

**ELECTRONICS
DESIGN AND MANUFACTURING
SERIES**

**HIGH DENSITY
INTERCONNECT
PRINTED CIRCUITS**

Nanotech Elektronik is an EMS company with a wide range of services

- PCB Services
- SMT and THT assembly
- Electronic components
- BOM Services
- Prototypes
- Turnkey manufacturing



Our technological capabilities in the scope of assembly

Production and assembly of printed circuit boards	
Minimum order quantity	from 1 piece upwards
Maximum PCB size (X x Y)	automatic SMT assembly - 610 mm x 510 mm; THT assembly - no restrictions
Minimum PCB Size (X x Y)	automatic SMT assembly - 50 mm x 50 mm; THT assembly - no restrictions
SMD components assembly	
Component size range	from 0,4 mm x 0,2 mm (01005) to 45 mm x 100 mm
Component height (max)	15 mm
Types of components	Chips: 01005, 0201, 0402, 0603, 0805, 1206, 1210, 1812, 2010, 2225, 2512
	IC: PLCC18-PLCC84, LCC20-LCC84, SO, HSOP, SOJ18-SOJ44, MSOP8-MSOP10, SSOP8-SSOP64, HSOP20-HSOP44, TSSOP8-TSSOP80, TSOP28-TSOP56, TQFP32-TQFP176, LQFP32-LQFP256, QFP44-QFP304, CSP40-CSP56 (0,5), BGA46-BGA100 (0,75-0,8), LBGA48-LBGA280 (0,75-0,8), BGA81-BGA324 (1,0) up to LBGA1936 (1,0), BGA208 (1,27) up to LBGA1225 (1,27), BGA169 (1,5) up to LBGA400, CBGA121 - CBGA1089
Assembly accuracy (X, Y)	50µm for chips 01005, 0201, 0402
	75µm for chips > 0402, SOIC
	30µm for QFPs

Product quality is assured by a multi-level control system at every stage of the production cycle. The manufactured product will fully comply with the provided technical requirements and standards of the international association of electronics manufacturers (Institute of Printed Circuits - IPC).

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Contacts

Feel free to contact us if you have further questions. You will always obtain comprehensive information both in the scope of designing and producing printed circuit boards, as well as practical information specifying the product manufacture and delivery time. We are always happy to share our knowledge and experience, in addition to taking care of the highest quality the projects implemented by us, which can be confirmed by the line-up of our clients in the EU and worldwide.

We are always willing to prepare a detailed cost estimate for the production of printed circuit boards, purchase of electronic components, assembly works consisting in mounting components on PCBs and other additional works. Owing to this, you will be able to find out about the production cost of both the first prototype batch and the cost of serial production after sending us the technical documentation of the project.

You can also contact us by phone: **+48 338 338 338**
or write to our email address: **office@nanotech-elektronik.com**
(we communicate in English, German and Polish).

Sincerely,
The Team of Nanotech Elektronik.

1. When HDI technology is used

A large number of signal connections with simultaneous requirement to reduce the size of the electronic device forces designers to introduce an increasing number of layers into the layout of printed circuit. An increase in the number of layers leads to an increase in the thickness of the PCB and imposes more stringent requirements on the design of vias as interlayer connections.

This significantly complicates the layout design process and often leads to subsequent technological complexity, and as a result, has a bad effect on the cost of the printed circuit board.

Despite the increase in the number of layers, designers often face the problem of routing signal connections from BGA, especially in the case of a large number of contact pads with a small pitch.

HDI (High Density Interconnect) technology allows you to reduce the number of signal layers on the printed circuit board using micro via and via-in-pads. Thus, the use of initially more expensive HDI technology can lead to a reduction in the price of the printed circuit board by using fewer layers than if the same printed circuit board was implemented using traditional technology.

Within the HDI technology, the complexity of the printed circuit board can be significantly reduced by using blind micro-vias that are placed directly in the soldering pads of BGA and connect the outer layers.

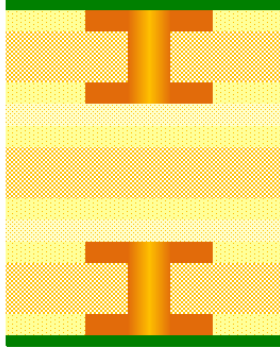
2. Brief overview of HDI PCB

HDI PCB are printed circuit boards that have an increased trace density per unit surface area compared to conventional multilayer boards.

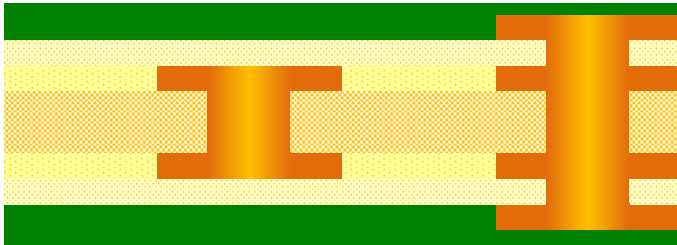
HDI printed circuit boards have the following typical parameters:

- Thinner spaces and conductors, ≤ 75 microns
- Laser micro-vias, diameter ≤ 100 microns
- Annular rings of micro-vias of small size, ≤ 260 microns
- High density of soldering pads, more than 20 per cm^2
- Special copper foil for outer layers (RCC foil - Resin Coated Copper)
- Based on sequential lamination

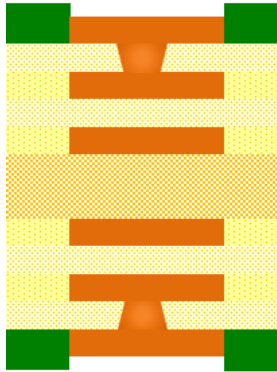
Blind holes (Blind Via) – holes connecting the outer layer with one or more inner layers. First, end-to-end drilling is performed separately in each of the cores, then a circuit pattern with metallization is formed and pressed as part of a multilayer board:



Hidden or buried holes (Buried Vias) – holes that do not go out, but connect the inner layers together. They are drilled through cores using a standard drilling technology, and then pressed into a multilayer board:

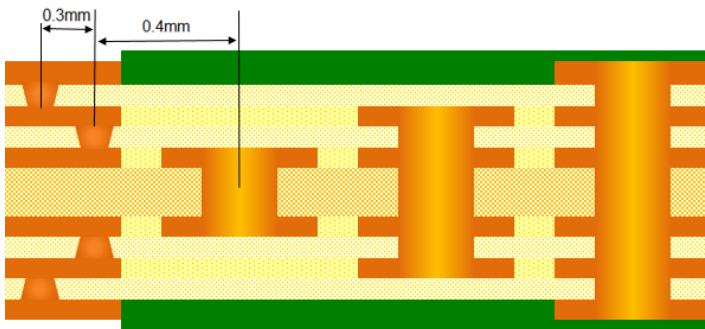


Laser via (Micro-via) – a hole formed by a laser beam with depth control through a thin layer of prepreg, which allows the holes of small diameter (less than 0,1mm). Such micro-vias have an aspect ratio of 1:1 (the ratio of the thickness of the prepreg layer to the diameter of the micro-via). That is why the depth of the micro-vias could not exceed their diameter:



Micro-vias are formed after pressing the stack-up of cores and prepregs. Further, the metallization is made simultaneously with the metallization of the other through holes and vias.

Please note that it is not recommended to place micro-vias over the buried vias because this increases the mechanical stresses in the PCB structure. Optimal distances are shown in the diagram below:



3. Recommended HDI build-ups for printed circuit boards

Below, you can find a list of the most common variants of HDI layer build-ups.

