

CATEGORY	SUB-CATEGORY	ITEM	UNITS	AVAILABILITY		COMMENTS
				DEVELOPMENT/ LOW VOLUME	MEDIUM/ HIGH VOLUME	
DESIGN & CAM	Design	SolidWorks 3D CAD + Altium Designer CAD				
		AutoCAD				
	CAM	Tibor Darvas Planmaster				
		Frontline Genflex				
PRODUCT RANGE	Flexible Circuits	Single layer, single-side access		•	•	
		Single layer, double-side access		•	•	
		Double-layer, non pth		•	•	
		Double-layer, pth		•	•	
		Multilayer pth		•	•	
	Sculptured Circuits	Sculptured jumpers		•	•	
		Sculptured flex circuits		•	•	
		Surface mount interconnects		•	•	
	Flex-Rigid Circuits	Surface-bonded		•	•	
		Sandwich		•	•	
		Regal-Flex		•	•	
	Local Reinforcement	Stiffeners (additional coverlay material)		•	•	
		Rigidisers (unclad rigid backers)		•	•	
		Moulded materials				
		Assembly carriers				
		Heatsinks/Planes		•	•	
		Anti wear strips		•	•	
		Transfer tapes		•	•	
	Hybrid Structures	Damping materials		•	•	
		Bonded and through plated combinations		•	•	
		Assembly	SMT		•	•
	BGA			•		

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PRODUCT RANGE contd	Assembly contd.	BGA		•		
		Pin in hole		•	•	
		Brazed pins		•	•	
		Soldered pins		•	•	
		Ribbon wire links		•		
		Rivets/Eyelets		•		
		Oddform		•	•	
		Conformal coating		•	•	
		Backpotting and encapsulation		•	•	
		Flex to ceramic		•		
MECHANICAL	Working Area (Standard Panel)	24" x 18" (610mm x 457mm) panel max	mm	560 x 406	560 x 406	Excluding release and process test coupons
		18" x 12" (457mm x 305mm) panel max	mm	407 x 356	407 x 356	Excluding release and process test coupons
		24" x 24" (610mm x 610mm) block max	mm	570 x 570	570 x 570	Reel to reel imaging only, (Excluding release /process test coupons & max bond areas)
	Finished Thickness	Rigid max	mm	5.0	5.0	
		Flexible min	mm	0.043	0.063	Single layer, not protected
	Panel Aspect Ratio	Thickness to min hole size		5:1	3:1	Greater aspect ratios can be considered by review
	Number of Layers	Flexible bonded max		10	8	Actual limit is constrained only by the required flexibility of the finished circuit
		Flexible selectively unbonded max		10	10	
		Flex-Rigid max		30	16	
	Multilayer Bonding Configurations	Flexible only		•	•	
		Rigid-flex-rigid sandwich		•	•	
		Surface-bonded flex-rigid		•	•	
		Sculptured multilayer		•	•	
		Sequential		•	•	
	Hole sizes	Mechanically drilled, pth min	mm	0.15	0.2	
		Mechanically drilled non-ptd max	mm	6.40	6.4	

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MECHANICAL contd	Hole sizes contd.	Laser drilled, pth min	mm	0.025	0.05	Dependant upon material structure and aspect ratio
	Conductor Line Width	Minimum line width	mm	0.050	0.075	Note variation with copper weight
		SFC Standard 250um copper	mm	0.500+	(+/-)0.13mm tolerance	
		Minimum compensation at CAM from design	mm	0.025	0.025	Per ounce per feature edge - Flex circuits
			mm	0.015	0.015	Per ounce per feature edge - Sculptured Flex circuits
	Conductor Space Width	Minimum gap width	mm	0.075	0.125	Note variation with copper weight
		Minimum compensation at CAM from design	mm	0.025	0.025	Per ounce per feature edge - Flex circuits
			mm	0.015	0.015	Per ounce per feature edge - Sculptured Flex circuits
	Conductor thickness (Copper)	Min	µm	2	5	
		Max	µm	500	500	
	Copper Thickness (Silver)	Typical	µm	12	12	
	Annular Ring	Solderable land	mm	IPC-6013A requirement	0.2	
	Drilling, Positional Accuracy	Mechanically drilled	mm	±0.05	±0.05	
		Laser	mm	0.025	±0.025	
	Drilling, Hole Size Accuracy	General	mm	±0.025	±0.025	
	Profile Cutting Accuracy	Flexible materials, steel rule die	mm	±0.25	±0.4	
		Flexible materials, punch and die set	mm	±0.05	±0.125	
		Flexible materials, laser	mm	±0.025	±0.05	
		Rigid and Flex-Rigid, CNC routing	mm	±0.2	±0.2	Allowing for machine, tolling feature & material movements
		Controlled depth (SemiFlex)	mm	0.02	0.02	Controlled depth from top surface & capability dependant on design
	Cut Feature Dimensions	Steel rule minimum (slit)	mm	0	0	
		Steel rule minimum (slot)	mm	2.0	2.0	
		Punch and die set minimum (slot)	mm	0.5	0.5	

