

<b>FEATURE</b>		
Minimum Outer Line Width (Heavy Plating)	0.006"	0.004"
Minimum Outer Line Width (Standard Plating)	0.004"	0.002"
Minimum Inner Line Width	0.003"	0.002"
Minimum Outer Space (Trace\Trace & Trace\Pad)(2 plating cycles)	0.005"	0.003"
Minimum Outer Space (Trace\Trace & Trace\Pad)(1 plating cycle)	0.004"	0.002"
Minimum Inner Space (Trace\Trace & Trace\Pad)	0.004"	0.0025"
Minimum Outer Space (Pad/Plane)(2 plating cycles)	0.006"	0.004"
Minimum Outer Space (Pad/Plane)(1 plating cycle)	0.005"	0.003"
Component Finished PTH Size Tolerance	±0.002"	±0.0015"
Internal Etch tolerance (+/-)	±0.0005"	±0.0003"
External Etch tolerance (+/-)	±0.0015"	±0.001"
Minimum Space, Conductor to PWB Edge	0.020"	<0.010"
Layer to Layer Registration (multilayer PWB)	0.005"	<0.003"
Layer to Layer Registration (2 layer core)	0.002"	0.001"
Minimum Dielectric Thickness (inches)	0.001"	0.0004"
Maximum PWB Thickness (inches)	0.250"	>0.250"
Maximum Board Thickness Tolerance	±10%	±5%
Maximum Numbers of Layer	50	>70
Profile Tolerance	±0.005"	±0.002"
Minimum Internal Cut-out Radius	0.031"	0.010"
<b>PAD AND HOLE</b>		
Minimum Finished Plated Hole Size	0.006"	0.004"
Component Finished PTH Size Tolerance	±0.003"	±0.0015"
Via Finished PTH Size Tolerance	+0.003"/ -0.006"	+0.003"/ -0.004"
PTH Locational Tolerance	±0.003"	±0.0015"
Internal Land Size (Diameter over Drill)	0.011"	0.007"
Internal Anti-pad (Diameter over Drill)	0.018"	0.012"
External Land Size (Diameter over Finished Hole)	0.008"	0.005"
Min. Internal Plated Hole to Trace Spacing	0.008"	0.006"
<b>DRILLING</b>		
Smallest Mechanical Drill Size	0.008"	<0.006"
Maximum Aspect Ratio (w/ min. drill)	15:1	10:1
Maximum Drill Hole Size	0.257"	Rout
NPTH Size Tolerance (+/- inches)	±0.001"	±0.001"
NPTH Locational Tolerance (+/- inches)	±0.003"	±0.0015"
Min. Outer Non-Plated Hole to Trace Spacing	0.006"	0.004"
Min. Inner Non-Plated Hole to Trace Spacing	0.008"	0.006"
Back Drilled Vias (High Speed Transitions)	Yes	Yes
Blind/Buried Vias (All Types)	Yes	Yes
Via Fill (Conductive) (Via in Pad) *1, 2	Yes	Yes
Via Fill (Non-Conductive)	Yes	Yes
Back Drilling (dimension over drilled hole)	0.008"	0.004"
Back Drilling (depth control)	±0.006"	±0.002"
<b>SOLDER MASK</b>		
Minimum LPI Soldermask Dam	0.004"	0.0025"
Soldermask Registration (+/-) or Clearance per side	0.003"	0.0015"
Dry Film Soldermask	Yes	Yes

LPI Soldermask	Yes	Yes
Soldermask Via Plug w/LPI	Yes	Yes
Soldermask Via Fill w/LPI	Yes	Yes
Soldermask Laser Ablation	No	Yes
Soldermask using Laser Direct Imaging	No	Yes
Available Colors (Green, Blue, Red, Yellow, Purple, Clear, Black, etc.)	Yes	Yes

## PART MARKING

Photo Imagable Nomenclature Ink	0.005-0.007" stroke width	0.002" stroke width
Available Colors (White, Yellow, Black, etc.)	Yes	Yes
Etch	Yes	Yes

## MATERIALS

13x18.5"	No	Yes
24x18"	Yes	Yes
24x28"	Yes	Yes
19.5x24"	Yes	Yes
24x32"	Yes	Yes
25.5x36"	No	Yes
Minimum Dielectric Thickness	0.001"	0.0004"
Minimum Copper Weight - Inner Layers	1/2 oz	1/4 oz
Minimum Copper Weight - Outer Layers	1/2 oz	1/8 oz
Maximum Copper Weight - Inner Layers	5 oz	6 oz
Maximum Copper Weight - Outer Layers	1 oz	3 oz
CAF Resistant Epoxies	Yes	Yes
Epoxy Glass (150C Tg min)	Yes	Yes
Epoxy Glass (170C Tg min)	Yes	Yes
Filled Epoxy Glass (170C Tg min) (Lead-Free)	Yes	Yes
Isola FR-370HR	Yes	Yes
Isola FR 406	Yes	Yes
Isola FR 408	Yes	Yes
Nelco 4000-13	Yes	Yes
Nelco 4000-29	Yes	Yes
Panasonic Megtron 6	Yes	Yes
Panasonic Megtron 4	Yes	Yes
Polyimide Glass	Yes	Yes
Rogers 4003/4403	Yes	Yes
Rogers 4350B	Yes	Yes
Rogers 4450B/4450F	Yes	Yes
Arlon CLTE	No	Yes
Buried Capacitance	Yes	Yes
DuPont Pyralux	No	Yes
Halogen Free Epoxies	No	Yes
LCP	No	Yes
Mixed Dielectric	Yes	Yes
Ohmega Ply & Ticer Foils	Yes	Yes
Resin Coated Copper (for HDI)	No	Yes
Rogers 2929	No	Yes
Rogers 3006	No	Yes
Taconic RF-60A	No	Yes

