LEW TECHNIQUES

Thick Film Microcircuits - Design Guidelines

SUBSTRATES	Standard materials	Alumina 90%, 96% Aluminium nitride (AlN)	
	Other materials	Sapphire Machineable ceramic	
	Standard thicknesses	0.254 - 1.00 mm (in 0.127 mm steps) 1.27 - 2.00 mm (in 0.254 mm steps)	
	Thickness tolerances	As fired Lapped	± 10% (standard) ± 7% (premium) ± 0.02 mm
	Standard sizes	25.4 x 25.4, 50.8 x 50.8, 57.15 x 57.15, 76.2 x 76.2, 114.3 x 114.3 mm	
	Surface finish - Alumina (96%) Alumina (90%) Surface finish - AlN	< 0.89 µm Ra < 1.14 µm Ra < 0.81 µm Ra	
	Camber Standard Premium	± 0.076 mm/mm ± 0.051 mm /mm	
IMAGING	Maximum printed area (typical) Printed area maximum (absolute)	76.2 x 76.2 mm 101.6 x 101.6 mm	
	Typical pattern position tolerance	Printed ± 0.05 mm	Photo-imaged ± 0.02 mm
CONDUCTORS		Printed	Photo-imaged
	Minimum line width/space	50 µm	25 µm
	Typical line width/space	150 µm	50 µm
	Minimum line width tolerance	± 25 µm	± 10 µm
	Typical line width tolerance	± 50 µm	± 20 µm
	Print thickness (typical) Fine Au Normal maximum range	8 - 12 µm 5 - 8 µm 4 - 18 µm	
	Minimum metallisation around vias	Via dia. + 100 µm	
METALLISED THRU HOLES / FILLED VIAS	Minimum aspect ratio Maximum substrate thickness (typical)	0.3:1 Hole diameter:substrate thickness 1.00 mm (deeper design dependent)	
	Typical hole diameter Minimum hole diameter	Substrate thickness 75% of substrate thickness	
	Minimum hole to hole web thickness or hole to edge web distance	Substrate thickness	
RESISTORS	Printed resistor values (typical) Resistor tolerance	10 - 100 ohms/sq (blended/trimmed) ± 0.30 ohms achievable	
	Minimum resistor dimension(s) Minimum probe point dimensions	0.250 mm 0.125 x 0.125 mm (> 0.25 mm preferable)	
	Maximum probe to resistor dimension Maximum substrate size	20.00 mm 114.30 x 114.30 mm	

LASER PROFILING	Maximum substrate size Maximum substrate thickness	150 x 150 mm 1.0 mm
	Lasered feature tolerance Lasered feature position tolerance	± 30 µm ± 30 µm
	Minimum lasered feature to pattern gap Lasered feature to pattern tolerance	30 µm ± 30 µm
	Typical laser taper	± 50 µm / mm
	Minimum distance hole to hole, hole to edge	= Substrate thickness
DIAMOND SAWING	Maximum substrate thickness for dicing	2.0 mm
	Maximum substrate size	Rectangular: 127 x 127 mm Circular: 150 mm dia.
	Minimum distance pattern to edge Typical distance pattern to edge	0.030 mm 0.050 mm
	Minimum dicing tolerance Typical dicing tolerance	± 0.025 mm ± 0.050 mm
	Typical blade width	Substrate Thickness / Blade Width < 0.5 mm / 0.2 mm 0.5-1.0 mm / 0.3 mm > 1.0 mm / 0.4 mm
METALLISATIONS	Conductor layers	Au, Pt/Au, Pt/Ag/Pd, Ag/Pd, Mo/Mn
	Solder dams, layer barriers	Dielectric
	Pre-deposited solder	Au/Sn, Sn/Ag
OTHER	Wrap over edges (single and multi), multi layers, double sided circuits, thru hole printing, passive component mounting, wire bonding, angled face printing/wrap over, mixed metal circuits, pre-deposited solder.	
GENERAL	Actual capabilities are application specific and will depend on the interactions between the substrate material, metallisation scheme, vias, apertures, line widths, line spacing, conductor thickness, resistor geometry, etc. Generally the more complicated the circuit and the tighter the tolerances the lower the yield and thus the higher the cost. Selection of metallisation schemes is dependant on requirements for solderability, wire bondability and temperature resistance as well as electrical and dimensional performance.	
DATA FORMAT	DWG, DXF, Gerber, GDSII	AutoCAD preferred

LEW Techniques specialises in the manufacture of miniature components and microcircuits for mounting of semiconductor devices. Our in-house capabilities include thin film, thick film and refractory metallising of ceramics and metals, electroplating, laser machining and marking, precision dicing, atmosphere/vacuum brazing and solder assembly.

To discuss your application in detail please contact our Technical Sales Department who will be pleased to assist you.

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