

HSIO technologies

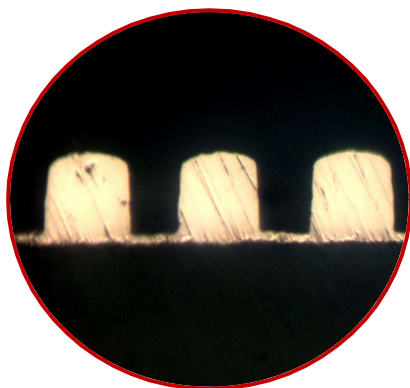
12+ LAYER LCP

PRECISION REGISTRATION

LAMINATION OF MIXED
MATERIAL

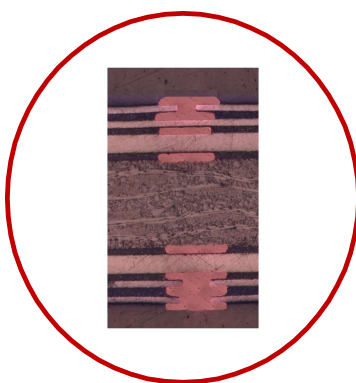
Rigid-Flex / LCP Fine Line Printed Circuits

**Revolutionary Standard and Advanced
Rigid-Flex Circuits. For high performance,
low loss, low Dk, high density circuits.**

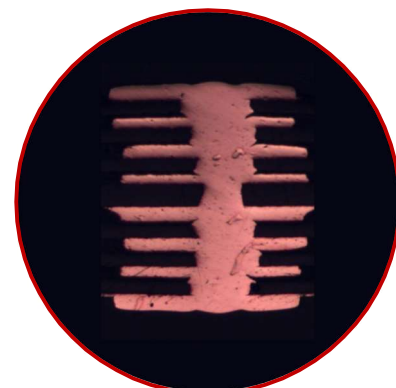


18 µm Line & Space

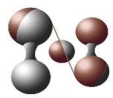
18 µm Copper



**LCP Dielectric used
with other materials**



Blind & Buried Filled Via

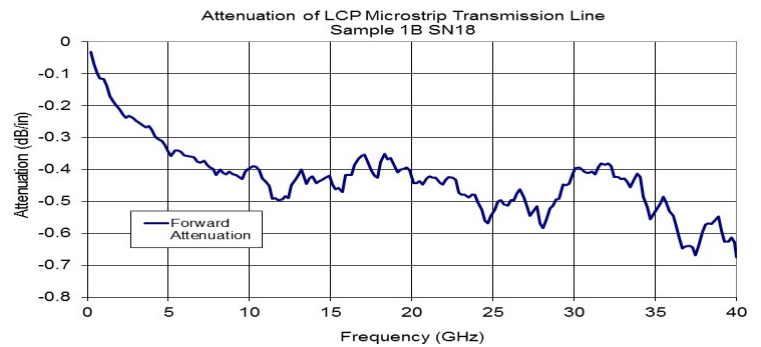
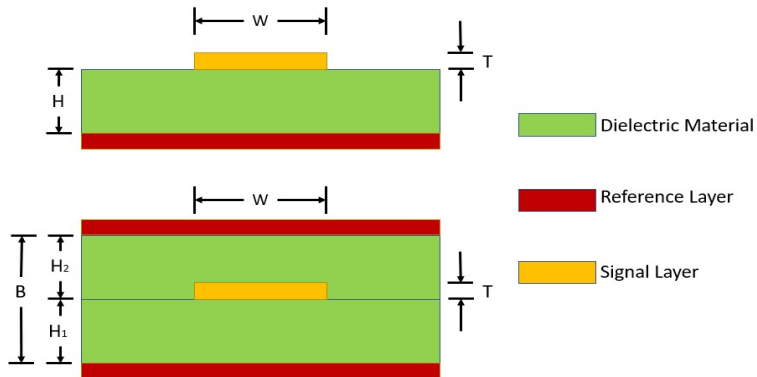


Capability	Standard	Advanced	HSIO Tech
Layer Count (Circuit Layers) Flex	1 to 6 layers	8 to 12 layers	> 12 layers
Layer Count (Circuit Layers) Rigid Flex (coming soon)	4 to 8 layers	9 to 12 layers	> 12 layers
Available Trace and Space	Thickness & process Dependent - See Below		
Laser Drill MicroVias to Pad (Inner (90° breakout)) for class II external add 50 µm and for class III add 100 µm	125 µm Pad with 75µm Via	100 µm Pad with 50 µm Via	80 µm Pad with 35 µm Via
Plated MicroVias to Pad (Aspect Ratio)	6 to 1	8 to 1	10 to 1
Plated Blind MicroVias Size - Laser Drill (Aspect Ratio 1:1)	> 50 µm blind	38 µm blind	25 µm blind
Solder Mask Position Tolerance	50 µm	35 µm	25 µm
Solder Mask Webbing	125 µm	100 µm	100 µm
PI Cover Lay Positional Tolerance	75 µm	50 µm	50 µm
Layer to Layer Registration	75 µm	50 µm	25 µm
Impedance	10%	5%	< 5%

Guidelines Only - "Mix and Match"
Designs that Span Categories are Typical for Our Customers

HSIO Tech Offers **Proto- to Production** Fabrication for Each Capability Category

		Copper Trace Thickness			
		1/8 oz (5µm)	1/4 oz (9µm)	1/3 oz (12µm)	1/2 oz (18µm)
Space & Trace	Subtractive Process	18-25 µm	30 µm	35 µm	50 µm
	Semi-Additive Process	10 µm	10 µm	15 µm	18 µm



The Graph Above is a Microstrip Design with 50 µm LCP (H) at 130µm Trace (W) with 15 µm Cu (T) with no CL or Mask that creates 50 Ω circuit

			Dielectric Type and Thickness				
			LCP 25 µm	LCP 50 µm	Polyimide 25 µm	Polyimide 35 µm	Polyimide 50 µm
Microstrip	Single Ended	35 Ω	120	220	105	165	220
		50 Ω	70	130	63	100	130
		75 Ω	30	63	30	50	63
	Diff Pair	75 Ω	90/50/90	104/50/104	82/50/82	120/50/120	140/50/140
		100 Ω	60/50/60	90/50/90	55/50/55	78/50/78	87/50/87
Microstrip w/ SM or CL	Single Ended	35 Ω	108	200	95	155	200
		50 Ω	61	108	54	82	116
		75 Ω	25	45	25	38	49
	Diff Pair	75 Ω	74/50/74	100/50/100	68/50/68	94/50/94	115/50/115
		100 Ω	43/50/43	54/50/54	40/50/40	55/50/55	67/50/67
StripLine	Single Ended	35 Ω		110			104
		50 Ω		62			57
		75 Ω		26			23
	Diff Pair	75 Ω		92/60/92			87/60/87
		100 Ω		55/60/55			50/60/50

Denotes Cover Lay 12µm polyimide w/ 25µm Acrylic Adhesive

Microstrip Dielectric in the Table Above represents H in the circuit design

Denotes SolderMask Tayo BN4000 35µm thick

StripLine Dielectric in the Table Above represents H1 and H2 in the circuit design