4-layer HDI PCB build-ups with single core

1-2-1 Structure		Required board thickness: 0,8 +/- 10%		
Layer		Thickness, um	Material	
Nr. 1	SMT TOP	1	20	Solder mask
	INT1	2	18	Final Copper Foil
	INT2	3	75	Laser prepreg
	BOTTOM SMB	4	18	Copper Foil
			510	Core
			18	Copper Foil
			75	Laser prepreg
			18	Final Copper Foil
			20	Solder mask

Approximate board thickness: 0,75 mm

1-2-1 Structure		Required board thickness: 1,0 +/- 10%		
Layer		Thickness, um	Material	
Nr. 2	SMT TOP	1	20	Solder mask
	INT1	2	18	Final Copper Foil
	INT2	3	75	Laser prepreg
	BOTTOM SMB	4	18	Copper Foil
			700	Core
			18	Copper Foil
			75	Laser prepreg
			18	Final Copper Foil
			20	Solder mask

Approximate board thickness: 0,95 mm

1-2-1 Structure		Required board thickness: 1,6 +/- 10%		
Layer		Thickness, um	Material	
Nr. 3	SMT TOP	1	20	Solder mask
	INT1	2	18	Final Copper Foil
	INT2	3	75	Prepreg
	BOTTOM SMB	4	18	Copper Foil
			1400	Core
			18	Copper Foil
			75	Prepreg
			18	Final Copper Foil
			20	Solder mask

Approximate board thickness: 1,55 mm

Possible drilling types for 4-layer HDI PCB

1-2-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%			
		Layer		Thickness, um	Material
Nr. 4	SMT TOP	1		20	Solder mask
				18	Final Copper Foil
				75	Laser prepreg
				18	Copper Foil
	INT1	2			Core
	INT2	3		18	Copper Foil
				75	Laser prepreg
				18	Final Copper Foil
	BOTTOM SMB	4		20	Solder mask
Possible types of holes: 1-2, 3-4 (microvia); 1-4 (PTH) Approximate board thickness: 0,75, 0,95, 1,55 mm					

1-2-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%			
		Layer		Thickness, um	Material
Nr. 5	SMT TOP	1		20	Solder mask
				18	Final Copper Foil
				75	Laser prepreg
				18	Copper Foil
	INT1	2			Core
	INT2	3		18	Copper Foil
				75	Laser prepreg
				18	Final Copper Foil
	BOTTOM SMB	4		20	Solder mask
Possible types of holes: 1-2, 3-4 (microvia); 2-3 (buried); 1-4 (PTH) Approximate board thickness: 0,75, 0,95, 1,55 mm					

6-layer HDI PCB build-ups with single core

1-4-1 Structure		Required board thickness: 0,7 +/- 10%			
		Layer		Thickness, um	Material
Nr. 1	SMT TOP	1		20	Solder mask
				18	Final Copper Foil
				75	Laser prepreg
				18	Copper Foil
				105	Preprag
				18	Copper Foil
	INT1	2			Core
	INT2	3		200	Core
	INT3	4		18	Copper Foil
				105	Preprag
				18	Copper Foil
	INT4	5		105	Preprag
				75	Laser prepreg
				18	Final Copper Foil
	BOTTOM SMB	6		20	Solder mask
Approximate board thickness: 0,65 mm					

1-4-1 Structure		Required board thickness: 1,0 +/- 10%			
		Layer		Thickness, um	Material
Nr. 2	SMT TOP	1		20	Solder mask
				18	Final Copper Foil
				75	Laser prepreg
				18	Copper Foil
				105	Preprag
				18	Copper Foil
	INT1	2			Core
	INT2	3		510	Core
	INT3	4		18	Copper Foil
				105	Preprag
				18	Copper Foil
	INT4	5		105	Preprag
				75	Laser prepreg
				18	Final Copper Foil
	BOTTOM SMB	6		20	Solder mask
Approximate board thickness: 0,95 mm					

1-4-1 Structure		Required board thickness: 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 3	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	1x1080
	INT1	2		18	Copper Foil	
				75	Prepreg	1x1080
				18	Copper Foil	
			1000	Core		
			18	Copper Foil		
			75	Preprag	1x1080	
			18	Copper Foil		
			75	Laser prepreg	1x1080	
			18	Final Copper Foil		
			20	Solder mask		
	BOTTOM SMB	6				

Approximate board thickness: 1,55 mm

6-layer HDI PCB build-ups with two cores

1-4-1 Structure		Required board thickness: 0,7 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 4	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	1x1080
	INT1	2		18	Copper Foil	
				130	Core	
				18	Copper Foil	
			130	Core		
			18	Copper Foil		
			105	Prepreg	1x2116	
			18	Copper Foil		
			130	Core		
			18	Copper Foil		
			75	Laser prepreg	1x1080	
			18	Final Copper Foil		
			20	Solder mask		
	BOTTOM SMB	6				

Approximate board thickness: 0,65 mm

1-4-1 Structure		Required board thickness: 1,0 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 5	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	1x1080
	INT1	2		18	Copper Foil	
				250	Core	
				18	Copper Foil	
			250	Core		
			18	Copper Foil		
			185	Prepreg	1x7628	
			18	Copper Foil		
			250	Core		
			18	Copper Foil		
			75	Laser prepreg	1x1080	
			18	Final Copper Foil		
			20	Solder mask		
	BOTTOM SMB	6				

Approximate board thickness: 0,95 mm

Possible drilling types for 6-layer HDI PCB

1-4-1 Structure		Required possible board thickness: 0,7, 1,0, 1,6 +/- 10%			
	Layer		Thickness, um	Material	
Nr. 7	SMT TOP	1	20	Solder mask	
	INT1	2	18	Final Copper Foil	1x1080
	INT2	3	75	Laser prepreg	
	INT3	4	18	Copper Foil	
	INT4	5	18	Preprag	
	BOTTOM SMB	6	18	Copper Foil	1x1080
				20	Final Copper Foil
		Possible types of holes: 1-2, 5-6 (microvia); 1-6 (PTH)		Approximate board thickness: 0,65, 0,95, 1,55 mm	

1-1-2-1-1 Structure		Required possible board thickness: 0,7, 1,0, 1,6 +/- 10%			
	Layer		Thickness, um	Material	
Nr. 8	SMT TOP	1	20	Solder mask	
	INT1	2	18	Final Copper Foil	1x1080
	INT2	3	75	Laser prepreg	
	INT3	4	18	Copper Foil	1x1080
	INT4	5	18	Laser prepreg	
	BOTTOM SMB	6	18	Copper Foil	1x1080
				20	Final Copper Foil
		Possible types of holes: 1-2, 2-3, 4-5, 5-6 (microvia); 1-6 (PTH)		Approximate board thickness: 0,65, 0,95, 1,55 mm	

1-(1-2-1)-1 Structure		Required possible board thickness: 0,7, 1,0, 1,6 +/- 10%			
	Layer		Thickness, um	Material	
Nr. 9	SMT TOP	1	20	Solder mask	
	INT1	2	18	Final Copper Foil	1x1080
	INT2	3	75	Prepreg	
	INT3	4	18	Copper Foil	1x1080
	INT4	5	18	Laser prepreg	
	BOTTOM SMB	6	18	Copper Foil	1x1080
				20	Final Copper Foil
		Possible types of holes: 2-3, 4-5 (microvia); 2-5 (buried); 1-6 (PTH)		Approximate board thickness: 0,65, 0,95, 1,55 mm	

1-1-2-1-1 Structure		Required possible board thickness: 0,7, 1,0, 1,6 +/- 10%	
Layer		Thickness, um	Material
Nr. 10	SMT TOP	20	Solder mask
	1	18	Final Copper Foil
	INT1	75	Laser prepreg
	2	18	Copper Foil
	INT2	18	Laser prepreg
	3	18	Copper Foil
INT3	18	Copper Foil	
INT4	18	Laser prepreg	
5	18	Copper Foil	
INT4	18	Laser prepreg	
5	75	Laser prepreg	
BOTTOM SMB	18	Final Copper Foil	
6	20	Solder mask	

