

Integrated Test Corporation

Manufacturing Capabilities Summary

GENERAL	Standard		Advanced		Leading Edge	
Panel Size (Inches)	12 x 18, 16 x 18, 18 x 24		21 x 24, 21 x 30			
Max Finished Board	16 x 22		19 x 28			
Number of Layers	1 to 35		36 - 52		> 52	
Minimum Core Thickness	0.005		0.002		< 0.002	
Minimum Dielectric Thickness	0.004		0.0035		< 0.0035	
Overall Board Dimensions	± 0.005		≤ ± 0.005		≤ ± 0.005	
Warp and Twist	.005 inch/inch		.004 inch/inch		.003 inch/inch	
Selective Warp/Flatness					0.001 inch/inch	
Board Overall Thickness & Tolerance						
<= 0.090	± 10%		± 5%		< ± 5%	
0.091 - 0.170	± 10%		± 5%		< ± 5%	
0.171 - 0.265	± 10%		± 5%		< ± 5%	
0.265 - 0.300					available	
MATERIALS						
Laminates / Prepreg & Adhesives Available	FR4 - 130° C		Gore (Speed board C)			
	FR4 - 175° C		Teflon: Rogers		Other Neltec	
	Rogers 4000 Series		Polyimide - 260°C		Other Isola	
	Nelco N4000-13		GE Getek (Enhanced Fr-4)		Other Arlon	
	Cyanate Ester- 240°C		Arlon 25N			
Foil Types Available	Electro-Deposited					
Copper Foil Elongation	>6 HTE Inners		HTE - Outer layers			
Available Cu Weight	1/2, 1, 2		1/4 (9 micron)		1/8 (5 micron), 3	
TRACE / SPACE						
Minimum inner layer	Line Width	Space	Line Width	Space	Line Width	Space
3 Oz cu foil	Plane		Plane		Plane	
2 Oz cu foil	0.007	0.007	0.006	0.006	0.005	0.005
1 Oz cu foil	0.005	0.005	0.004	0.004	0.003	0.003
1/2 Oz cu foil	0.004	0.004	0.003	0.003	0.002	0.0025
1/4 Oz cu foil						
Minimum outer layer	Line Width	Space	Line Width	Space	Line Width	Space
2 Oz cu foil	0.009	0.009	0.008	0.008	0.007	0.007
1 Oz cu foil	0.007	0.006	0.006	0.005	0.005	0.004
1/2 Oz cu foil	0.005	0.005	0.004	0.004	0.002	0.003
1/4 Oz cu foil	0.004	0.004	0.0035	0.003	0.002	0.002
Drilled Hole to Copper Space						
Innerlayer	0.009		0.006		0.004	
Outerlayer	0.008		0.006		0.004	
Drilled Holes						
PTH tolerance & minimum plated hole size	± 0.003 0.018		± 0.0025 > 0.018		± 0.002 > 0.018	
NPTH tolerance (drill bit dependent)	± 0.003		± 0.001		± 0.0005	
Minimum drilled hole size	0.008		0.006		0.004	
Thickness ≤ 0.160	0.010		0.006			
0.161 to 0.190	0.012		0.010		0.006	
0.191 to 0.250	0.016		0.012		0.010	
Maximum thickness						
Minimum drill 0.006	< 0.155		0.155		0.187	
Minimum drill 0.008	< 0.155		0.187		> 0.187	
Minimum drill 0.010	0.210		0.250			
Maximum Aspect Ratio (thru)	20:1		20:1 - 25:1		25.1 - 32:1	
Maximum Aspect Ratio (blind)	0.5:1					
Depth Control Tolerance	± 0.005		± 0.004		± 0.003	
Hole Location Tolerance	± 0.003		± 0.002		± 0.001	
MIN PAD / CLR DIA						
Inner Layers						
Tangency **	DHS + 0.012 DHS + 0.008 / Thermals		DHS + 0.010		DHS + 0.007	
Annular Ring	DHS + 0.012 + 2x min A/R		DHS + 0.010 + 2x min A/R		DHS + 0.008 + 2x min A/R	
Clearance (antipad) (0.005 min)	DHS + 0.020		DHS + 0.016		DHS + 0.012	
Outer Layers						
Tangency **	DHS + 0.008		DHS + 0.006		DHS + 0.005	
Annular Ring	DHS + 0.008 + 2x min A/R		DHS + 0.006 + 2x min A/R		DHS + 0.005 + 2x min A/R	
EDGE BEVEL						
Bevel Angles	45°		20°, 30°		70°	
Angle Tolerance	± 5°					
Bevel Depth	.010 up to .080					
Depth Tolerance	± 0.010		± 0.007		± 0.005	

