



Manufacturing Capabilities - Technology

10/1/2019

	Standard	Advanced	Emerging
Layer Count	2-48 Layers	2-48 layers	50+ Layers

Laminate Materials			
FR4 Tg 140	Yes	Yes	Yes
FR4 Tg 170	Yes	Yes	Yes
FR4 Tg 180	Yes	Yes	Yes
GETEK	Yes	Yes	Yes
Polyimide	Yes	Yes	Yes
Rogers RF	Yes	Yes	Yes
Taconic RF	Yes	Yes	Yes
Arlon RF	Yes	Yes	Yes
Duriod	Yes	Yes	Yes
Megtron	Yes	Yes	Yes
RoHS Materials	Yes	Yes	Yes
Halogen Free	Yes	Yes	Yes
Aluminum Backing	Yes	Yes	Yes
Brass Backing	Yes	Yes	Yes
Copper Backing	Yes	Yes	Yes
Bergquist	Yes	Yes	Yes
Laird	Yes	Yes	Yes
C-LEC Plastic	Yes	Yes	Yes
Speed Board	Yes	Yes	Yes
Flex Substrates	Yes	Yes	Yes

Board Types			
Rigid	Yes	Yes	Yes
Rigid-Flex	Yes	Yes	Yes
Flex	Yes	Yes	Yes
RF Microwave	Yes	Yes	Yes
Mix Dielectrics	Yes	Yes	Yes
Dielectrics With Metal Core/Backing	Yes	Yes	Yes

Panel Sizes	Standard Panel	Non-Standard Panel
12 X 18	Yes	No
16 X 18	Yes	No
16 x 21	No	Yes
18 X 24	Yes	No
21 x 24	No	Yes
22 x 28	No	Yes

** Panel Utilization Can Vary On Panel Area Depending On Design, IPC Coupons & TDR Coupons.

Material Thickness

Finish Thickness	.003" to .200"	.003" to .500"	> .500
Minimum Core Thickness	.004"	.003"	.002"
Finished Thickness Tolerance	10%	7%	5%
Multiple Lamination Cycles	5	7	7+
Copper Foil Weights (Internal Layers)	1/2 - 3 OZ	1/4 - 4 OZ	1/4 - 6 OZ
Copper Foil Weights (External Layers)	1/2 - 3 OZ	1/4 - 4 OZ	1/4 - 6 OZ

Pad, Lines & Spacing Diameters

External Line Width	.004"	.003"	.002"
External Spacing	.004"	.003"	.002"
Internal Line Width	.004"	.003"	.002"
Internal Spacing	.004"	.003"	.002"
External Pad Size - Annual Ring Per Side	.005"	.004"	.003"
Internal Pad Size - Annular Ring Per Side	.005"	.004"	.003"
SMT Pitch	.040"	.030"	.020"
BGA Pitch	.040"	.030"	.020"
Laser Direct Imaging (LDI)	Yes	Yes	Yes
Impedance	10%	5%	2.5%

Plating Finishes

ENIG (Electroless Nickel Immersion Gold)	Yes	Yes	Yes
ENEPIG	Yes	Yes	Yes
Immersion Silver	Yes	Yes	Yes
Immersion White Tin	Yes	Yes	Yes
HASL (60/40 Tin-Lead)	Yes	Yes	Yes
HAL (Lead-Free)	Yes	Yes	Yes
Nickel (Electroplated)	Yes	Yes	Yes
Palladium (Electroplated)	Yes	Yes	Yes
Gold (Electroplated)	Yes	Yes	Yes
Soft Wire Bondable Gold	Yes	Yes	Yes
OSP (Organic Surface Protection)	Yes	Yes	Yes
Carbon Ink	Yes	Yes	Yes
Selective Plating	Yes	Yes	Yes

RoHS Finishes

ENIG (Electroless Nickel Immersion Gold)	Yes	Yes	Yes
Immersion Silver	Yes	Yes	Yes
Immersion White Tin	Yes	Yes	Yes
HAL (Lead-Free)	Yes	Yes	Yes
OSP (Organic Surface Protection)	Yes	Yes	Yes
Soft Wire Bondable Gold	Yes	Yes	Yes