Possible types of holes: 1-2, 2-3, 4-5, 5-6 (microvia); 2-5 or/and 3-4 (buried); 1-6 (PTH)
 Approximate board thickness: 0,65, 0,95, 1,55 mm

1-4-1 Structure		Required possible board thickness: 0,7, 1,0, 1,6 +/- 10%	
Layer		Thickness, um	Material
Nr. 11	SMT TOP	20	Solder mask
	1	18	Final Copper Foil
	INT1	75	Laser prepreg
	2	18	Copper Foil
	INT2	18	Core
	3	18	Copper Foil
INT3	18	Prepreg	
4	18	Copper Foil	
INT4	18	Core	
5	18	Copper Foil	
INT4	18	Laser prepreg	
5	75	Laser prepreg	
BOTTOM SMB	18	Final Copper Foil	
6	20	Solder mask	

Possible types of holes: 1-2, 5-6 (microvia); 1-6 (PTH)
 Approximate board thickness: 0,65, 0,95, 1,55 mm

1-4-1 Structure		Required possible board thickness: 0,7, 1,0, 1,6 +/- 10%	
Layer		Thickness, um	Material
Nr. 12	SMT TOP	20	Solder mask
	1	18	Final Copper Foil
	INT1	75	Laser prepreg
	2	18	Copper Foil
	INT2	18	Core
	3	18	Copper Foil
INT3	18	Prepreg	
4	18	Copper Foil	
INT4	18	Core	
5	18	Copper Foil	
INT4	18	Laser prepreg	
5	75	Laser prepreg	
BOTTOM SMB	18	Final Copper Foil	
6	20	Solder mask	

Possible types of holes: 1-2, 5-6 (microvia); 2-5 (buried); 1-6 (PTH)
 Approximate board thickness: 0,65, 0,95, 1,55 mm

1-2-2-1 Structure		Required possible board thickness: 0,7, 1,0, 1,6 +/- 10%	
Layer		Thickness, um	Material
Nr. 13	SMT TOP	20	Solder mask
	1	18	Final Copper Foil
	INT1	75	Laser prepreg
	2	18	Copper Foil
	INT2	18	Core
	3	18	Copper Foil
INT3	18	Prepreg	
4	18	Copper Foil	
INT4	18	Core	
5	18	Copper Foil	
INT4	18	Laser prepreg	
5	75	Laser prepreg	
BOTTOM SMB	18	Final Copper Foil	
6	20	Solder mask	

Possible types of holes: 1-2, 5-6 (microvia); 2-3 or/and 4-5 or/and 2-5 (buried); 1-6 (PTH)
 Approximate board thickness: 0,65, 0,95, 1,55 mm

1-2-2-1 Structure		Required possible board thickness: 0,7, 1,0, 1,6 +/- 10%		
	Layer		Thickness, um	Material
Nr. 14	SMT TOP	1	20	Solder mask
			18	Final Copper Foil
			75	Laser prepreg
	INT1	2	18	Copper Foil
				Core
			18	Copper Foil
	INT2	3		Preprag
				Core (without cooper)
	INT3	4	18	Preprag
				Copper Foil
				Core
	INT4	5	18	Copper Foil
			75	Laser prepreg
	BOTTOM SMB	6	18	Final Copper Foil
			20	Solder mask

Possible types of holes: 1-2, 5-6 (microvia); 2-3 or/and 4-5 or/and 2-5 (buried); 1-6 (PTH)
 Approximate board thickness: **0,65, 0,95, 1,55 mm**

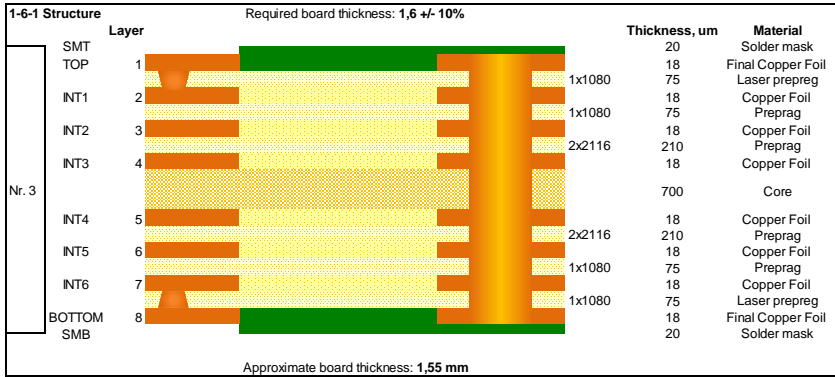
8-layer HDI PCB build-ups with single core

1-6-1 Structure		Required board thickness: 0,8 +/- 10%		
	Layer		Thickness, um	Material
Nr. 1	SMT TOP	1	20	Solder mask
			18	Final Copper Foil
			75	Laser prepreg
	INT1	2	18	Copper Foil
			75	Preprag
	INT2	3	18	Copper Foil
			75	Preprag
	INT3	4	18	Copper Foil
		150	Core	
	INT4	5	18	Copper Foil
			75	Preprag
	INT5	6	18	Copper Foil
			75	Preprag
	INT6	7	18	Copper Foil
			75	Laser prepreg
BOTTOM SMB	8	18	Final Copper Foil	
			20	Solder mask

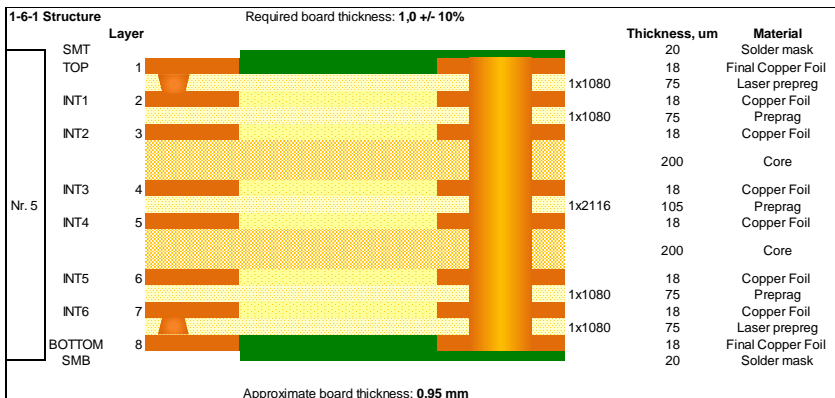
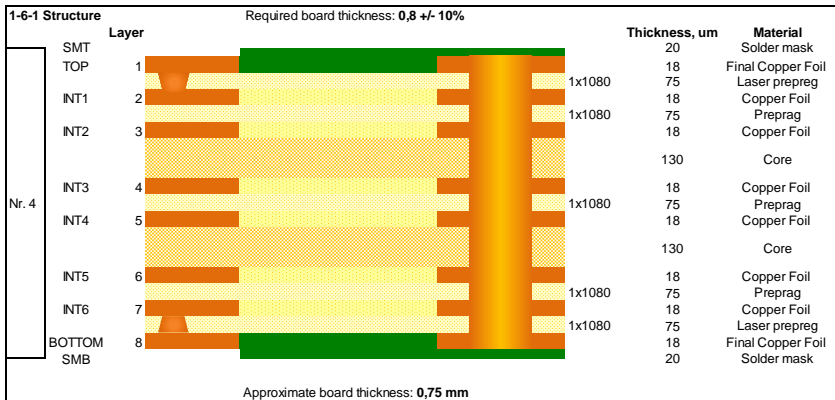
Approximate board thickness: **0,75 mm**

