

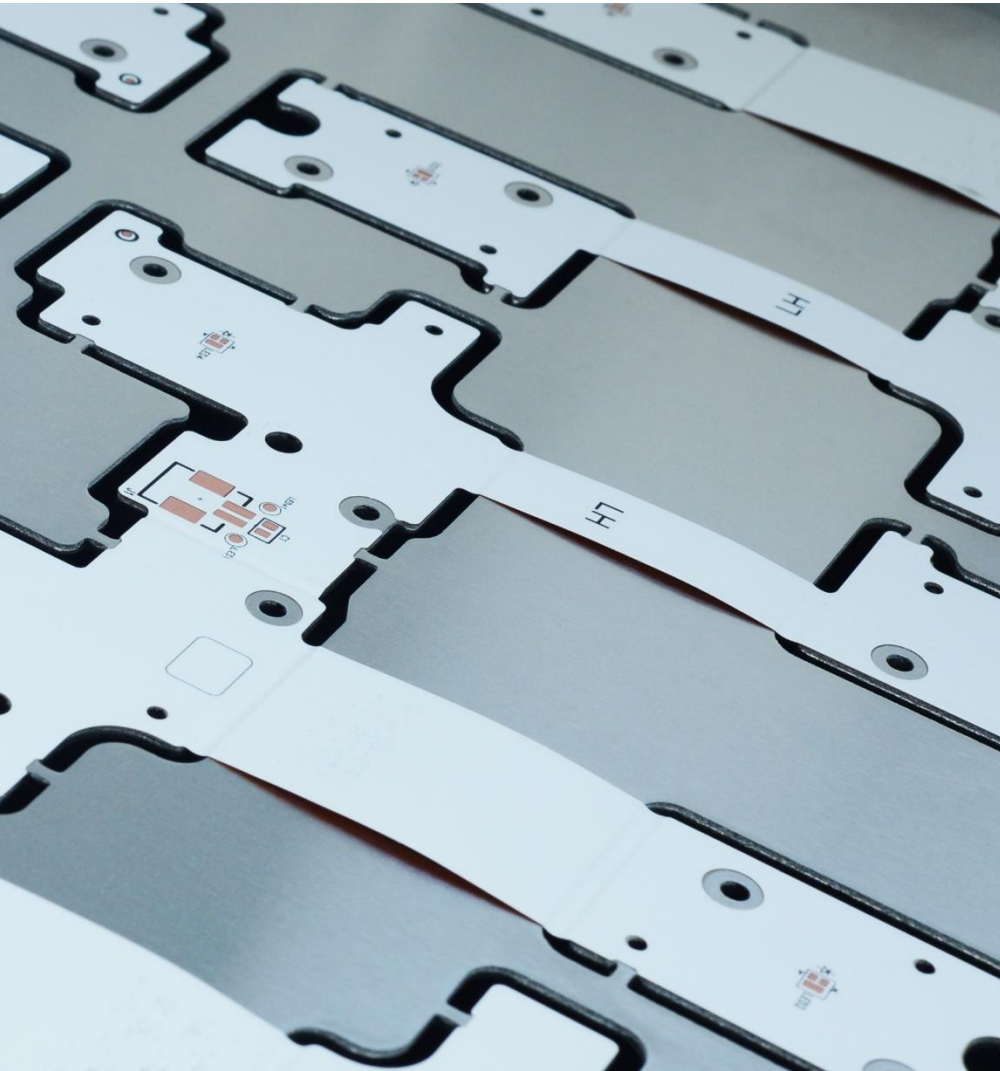


## Technical Capabilities

2018



## Our Technical Capabilities



We provide a broad spectrum of PCB knowledge and expertise with global experts in PCB manufacturing and design.

Our portfolio ranges from **single & double sided, multi layer, highly advanced HDI, bendable, rigid-flex** and **high-frequency** boards.