Tolerances

Hole Aspect Ratio	10:1	15:1	20:1
Drilled Hole To Copper	.008"	.005"	< .005"
Plated Hole Tolerances (+/-)	.003"	.002"	<.002"
Non Plated Hole Tolerances (+/-)	.001"	.001"	.001"
Fabrication Tolerances (+/-)	.005"	.003"	<.003"

Via Holes			
Laser Micro Vias	0.004	0.003	0.002
Blind Vias	.0063"	.0063"	.0063"
Buried Vias	.0063"	.0063"	.0063"
Via Holes Under PAD	Yes	Yes	Yes
Laser Drill	Pending	Pending	Pending
Mechanical Drill Vias	.0063"	.0063"	.0063"
Tented Vias	Coated with LPI	Coated/Plugged	Coated/Plugged
Silver Conductive Via Filled	Yes	Yes	Yes
Copper Conductive Via Filled	Yes	Yes	Yes
Non-Conductive Via Filled	Yes	Yes	Yes
Copper Plated Plugged Vias (80%) .008" Min	Yes	Yes	Yes
Automated Planarization Capability	Yes	Yes	Yes

Routing/Scoring			
Scoring (Jump)	Yes	Yes	Yes
Scoring (Jump) Min length 1"	Yes	Yes	Yes
Scoring Webb .014 +/- .003 Min	Yes	Yes	Yes
Routed/Plated Edges	Yes	Yes	Yes
Routed/Plated Pockets & Cuts Outs	Yes	Yes	Yes
Z-Depth Routing (Plated Pockets & Cutouts)	Yes	Yes	Yes
Cavities (Plated & Non-Plated)	Yes	Yes	Yes

Soldermask			
LPI (Liquid Photo Imagable Soldermask)	Yes	Yes	Yes
Soldermask Colors	All Avail. Colors	All Avail. Colors	All Avail. Colors
Soldermask Type	LPI	LPI	LPI
Dry Film Soldermask	Yes	Yes	Yes
Minimum Mask Clearance (LPI) Per Side	.003"	.002"	.001"
Minimum Mask Clearance (Dry Film)	.003"	.003"	.003"
Minimum Soldermask Thickness (LPI)	.0005"	.0004"	.0004"
Minimum Soldermask Thickness (Dry Film)	.003"	.003"	.003"
Soldermask Web Minimum (LPI)	.004"	.003"	.003"
Soldermask Web Minimum (Dry Film)	.010"	.008"	.008"

Silkscreen/Legend			
Silkscreen/Legend Colors	All Avail. Colors	All Avail. Colors	All Avail. Colors
Silkscreen/Legend Feature Size	.008" W X .030 H Min.	.008" W X .030 H Min.	.008" W X .030 H Min.
Flatness	IPS Standard	IPC Standard	IPC Standard

Electrical Testing			
Netlist Testing	Yes	Yes	Yes
Flying Probe	Yes	Yes	Yes
Clamshell Fixture	Yes	Yes	Yes
Netlist IPC-356A	Yes	Yes	Yes

Controlled Impedance			
Controlled Impedance Testing	Yes	Yes	Yes

TDR Tester (Polar Instruments)	Yes	Yes	Yes
Impedance tolerance (+/-)	10%	5%	2.50%

CAM			
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Genesis 2000	Yes	Yes	Yes
ODB++	Yes	Yes	Yes
FTP Site	Yes	Yes	Yes

Certifications & Standards			
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AS9100 Certified	Yes	Yes	Yes
ISO 9001:2008 Certified	Yes	Yes	Yes
MIL-PRF-31032 Certified	Yes	Pending	Pending
ITAR Registered	Yes	Yes	Yes
IPC Standards	Yes	Yes	Yes
IPC-6012 Class 1,2,& 3	Yes	Yes	Yes
IPC-6013 Class 1,2,& 3	Yes	Yes	Yes
IPC-6018 Class 1,2 & 3	Yes	Yes	Yes
MIL-PRF-55110 Certified FR4/GFN	Yes	Yes	Yes
MIL-PRF-55110 Certified Polyimide/GIN	Yes	Yes	Yes
Certified Etchback On Mil-PRF-55110	Yes	Yes	Yes

Certification(s) are on our website www.multilayer.com

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