



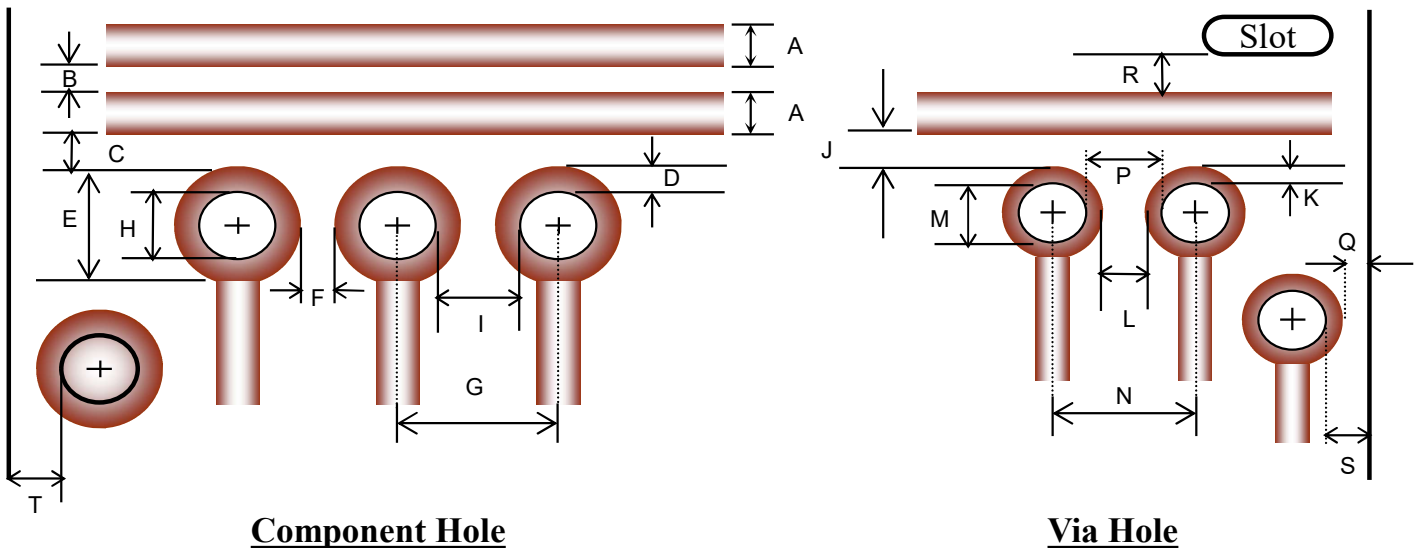
## Single Sided PCB Production & Technical Capabilities

No.	Design Items	Specification / Tolerance
1	Minimum copper track width / Conductor width ( By screen printing )	0.18 mm
2	Minimum gap between copper track / copper pad ( By screen printing )	0.18 mm
3	Minimum Copper ring	0.20 mm
4	Printed copper pad and hole location accuracy	+/- 0.120 mm
5	Copper pad to pad location accuracy	+/- 0.120 mm
6	Solder resist opening registration accuracy	+/- 0.125 mm
7	Minimum Punching hole diameter :- FR-4	Ø 2.00 mm
	Minimum Punching hole diameter :- CEM-1	Ø 0.70 mm
	Minimum Punching hole diameter :- CEM-3	Ø 0.75 mm
	Minimum Punching hole diameter :- XPC , FR-1 , FR-2 ( Paper Phenolic )	Ø 0.60 mm
	Minimum Punching hole diameter tolerance	+ 0.10 mm / - 0 mm
8	Minimum Punching Slot size :- FR-4	1.0 x 2.00 mm
	Minimum Punching Slot size :- CEM-1 / CEM-3	1.0 x 1.50 mm
	Minimum Punching Slot size :- XPC , FR-1 , FR-2 ( Paper Phenolic )	0.8 x 1.00 mm
9	Minimum CNC Hole drilling diameter	0.35 mm
	Minimum CNC Slot Drill diameter	0.80 X 1.70 mm
	CNC hole drilling diameter tolerance	+/- 0.05 mm
10	Minimum Workable CCL base material thickness with UL approval	0.80 mm
11	Hole edge to board edge distance	≥ 1.20 mm
12	Hole edge to V-cut line distance	≥ 1.60 mm
13	Hole edge to hole edge distance	≥ 1.00 mm
14	Minimum solder resist opening clearance from copper pad / land	≥ 0.15 mm
15	Minimum symbol opening clearance from copper pad / land	≥ 0.15 mm
16	Nickel Plating thickness ( Electroless / Electrolytic )	2 µm ~ 5 µm
17	Gold Plating thickness ( Electroless / Electrolytic )	0.025 µm ~ 0.05 µm
18	Electrical Test SMD pad pitch distance	> 0.40 mm
19	Maximum numbers of Electrical Test point	6,144 points