1-6-1 Structure		Required board thickness: 1,0 +/- 10%		
	Layer		Thickness, um	Material
Nr. 2	SMT TOP	1	20	Solder mask
			18	Final Copper Foil
			75	Laser prepreg
	INT1	2	18	Copper Foil
			75	Preprag
	INT2	3	18	Copper Foil
			105	Preprag
	INT3	4	18	Copper Foil
		300	Core	
	INT4	5	18	Copper Foil
			105	Preprag
	INT5	6	18	Copper Foil
			75	Preprag
	INT6	7	18	Copper Foil
			75	Laser prepreg
BOTTOM SMB	8	18	Final Copper Foil	
			20	Solder mask

Approximate board thickness: **0,95 mm**



8-layer HDI PCB build-ups with two cores



1-6-1 Structure		Required board thickness: 1,6 +/- 10%					
	Layer			Thickness, um	Material		
Nr. 6	SMT TOP	1		20	Solder mask		
				18	Final Copper Foil		
				75	Laser prepreg		
	INT1	2		1x1080	18	Copper Foil	
					75	Preprag	
	INT2	3			18	Copper Foil	
					450	Core	
					18	Copper Foil	
			2x2116	210	Preprag		
			18	Copper Foil			
			450	Core			
			18	Copper Foil			
			1x1080	75	Preprag		
			18	Copper Foil			
			1x1080	75	Laser prepreg		
			18	Final Copper Foil			
			20	Solder mask			
	BOTTOM SMB	8					

Approximate board thickness: 1,55 mm

8-layer HDI PCB build-ups with three cores

1-6-1 Structure		Required board thickness: 0,8 +/- 10%					
	Layer			Thickness, um	Material		
Nr. 7	SMT TOP	1		20	Solder mask		
				18	Final Copper Foil		
				75	Laser prepreg		
	INT1	2		1x1080	18	Copper Foil	
					100	Core	
	INT2	3			18	Copper Foil	
					75	Preprag	
					18	Copper Foil	
			1x1080	18	Copper Foil		
			100	Core			
			18	Copper Foil			
			1x1080	75	Preprag		
			18	Copper Foil			
			1x1080	75	Laser prepreg		
			18	Final Copper Foil			
			20	Solder mask			
	BOTTOM SMB	8					

Approximate board thickness: 0,75 mm

1-6-1 Structure		Required board thickness: 1,0 +/- 10%					
	Layer			Thickness, um	Material		
Nr. 8	SMT TOP	1		20	Solder mask		
				18	Final Copper Foil		
				75	Laser prepreg		
	INT1	2		1x1080	18	Copper Foil	
					150	Core	
	INT2	3			18	Copper Foil	
					105	Preprag	
					18	Copper Foil	
			1x2116	18	Copper Foil		
			150	Core			
			18	Copper Foil			
			1x2116	75	Preprag		
			18	Copper Foil			
			150	Core			
			18	Copper Foil			
			1x1080	75	Laser prepreg		
			18	Final Copper Foil			
			20	Solder mask			
	BOTTOM SMB	8					

Approximate board thickness: 0,95 mm

1-6-1 Structure		Required board thickness: 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 9	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	
	INT1	2		18	Copper Foil	
				350	Core	
				18	Copper Foil	
				105	Preprag	
				18	Copper Foil	
		350	Core			
		18	Copper Foil			
		105	Preprag			
		18	Copper Foil			
		350	Core			
		18	Copper Foil			
		75	Laser prepreg			
		18	Final Copper Foil			
		20	Solder mask			
	BOTTOM SMB	8				

Approximate board thickness: 1,55 mm

1-6-1 Structure		Required board thickness: 2,0 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 10	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	
	INT1	2		18	Copper Foil	
				400	Core	
				18	Copper Foil	
				210	Preprag	
				18	Copper Foil	
		400	Core			
		18	Copper Foil			
		210	Preprag			
		18	Copper Foil			
		400	Core			
		18	Copper Foil			
		75	Laser prepreg			
		18	Final Copper Foil			
		20	Solder mask			
	BOTTOM SMB	8				

Approximate board thickness: 1,90 mm

Possible drilling types for 8-layer HDI PCB

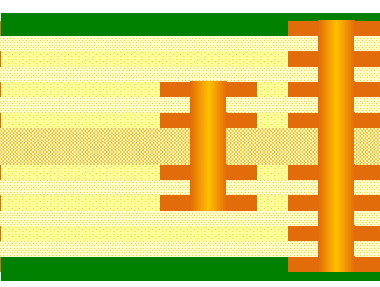
1-6-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 11	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	
	INT1	2		18	Copper Foil	
				18	Copper Foil	
				18	Copper Foil	
				18	Copper Foil	
				18	Copper Foil	
		18	Copper Foil			
		18	Copper Foil			
		18	Copper Foil			
		75	Laser prepreg			
		18	Final Copper Foil			
		20	Solder mask			
	BOTTOM SMB	8				

Possible types of holes: 1-2, 7-8 (microvia); 1-8 (PTH)
Approximate board thickness: 0,75, 0,95, 1,55 mm

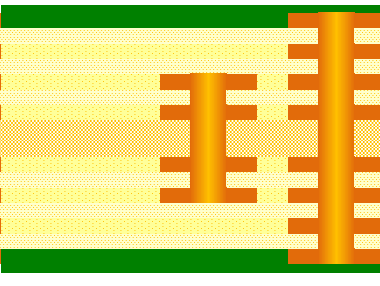
1-1-4-1-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%						
	Layer			Thickness, um		Material		
Nr. 12	SMT TOP	1		20		Solder mask		
				18		Final Copper Foil		
				75	1x1080		Laser prepreg	
	INT1	2		18		Copper Foil		
				75	1x1080		Laser prepreg	
	INT2	3		18		Copper Foil		
				75	1x1080		Preprag	
	INT3	4		18		Copper Foil		
		75	1x1080		Laser prepreg			
INT4	5	18		Copper Foil				
		75	1x1080		Preprag			
INT5	6	18		Copper Foil				
		75	1x1080		Laser prepreg			
INT6	7	18		Copper Foil				
		75	1x1080		Laser prepreg			
BOTTOM SMB	8	18		Final Copper Foil				
		20			Solder mask			
Possible types of holes: 1-2, 2-3, 6-7, 7-8 (microvia); 1-8 (PTH) Approximate board thickness: 0,75, 0,95, 1,55 mm								

1-1-1-2-1-1-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%						
	Layer			Thickness, um		Material		
Nr. 13	SMT TOP	1		20		Solder mask		
				18		Final Copper Foil		
				75	1x1080		Laser prepreg	
	INT1	2		18		Copper Foil		
				75	1x1080		Laser prepreg	
	INT2	3		18		Copper Foil		
				75	1x1080		Laser prepreg	
	INT3	4		18		Copper Foil		
		75	1x1080		Laser prepreg			
INT4	5	18		Copper Foil				
		75	1x1080		Laser prepreg			
INT5	6	18		Copper Foil				
		75	1x1080		Laser prepreg			
INT6	7	18		Copper Foil				
		75	1x1080		Laser prepreg			
BOTTOM SMB	8	18		Final Copper Foil				
		20			Solder mask			
Possible types of holes: 1-2, 2-3, 3-4, 5-6, 6-7, 7-8 (microvia); 1-8 (PTH) Approximate board thickness: 0,75, 0,95, 1,55 mm								