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MECHANICAL contd	Cut Feature Dimensions contd.	Laser minimum (slot)	mm	0.025	0.05		
		CNC routed slot	mm	0.5	0.5	Depending upon material	
	Print Registration Accuracy	Screen Print	mm	±0.075	±0.10		
		Photoimaged	mm	±0.05	±0.05		
	Base Materials	Polyimide		•	•		
		PET (Polyester)		•	•		
		PEN		•	•		
		FEP		•			
		Epoxide woven glass		•	•		
		PTFE		•	•		
		PI Glass		•			
		High Speed Laminates		•	•		
		Conductor Materials	Copper foil HDED		•	•	
			Copper foil RA		•	•	
			Copper foil LTA		•	•	
			Screen printed silver polymer		•	•	
			Screen printed carbon polymer		•	•	
			Screen printed silver/carbon polymer		•		
	Adhesive Systems	Modified acrylic cast film		•	•		
		Modified epoxy cast film		•	•		
		Epoxy pre-preg		•	•		
		Polyimide cast film		•	•		
		Polyimide pre-preg		•	•		
		Acrylic pressure-sensitive		•	•		
		Cross linking polyester		•	•		
		Polyurethane		•	•		
	Coverlay Dielectric Materials	Adhesiveless		•	•		
		Polyimide		•	•		

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MECHANICAL contd	Coverlay Dielectric Materials contd.	Polyester		•	•	
		PEN		•	•	
	Covercoat Materials	Solder resist, screen printed		•	•	
		Solder resist, photoimageable		•	•	
		Peelable resist		•	•	
		Hydrophobic coatings		•	•	
	Metallic Finishes	Bare copper		•	•	
		HASL SnPb		•	•	
		HASL SAC				
		Electroplated SnPb		•	•	
		Electroplated matt Sn		•	•	
		Electroplated Bright Sn		•	•	
		ENIG		•	•	
		Electroplated NiAu – Soft or Hard Au		•	•	
		OSP Entek 56		•	•	Others by Request
		Immersion silver		•	•	
		Immersion tin				Whisker resistant tin/silver alloy
	Heatsinks	Thermally bonded		•	•	
		PSA bonded		•	•	
	Marking Ink	Two-part epoxy		•	•	
INSPECTION & TESTING	Bare Board Shorts & Opens, Isolation, HiPost and Resistance	Bed of nails		•	•	Double sided double density
		Flying probe		•	•	
		Harness		•	•	
		In circuit		•	•	Inductance, Capacitance & resistance
	Test Voltage	Min	VDC	30	30	
		Max	VDC	1000	1000	
		Programmable Continuity Range	Ω	0.3∞	0.3∞	

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INSPECTION & TESTING contd		Insulation Resistance	MΩ	∞	∞	Programmable up to maximum stated
		Resistance	Ω	<1Ω	1<5Ω	Standard measurement
	AOI	Flex		•	•	
		FRML		•	•	
		SFC		•	•	2nd side only
ASSEMBLY	Smallest Component Size	SMT		0402	0402	
	Minimum Brazed Pin Pitch	Pinflex	mm	1.9	1.9	
	Minimum Pitch	BGA	mm	0.6	0.6	
LABORATORY	Optical Microscopy					
	Microsection					
	Chemical Analysis	Potentiometric analysis				
	Flexural Test					
	Peel Test/Tensile/ Compression test					
	Thermal Shock					
	Solderability					
	Accelerated Ageing					
	Porosity					
	Environmental	Tenney – TeH/TC/HTS				
	X-ray					
	Electron Microscopy					
	Ionic Surface Contamination	Ionograph				
	Tensile Test					
	Damp Heat					
	Thermal Cycling					
	CVS	Metr0hm				
	X/Y/Z Coordinate measurement	Baty Venture Plus				