## Single Sided PCB Production & Technical Capabilities

No.	Design Items	Specification / Tolerance
20	Minimum Surface copper thickness	17 $\mu$ m
21	Maximum Surface copper thickness	70 $\mu$ m
22	Minimum pitch distance for punched hole diameter (1.6mm PCB thickness)	Pitch
	Diameter $\varnothing$ 0.60 mm ~ $\varnothing$ 0.90 mm	1.78 mm
	Diameter $\varnothing$ 1.00 mm ~ $\varnothing$ 1.10 mm	2.00 mm
	Diameter $\varnothing$ 1.20 mm ~ $\varnothing$ 1.30 mm	2.30 mm
	Diameter $\varnothing$ 1.40 mm ~ $\varnothing$ 1.50 mm	2.60 mm
	Diameter $\varnothing$ 1.60 mm ~ $\varnothing$ 1.70 mm	2.90 mm
	Diameter $\varnothing$ 1.80 mm ~ $\varnothing$ 1.90 mm	3.20 mm
	Diameter $\varnothing$ 2.00 mm ~ $\varnothing$ 2.10 mm	3.45 mm
	Diameter $\varnothing$ 2.20 mm ~ $\varnothing$ 2.30 mm	3.70 mm
	Diameter $\varnothing$ 2.40 mm ~ $\varnothing$ 2.50 mm	3.95 mm
23	V-cut depth	
	1.60 mm ( XPC , FR-1 , FR-2 , CEM-1 , CEM-3 ) – each side V-cutting	0.35 ~ 0.45 mm
	1.20 mm ( XPC , FR-1 , FR-2 , CEM-1 , CEM-3 ) – each side V-cutting	0.25 ~ 0.35 mm
	1.00 mm ( XPC , FR-1 , FR-2 , CEM-1 , CEM-3 ) – each side V-cutting	0.20 ~ 0.30 mm
	0.80 mm ( XPC , FR-1 , FR-2 , CEM-1 , CEM-3 ) – each side V-cutting	0.15 ~ 0.25 mm
	1.60 mm ( FR-4 ) – each side V-cutting	0.50 ~ 0.70 mm
	1.20 mm ( FR-4 ) – each side V-cutting	0.40 ~ 0.50 mm
	1.00 mm ( FR-4 ) – each side V-cutting	0.30 ~ 0.40 mm
	0.80 mm ( FR-4 ) – each side V-cutting	0.20 ~ 0.30 mm

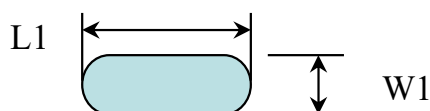
# Double Sided and Multilayer PCB Production Capabilities



