

| CATEGORY | SUB-CATEGORY | ITEM | UNITS | AVAILABILITY | | COMMENTS |
|---------------|---------------------|---|--|----------------------------|------------------------|----------|
| | | | | DEVELOPMENT/ LOW VOLUME | MEDIUM/ HIGH VOLUME | |
| DESIGN & CAM | Design | SolidWorks 3D 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 | | • | • | |
| | | Damping materials | | • | • | |
| | | Hybrid Structures | Bonded and through plated combinations | | • | • |

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| PRODUCT RANGE contd | Assembly | SMT | | • | • | |
| | | 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 | | | 6.2 | 0.3mm upwards finished hole size |
| | Number of Layers | Flexible bonded max | | 8 | 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 | | • | • | |

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| MECHANICAL contd | Hole sizes | Mechanically drilled, pth min | mm | 0.15 | 0.2 | |
| | | Mechanically drilled non-ptd max | mm | 6.40 | 6.4 | |
| | | 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 | 0.300 | (+/-)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 | 0.05 | 0.05 | IPC-6013A requirement |
| | 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 | mm | 0.02 | 0.02 | Controlled depth from top surface & capability dependant on design |

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| MECHANICAL contd | 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 | |
| | | Laser minimum (slot) | mm | 0.025 | | |
| | | 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 | | • | | |
| | | 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 | | • | • | |

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| | | | | DEVELOPMENT/ LOW VOLUME | MEDIUM/ HIGH VOLUME | |
| MECHANICAL contd | | Adhesiveless | | • | • | |
| | Coverlay Dielectric Materials | Polyimide | | • | • | |
| | | 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 | | • | • | |
| | | ENIG | | • | • | |
| | | Electroplated NiAu | | • | • | |
| | | OSP Entek 56 | | • | • | |
| | | 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 | Bed of nails | | • | • | Double sided double density |
| | | Flying probe | | • | • | |
| | | Harness | | • | • | |
| | | In circuit | | • | • | Indictance, Capacitance & resistance |
| | Test Voltage | Min | VDC | 30 | 30 | |
| | | Max | VDC | 1000 | 1000 | |

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| | | | | DEVELOPMENT/ LOW VOLUME | MEDIUM/ HIGH VOLUME | |
| INSPECTION & TESTING contd | | Programmable Continuity Range | Ω | 0.3-8000 | 0.3-8000 | |
| | | Insulation Resistance | MΩ | 1200 | 1200 | Programmable up to maximum stated |
| | | Resistance | mΩ | 10 | 10 | Kelvin probe 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 | | | | | |
| | Flexural Test | | | | | |
| | Peel Test | | | | | |
| | Thermal Shock | | | | | |
| | Solderability | | | | | |
| | Accelerated Ageing | | | | | |
| | Porosity | | | | | |
| | Environmental | | | | | |
| | X-ray | | | | | |
| | Electron Microscopy | | | | | |
| Ionic Surface Contamination | | | | | | |