Fabrication capabilities

Fabrication · partner network

Made in the USA

Under 24 hour turnaround available. Load board, probe card, and test board expertise.

Overseas partners

Prototype to high volume. ISO, UL, and IPC standards certified. India, Vietnam.

The fabrication route for each order is determined and documented in the quote before approval.

2.1 Fabrication envelope

Specification	Standard	Advanced
Maximum layer count	16	32
Board thickness	0.015 to 0.200 in	0.010 to 0.250 in
Trace / space, outer 1 oz	6/6 mil	4/4 mil
Trace / space, inner 0.5 oz	5/5 mil	3/3 mil
Minimum mechanical drill	0.006 in	0.004 in
Minimum laser drill	0.004 in	0.003 in

2.2 Board construction

Specification	Standard	Advanced
Minimum layer count	1	1
Outer layer finished copper	1 oz to 2 oz	1 oz to 4 oz
Inner layer finished copper	0.5 oz to 2 oz	0.3 oz to 3 oz
Annular ring	0.005 in	0.003 in mechanical, 0.001 in laser
Aspect ratio, through-hole	10:1	15:1
Plated hole to copper	0.008 in	0.005 in
Copper to board edge, outer	0.010 in	0.005 in
Copper to board edge, inner	0.015 in	0.005 in
Plated and non-plated slots	Routed	Routed or nibbled
Minimum panel size	9 in × 12 in	8 in × 8 in
Maximum panel size	18 in × 24 in	24 in × 36 in

2.3 Trace and space by copper weight (mil, trace/space)

Layer and copper weight	Standard	Advanced
Outer, 1 oz	6/6	4/4

Layer and copper weight	Standard	Advanced
Outer, 2 oz	10/10	8/8
Outer, 3 oz	15/15	12/12
Outer, 4 oz	20/20	20/20
Inner, 0.5 oz	5/5	3/3
Inner, 1 oz	6/6	5/5
Inner, 2 oz	10/10	8/8

3 mil geometry is available on inner layers at 0.5 oz under the advanced process. Best outer layer geometry is 4 mil at 1 oz.

2.4 Board thickness by layer count

Layer count	Standard	Advanced
1 layer	0.015 to 0.200 in	0.010 to 0.250 in
2 layer	0.015 to 0.200 in	0.010 to 0.250 in
4 layer	0.020 to 0.200 in	0.016 to 0.250 in
6 layer	0.031 to 0.200 in	0.025 to 0.250 in
8 layer	0.047 to 0.200 in	0.031 to 0.250 in
10 layer	0.062 to 0.200 in	0.040 to 0.250 in
12 layer	0.062 to 0.200 in	0.050 to 0.250 in
14 layer	0.075 to 0.200 in	0.062 to 0.250 in

2.5 Drilling

Specification	Standard	Advanced
Min drill, final thickness up to 0.031 in	0.006 in	0.004 in
Min drill, 0.031 to 0.062 in	0.008 in	0.005 in
Min drill, 0.062 to 0.093 in	0.010 in	0.006 in
Min drill, 0.093 to 0.125 in	0.015 in	0.008 in
Min laser, dielectric up to 0.004 in	0.004 in	0.003 in
Largest hole	0.247 in plated, 0.250 in non-plated	Design specific
Nibbling	No	Yes
Plating in holes	0.0008 in	0.0015 in
Back drill for stub removal	Available	Available

2.6 Via technology

Capability	Standard	Advanced
Blind vias	No	Yes
Buried vias	No	Yes

Capability	Standard	Advanced
Stacked vias	No	Yes
Controlled depth blind vias	No	Yes, max 0.75:1 aspect ratio
Pre-drilled core blind vias	No	Yes
Sublamination blind vias	No	Yes
Build-up technology	No	Up to 4-N-4, any layer
Filled vias	Non-conductive	Non-conductive, conductive, or partial
Tented vias	Yes	Yes
Soldermask plugged vias	Yes	Yes

2.7 Controlled impedance

Layers supported	Up to 32
Single-ended tolerance	±10% std / ±5% adv
Differential pair tolerance	±10% std / ±5% adv
TDR testing	Yes

2.8 Silkscreen

Colors	7 standard / custom adv
Minimum legend width	0.004 in
Silkscreen to pad spacing	0.005 in std / 0.004 in adv

2.9 Soldermask

Specification	Standard	Advanced
Colors	Green, black, blue, red, white, clear, yellow	Custom
Finish	Semi-gloss, matte	Semi-gloss, matte
Thickness over copper	0.0007 in	0.0010 to 0.0012 in, double coat
Web / dam	0.005 in	0.003 in
Gap to pad	0.004 in	0.002 in
Copper ring under mask-defined pad	0.003 in	0.001 in
LPI	Yes	Yes
Dry film	No	Yes

2.10 Surface finishes

HASL, leaded and lead-free	Electrolytic hard and soft gold
ENIG	Hard gold body and flash gold
ENEPIG / EPIG (advanced)	Selective plating, hard and soft bondable gold
Immersion silver	Tin nickel (advanced)

Hard gold fingers with ENIG or HASL	White tin
OSP	Bare copper / carbon ink (advanced)

2.11 Laminate and material systems

Material class	Suppliers	Designations
FR-4 and high-Tg FR-4	Isola, Ventec	IT180, 185HR, 370HR, VT42, VT47
Specialty FR-4	Isola	IS410, FR408HR
RF and high frequency	Rogers	RO4003, RO4350, RO4360, RO4835
PTFE and ceramic-filled	Rogers	RO3003, RO3006, RO3010, RO3210, RO5880, RO6002, RO6006, RO6035
Polyimide	Isola, Arlon	G200, 85N
Low-loss digital	Nelco	N4000, N4350, N5000, 4000-13
Very low loss	Panasonic	Megtron 6
Black FR-4	Ventec	VT42-B
Flex core	DuPont, Apexyl	AP series
Flex adhesive and coverlay	DuPont, Apexyl	LF/FR series

Polyimide, Rogers RF and PTFE, and Megtron 6 support airborne and RF defense hardware. Hybrid and mixed-material stackups are supported.

2.12 Product types

Rigid multilayer, HDI, Flex, rigid & rigid-flex, RF & microwave, Backplane, Burn-in boards, Probe cards, Load & test boards

2.13 RF and microwave

Frequency range	100 MHz to 30 GHz and beyond
Test equipment	6 network analyzers, combined sweep 50 MHz to 40 GHz
Antenna measurement	Custom anechoic boxes
Etch control	Close tolerances on critical RF features
Stub removal	Back drill
Stackups	Multilayer, hybrid, mixed-material
RF finishes	ENIG, ENEPIG, hard and soft wire bondable gold, immersion silver

Design and secondary operations

3.1 / Design capability

- Single and multilayer boards
- Digital, analog, and RF circuits
- High density and fine line SMT, BGA, and through-hole

3.2 / Deliverables

- Layout PCB database
- Gerber files and aperture list
- Drill data
- Fabrication drawings

3.3 / Secondary operations

- Conformal coating
- Staking
- Encapsulation
- Flying probe test

- Ultra high speed
- EMI suppression
- Design for manufacturing (DFM)
- Design for test (DFT)
- Input: netlist, PADS PowerLogic, AutoCAD, hand-drawn schematics
- Photoplots on request

Certifications and standards

ProvenMetal

ITAR compliant

Held across our assembly and fab partners

ISO 9001:2015, AS9100, ITAR registered, NIST 800-171, ISO 13485:2016, ISO 27001:2022, IPC-A-600, IPC J-STD-001, UL certified, RoHS compliant

Certificates, registration numbers, and scopes available on request through ProvenMetal.