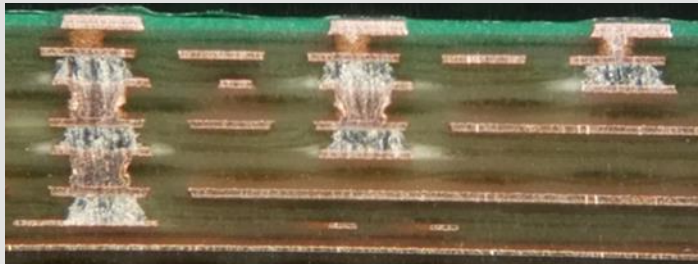


# Technical Capabilities | Rigid

Layer count	<ul style="list-style-type: none"><li>• 1 - 24 layers (up to 58 layers on request)</li></ul>
PCB thickness	<ul style="list-style-type: none"><li>• 0.4 - 3.2 mm (&gt; 3.2 mm on request)</li><li>• Tolerance: +/-10%</li><li>• Core thickness min 0.075 mm for inner layer</li></ul>
PCB size	<ul style="list-style-type: none"><li>• Maximum 450 mm x 600mm</li></ul>
Bow & Twist	<ul style="list-style-type: none"><li>• ≤ 0.7%</li></ul>
Base copper thickness	<ul style="list-style-type: none"><li>• Up to 6 OZ (210µm) with UL approval</li></ul>
Laminate types	<ul style="list-style-type: none"><li>• CEM-1 / CEM-3</li><li>• FR-4</li><li>• Aluminum substrate</li><li>• Copper substrate</li><li>• High frequency materials</li></ul> <p>Available FR-4 properties:</p> <ul style="list-style-type: none"><li>• TG ≤ 170°C</li><li>• CAF resistant</li><li>• Halogen free</li><li>• CTI ≥ 600V</li></ul>
Laminate brands (FR-4)	<ul style="list-style-type: none"><li>• Shengyi</li><li>• Kingboard</li><li>• Ventec</li></ul> <ul style="list-style-type: none"><li>• ITEQ</li><li>• Nanya</li><li>• Doosan</li></ul>
Solder mask	<ul style="list-style-type: none"><li>• Green (glossy / semi-matte / matte)</li><li>• White</li><li>• Black</li></ul> <ul style="list-style-type: none"><li>• Blue</li><li>• Red</li></ul>
Solder mask brands	<ul style="list-style-type: none"><li>• Taiyo</li><li>• Tamura</li><li>• Huntsman</li></ul> <ul style="list-style-type: none"><li>• Rongda</li><li>• Yeyo</li><li>• Gingwa</li></ul>
Outline	<ul style="list-style-type: none"><li>• Routing</li><li>• Punching</li><li>• V-scoring / Jump V-scoring</li></ul>
Special features	<ul style="list-style-type: none"><li>• Resin or solder mask plugging of via holes</li><li>• Depth routing</li><li>• Press-fit hole</li><li>• Back drilling</li></ul>



# Technical Capabilities | HDI

HDI structures	<ul style="list-style-type: none"><li>• 1+N+1 / 2+N+2 / 3+N+3 / 4+N+4 (Any layer on request)</li></ul>
μ-via drill diameter	<ul style="list-style-type: none"><li>• Min. 0.10mm</li><li>• Max. 0.20mm</li></ul>
Max. Aspect Ratio	<ul style="list-style-type: none"><li>• Through hole 15:1 (advanced 18:1)</li><li>• Micro via 0.8:1 (advanced 1:1)</li></ul>
Surface finishes	<ul style="list-style-type: none"><li>• Electroless Nickel Gold</li><li>• Immersion Tin</li></ul>
Special features	<ul style="list-style-type: none"><li>• Copper filled micro vias</li><li>• stacked and staggered micro vias</li><li>• sequential build-up</li><li>• Copper paste plugging of burried micro vias (hybrid stacked micro vias)</li></ul>
HDI 3+N+3 example	<ul style="list-style-type: none"><li>• ...cross section picture of e.g. Kostal PCB or theoretical stack up with new CML-Design</li></ul>
HDI with hybrid stacked micro vias (filled with copper paste)	



