

Precision Technology Inc. Design Guideline for Manufacturability

Hole Sizes and Tolerances

Hole Type	Min. Dia.	Max. Dia.	Tolerance	Tolerance
Drilled Plated Thru Holes	.008"	.250"	+ .003"	- .003"
Drilled Non - Plated Holes	.010"	.257"	+ .002"	- .002"
Oversized Plated Thru Holes	.251	Up	+ .005"	- .005"
Oversized Non - Plated Holes	.258	Up	+ .005"	- .005"

Example: .010" plated thru hole has a tolerance of +.003 / -.003

Slots and Tolerances

Slot Type	Min. Dia.	Max. Dia.	Tolerance	Tolerance
Drilled Plated Slots	.023"	.250"	+ .005"	+ .005"
Drilled Non Plated Slots	.028"	.257"	+ .005"	- .005"
Routed Plated Slots	.031"	Up	+ .005"	- .005"
Routed Non Plated Slots	.035"	Up	+ .005"	- .005"

Example: Plated Slot with a diameter of .035" has a tolerance of +.005 / -.005

Selecting Feature Sizes For Plated Through Holes and Slots

Hole Type	Plated or Non Plated	Hole Purpose	Outer Layer Pad Size	Internal Signal Layer, Pad Size	Internal Plane Layer, Clearance Size	Internal Plane Layer, Thermal Inner Diameter	Internal Plane Layer, Thermal Outer Diameter	Solder Mask Clearance
Drilled Plated Thru Holes	Plated	Via	.016"	.016"	.020"	+ .020"	+ .036"	+ .020"
Drilled Plated Thru Holes	Plated	Component	+ .020"	+ .025"	+ .025"	+ .025"	+ .045"	+ .026"
Drilled Plated Thru Holes	Plated	Tooling	+ .025"	+ .035"	+ .035"	+ .035"	+ .060"	+ .031"
Drilled Non - Plated Holes	Non Plated	All	N/A	N/A	+ .030"	N/A	N/A	+ .020"
Oversized Plated Thru Holes	Plated	All	+ .045"	+ .055"	+ .055"	+ .055"	+ .095"	+ .051"
Oversized Non - Plated Holes	Non Plated	All	N/A	N/A	+ .050"	N/A	N/A	+ .020"
Drilled Plated Slots	Plated	All	+ .045"	+ .055"	+ .055"	+ .055"	+ .095"	+ .051"
Drilled Non Plated Slots	Non Plated	All	N/A	N/A	+ .050"	N/A	N/A	+ .020"
Routed Plated Slots	Plated	All	+ .045"	+ .055"	+ .055"	+ .055"	+ .095"	+ .051"
Routed Non Plated Slots	Non Plated	All	N/A	N/A	+ .050"	N/A	N/A	+ .020"
Example: .010" Via Hole	Plated	Via	= .016"	= .016"	= .035"	= .030"	= .046"	= .030"

Min. Line Width : Starting Cu Weight determines the minimum line width

Starting Cu Weight	1/2 oz. Cu	1 oz. Cu	2 oz Cu
Outer Layer Trace	.005"	.005"	.007"
Outer Layer Nomenclature	.007"	.010"	.015"
Inner Layer Trace	.005"	.005"	.007"
Inner Layer Nomenclature	N/A	.008"	.012"

1/2 oz Copper on Inner Layers is Special Order Material

Min. Copper Clearance to Edge of Board (Including Internal Cut Outs)

	Routed Edge	Scored Edge	Preferred
Outer Layer	.008"	.025"	.025"
Internal Signal Layers	.010"	.020"	.025"
Internal Plane Layers	.010"	.020"	.025"

Clearance prevents exposed copper and burrs on edges of board.

Min. Spacing: Spacing should be set as large as possible to Improve Manufacturability

	With Mask Clearance	With No Mask Clearance	Comments
Pad to Pad	.008"	.005"	.008" Space with clearance is to make sure clearances do not break into each other
Pad to Trace	.006"	.005"	.006" Space is to prevent exposed circuitry
Trace to Trace	.005"	.005"	
NPT Hole to Trace	.010"	N/A	.010" min. space to allow for tenting of dry film resist which creates the NPT hole.
SMT to SMT Pad	.008"	N/A	Must be .008" min. to allow 3 mil soldermask dams between SMT Pads.

3 mil soldermask dams are available in Light Green Mask Only. For dam information see Soldermask Dam Chart

Min. Silkscreen Parameters

Line Width	Character Size	Clearance From Pad
.006"	.038"	.006"
.007"	.042"	.006"
.008"	.050"	.006"

Silkscreen letter size and line width is best legible at a minimum of .042" character size and .007" line width. For heavier copper layers the character size and line width should be increased.

Soldermask Dams

A soldermask dam is the mask between SMT pads on 25 mil, 20 mil, and 16 mil pitch SMT devices.

The purpose of the dam is to minimize the potential for solder bridging during assembly.

The determining factor of dam size is the space between the SMT pads and the color of the soldermask.

SMT Spacing	Mask Color	Dam Size	Comments
< .008"	ALL	Not Available	The color of the soldermask is a limiting factor to the minimum soldermask dam width that may be placed between SMT pads.
.008" and Up	Light Green	3 Mils	
.009" and Up	Red	4 Mils	
.009" and Up	Clear	4 Mils	
.010" and Up	Blue	4 Mils	
.010" and Up	Black	4 Mils	

Board and Array Fabrication Types and Tolerances

Board Fabrication Options: Individual Rout and Individual Score				
Array Fabrication Options: Tab Rout, Scored, Tab Rout and Score				
Fabrication	Maximum Board Length	Maximum Array Length	Board Tolerance	Array Tolerance
Board	< 15"	N/A	N/A	+ .005 / -.005
Board	> 15"	N/A	N/A	+ .010 / -.010
Array	< 15"	< 10"	+ .005 / -.005	+ .005 / -.005
Array	< 15"	> 15"	+ .005 / -.005	+ .010 / -.010
Array	> 15"	> 15"	+ .010 / -.010	+ .010 / -.010