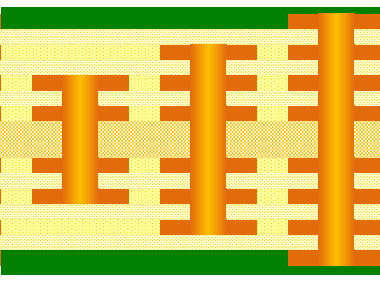
1-1-1-2-1-1-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%						
	Layer			Thickness, um		Material		
Nr. 14	SMT TOP	1		20		Solder mask		
				18		Final Copper Foil		
				75	1x1080		Laser prepreg	
	INT1	2		18		Copper Foil		
				75	1x1080		Laser prepreg	
	INT2	3		18		Copper Foil		
				75	1x1080		Laser prepreg	
	INT3	4		18		Copper Foil		
		75	1x1080		Laser prepreg			
INT4	5	18		Copper Foil				
		75	1x1080		Laser prepreg			
INT5	6	18		Copper Foil				
		75	1x1080		Laser prepreg			
INT6	7	18		Copper Foil				
		75	1x1080		Laser prepreg			
BOTTOM SMB	8	18		Final Copper Foil				
		20			Solder mask			
Possible types of holes: 1-2, 2-3, 3-4, 5-6, 6-7, 7-8 (microvia); 4-5 or/and 3-6 (buried); 1-8 (PTH) Approximate board thickness: 0,75, 0,95, 1,55 mm								

1-1-4-1-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 15	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	1x1080
	INT1	2		18	Copper Foil	
				75	Laser prepreg	1x1080
	INT2	3		18	Copper Foil	
				75	Preprag	
	INT3	4		18	Copper Foil	
					Core	
INT4	5		18	Copper Foil		
			18	Preprag		
INT5	6		18	Copper Foil		
			75	Laser prepreg	1x1080	
INT6	7		18	Copper Foil		
			75	Laser prepreg	1x1080	
BOTTOM SMB	8		18	Final Copper Foil		
			20	Solder mask		

Possible types of holes: 1-2, 2-3, 6-7, 7-8 (microvia); 3-6 (buried); 1-8 (PTH)
Approximate board thickness: 0,75, 0,95, 1,55 mm

1-(1-4-1)-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 16	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Preprag	
	INT1	2		18	Copper Foil	
				75	Laser prepreg	1x1080
	INT2	3		18	Copper Foil	
				75	Preprag	
	INT3	4		18	Copper Foil	
					Core	
INT4	5		18	Copper Foil		
			18	Preprag		
INT5	6		18	Copper Foil		
			75	Laser prepreg	1x1080	
INT6	7		18	Copper Foil		
			75	Preprag		
BOTTOM SMB	8		18	Final Copper Foil		
			20	Solder mask		

Possible types of holes: 2-3, 6-7 (microvia); 3-6 (buried); 1-8 (PTH)
Approximate board thickness: 0,75, 0,95, 1,55 mm

1-1-4-1-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 17	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	1x1080
	INT1	2		18	Copper Foil	
				75	Laser prepreg	1x1080
	INT2	3		18	Copper Foil	
				75	Preprag	
	INT3	4		18	Copper Foil	
					Core	
INT4	5		18	Copper Foil		
			18	Preprag		
INT5	6		18	Copper Foil		
			75	Laser prepreg	1x1080	
INT6	7		18	Copper Foil		
			75	Laser prepreg	1x1080	
BOTTOM SMB	8		18	Final Copper Foil		
			20	Solder mask		

Possible types of holes: 1-2, 2-3, 6-7, 7-8 (microvia); 2-7 or/and 3-6 (buried); 1-8 (PTH)
Approximate board thickness: 0,75, 0,95, 1,55 mm

1-6-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 18	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	
	INT1	2		18	Copper Foil	
				18	Preprag	
	INT2	3		18	Copper Foil	
				18	Preprag	
	INT3	4		18	Copper Foil	
		18	Preprag			
INT4	5	18	Copper Foil			
		18	Preprag			
INT5	6	18	Copper Foil			
		18	Preprag			
INT6	7	18	Copper Foil			
		75	Laser prepreg			
BOTTOM SMB	8	18	Final Copper Foil			
		20	Solder mask			

Possible types of holes: 1-2, 7-8 (microvia); 2-7 or/and 3-6 (buried); 1-8 (PTH)
Approximate board thickness: 0,75, 0,95, 1,55 mm

1-(1-4-1)-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 19	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	
	INT1	2		18	Copper Foil	
				18	Preprag	
	INT2	3		18	Copper Foil	
				18	Preprag	
	INT3	4		18	Copper Foil	
		18	Preprag			
INT4	5	18	Copper Foil			
		18	Preprag			
INT5	6	18	Copper Foil			
		75	Laser prepreg			
INT6	7	18	Copper Foil			
		75	Laser prepreg			
BOTTOM SMB	8	18	Final Copper Foil			
		20	Solder mask			

Possible types of holes: 2-3, 6-7 (microvia); 2-7 or/and 3-6 (buried); 1-8 (PTH)
Approximate board thickness: 0,75, 0,95, 1,55 mm

1-6-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 20	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	
	INT1	2		18	Copper Foil	
				18	Preprag	
	INT2	3		18	Copper Foil	
				18	Preprag	
	INT3	4		18	Copper Foil	
		18	Preprag			
INT4	5	18	Copper Foil			
		18	Preprag			
INT5	6	18	Copper Foil			
		18	Preprag			
INT6	7	18	Copper Foil			
		75	Laser prepreg			
BOTTOM SMB	8	18	Final Copper Foil			
		20	Solder mask			

Possible types of holes: 1-2, 7-8 (microvia); 1-8 (PTH)
Approximate board thickness: 0,75, 0,95, 1,55 mm

1-1-4-1-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 21	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	1x1080
	INT1	2		18	Copper Foil	
				75	Laser prepreg	1x1080
	INT2	3		18	Copper Foil	
					Core	
				18	Copper Foil	
			Preprag			
INT3	4		Copper Foil			
			Preprag			
INT4	5		Copper Foil			
			Core			
			Copper Foil			
INT5	6		Copper Foil	18		
			Laser prepreg	75		
INT6	7		Copper Foil	18		
			Laser prepreg	75		
BOTTOM SMB	8		Final Copper Foil	18		
			Solder mask	20		

Possible types of holes: 1-2, 2-3, 6-7, 7-8 (microvia); 1-8 (PTH)
 Approximate board thickness: 0,75, 0,95, 1,55 mm

1-1-4-1-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 22	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	1x1080
	INT1	2		18	Copper Foil	
				75	Laser prepreg	1x1080
	INT2	3		18	Copper Foil	
					Core	
				18	Copper Foil	
			Preprag			
INT3	4		Copper Foil			
			Preprag			
INT4	5		Copper Foil			
			Core			
			Copper Foil			
INT5	6		Copper Foil	18		
			Laser prepreg	75		
INT6	7		Copper Foil	18		
			Laser prepreg	75		
BOTTOM SMB	8		Final Copper Foil	18		
			Solder mask	20		

Possible types of holes: 1-2, 2-3, 6-7, 7-8 (microvia); 2-7 (buried); 1-8 (PTH)
 Approximate board thickness: 0,75, 0,95, 1,55 mm

1-(1-4)-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 23	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	1x1080
	INT1	2		18	Copper Foil	
				75	Laser prepreg	1x1080
	INT2	3		18	Copper Foil	
					Core	
				18	Copper Foil	
			Preprag			
INT3	4		Copper Foil			
			Preprag			
INT4	5		Copper Foil			
			Core			
			Copper Foil			
INT5	6		Copper Foil	18		
			Laser prepreg	75		
INT6	7		Copper Foil	18		
			Preprag			
BOTTOM SMB	8		Final Copper Foil	18		
			Solder mask	20		

Possible types of holes: 2-3, 6-7 (microvia); 2-7 (buried); 1-8 (PTH)
 Approximate board thickness: 0,75, 0,95, 1,55 mm