# Technical Capabilities | Metal Substrate

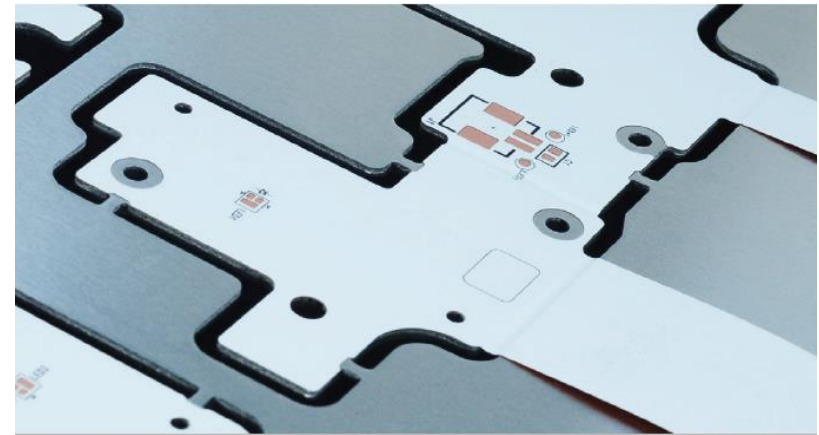
	Aluminum substrate	Copper substrate
PCB structure		<p>e.g: 1 layer copper substrate with filled vias</p>
Layer count	<ul style="list-style-type: none"> <li>1 layer</li> </ul>	<ul style="list-style-type: none"> <li>1 or 2 layers</li> </ul>
Substrates (thermal conductivity)	<ul style="list-style-type: none"> <li>Ventec VT4B5 (4.2 W/mK)</li> <li>Ventec VT4B3 (3.0 W/mK)</li> <li>Ventec VT4A2 (2.2 W/mK)</li> <li>Aju A2000N (2 W/mK)</li> <li>Aju A5000 (5 W/mK)</li> </ul>	<ul style="list-style-type: none"> <li>Doosan DST 7000-HC (1.3 W/ mK)</li> <li>Ventec VT4B3 (3.0 W/mK)</li> <li>Aju A2000N (2 W/mK)</li> <li>Aju A5000 (5 W/mK)</li> <li>Copper foil + Shengyi S1000HB + copper plate C1100P</li> </ul>
Thickness	<ul style="list-style-type: none"> <li>Copper: 18 to 70µm</li> <li>Dielectric: min 50µm</li> <li>Aluminum: 0.5 to 3mm</li> </ul>	<ul style="list-style-type: none"> <li>Copper: 18 to 70µm</li> <li>Dielectric: min 50µm</li> <li>Copper: 0.5 to 3mm</li> </ul>
Surface finishes	<ul style="list-style-type: none"> <li>Lead Free HAL</li> <li>OSP</li> </ul>	<ul style="list-style-type: none"> <li>All finishes (no restrictions)</li> </ul>
Specials	<ul style="list-style-type: none"> <li>Anodized aluminum surface</li> <li>Panelization rules depending from outline (routing or punching)</li> </ul>	<ul style="list-style-type: none"> <li>Copper filled vias</li> <li>Panelization rules depending from outline (routing or punching)...</li> </ul>