Taconic TLG	No	Yes
Taconic TPG	No	Yes
Taconic RF-35	No	Yes
Teflon Fusion Bonding	No	Yes
Teflons (Rogers 5880, 6002, 6202, Ultralam)	No	Yes
Thick Film Polymer Resistors	No	Yes
Zetalam	No	Yes
Panasonic 1650V/1755V	No	Yes
Hitachi FX II	No	Yes
Zeon	No	Yes
Nelco N4800-20	No	Yes
Nelco Meteorwave 1000	No	Yes
Nelco Meteorwave 2000	No	Yes

### **SURFACE FINISHES**

Selective Solder Strip	Yes	Yes
HASL (Sn/Pb)	Yes	Yes
HASL (lead-free)	No	Yes
E-less Ni Immersion Au (ENIG)	Yes	Yes
E-less Ni/E-less Pd/Imm Au (ENEPIG)	Yes	Yes
Electrolytic Ni	Yes	Yes
Soft Bondable Gold (Electroless Au )	Yes	Yes
Soft Bondable Gold (Electrolytic Au )	Yes	Yes
Hard Gold (Deep)	Yes	Yes
Immersion Silver	Yes	Yes
Organic Solderability Preservative (OSP) Cu 56	Yes	Yes
Gliccoat	Yes	Yes
Immersion Tin	Yes	Yes
Combination Finishes (i.e. Solder and Soft Gold)	Yes	Yes
Milled and Plated Pockets	Yes	Yes
Edge Plating	Yes	Yes

### **HDI**

HDI Type (I, II, III, IV, V, VI)	Yes	Yes
Minimum Laser Via Drill Diameter	0.004"	0.002"
Laser Via Land Size (Diameter over Drill)	D+0.006"	D+0.005"
Laser Blind Via Aspect Ratio	0.85:1	>1:1
Minimum Mechanical Via Drill Diameter	0.008"	0.004"
Mechanical Via Land Size (Diameter over Drill)	D+0.010"	D+0.006"
Mechanical Blind Via Aspect Ratio	0.85:1	>1:1

### **IMPEDANCE**

Single-ended (± %)	10	5
Differential, Edge-coupled (± %)	10	5
Differential, Broadside-Coupled (± %)	10	5
In-house Testing/Verification	Yes	Yes

### **ELECTRICAL TEST**

Test Voltage	≤ 250V	500V
Resistor Trim Capability	Yes	Yes
Insertion Loss testing Using SPP	Yes	Yes
Test Fixtures for Bed of Nails	Yes	Yes
Flying Probe	Yes	Yes

Composite Hi-Pot	Yes	Yes
<b>AUTOMATED OPTICAL INSPECT</b>		
Signal / Power Cores	Yes	Yes
Subcomposites	Yes	Yes
Composites	Yes	Yes
<b>TECHNOLOGY</b>		
Etchback	Yes	Yes
Copper Cores	No	Yes
Heat Sinks	No	Yes
Exposed Cavities	Yes	Yes
Backplanes	Yes	Yes
V-Cut (Scoring)	Yes	Yes
Smallest BGA footprint pitch (mm)	0.5	0.3
Laser Trimming of Buried Resistors	Yes	Yes
Via Fill Plating	Yes	Yes
<b>EMBEDDED/OTHER CAPABILITIES</b>		
Embedded Discrete Ceramic Resistors	No	Yes
Embedded Thick Film Polymer Resistors	No	Yes
Ohmega Ply or Ticer Foils	Yes	Yes
Embedded Capacitance	Yes	Yes
Heavy Metal Backed Cavities	No	Yes
	Yes	Yes
<b>LEAD TIME</b>		
5 Day	Yes	No
10 Day	Yes	No
15 Day	Yes	No
25 day	Yes	No
> 25 day	Yes	Yes
<b>PRODUCTION CAPABILITY</b>		
Low, Prototype	Yes	Yes
Medium, Pre-Production	Yes	Yes
High - Production	Yes	No
<b>QUALITY</b>		
Best Commercial Practice	Yes	Yes
IPC-6012 Class 2, 3 & 3A (Type 1-6, all classes)	Yes	Yes
IPC-6016 (HDI/Micro-Via)	Yes	Yes
IPC-6018 (RF)	Yes	Yes
AS9100C	Yes	Yes
PCQR^2 Participant	Yes	Yes
IPC-1752 Materials Declaration Capable?	No	Yes