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Technology Roadmap

Product types	**Standard**	**Premium**	**Leading edge**	**Future**
Rigid PCB technologies	Yes			
Flexible circuits	Yes			
Rigid-flex circuits	Yes			
Flex heaters / ribbon cables	Yes			
Thermal management / LED PCBs	Yes			
High speed digital PCBs	Yes			
RF/microwave/mm-wave PCBs	Yes			
Technologies				
Highest layer count	24	28	40	40
Maximum board thickness (in mils)	220	235	250	300
Minimum board thickness (2 layer) (in mils)	5	4	3	2
Thinnest core material (rigid) (in mils)	3	2.5	2	1.5
Thickest core material (in mils)	125	125	125	125
Largest panel size (in inches)	18 by 24	24 by 30	24 by 30	24 by 30
Maximum usable area (in inches)	16 by 22	22 by 28	22 by 28	22 by 28
Bow and twist -% (balanced)	<0.75%	<0.75%	<0.75%	<0.75%
Minimum copper to edge clearance (in mils)	10	8	5	5
Min. positional tol.-feature to feature (in mils)	+/- 5	+/- 4	+/- 3	+/- 2
Layer to layer registration tolerance (in mils)	+/- 5	+/- 4	+/- 3	+/- 2
Number of sequential lamination cycles	2	4	5	6
Hole to copper (internal plane layers) (in mils)	10	7	6	5
Drilled hole to drilled hole distance (in mils)	14	12	8	7
Inner layer lines and spaces (1/2 oz.)	4	3	2	2
Inner layer lines and spaces (1/4 oz.)	4	3	2	1.5
Outer layer lines and spaces (1/2 oz. base)	4	3	2	2.5
Outer layer lines and spaces (1/4 oz. base)	4	3	2	2
Maximum aspect ratio-w/.010" drilled hole	10:1	20:1	30:1	35:1
Smallest drilled thru via 62 mil thick (in mils)	8	6	4	5
Smallest drilled thru via 93 mil thick (in mils)	10	8	6	5
Smallest drilled thru via 115 mil thick (in mils)	12	10	8	6
Pad size over via size -Class 2 (in mils)	10	8	6	4
Pad size over via size -Class 3 (in mils)	12	10	8	8
Antipad over drill size (in mils)	20	16	8	7
Press fit hole tolerance (in mils)	+/- 2	+/-2	+/-1.5	+/- 1
Back drilling tolerance +/- (in mils)	10	6	4	3
High Density Interconnect (HDI)				
Smallest laser drilled vias (in mils)	4	3	2	2
Smallest pad size over drilled hole size (in mils)	12	10	8	6
Maximum aspect ratio-microvias	0.8:1	1.2:1	1.5:1	2:1

Stacked/Staggered Micro Vias	yes	yes	yes	yes
HDI Constructions	1+n+1	2+n+2	5+n+5	6+n+6
Soldermask				
SMD soldermask web width (in mils)	3	2	2	3
SMD soldermask clearance over pad (in mils)	4	3	2	3
Soldermask registration tolerance (using film)	3	2.5	2	2
Soldermask registration tolerance (using LDI)	2.5	2	1.5	1
Controlled Impedance				
Impedance control-single ended +/- %	10%	5%	5%	3%
Impedance control-edge coupled diff. +/-%	10%	5%	5%	3%
Impedance control-broad side differential +/-%	10%	5%	5%	5%
Laminate materials	Yes			
Standard FR4	Yes			
Lead-free compatible FR4	Yes			
High speed digital materials	Yes			
RF / microwave materials	Yes			
Millimeterwave compatible materials	Yes			
Thermal management / LED board				
Aluminum backed materials	Yes			
Thermal conductivity of 1.5 up to 8.0W/mK	Yes			
Surface Finishes				
ENIG (electroless Ni-immersion gold)	Yes			
ENIPIG (thin palladium <8 micro inches	Yes			
ENEPIG (thick palladium up to 24 micro inches	Yes			
Immersion Silver	Yes			
Immersion Tin	Yes			
OSP - lead free compatible	Yes			
HASL (Tin/Lead) - vertical	Yes			
HASL (lead-free) - vertical	Yes			
Electrolytic hard gold	Yes			
Advanced technologies				
Via-in-pad	Yes			
Copper plated shut micro vias	Yes			
Single tier cavity design	Yes			
Mixed dielectric designs	Yes			
Edge plating / edge castellations	Yes			
Wrap plating (blind vias / filled vias)	Yes			
Laser defined soldermask printing	Yes			
Embedded resistance	Yes			
Embedded capacitance	Yes			
Jump scoring capabilities	Yes			
ISO-9001:2015	Yes			