5V Power Supply PCB Layout Review Sheet

Purpose: A pre-fabrication and bring-up worksheet for a board that receives, generates or distributes a 5V rail. It helps a reviewer connect the actual topology, controller documentation, current paths, placement and measurement plan.

Boundary: This is an original planning tool, not a manufacturer data sheet, safety approval, EMC report, design certification, test record or universal layout recipe. It does not establish compliance or replace a qualified review.

1. Identify What 5V Means

Review item	Record or attach before release
Rail role	Is 5V an input, regulated output, USB-derived rail or intermediate distribution rail?
Topology	Identify LDO, buck, boost, buck-boost or other topology; record isolation and protection boundaries.
Operating envelope	Input range and transients, load range and steps, switching modes, ambient, airflow and enclosure.
Controlling documents	Controller and component data sheets, reference layout, schematic revision, stackup and fabrication limits.
Acceptance criteria	Define regulation, ripple, transient, thermal, EMC, reliability and manufacturing criteria for this product.

2. Placement and Current-Path Review

Check	Evidence to inspect	Status / notes
Local bypass	Check capacitor value/type against the IC data sheet and inspect pad-to-pin and return geometry.	
Buck hot loop	For a switching rail, mark the topology-specific pulsed-current loop and confirm the local input capacitor connection.	
Switch node	Identify required SW copper and keep unnecessary high-dv/dt area away from sensitive nets.	
Output path	Review inductor/output capacitor/load path for current, voltage drop, heat and return continuity.	
Feedback	Verify divider pickup point, quiet reference and separation from switching copper against the controller data sheet.	
5V boundary	Review connector or USB source limits, protection, inrush/backfeed risks, bulk energy and shared returns.	

3. Copper, Thermal and Fabrication Checks

1. Size traces, planes and vias from actual current waveform, copper thickness, layer, path length, temperature-rise target and fabricator capability - not from the 5V label alone.

2. Review every critical layer change with its return path; use vias in pulsed-current loops only when the topology and layout guidance support them.

3. Treat exposed-pad land pattern, thermal vias, copper spreading, component loss, airflow and enclosure as one heat path.

4. Check DRC, clearances, solder mask, paste, assembly, inspection and test-point access with the fabricator and assembler.

4. Bring-Up and Measurement Plan

Measurement	Document before interpreting the result
5V regulation / ripple	Input, load, probe type, ground connection, bandwidth limit, test point and board revision.
Load transient	Load-step amplitude/slew, fixture and cable, measurement point, recovery criterion and operating mode.
Switch node / stress	Probe rating and method, input/load condition, ringing observed and device limits from the data sheet.
Temperature	Ambient, airflow, load duration, instrument/method and component/board locations measured.
EMC observation or test	Requirement, cable/enclosure setup, operating mode, limit and hardware/firmware revision.

Release decision: record each open item, owner, evidence needed and disposition. A checked box is not evidence by itself.

Source Basis and Use Notes

This original worksheet is based on the following public technical guidance. For a specific design, the selected controller data sheet and its reference layout remain the primary authority.

Analog Devices AN-136: PCB Layout Considerations for Non-Isolated Switching Power Supplies
https://www.analog.com/en/resources/app-notes/an-136.html

Analog Devices AN-1119: Printed Circuit Board Layout Guidelines for Step-Down Regulators
https://wiki.analog.com/resources/app-notes/an-1119

Texas Instruments: Board Layout Considerations for Buck Converter EMI
https://www.ti.com/document-viewer/lit/html/SSZT090/GUID-D62264EC-5FF1-497C-9311-E3E043EE6B4F

STMicroelectronics AN2603: ST1S09 high-efficiency synchronous buck converter
https://www.st.com/resource/en/application_note/an2603-st1s09-high-efficiency-synchronous-buck-converter-stmicroelectronics.pdf

Texas Instruments Power Supply Design Seminar: PCB Layout for Switching Power Supplies
https://www.ti.com/seclit/ml/slup384/slup384.pdf

Use condition: Complete this sheet with the project schematic, controller documentation, stackup, selected components, fabrication constraints and applicable acceptance criteria. It is not evidence that a board meets any standard or performance target.