**Component Hole**

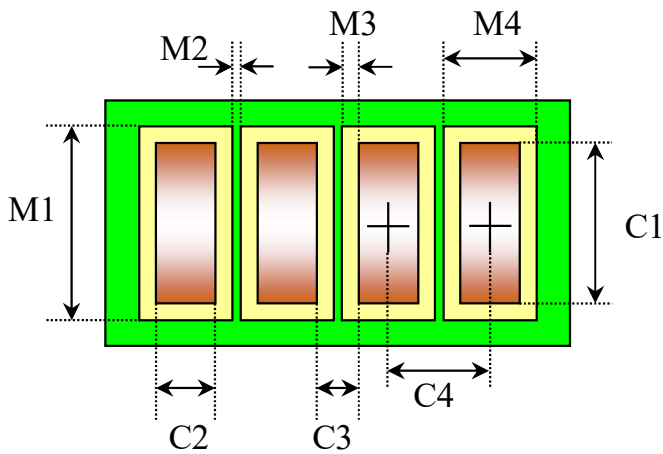
**Via Hole**

Location	Design (min)	Tolerance	Description
A	0.075 mm	+/- 0.025 mm	Minimum Conductor Width
B	0.075 mm	+/- 0.025 mm	Minimum Gap Between Copper Conductor
C	0.125 mm	+/- 0.05 mm	Minimum Gap Between Copper Pad Ring & Conductor
D	0.25 mm	+/- 0.05 mm	Minimum Copper Ring ( Component Hole )
E	1.20 mm	+/- 0.08 mm	Minimum Copper Pad Diameter ( Component Hole )
F	0.20 mm	+/- 0.05 mm	Minimum Gap Between Copper Pad ( Component Hole )
G	1.40 mm	+/- 0.08 mm	Minimum Pitch Distance For Component Hole
H	0.70 mm	+/- 0.05 mm	Minimum Diameter for Component Hole
I	0.70 mm	+/- 0.05 mm	Minimum Distance from Hole Edge to Hole Edge
J	0.10 mm	+/- 0.03 mm	Minimum Gap Between Copper Pad Ring & Conductor
K	0.10 mm	+/- 0.03 mm	Minimum Copper Ring ( Via Hole )
L	0.20 mm	+/- 0.03 mm	Minimum Gap Between Copper Pad ( Via Hole )
M	0.25 mm	+/- 0.05 mm	Minimum Diameter for Via Hole
N	0.65 mm	+/- 0.05 mm	Minimum pitch distance For via hole
P	0.40 mm	+/- 0.05 mm	Minimum distance from via hole edge to via hole edge
Q	0.50 mm	+/- 0.10 mm	Minimum Gap between copper pad ring & board edge
R	0.50 mm	+/- 0.08 mm	Minimum Gap between conductor & CNC slot edge
S	≥ 0.60 mm	+/- 0.10 mm	CNC Drilling hole edge to outline board edge distance
T	≥ 1.50 mm	+/- 0.10 mm	Tooling Punch hole edge to outline board edge distancem
W1	0.80 mm	+/- 0.08 mm	Minimum Slot Width ( By CNC )
L1	≥ 2 W1 + 0.1mm	+/- 0.08 mm	Minimum Slot Length ( By CNC )
W1	≥ 1.00 mm	+/- 0.10 mm	Minimum Slot Width ( By Tooling Punch )
L1	≥ 2.30 mm	+/- 0.10 mm	Minimum Slot Length ( By Tooling Punch )

