sufficient width.
19	ACIN	Place the voltage divider resistors and the optional decoupling capacitor in the general proximity of the controller.
20	OTGEN/CMIN	No special consideration.
21	SDA	Digital pins. No special consideration. Run the SDA and SCL traces in parallel.
22	SCL	
23	PROCHOT#	Digital pin, open-drain output. No special consideration.
24	ACOK	
25	BATGONE	Digital pin. Place the 100kΩ resistor series in the BATGONE signal trace and the optional decoupling capacitor in the general proximity of the controller.

Pin Number	Pin Name	Layout Guidelines
26	OTGPG/ CMOUT	Digital pin, open-drain output. No special consideration.
27	PROG	Signal pin. Place the PROG programming resistor in the general proximity of the controller.
28	COMP	Place the compensation components in the general proximity of the controller. Avoid any switching signal from crossing over or getting close.
29	AMON/BMON	No special consideration. Place the optional RC filter in the general proximity of the controller.
30	CONFIG/ PSYS	Dual-purpose pin: Configuration input or current source signal output. No special consideration.
31	VBAT	Place the optional R-C filter in the general proximity of the controller. Run a dedicated trace from the battery positive connection point to the IC.
32	BGATE	Use sufficient width trace from the IC to the BGATE MOSFET gate. Place the capacitor from BGATE to ground close to the MOSFET.