# Technical Capabilities | Flex and Rigid-Flex

	Flexible PCB
Layer count	<ul style="list-style-type: none"><li>• 1 to 8 layers</li></ul>
PCB thickness	<ul style="list-style-type: none"><li>• 0.15 to 1mm</li></ul>
Line and space	<ul style="list-style-type: none"><li>• Minimum 50µm / 50µm with ¼ OZ base copper on inner layers</li></ul>
Flexible base material	<ul style="list-style-type: none"><li>• PI thickness: minimum 13µm</li><li>• Available as adhesive-less</li><li>• Brands: Doosan, Hanwha, Innox</li></ul>
Coverlay	<ul style="list-style-type: none"><li>• Color: amber, black, white</li><li>• For fine pattern: Flexible solder mask</li></ul>
Surface finishes	<ul style="list-style-type: none"><li>• OSP</li><li>• Electroless Nickel / Gold</li><li>• Immersion Tin</li><li>• Electrolytic Nickel / Gold</li></ul>
Stiffeners	<ul style="list-style-type: none"><li>• FR-4, PI, PET (SUS on request)</li><li>• PSA (pressure sensitive adhesive)</li><li>• TSA (thermal sensitive adhesive)</li></ul>
Outline	<ul style="list-style-type: none"><li>• Laser Cutting (Sample)</li><li>• Routing (Sample)</li><li>• Punching (Mass Production)</li></ul>
Specials	<ul style="list-style-type: none"><li>• Flex PCB attached to Aluminum substrate</li><li>• EMI shielding film</li></ul>

	Rigid-Flex PCB
Layer count	<ul style="list-style-type: none"><li>• 2 to 10 layers</li></ul>
PCB thickness	<ul style="list-style-type: none"><li>• 0.2 to 3.2mm</li></ul>
Structure	<ul style="list-style-type: none"><li>• Depends from customer design</li><li>• To be reviewed case by case</li></ul>
Material	<ul style="list-style-type: none"><li>• Combination of materials (base material, solder mask, coverlay, stiffeners) for rigid and flexible PCB</li></ul>
Specials	<ul style="list-style-type: none"><li>• Book structure</li><li>• Unsymmetrical structure</li><li>• Hybrid Rigid-Flex</li></ul>



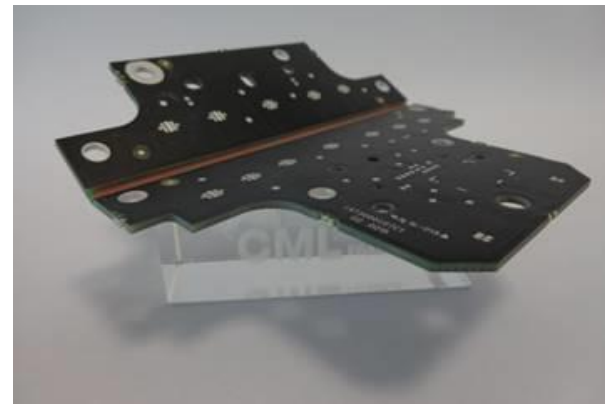
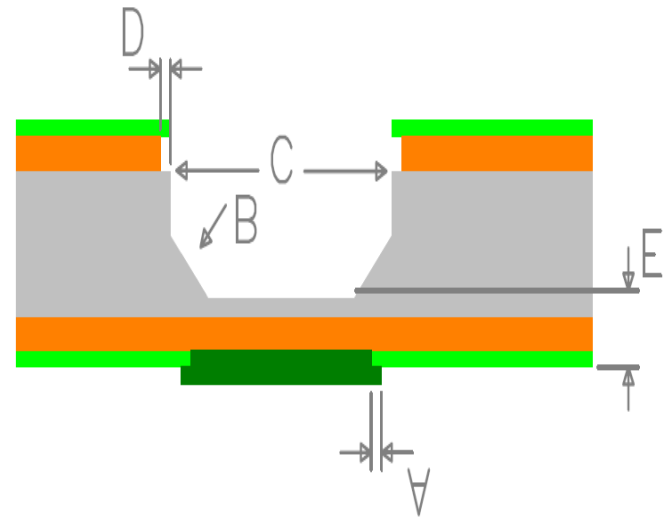
Flex on Alu