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	Standard	Advanced	Leading Edge
LPI MASK			
Mask Types	Taiyo (PSR-4000) Coates	Dupont (8040)	Taiyo PSR-4000 (LDI Image)
Average Thk Over Traces	.0006 (except corners)		
Registration Tolerance	± 0.004	± 0.003	± 0.002
Smallest Hole Cleared	.012 (LPI or Dry Film)	0.010	
Largest Hole Plugged	< 0.0135 drilled hole	0.016 drilled hole	> 0.020 drilled hole
Min Pad to Pad Space	0.011	0.009	0.006
Web/Dam Between Pads LPI	0.005	0.004	0.003
Between Pads Dry-film	0.006	0.005	0.004
Colors	Green	Matte Clear, Red, Blue, Black	
LEGEND			
Colors	White, Yellow, Red	Blue, Green, Black	Orange
Smallest Line Width / Height	0.007 / 0.050	0.006 / 0.040	0.005 / 0.040
Location Accuracy	± 0.010	± 0.008	
SURFACE FINISH			
Hot Air Solder Leveling	0.0003 - 0.0015 @ outside service 0.150 max board thickness		
Electroless Ni/ Immer Au	Yes		
Electrolytic Ni/Au (Hard Au)	2µ to 10µ multi - thickness		
Electrolytic Ni/Au (Soft Au)	Yes		
Electrolytic bright nickel	Yes		
Nickel Thickness	100µ to 350µ	< 100µ	> 350µ
Gold Thickness	30µ to 100µ	< 30µ	> 100µ
ELECTRICAL TEST			
Netlist Type	Gerber extract	IPC 356	
Minimum SMT Pitch	> 0.012	0.012	
Test Voltage	250V	500V	1000V
Buried Resistor Testing			Available
Open Resistance	5 Ω	5Ω	
Short Resistance	500 MO	500MO	1GO
Hi-Pot Testing			1000 V
Impedance Testing	TDR 2GHz		
IMPEDANCE			
Inner layer			
Coplanar Waveguide	Yes ± 10%	± 5%	< ± 5%
Single Ended	Yes ± 10%	± 5%	< ± 5%
Differential- Edge Coupled	Yes ± 10%	± 5%	< ± 5%
Differential- Broadside Coupled	Yes ± 10%	± 10%	< ± 10%
Outer Layer			
Coplanar Waveguide	± 10%	± 5%	< ± 5%
Single Ended	± 10%	± 5%	< ± 5%
Differential- Edge Coupled	± 15%	< ± 15%	< ± 5%
Differential- Broadside Coupled	± 15%	< ± 15%	< ± 10%
TECHNOLOGY			
Sequential Lamination	3 Cycles	4 Cycles	5 Cycles
Edge Plating		Yes	
Silver-Via-Fill Or Non-conductive Epoxy Via in Pad		0.006 Min Hole, 0.155 Max Board Thickness 0.008 Min Hole, 0.175 Max Board Thickness 0.010 Min Hole, 0.200 Max Board Thickness	0.004 Min Hole - Sub-lam 0.006 Min Hole, 0.190 Max Board Thickness 0.008 Min Hole, 0.210 Max Board Thickness 0.010 Min Hole, 0.250 Max Board Thickness
Micro Via		Yes	
Stub Removal/Back drill		Yes	
Blind Via (controlled depth)			Yes
Buried Via			Yes
MCM-L/SCM	Yes		
Via Plug	SR 1000	LPI	Silver and Non-conductive
Cavity Boards			Yes
QUALITY SERVICES /SYSTEMS			
Micro Section	On request		
AOI	Yes		
Ionic Contamination	Yes		
UL	Yes		
TDR Report	Yes		
XRF Readings	Yes		
CUSTOMER DATA TRANSFER			
Postscript for Blueprints	Yes		
Gerber for Blueprints	Yes		
ODB+ + / Gerber / RS274X	Yes		
Internet Capability	Yes		
CAM ENGINEERING			
Data Mgmt. System	Frontline/Genesis		
DFM (Pre-CAM)	Frontline/Genesis		
DRC-All Jobs	Frontline/Genesis		
Gerber: Net Comparison	IPC D 356		
CAM Workstations	Unix		
Photo plotters	Orbotech 5008, CSI Fire 9000		