1-(1-2-2-1)-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6 +/- 10%		
	Layer		Thickness, um	Material
Nr. 24	SMT TOP	1	20	Solder mask
	INT1	2	18	Final Copper Foil
	INT2	3	75	Laser prepreg
	INT3	4	18	Copper Foil
	INT4	5	18	Preprag
	INT5	6	18	Copper Foil
	INT6	7	18	Preprag
	BOTTOM SMB	8	20	Final Copper Foil
				Solder mask
Possible types of holes: 1-2, 7-8 (microvia); 3-4 or/and 5-6 or/and 2-7 (buried); 1-8 (PTH)				
Approximate board thickness: 0,75, 0,95, 1,55 mm				

1-6-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6, 2,0 +/- 10%		
	Layer		Thickness, um	Material
Nr. 25	SMT TOP	1	20	Solder mask
	INT1	2	18	Final Copper Foil
	INT2	3	75	Laser prepreg
	INT3	4	18	Copper Foil
	INT4	5	18	Preprag
	INT5	6	18	Copper Foil
	INT6	7	18	Preprag
	BOTTOM SMB	8	20	Final Copper Foil
				Solder mask
Possible types of holes: 1-2, 7-8 (microvia); 1-8 (PTH)				
Approximate board thickness: 0,75, 0,95, 1,55, 1,90 mm				

1-2-2-2-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6, 2,0 +/- 10%		
	Layer		Thickness, um	Material
Nr. 26	SMT TOP	1	20	Solder mask
	INT1	2	18	Final Copper Foil
	INT2	3	75	Laser prepreg
	INT3	4	18	Copper Foil
	INT4	5	18	Preprag
	INT5	6	18	Copper Foil
	INT6	7	18	Preprag
	BOTTOM SMB	8	20	Final Copper Foil
				Solder mask
Possible types of holes: 1-2, 7-8 (microvia); 4-5 (buried); 1-8 (PTH)				
Approximate board thickness: 0,75, 0,95, 1,55, 1,90 mm				

1-2-2-2-1 Structure		Required possible board thickness: 0,8, 1,0, 1,6, 2,0 +/- 10%			
	Layer			Thickness, um	Material
Nr. 27	SMT TOP	1		20	Solder mask
	INT1	2	1x1080	18	Final Copper Foil
	INT2	3		75	Laser prepreg
	INT3	4		18	Copper Foil
	INT4	5		18	Copper Foil
	INT5	6		75	Preprag
	INT6	7		18	Copper Foil
	BOTTOM SMB	8	1x1080	18	Final Copper Foil
				75	Laser prepreg
				18	Solder mask

Possible types of holes: 1-2, 7-8 (microvia); 2-3 or/and 4-5 or/and 6-7 (buried); 1-8 (PTH)
 Approximate board thickness: 0,75, 0,95, 1,55, 1,90 mm

10-layer HDI PCB build-ups with two cores

1-8-1 Structure		Required board thickness: 1,0 +/- 10%			
	Layer			Thickness, um	Material
Nr. 1	SMT TOP	1		20	Solder mask
	INT1	2	1x1080	18	Final Copper Foil
	INT2	3	1x1080	75	Laser prepreg
	INT3	4	1x1080	18	Copper Foil
	INT4	5		18	Copper Foil
	INT5	6	1x1080	75	Preprag
	INT6	7		18	Copper Foil
	INT7	8	1x1080	75	Preprag
	INT8	9	1x1080	18	Copper Foil
	BOTTOM SMB	10	1x1080	75	Laser prepreg
				18	Final Copper Foil
				20	Solder mask

Approximate board thickness: 0,95 mm

1-8-1 Structure		Required board thickness: 1,6 +/- 10%					
	Layer			Thickness, um	Material		
Nr. 2	SMT TOP	1		20	Solder mask		
				18	Final Copper Foil		
				1x1080	75	Laser prepreg	
	INT1	2		18	Copper Foil		
				1x1080	75	Preprag	
	INT2	3		18	Copper Foil		
				1x1080	75	Preprag	
	INT3	4		18	Copper Foil		
					350	Core	
	INT4	5		18	Copper Foil		
		2x2116	210	Preprag			
INT5	6	18	Copper Foil				
			350	Core			
INT6	7	18	Copper Foil				
		1x1080	75	Preprag			
INT7	8	18	Copper Foil				
		1x1080	75	Preprag			
INT8	9	18	Copper Foil				
		1x1080	75	Laser prepreg			
BOTTOM SMB	10	18	Final Copper Foil				
			20	Solder mask			

Approximate board thickness: 1,55 mm

1-8-1 Structure		Required board thickness: 2,0 +/- 10%					
	Layer			Thickness, um	Material		
Nr. 3	SMT TOP	1		20	Solder mask		
				18	Final Copper Foil		
				1x1080	75	Laser prepreg	
	INT1	2		18	Copper Foil		
				1x1080	75	Preprag	
	INT2	3		18	Copper Foil		
				2x2116	210	Preprag	
	INT3	4		18	Copper Foil		
					400	Core	
	INT4	5		18	Copper Foil		
		2x2116	210	Preprag			
INT5	6	18	Copper Foil				
			400	Core			
INT6	7	18	Copper Foil				
		2x2116	210	Preprag			
INT7	8	18	Copper Foil				
		1x1080	75	Preprag			
INT8	9	18	Copper Foil				
		1x1080	75	Laser prepreg			
BOTTOM SMB	10	18	Final Copper Foil				
			20	Solder mask			

Approximate board thickness: 1,90 mm

10-layer HDI PCB build-ups with three cores

1-8-1 Structure		Required board thickness: 1,0 +/- 10%			
	Layer		Thickness, um	Material	
Nr. 4	SMT TOP	1	20	Solder mask	
			18	Final Copper Foil	
			75	Laser prepreg	
	INT1	2	18	Copper Foil	
			75	Preprag	
	INT2	3	18	Copper Foil	
			100	Core	
			18	Copper Foil	
			105	Preprag	
			18	Copper Foil	
		100	Core		
		18	Copper Foil		
		75	Preprag		
		18	Copper Foil		
		100	Core		
		18	Copper Foil		
		75	Preprag		
		18	Copper Foil		
		75	Laser prepreg		
		18	Final Copper Foil		
		20	Solder mask		
	BOTTOM SMB	10			

Approximate board thickness: 0,95 mm

1-8-1 Structure		Required board thickness: 1,6 +/- 10%			
	Layer		Thickness, um	Material	
Nr. 5	SMT TOP	1	20	Solder mask	
			18	Final Copper Foil	
			75	Laser prepreg	
	INT1	2	18	Copper Foil	
			75	Preprag	
	INT2	3	18	Copper Foil	
			200	Core	
			18	Copper Foil	
			210	Preprag	
			18	Copper Foil	
		200	Core		
		18	Copper Foil		
		210	Preprag		
		18	Copper Foil		
		200	Core		
		18	Copper Foil		
		75	Preprag		
		18	Copper Foil		
		75	Laser prepreg		
		18	Final Copper Foil		
		20	Solder mask		
	BOTTOM SMB	10			

Approximate board thickness: 1,55 mm

1-8-1 Structure		Required board thickness: 2,0 +/- 10%					
	Layer			Thickness, um	Material		
Nr. 6	SMT TOP	1		20	Solder mask		
				18	Final Copper Foil		
				75	Laser prepreg	1x1080	
	INT1	2		18	Copper Foil		
				75	Preprag	1x1080	
	INT2	3		18	Copper Foil		
				350	Core		
	INT3	4		18	Copper Foil		
				210	Preprag	2x2116	
	INT4	5		18	Copper Foil		
		350	Core				
			18	Copper Foil			
			210	Preprag	2x2116		
INT5	6	18	Copper Foil				
			18	Copper Foil			
INT6	7	18	Copper Foil				
			350	Core			
INT7	8	18	Copper Foil				
			75	Laser prepreg	1x1080		
INT8	9	18	Copper Foil				
			75	Laser prepreg	1x1080		
BOTTOM SMB	10	18	Final Copper Foil				
			20	Solder mask			