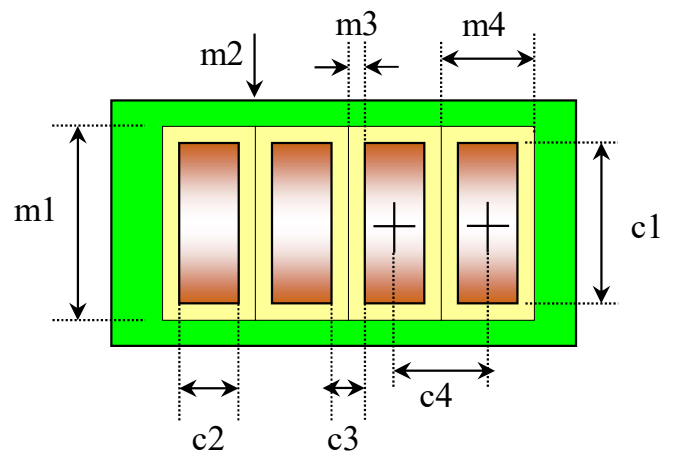


**Slot Hole ( FR-4 Material )**

## Double Sided and Multilayer PCB Production Capabilities :



**SMD Pad Pitch > 0.60 mm**



**SMD Pad Pitch = 0.50 mm**

### SMD Pad Pitch > 0.60 mm

Location	Design	Tolerance	Description
M1	0.80 mm	+/- 0.05 mm	Minimum length of solder resist opening
M2	0.10 mm	+/- 0.05 mm	Minimum solder resist width between openings
M3	0.10 mm	+/- 0.05 mm	Minimum solder resist opening clearance from copper land
M4	0.50 mm	+/- 0.05 mm	Minimum solder resist opening width
C1	0.60 mm	+/- 0.05 mm	Minimum SMD pad length
C2	0.30 mm	+/- 0.05 mm	Minimum SMD pad width
C3	0.30 mm	+/- 0.05 mm	Minimum gap in between SMD pads
C4	0.60 mm	+/- 0.05 mm	Minimum SMD pitch

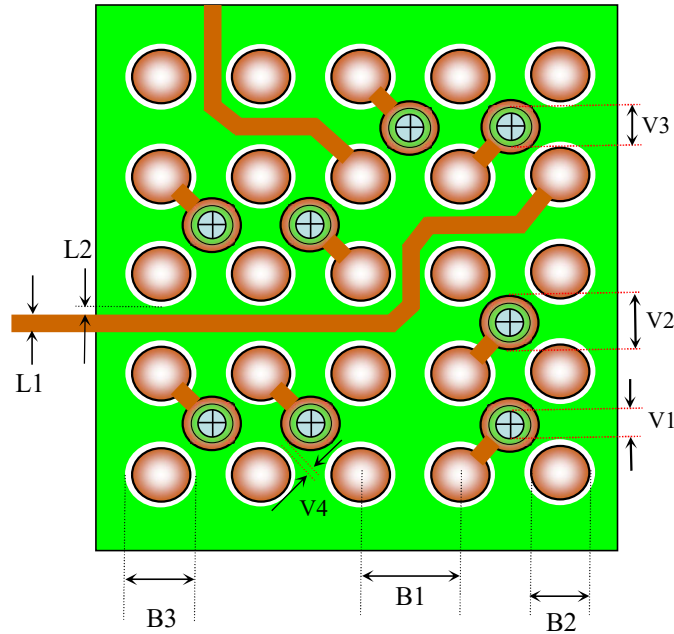
### SMD Pad Pitch = 0.50 mm

m1	0.80 mm	+/- 0.05 mm	Minimum length of solder resist opening
m2	NIL	NIL	No Solder Resist In Between
m3	0.10 mm	+/- 0.05 mm	Minimum solder resist opening clearance from copper land
m4	0.50 mm	+/- 0.05 mm	Minimum solder resist opening width
c1	0.60 mm	+/- 0.05 mm	Minimum SMD pad length
c2	0.30 mm	+/- 0.05 mm	Minimum SMD pad width
c3	0.20 mm	+/- 0.05 mm	Minimum gap in between SMD pads
c4	0.50 mm	+/- 0.05 mm	Minimum SMD pitch

*The above production capabilities serve as general guide lines only, and subject to further negotiation and confirmation.*

