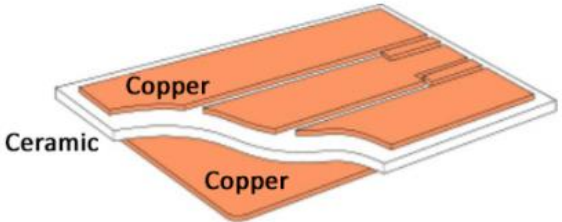
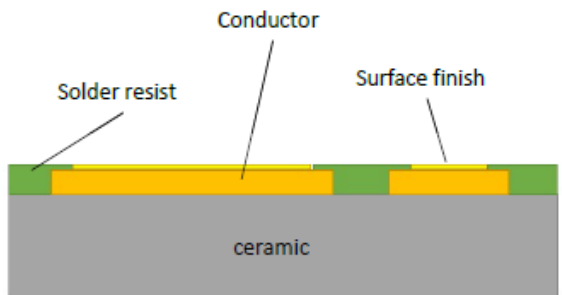
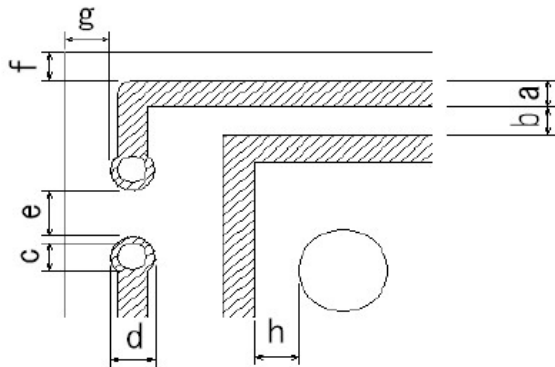


CERAMIC MANUFACTURING PROCESS


Ceramic Manufacturing Process		Manufacturing Guidelines	Rules and Guidelines
Dimensions & Thickness 	Panel Dimensions	Panel Dimensions (master)	Panel Dimensions (usable)
	Standard	115mm x 115mm	105mm x 105mm
	Special	Up to 170mm x 250mm AlN: 220mmx220mm (T:1.0mm) Alumina: 150mmx200mm (T:0.63/1.0mm)	160mm x 240mm 210mm x 210mm 140mm x 190mm
	Thickness		
	Standard	0.25/0.38/0.5/0.635/1.0/1.5mm	Most Common/Widely used
	Special	Available upon request Minimum: 0.1mm (sapphire/ZrO2) Maximum:3.0mm(alumina/ZrO2)	
Metallisation & Finish			
	Conductor		
	Standard	Copper – Cu	Most Common/Widely Used
	Special	Available upon request	
	Standard metric	35µm - 140µm	0.3/0.4/0.5/0.8mm copper
Special	18µm / 175um – 350um Maximum: 2000µm(DPC) Multi-thickness: from 5 to 2000um on one side	AMB	
	Surface finish		
	Standard	OSP, Immersion Silver, Immersion Tin, ENIG, ENEPIG and EPAG (no nickel)	Most Common/Widely Used
	Special		EPAG (non-magnetic finish)

CERAMIC MANUFACTURING PROCESS

	Manufacturing Guidelines		Rules and Guidelines
	Solder resist		
	Standard Special	Green, Black, White, Transparent Other – please enquire SR height: >15-20µm as std (150µm max) Min SR width 0.15mm Std (0.1mm Special) Min SR-SR gap (SR bridge) standard 0.15mm (0.1mm Special) Min SR-Copper (SR clearance) Standard 0.1mm (min 0.05mm) Min SR-Board edge standard 0.2mm Positional accuracy = +/- 0.05mm	Solder Resist - 130°C is max long term exposure for any SR. As a minimum, all Solder Resists used pass IPC thermal stress test; 3 times, 288°, 10 seconds.
	Silk screen / legend		
	Standard	Black, white	
	Layers		
	Standard	Single, double sided	
	Spacing and Vias		
	Min. line width / gap (a) and (b)		
	Standard Special	0.1mm 0.05mm	0.1mm accepted upon DFM approval
	Line/pad to edge spacing (f)		
	Standard	0.1mm (laser) 0mm (diamond blade cutting)	
	Via specifications		
	Via diameter (c) Min. via spacing (b) Via/hole to edge spacing Min via diameter (c) (Aspect Ratio) Through hole metallisation	0.08mm 0.15mm 3 x via diameter (Al2O3 thickness/6) Plated through hole (PTH)	PTH not available for DBC or AMB



CERAMIC MANUFACTURING PROCESS

	Manufacturing Guidelines		Rules and Guidelines
	Annular ring specifications		
	Min. annular ring diameter (d)	Via diameter + 0.20mm	Minimum 0.10mm either side of via
	Min. annular ring spacing (e)	0.20mm	
	Annular ring to edge spacing (g)	0.20mm	
	Line to hole/via spacing (h)		
	Standard	0.2mm	0.1mm accepted upon DFM approval
	Special	0.1mm	
Tolerance 	Dimensional tolerance		
	Standard	+/- 100µm (laser) +/- 60µm (diamond blade)	
	Thickness tolerance		
	Standard	+/- 10%	
	Hole tolerance		
	Standard	+/- 100µm	
	Pad to hole/via tolerance		
	Standard	+/- 100µm	