# Technical Capabilities | Bendable PCB

	Bendable PCB
A: Overlap flexible coating on solder mask	<ul style="list-style-type: none"><li>• 0.1mm</li></ul>
B: Angle inside the depth-routed slot	<ul style="list-style-type: none"><li>• 45°</li></ul>
C: Depth-routed slot width	<ul style="list-style-type: none"><li>• Depends on bending angle</li></ul>
D: Spacing between depth-routed slot and copper	<ul style="list-style-type: none"><li>• 0.7mm</li></ul>
E: Remaining thickness	<ul style="list-style-type: none"><li>• On request – minimum 1 Prepreg + Copper + Solder Mask</li></ul>
Bending cycles	<ul style="list-style-type: none"><li>• 1 x bend in shape</li></ul>
Bending angle	<ul style="list-style-type: none"><li>• Depends on depth routing slot width</li></ul>





# Surface Finishes

	OSP	HASL (lead free)	HASL (SnPb)	Immersion tin (Imm Sn)	Immersion silver (Imm Ag)	Electroless Nickel/Gold (ENIG)	Electrolytic (hard) Au
Thickness	N/A	1-40mm	1-40µm	min 1µm	0.15-0.5 µm	Ni: 3.5-6µm Au: min 0.05µm	Ni: >3µm Au: 0.05-2µm
Shelf life (solderability)	6 months	12 months	12 months	9 months	6 months	12 months	12 months
Co-planarity	Excellent	Poor	Poor	Excellent	Excellent	Excellent	Excellent
Solder joint Integrity	Good	Good	Excellent	Good	Excellent	Good	No soldering
Assembly cycles	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	No soldering
Final surface finishing	No	Yes	Yes	No	No	Yes	Yes
Rework	Yes	Yes	Yes	Yes	No	No	No
ROHS compliance	Yes	Yes	No	Yes	Yes	Yes	Yes
Fabrication costs	-	Standard	+	+	+	++	+++





# Capabilities | s.m.a.r.t.

Layer Count	<ul style="list-style-type: none"><li>• 1 – 6 Layers</li></ul>
Max Production Panel	<ul style="list-style-type: none"><li>• 520mm x 622mm / 20.5in x 24.5in</li></ul>
Laminate	<ul style="list-style-type: none"><li>• CEM-3<ul style="list-style-type: none"><li>• CTI <math>\geq</math> 600 (for DS)</li><li>• CTI <math>\leq</math> 350 (for ML)</li><li>• Halogen Free</li></ul></li><li>• FR-4<ul style="list-style-type: none"><li>• Maximum Tg 170</li><li>• Anti CAF</li><li>• Halogen Free</li></ul></li></ul>
Finished Board Thickness	<ul style="list-style-type: none"><li>• 0.4 – 2.4mm / 0.016in – 0.094in</li></ul>
Base Copper Thickness	<ul style="list-style-type: none"><li>• 18<math>\mu</math>m – 105<math>\mu</math>m / H oz – 3 oz</li></ul>
Min. Finished Hole Size	<ul style="list-style-type: none"><li>• 0.3mm / 0.012in (mechanical drilling)</li></ul>
Min. Line Width / Spacing	<ul style="list-style-type: none"><li>• 0.1mm / 0.1mm / 4mil / 4mil (sample only)</li><li>• 0.15mm / 0.15mm / 6mil / 6mil (normal)</li></ul>
Profiling	<ul style="list-style-type: none"><li>• Routing / Depth Routing</li><li>• V-scoring / Jump V-scoring</li></ul>
LPI Solder Mask Color	<ul style="list-style-type: none"><li>• Green (glossy   semi-matte   matte)</li><li>• Blue</li><li>• Black</li><li>• White</li><li>• Red</li></ul>
Surface Finish	<ul style="list-style-type: none"><li>• HAL (lead-free)</li><li>• Immersion Nickel Gold</li><li>• Galvanic Nickel Gold</li><li>• Immersion Tin</li><li>• Immersion Silver</li><li>• OSP</li><li>• Carbon Print</li><li>• Peelable Mask</li></ul>
Lead Time	<ul style="list-style-type: none"><li>• Express service: 3-7 days (FCA HK)</li><li>• Mass Production: 10-20 days (FCA HK)</li></ul>



pcbs from just around the corner