

General	
<u>Number of Layers</u>	<ul style="list-style-type: none"> <li>◆ 1 - 22 Layers</li> </ul>
<u>Special Treatment</u>	<ul style="list-style-type: none"> <li>◆ Gold finger</li> <li>◆ Via Protection (IPC4761 Type I, VI, VII)</li> <li>◆ Blind &amp; Buried Via</li> <li>◆ Impedance Control</li> <li>◆ Carbon Ink</li> <li>◆ Peelable Mask / Kapton</li> <li>◆ Counter Sink</li> </ul>
Material	
<u>Base Material</u>	<ul style="list-style-type: none"> <li>◆ CEM-3</li> <li>◆ FR-4 (TG &gt; 130 °C, 150 °C, 170 °C)</li> <li>◆ FR-4 (Halogen-free)</li> </ul>
<u>Current Suppliers</u>	<ul style="list-style-type: none"> <li>◆ KINGBOARD</li> <li>◆ Hua Zheng</li> <li>◆ SHENGYI</li> <li>◆ ITEQ</li> </ul>
	<ul style="list-style-type: none"> <li>◆ KB-6160</li> <li>◆ H-140</li> <li>◆ S1000</li> <li>◆ IT-158, IT-180A</li> </ul>
Dimension & Thickness	
<u>Board Size</u>	<ul style="list-style-type: none"> <li>◆ Maximum</li> </ul>
	<ul style="list-style-type: none"> <li>◆ 584 X 813mm (23 X 32")</li> </ul>
<u>Board Thickness</u>	<ul style="list-style-type: none"> <li>◆ Maximum</li> <li>◆ Minimum</li> </ul>
	<ul style="list-style-type: none"> <li>◆ 3.2mm (0.126")</li> <li>◆ 0.4mm (0.016")</li> </ul>
<u>Finished Board Thickness Tolerance</u>	<ul style="list-style-type: none"> <li>◆ Board Thickness ≥ 0.8 mm</li> <li>◆ 0.4 mm ≤ Board Thickness &lt; 0.8 mm</li> </ul>
	<ul style="list-style-type: none"> <li>◆ ± 10%</li> <li>◆ ± 0.076mm (± 3mil)</li> </ul>
<u>Minimum Core Thickness</u>	<ul style="list-style-type: none"> <li>◆ 0.1mm (0.0039")</li> </ul>
<u>Minimum Dielectric Thickness of Inner Layer</u>	<ul style="list-style-type: none"> <li>◆ ± 0.076mm (± 3mil)</li> </ul>
<u>Maximum Warp &amp; Twist</u>	<ul style="list-style-type: none"> <li>◆ 0.7%</li> </ul>
Hole & Slot	
<u>Drilling Diameter</u>	<ul style="list-style-type: none"> <li>◆ Maximum</li> <li>◆ Minimum</li> </ul>
	<ul style="list-style-type: none"> <li>◆ 6.4mm (0.252")</li> <li>◆ 0.20mm (0.0079")</li> </ul>
<u>Finished Diameter</u>	<ul style="list-style-type: none"> <li>◆ Minimum</li> </ul>
	<ul style="list-style-type: none"> <li>◆ 0.102mm (4mil)</li> </ul>
<u>Hole Diameter Tolerance</u>	<ul style="list-style-type: none"> <li>◆ PTH</li> <li>◆ NPTH</li> </ul>
	<ul style="list-style-type: none"> <li>◆ ± 0.076mm (± 3mil)</li> <li>◆ ± 0.051mm (± 2mil)</li> </ul>
<u>Minimum Hole to Hole Distance</u>	<ul style="list-style-type: none"> <li>◆ 0.305mm (12 mil)</li> </ul>

Hole & Slot	
<u>Slot Width</u>	
◆ Minimum	◆ 0.5mm (0.020")
Maximum Countersink Diameter (When Top Angle is 165°)	◆ 6.35mm (0.25")
<u>Hole Position Tolerance</u>	
◆ Compared with CAD data	◆ ± 0.076mm (± 3mil)
◆ Hole to Hole with $\Phi < 1.0\text{mm}$	◆ ± 0.102mm (± 4mil)