Approximate board thickness: 1,90 mm

1-8-1 Structure		Required board thickness: 2,5 +/- 10%					
	Layer			Thickness, um	Material		
Nr. 7	SMT TOP	1		20	Solder mask		
				18	Final Copper Foil		
				75	Laser prepreg	1x1080	
	INT1	2		18	Copper Foil		
				105	Preprag	1x2116	
	INT2	3		18	Copper Foil		
				500	Core		
	INT3	4		18	Copper Foil		
				210	Preprag	2x2116	
	INT4	5		18	Copper Foil		
		500	Core				
			18	Copper Foil			
			210	Preprag	2x2116		
INT5	6	18	Copper Foil				
			18	Copper Foil			
INT6	7	18	Copper Foil				
			500	Core			
INT7	8	18	Copper Foil				
			105	Preprag	1x2116		
INT8	9	18	Copper Foil				
			75	Laser prepreg	1x1080		
BOTTOM SMB	10	18	Final Copper Foil				
			20	Solder mask			

Approximate board thickness: 2,40 mm

10-layer HDI PCB build-ups with four cores

1-8-1 Structure		Required board thickness: 1,0 +/- 10%					
	Layer			Thickness, um	Material		
Nr. 8	SMT TOP	1		20	Solder mask		
				18	Final Copper Foil		
	INT1	2		1x1080	75	Laser prepreg	
					18	Copper Foil	
					100	Core	
	INT2	3			18	Copper Foil	
	INT3	4		1x1080	75	Preprag	
					18	Copper Foil	
					100	Core	
	INT4	5			18	Copper Foil	
INT5	6	1x1080	75	Preprag			
			18	Copper Foil			
			100	Core			
INT6	7		18	Copper Foil			
INT7	8	1x1080	75	Preprag			
			18	Copper Foil			
			100	Core			
INT8	9		18	Copper Foil			
BOTTOM SMB	10	1x1080	75	Laser prepreg			
			18	Final Copper Foil			
			20	Solder mask			

Approximate board thickness: 0,95 mm

1-8-1 Structure		Required board thickness: 1,6 +/- 10%					
	Layer			Thickness, um	Material		
Nr. 9	SMT TOP	1		20	Solder mask		
				18	Final Copper Foil		
	INT1	2		1x1080	75	Laser prepreg	
					18	Copper Foil	
					200	Core	
	INT2	3			18	Copper Foil	
	INT3	4		1x2116	105	Preprag	
					18	Copper Foil	
					200	Core	
	INT4	5			18	Copper Foil	
INT5	6	2x2116	210	Preprag			
			18	Copper Foil			
			200	Core			
INT6	7		18	Copper Foil			
INT7	8	1x2116	105	Preprag			
			18	Copper Foil			
			200	Core			
INT8	9		18	Copper Foil			
BOTTOM SMB	10	1x1080	75	Laser prepreg			
			18	Final Copper Foil			
			20	Solder mask			

Approximate board thickness: 1,55 mm

1-8-1 Structure		Required board thickness: 2,0 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 10	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
			1x1080	75	Laser prepreg	
	INT1	2		18	Copper Foil	
				250	Core	
	INT2	3		18	Copper Foil	
				210	Preprag	
	INT3	4		18	Copper Foil	
				250	Core	
	INT4	5		18	Copper Foil	
			210	Preprag		
INT5	6		18	Copper Foil		
			250	Core		
INT6	7		18	Copper Foil		
			210	Preprag		
INT7	8		18	Copper Foil		
			250	Core		
INT8	9		18	Copper Foil		
			75	Laser prepreg		
BOTTOM SMB	10		1x1080	18	Final Copper Foil	
				20	Solder mask	

Approximate board thickness: 1,90 mm

1-8-1 Structure		Required board thickness: 2,5 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 11	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
			1x1080	75	Laser prepreg	
	INT1	2		18	Copper Foil	
				350	Core	
	INT2	3		18	Copper Foil	
				185	Preprag	
	INT3	4		18	Copper Foil	
				350	Core	
	INT4	5		18	Copper Foil	
			370	Preprag		
INT5	6		18	Copper Foil		
			350	Core		
INT6	7		18	Copper Foil		
			185	Preprag		
INT7	8		18	Copper Foil		
			350	Core		
INT8	9		18	Copper Foil		
			75	Laser prepreg		
BOTTOM SMB	10		1x1080	18	Final Copper Foil	
				20	Solder mask	

Approximate board thickness: 2,40 mm

1-8-1 Structure		Required board thickness: 3,0 +/- 10%				
	Layer			Thickness, um		Material
Nr. 12	SMT TOP	1		20		Solder mask
				18		Final Copper Foil
				75		Laser prepreg
	INT1	2		18	1x1080	Copper Foil
				450		Core
	INT2	3		18		Copper Foil
				210	2x2116	Preprag
	INT3	4		18		Copper Foil
				450		Core
	INT4	5		18		Copper Foil
		370	2x7628	Preprag		
INT5	6	18		Copper Foil		
		450		Core		
INT6	7	18		Copper Foil		
		210	2x2116	Preprag		
INT7	8	18		Copper Foil		
		450		Core		
INT8	9	18		Copper Foil		
		75	1x1080	Laser prepreg		
BOTTOM SMB	10	18		Final Copper Foil		
		20		Solder mask		

Approximate board thickness: 2,90 mm

Possible drilling types for 10-layer HDI PCB

1-8-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0 +/- 10%				
	Layer			Thickness, um		Material
Nr. 13	SMT TOP	1		20		Solder mask
				18		Final Copper Foil
				75		Laser prepreg
	INT1	2		18	1x1080	Copper Foil
						Preprag
	INT2	3		18		Copper Foil
						Preprag
	INT3	4		18		Copper Foil
						Core
	INT4	5		18		Copper Foil
				Preprag		
INT5	6	18		Copper Foil		
				Core		
INT6	7	18		Copper Foil		
				Preprag		
INT7	8	18		Copper Foil		
				Preprag		
INT8	9	18		Copper Foil		
		75	1x1080	Laser prepreg		
BOTTOM SMB	10	18		Final Copper Foil		
		20		Solder mask		

Possible types of holes: 1-2, 9-10 (microvia); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90 mm

1-1-6-1-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 14	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
			1x1080	75	Laser prepreg	
	INT1	2		18	Copper Foil	
			1x1080	75	Laser prepreg	
	INT2	3		18	Copper Foil	
					Preprag	
	INT3	4		18	Copper Foil	
					Core	
	INT4	5		18	Copper Foil	
				Preprag		
INT5	6		18	Copper Foil		
				Core		
INT6	7		18	Copper Foil		
				Preprag		
INT7	8		18	Copper Foil		
		1x1080	75	Laser prepreg		
INT8	9		18	Copper Foil		
		1x1080	75	Laser prepreg		
BOTTOM SMB	10		18	Final Copper Foil		
			20	Solder mask		

Possible types of holes: 1-2, 2-3, 8-9, 9-10 (microvia); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90 mm

