


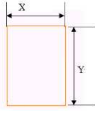
# ICAPE capability for Flex and Rigid-Flex Printed Circuits

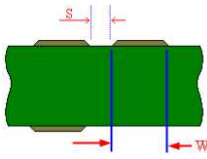
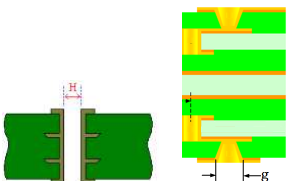
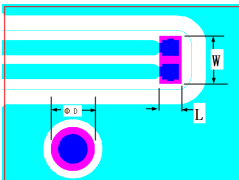
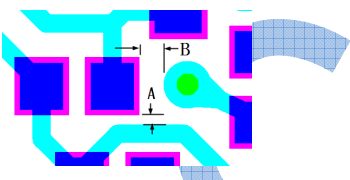
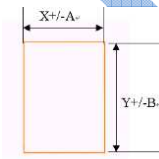
As of March 2017

## 1- MATERIALS :

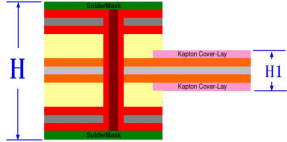
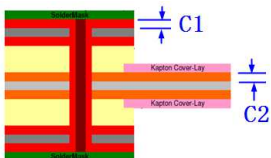
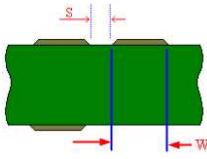
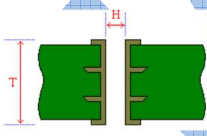
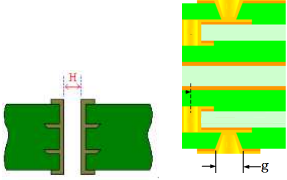
Material	Type	Material thickness (μm)	Adhesive thickness (μm)	Cu thickness (μm)	Suppliers
Base material	Adhesiveless Polyimide (PI)	12,5 ; 25 ; 50	NA	12; 18 ; 35 ; 70	Doosan ; Thinflex ; Sheng Yi ; Dupont
	Polyimide (PI) with adhesive	12,5 ; 25 ; 50	12 ; 20	18 ; 35 ; 70	Sheng Yi ; Dong Yi
	PET, PEN	25 ; 50 ; 75 ; 100 ; 125	12,5 ; 25	18 ; 35 ; 70	Thinflex ; Sheng Yi ; Ju Jiang
Coverlay	Polyimide	12,5 ; 25	13 ; 15 ; 20 ; 25 ; 30	NA	Sheng Yi ; Dong Yi ; Dupont
	PET/PEN	25 ; 50 ; 75 ; 100 ; 125	15 ; 25 ; 50		
Bonding material	Bonding film (Acrylic) NoFlow prepreg	NA	12,5 ; 25 ; 40 ; 75	NA	Dong Yi ; Dupont
Stiffener	Polyimide (PI) FR4 Mylar (Polyester film) Stainless steel				
Rigid	FR4 MTg – HTg Leadfree Hi-Frequency material				

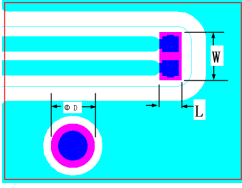
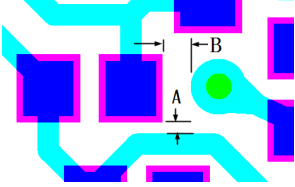
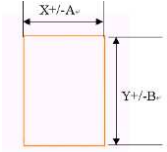
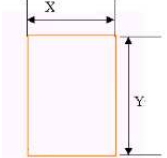
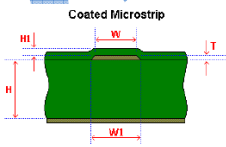
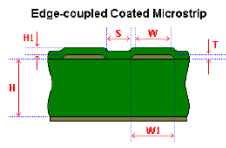
## 2- CAPABILITY FOR FLEX PRINTED CIRCUITS (FPC) :

Item	description	Sym.	Standard	Advanced
1. Minimal FPC thickness 	Single side	H1	0,07 mm	0,07 mm
	Double side		0,10 mm	0,10 mm
	4 layers		0,21 mm	0,21 mm
2. Layer count	Max layer count	NA	10	12
3. Pcb external size 	Minimum size	X*Y	20*20mm	20*20mm
	Maximum size	X*Y	500*500 mm	500*500 mm

