Circuit Design Guidelines

The table below offers recommended circuit design guidelines. These recommendations are taken from general metal fabrication guidelines. Safety Agency rules are used to design dielectric creepage distances and clearances.

DESIGN CATEGORY	DESIGN PARAMETER	STANDARD DESIGN RECOMMENDATION AND SPECIFICATION	
1.0 Circuit Design	1.1 Minimum circuit width	**Circuit Thickness**	
		1oz (35µm) - 0.005" (0.13mm)	
		2oz (70µm) - 0.006" (0.15mm)	
		3oz (105µm) - 0.007" (0.18mm)	
		4oz (140µm) - 0.008" (0.20mm)	
		6oz (210µm) - 0.010" (0.25mm)	
		8oz (280µm) - 0.015" (0.38mm)	
		10oz (350µm) - 0.015" (0.38mm)	
	1.2 Minimum space and gap single layer	**Single Layer (non-plated)**	**Multi Layer (plated)**
		1oz (35µm) - 0.007" (0.18mm)	1oz (35µm) - 0.009" (0.23mm)
		2oz (70µm) - 0.009" (0.23mm)	2oz (70µm) - 0.011" (0.28mm)
		3oz (105µm) - 0.012" (0.30mm)	3oz (105µm) - 0.014" (0.36mm)
		4oz (140µm) - 0.014" (0.36mm)	4oz (140µm) - 0.016" (0.41mm)
		6oz (210µm) - 0.020" (0.51mm)	6oz (210µm) - 0.022" (0.56mm)
		8oz (280µm) - 0.024" (0.61mm)	8oz (280µm) - 0.026" (0.66mm)
		10oz (350µm) - 0.030" (0.76mm)	10oz (350µm) - 0.032" (0.81mm)
	1.3 Minimum circuit to edge blanking	One material thickness + 0.020" (0.50mm)	
	1.4 Minimum circuit to edge v - scored/milled/routed	**Material Thickness**	**Circuit to Edge Distance**
		0.040" – (1.02mm)	0.026" – (0.66mm)
		0.062" – (1.57mm)	0.029" – (0.74mm)
		0.080" – (2.03mm)	0.031" – (0.79mm)
		0.125" – (3.18mm)	0.037" – (0.94mm)
	1.5 Minimum conductor to hole edge	One material thickness	
	1.6 Minimum annular ring	Punched non-plated through hole is 0.030" (0.76mm) min. Drilled/plated via hole is 0.010" (0.25mm) min.	
	1.7 Minimum character height for etched nomenclature	0.060" (1.52mm)	
2.0 Soldermask Design	2.1 Minimum soldermask line width	0.060" (1.52mm)	
	2.2 Soldermask pad apertures	Bergquist recommends that whenever possible, design the soldermask overlap on top of 0.010" (0.25mm) copper foil	
	2.3 Minimum soldermask aperture size	0.008" x 0.008" (0.20mm x 0.20mm)	
	2.4 Minimum character height and line width for nomenclature	0.008" x 0.008" (0.20mm x 0.20mm)	
	2.5 Soldermask setback	Suggested setback from part edge = one material thickness + 0.025" (0.635mm)	
3.0 Silk Screen Design	3.1 Character height/width	Minimum character height 0.060" (1.52mm) Minimum line width 0.010" (0.38mm)	
	3.2 Silk Screen to pad	Recommend minimum distance from silk-screen feature to nearest pad is 0.015" (0.38mm)	
	3.4 Minimum distance to board edge	One material thickness	
4.0 Mechanical Design	4.1 Hole to board edge	Minimum distance from edge of the hole to edge of board is one material thickness	
	4.2 Punched hole size	Minimum punched hole size is 1.5x material thickness	
	4.3 Minimum drilled hole diameter– copper base plate	One material thickness	
	4.4 Minimum drilled hole diameter– Aluminum base plate	**Base Plate Thickness**	**Drilled Hole Diameter**
		0.040" - (1.02mm)	0.030" - (0.76mm)
		0.062" - (1.57mm)	0.030" - (0.76mm)
		0.080" - (2.03mm)	0.040" - (1.02mm)
		0.125" - (3.18mm)	0.062" - (1.57mm)
	4.5 Minimum drilled via diameter for circuit layer	0.014" - (0.36mm)	
	4.6 Minimum edge radius	One material thickness for blanking No Radius for V-scoring	
	4.7 Minimum circuit to edge for blanking	One material thickness + 0.020" (0.51mm)	

The shaded blue areas represent Bergquist circuit processing capabilities. If your application requires different specifications, please contact Bergquist Sales.