# Double Sided and Multilayer PCB Production Capabilities :

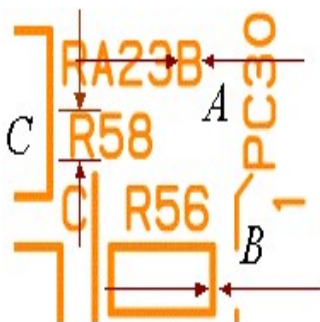
## BGA Pad



## BGA Pad

Location	BGA	BGA	BGA	Tolerance	Description
B1	0.65mm Pitch	0.70mm Pitch	0.80mm Pitch	+/- 0.05 mm	Pitch Between BGA & BGA Pad
B2	0.30 mm	0.30 mm	0.40 mm	+/- 0.05 mm	BGA pad diameter
B3	0.40 mm	0.40 mm	0.50 mm	+/- 0.05 mm	BGA solder resist opening diameter
V1	0.20 mm	0.20 mm	0.25 mm	+/- 0.05 mm	Minimum Diameter for Via Hole
V2	0.40 mm	0.40 mm	0.45 mm	+/- 0.03 mm	Via hole copper pad diameter
V3	0.30 mm	0.30 mm	0.30 mm	+/- 0.03 mm	Via hole solder resist opening
V4	0.06 mm	0.095 mm	0.090 mm	+/- 0.03 mm	Minimum Gap between BGA resist opening & via copper land
L1	0.10 mm	0.10 mm	0.10 mm	+/- 0.05 mm	Minimum Conductor width
L2	0.075 mm	0.10 mm	0.10 mm	+/- 0.05 mm	Minimum Gap between conductor & BGA resist opening

## Symbol Printing Capability :-



- Minimum A  $\geq$  0.80 mm
- Minimum B  $\geq$  0.15 mm
- Minimum C  $\geq$  1.00 mm
- Minimum D  $\geq$  0.15 mm

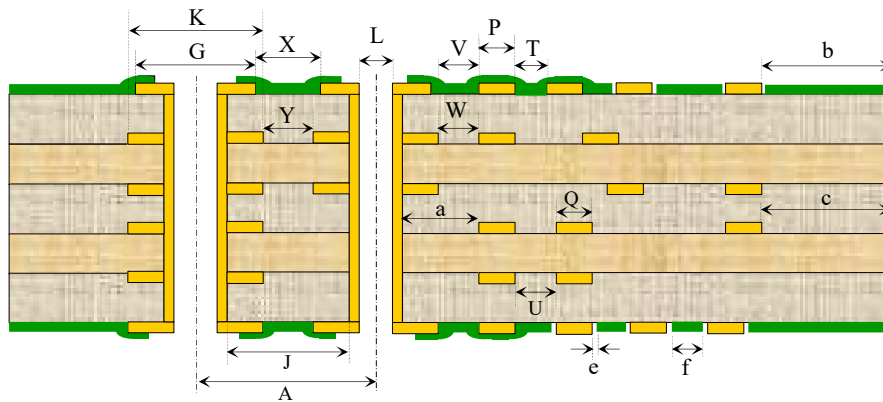


D= Symbol width

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# Multilayer PCB Technical Capabilities :

## 6 Layer MLB Design Standard Explanatory



	Mark	Description	Location Points	Minimum Design Value (mm)
TH	A	Distance from centre of TH to centre of TH	Between TH centre & TH centre	0.70 mm
	J	Distance from wall to wall of TH *	Spaces between TH walls	0.45 mm
	G	Through hole land / pad diameter	Outer layer land / pad	0.55 mm
	K		Inner layer land / pad	0.60 mm
	L	Through hole diameter	Through hole diameter after copper plated	0.25 mm
Pattern Design	P	Pattern track width	Outer layer pattern	0.075 mm
	Q		Inner layer pattern	0.10 mm
	T	Spacing between pattern track	Outer layer track gap	0.075 mm
	U		Inner layer track gap	0.10 mm
	V	Spacing between pattern track and pad	Outer layer pattern track & pad gap	0.10 mm
	W		Inner layer pattern track & pad gap	0.10 mm
	X	Spacing between pad & pad	Outer layer copper pad gap	0.15 mm
	Y		Inner layer copper pad gap	0.10 mm
Outline	a	Spacing between inner layer pattern track & TH wall	Inner Layer	0.35 mm
	b	Spacing between pattern track & PCB outline	Outer layer pattern track	0.50 mm
	c		Inner layer	0.50 mm
	d	Spacing between TH wall & PCB outline	TH ( Outline by CNC routing )	0.65 mm
	TH ( Outline punch by tooling )		1.60 mm	
Solder Resist	e	Solder resist clearance ( one side )		0.05 mm
	f	Minimum solder resist width	Solder mask slit	0.10 mm
		Solder resist misregistration tolerance		+/- 0.05 mm

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