◆ Hole to Hole with $\Phi \geq 1.0\text{mm}$	◆ ± 0.076mm (± 3mil)
◆ Hole to Edge with $\Phi < 1.0\text{mm}$	◆ ± 0.204mm (± 8mil)
◆ Hole to Edge with $\Phi \geq 1.0\text{mm}$	◆ ± 0.152mm (± 6mil)
<u>Slot Tolerance</u>	
◆ PTH with Length $\geq 2 \times \text{Width} + 0.15\text{mm}$	◆ ± 0.102mm (± 4mil)
◆ PTH with Length $< 2 \times \text{Width} + 0.15\text{mm}$	◆ ± 0.127mm (± 5mil)
◆ NPTH	◆ ± 0.076mm (± 3mil)
Maximum Aspect Ratio of Plated Hole	◆ 8 : 1
Copper Thickness	
<u>Base Copper Thickness of Outer Layer</u>	
◆ Maximum	◆ 0.102mm (3oz)
◆ Minimum	◆ 0.012mm (1/3oz)
<u>Base Copper Thickness of Inner Layer</u>	
◆ Maximum	◆ 0.175mm (5oz)
◆ Minimum	◆ 0.017mm (1/2oz)
Copper Thickness of PTH Wall (SMOBC)	◆ $\geq 0.020\text{mm}$ ( $\geq 0.8\text{mil}$ )
Circuitry	
<u>Minimum Design Line Width / Space in Outer Layer</u>	
◆ T / T oz (1/3oz)	◆ 0.089mm / 0.089mm (3.5mil / 3.5mil)
◆ H / H oz (1/2oz)	◆ 0.089mm / 0.089mm (3.5mil / 3.5mil)
◆ 1 / 1 oz	◆ 0.102mm / 0.102mm (4mil / 4mil)
◆ 2 / 2 oz	◆ 0.127mm / 0.127mm (5mil / 5mil)
◆ 3 / 3 oz	◆ 0.152mm / 0.152mm (6mil / 6mil)
<u>Minimum Design Line Width / Space in Inner Layer</u>	
◆ H / H oz (1/2oz)	◆ 0.089mm / 0.089mm (3.5mil / 3.5mil)
◆ 1 / 1 oz	◆ 0.102mm / 0.102mm (4mil / 4mil)
◆ 2 / 2 oz	◆ 0.127mm / 0.127mm (5mil / 5mil)
◆ 3 / 3 oz	◆ 0.152mm / 0.152mm (6mil / 6mil)
◆ 5 / 5 oz	◆ 0.229mm / 0.229mm (9mil / 9mil)
<u>Tolerance After Etching</u>	
◆ H / H oz (1/2oz)	◆ ± 10%
◆ 1 / 1 oz	◆ ± 20%

Circuitry	
<u>Impedance Tolerance</u>	<ul style="list-style-type: none"> <li>◆ <math>\leq 50 \Omega</math></li> <li>◆ <math>&gt; 50 \Omega</math></li> </ul>
<u>Position Tolerance (Minimum)</u>	<ul style="list-style-type: none"> <li>◆ <math>\pm 5\Omega</math></li> <li>◆ <math>\pm 10\%</math></li> </ul>
<ul style="list-style-type: none"> <li>◆ Image to Image</li> <li>◆ Image to Hole</li> <li>◆ Image to Outline (Outer Layer)</li> <li>◆ Image to Outline (Inner Layer)</li> </ul>	<ul style="list-style-type: none"> <li>◆ <math>\pm 0.127\text{mm}</math> (<math>\pm 5\text{mil}</math>)</li> <li>◆ <math>\pm 0.102\text{mm}</math> (<math>\pm 4\text{mil}</math>)</li> <li>◆ <math>\pm 0.152\text{mm}</math> (<math>\pm 6\text{mil}</math>)</li> <li>◆ <math>\pm 0.254\text{mm}</math> (<math>\pm 10\text{mil}</math>)</li> </ul>
Soldermask	
<u>Colors</u>	<ul style="list-style-type: none"> <li>◆ Green (Matt or Glossy)</li> <li>◆ Black (Matt or Glossy)</li> <li>◆ White</li> <li>◆ Blue</li> <li>◆ Red</li> <li>◆ Yellow</li> </ul>
<u>Soldermask Registration</u>	◆ $\pm 0.05\text{mm}$ ( $\pm 2\text{mil}$ )
<u>Minimum Soldermask Thickness</u>	◆ $10\mu\text{m}$
<u>Soldermask Plugging Hole Diameter</u>	