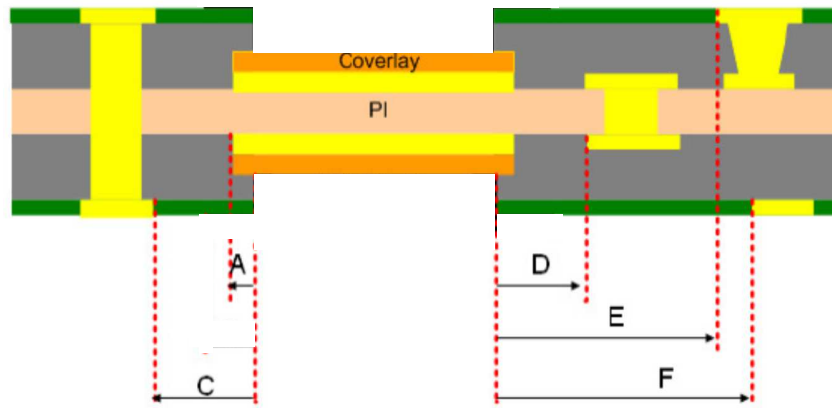
<p>4.Line width /spacing</p> 	<p>Inner Layers (@18µm Cu).</p> <p>Outer Layers</p>	<p>W/S</p> <p>W/S</p>	<p>75/75 µm</p> <p>75/75 µm</p>	<p>50/50 µm</p> <p>60/60 µm</p>
<p>5. Drilling hole</p> 	<p>1. Minimum Mechanical drilling</p> <p>2.Minimum micro-via</p>	<p>H</p> <p>g</p>	<p>0.20 mm</p> <p>30 µm</p>	<p>0.15 mm</p> <p>25 µm</p>
<p>6. cover-layer opening</p> 	<p>Minimum round cover-layer opening</p> <p>Minimum rectangle cover-layer opening</p>	<p>Φ D</p> <p>L*W</p>	<p>Φ 0.4 mm</p> <p>0.5*0.45 mm</p>	<p>Φ 0.4 mm</p> <p>0.5*0.4 mm</p>
<p>7. cover-layer opening clearance to the pad &amp; trace.</p> 	<p>Minimum clearance</p>	<p>A,B</p>	<p>0.18mm</p>	<p>0.15mm</p>
<p>8.outline tolerance</p> 	<p>Flex outline tolerance</p>	<p>A,B</p>	<p>+/-0.10 mm</p> <p>(0,05 mm on specific areas)</p>	<p>+/-0.05 mm</p>
<p>9. EMI shielding</p>	<p>Silver ink</p> <p>Silver screen</p>			
<p>10. Finishing</p>	<p>ENIG, ENIPIG, ENEPIG, HASL, HASL LF</p> <p>Immersion Tin possible</p> <p>OSP not recommended</p>			

### 3- CAPABILITY FOR RIGID-FLEX PRINTED CIRCUITS :

Item	description	Sym.	Standard	Advanced
1.Rigid-Flex Board thickness (4 layers)  	Minimal thickness  Minimal thickness (flex portion)	H  H1	0.30 mm  0,10 mm	0,25 mm  0,10 mm
2.Layer count	Max layer count  Of which flexible parts	NA  NA	12  8	16  12
3.Copper thickness  	Rigid part  Flex part	C1  C2	18-70 $\mu\text{m}$  12- 35 $\mu\text{m}$	18-70 $\mu\text{m}$  9 - 35 $\mu\text{m}$
4.Line width /spacing  	Inner Layers (@18 $\mu\text{m}$ Cu).  Outer Layers	W/S  W/S	75/75 $\mu\text{m}$  75/75 $\mu\text{m}$	50/50 $\mu\text{m}$  60/60 $\mu\text{m}$
5. Aspect Ratio  	Max. Aspect Ratio (CNC)  Max Aspect Ratio (Laser)	T:H  T:H	10:1  0,8:1	12:1  1,2:1
6. Drilling hole  	1. Minimum Mechanical drilling  2.Minimum micro-via  3. Buried vias  4. HDI	H  g  NA  NA	0.20 mm  30 $\mu\text{m}$  YES  2+N+2	0.15 mm  25 $\mu\text{m}$  YES  3+N+3

<p>7. cover-lay opening</p> 	<p>Minimum round cover-lay opening</p> <p>Minimum rectangle cover-lay opening</p>	<p>Φ D</p> <p>L*W</p>	<p>Φ 0.4 mm</p> <p>0.5*0.45 mm</p>	<p>Φ 0.4 mm</p> <p>0.5*0.4 mm</p>
<p>8. cover-lay opening clearance to the pad &amp; trace.</p> 	<p>Minimum clearance</p>	<p>A,B</p>	<p>0.18mm</p>	<p>0.15mm</p>
<p>9.outline tolerance</p> 	<p>Flex outline tolerance</p>	<p>A,B</p>	<p>+/-0.10 mm</p> <p>(0,05 mm on specific areas)</p>	<p>+/-0.075mm</p>
<p>10. Pcb external size</p> 	<p>Minimum size</p> <p>Maximum size</p>	<p>X*Y</p> <p>X*Y</p>	<p>30*30mm</p> <p>250*330mm</p>	<p>30*30mm</p> <p>250*400mm</p>
<p>11.Impedance control</p>	<p>Single-end impedance</p> <p>Coated Microstrip</p> 	<p>NA</p>	<p>+/-10%</p>	<p>+/-8%</p>
	<p>Differential impedance</p> <p>Edge-coupled Coated Microstrip</p> 	<p>NA</p>	<p>+/-10%</p>	<p>+/-8%</p>
<p>12. EMI shielding</p>	<p>Silver ink</p> <p>Silver screen</p>			
<p>13. Finishing</p>	<p>ENIG, ENIPIG, ENEPIG, HASL, HASL LF</p> <p>Immersion Tin possible</p> <p>OSP not recommended</p>			

#### 4- SIZING OF TRANSITION REGION :



Description	Sym.	Standard	Advanced
Minimum overlap distance of coverlay	A	0,30 mm	0,25 mm
Registration tolerance of EMI shielding film overlap	NA	0,10 mm	0,076 mm
Minimum distance from PTH pad to transition line	C	0,45 mm	0,35 mm
Minimum distance from drilled via to transition line	D	0,45 mm	0,35 mm
Minimum distance from laser via to transition line	E	0,45 mm	0,35 mm
Minimum distance from component pad to transition line	F	0,45 mm	0,35 mm