<ul style="list-style-type: none"> <li>◆ <math>\Phi &gt; 0.75\text{mm}</math></li> <li>◆ <math>0.55\text{mm} &gt; \Phi \geq 0.75\text{mm}</math></li> <li>◆ <math>\Phi \leq 0.55\text{mm}</math></li> </ul>	<ul style="list-style-type: none"> <li>◆ Soldermask in Hole</li> <li>◆ Solder Ball on One Side</li> <li>◆ No Solder Ball</li> </ul>
<u>Minimum Soldermask Bridge</u>	◆ $0.076\text{mm}$ (3mil)
Legend	
<u>Colors</u>	<ul style="list-style-type: none"> <li>◆ White</li> <li>◆ Black</li> <li>◆ Yellow</li> </ul>
<u>Legend Registration</u>	◆ $0.102\text{mm}$ (4mil)
<u>Legend Line Width</u>	◆ $0.102\text{mm}$ (4mil)
<u>Legend on Circuit</u>	
<ul style="list-style-type: none"> <li>◆ Height</li> <li>◆ Width</li> </ul>	<ul style="list-style-type: none"> <li>◆ <math>0.635\text{mm}</math> (25mil)</li> <li>◆ <math>0.381\text{mm}</math> (15mil)</li> </ul>
<u>Legend on Large Copper or Lamination</u>	
<ul style="list-style-type: none"> <li>◆ Height</li> <li>◆ Width</li> </ul>	<ul style="list-style-type: none"> <li>◆ <math>0.559\text{mm}</math> (22mil)</li> <li>◆ <math>0.330\text{mm}</math> (13mil)</li> </ul>
<u>Minimum Letter Width of Soldermask Opening</u>	◆ $0.127\text{mm}$ (5mil)
Plating	
<u>Thickness for Lead-free HAL (Measured at the Minimum Point)</u>	
<ul style="list-style-type: none"> <li>◆ Tin (Sn)</li> </ul>	◆ $0.5 - 40\mu\text{m}$ (20 - 1600 $\mu\text{in}$ )

<b>Plating</b>	
<u>Thickness for ENIG (Measured at the Minimum Point)</u>	
◆ Nickel (Ni)	◆ 2.54 - 5μm (102 - 200μin)
◆ Gold (Au)	◆ 0.0254 - 0.102μm (1 - 4μin)
<u>Thickness for Immersion Silver (Measured at the Minimum Point)</u>	
◆ Silver (Ag)	◆ 0.15 - 0.3μm (6 - 12μin)
<u>Thickness for Immersion Tin (Measured at the Minimum Point)</u>	
◆ Tin (Sn)	◆ 0.5 - 1.0μm (20 - 40μin)
<u>Thickness for OSP (Measured at the Minimum Point)</u>	◆ 0.2 - 0.3μm (8 - 12μin)
<u>Carbon Ink Resistance</u>	◆ 20Ω / cm <sup>2</sup>
<u>Minimum Space for Carbon Conductor</u>	◆ 0.375mm (15mil)
<b>E-test</b>	
<u>Minimum Test PAD Width</u>	
◆ Flying Probe Machine	◆ 0.076mm (3mil)
◆ E-tester Machine	◆ 0.203mm (8mil)
<u>Minimum AOI Test Line</u>	◆ 0.05mm (2mil)
<u>Maximum AOI Test Dimension</u>	◆ 620 X 650mm (24.4 x 25.6")
<b>Outline (Punching / Routing / V-cut)</b>	
<u>Minimum Punching Dimension Tolerance</u>	
◆ Edge to Edge	◆ ± 0.203mm (± 8mil)
◆ Hole to Edge	◆ ± 0.178mm (± 7mil)
<u>Minimum Routing Dimension Tolerance</u>	
◆ Edge to Edge	◆ ± 0.102mm (± 4mil)
◆ Hole to Edge	◆ ± 0.102mm (± 4mil)
<u>Minimum Radius by Routing (Internal Angle)</u>	◆ 0.40mm (16mil)
<u>Minimum Board Thickness that can be V-cut</u>	◆ 0.61mm (24mil)
<u>V-cut Tolerance (Minimum)</u>	
◆ Angle (30° - 60°)	◆ ± 5°
◆ Remaining Thickness	◆ ± 0.102mm (± 4mil)
◆ Mis-Registration	◆ ± 0.127mm (± 5mil)
◆ V-cut to Hole	◆ ± 0.152mm (± 6mil)
◆ V-cut to V-cut	◆ ± 0.127mm (± 5mil)
<u>Maximum Distance between V-cut and Board Edge</u>	◆ 457mm (18")