1-1-1-4-1-1-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 15	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
			1x1080	75	Laser prepreg	
	INT1	2		18	Copper Foil	
			1x1080	75	Laser prepreg	
	INT2	3		18	Copper Foil	
			1x1080	75	Laser prepreg	
	INT3	4		18	Copper Foil	
					Core	
	INT4	5		18	Copper Foil	
				Preprag		
INT5	6		18	Copper Foil		
				Core		
INT6	7		18	Copper Foil		
		1x1080	75	Laser prepreg		
INT7	8		18	Copper Foil		
		1x1080	75	Laser prepreg		
INT8	9		18	Copper Foil		
		1x1080	75	Laser prepreg		
BOTTOM SMB	10		18	Final Copper Foil		
			20	Solder mask		

Possible types of holes: 1-2, 2-3, 3-4, 7-8, 8-9, 9-10 (microvia); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90 mm

1-1-1-2-2-1-1-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 16	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	1x1080
	INT1	2		18	Copper Foil	
				75	Laser prepreg	1x1080
	INT2	3		18	Copper Foil	
				75	Laser prepreg	1x1080
	INT3	4		18	Copper Foil	
				Core		
	INT4	5		18	Copper Foil	
		Preprag				
INT5	6	18	Copper Foil			
		Core				
INT6	7	18	Copper Foil			
		75	Laser prepreg	1x1080		
INT7	8	18	Copper Foil			
		75	Laser prepreg	1x1080		
INT8	9	18	Copper Foil			
		75	Laser prepreg	1x1080		
BOTTOM SMB	10	18	Final Copper Foil			
		20	Solder mask			

Possible types of holes: 1-2, 2-3, 3-4, 7-8, 8-9, 9-10 (microvia); 4-5 or/and 6-7 or/and 4-7 (it can be changed to 3-8 or 2-9) (buried); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90 mm

1-8-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0, 2,5 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 17	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
				75	Laser prepreg	1x1080
	INT1	2		18	Copper Foil	
				Preprag		
	INT2	3		18	Copper Foil	
				Core		
	INT3	4		18	Copper Foil	
				Preprag		
	INT4	5		18	Copper Foil	
		Core				
INT5	6	18	Copper Foil			
		Preprag				
INT6	7	18	Copper Foil			
		Core				
INT7	8	18	Copper Foil			
		Preprag				
INT8	9	18	Copper Foil			
		75	Laser prepreg	1x1080		
BOTTOM SMB	10	18	Final Copper Foil			
		20	Solder mask			

Possible types of holes: 1-2, 9-10 (microvia); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90, 2,40 mm

1-1-6-1-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0, 2,5 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 18	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
			1x1080	75	Laser prepreg	
	INT1	2		18	Copper Foil	
			1x1080	75	Laser prepreg	
	INT2	3		18	Copper Foil	
					Core	
	INT3	4		18	Copper Foil	
					Preprag	
	INT4	5		18	Copper Foil	
				Core		
INT5	6		18	Copper Foil		
				Preprag		
INT6	7		18	Copper Foil		
				Core		
INT7	8		18	Copper Foil		
		1x1080	75	Laser prepreg		
INT8	9		18	Copper Foil		
		1x1080	75	Laser prepreg		
BOTTOM SMB	10		18	Final Copper Foil		
			20	Solder mask		

Possible types of holes: 1-2, 2-3, 8-9, 9-10 (microvia); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90, 2,40 mm

1-1-6-1-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0, 2,5 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 19	SMT TOP	1		20	Solder mask	
				18	Final Copper Foil	
			1x1080	75	Laser prepreg	
	INT1	2		18	Copper Foil	
			1x1080	75	Laser prepreg	
	INT2	3		18	Copper Foil	
					Core	
	INT3	4		18	Copper Foil	
					Preprag	
	INT4	5		18	Copper Foil	
				Core		
INT5	6		18	Copper Foil		
				Preprag		
INT6	7		18	Copper Foil		
				Core		
INT7	8		18	Copper Foil		
		1x1080	75	Laser prepreg		
INT8	9		18	Copper Foil		
		1x1080	75	Laser prepreg		
BOTTOM SMB	10		18	Final Copper Foil		
			20	Solder mask		

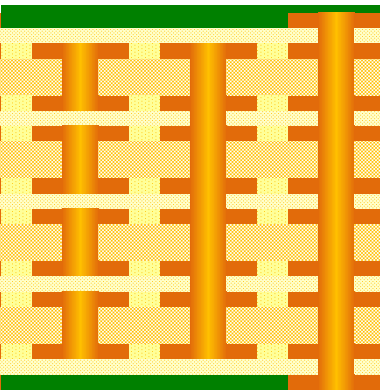
Possible types of holes: 1-2, 2-3, 8-9, 9-10 (microvia); 5-6 (it can be changed to 3-6 or 5-8) or/and 3-8 (it can be changed to 2-9) (buried); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90, 2,40 mm

1-1-2-2-1-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0, 2,5, 3,0 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 20	SMT TOP	1		1x1080	20	Solder mask
	INT1	2		1x1080	18	Final Copper Foil
	INT2	3		1x1080	75	Laser prepreg
					18	Copper Foil
						Core
	INT3	4			18	Copper Foil
	INT4	5			18	Preprag
						Copper Foil
						Core
	INT5	6			18	Copper Foil
INT6	7			18	Preprag	
					Copper Foil	
					Core	
INT7	8			18	Copper Foil	
INT8	9		1x1080	75	Laser prepreg	
BOTTOM SMB	10		1x1080	75	Laser prepreg	
				18	Final Copper Foil	
				20	Solder mask	

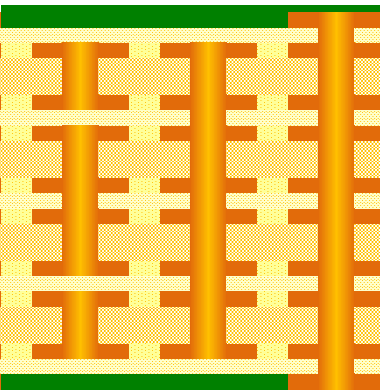
Possible types of holes: 1-2, 2-3, 8-9, 9-10 (microvia); 3-4 or/and 7-8 or/and 3-8 (It can be changed to 2-9) (buried); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90, 2,40 mm

1-8-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0, 2,5, 3,0 +/- 10%				
	Layer			Thickness, um	Material	
Nr. 21	SMT TOP	1		1x1080	20	Solder mask
	INT1	2		1x1080	18	Final Copper Foil
	INT2	3		1x1080	75	Laser prepreg
					18	Copper Foil
						Core
	INT3	4			18	Copper Foil
	INT4	5			18	Preprag
						Copper Foil
						Core
	INT5	6			18	Copper Foil
INT6	7			18	Preprag	
					Copper Foil	
					Core	
INT7	8			18	Copper Foil	
INT8	9		1x1080	75	Laser prepreg	
BOTTOM SMB	10		1x1080	75	Laser prepreg	
				18	Final Copper Foil	
				20	Solder mask	

Possible types of holes: 1-2, 9-10 (microvia); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90, 2,40, 2,90 mm

1-2-2-2-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0, 2,5, 3,0 +/- 10%			
	Layer			Thickness, um	Material
Nr. 22	SMT TOP	1		20	Solder mask
				18	Final Copper Foil
				75	Laser prepreg
	INT1	2		18	Copper Foil
					Core
	INT2	3		18	Copper Foil
					Preprag
	INT3	4		18	Copper Foil
					Core
	INT4	5		18	Copper Foil
			Preprag		
INT5	6	18	Copper Foil		
			Core		
INT6	7	18	Copper Foil		
			Preprag		
INT7	8	18	Copper Foil		
			Core		
INT8	9	18	Copper Foil		
			Laser prepreg		
BOTTOM SMB	10	75	Final Copper Foil		
			20	Solder mask	

Possible types of holes: 1-2, 9-10 (microvia); 2-3 or/and 4-5 or/and 6-7 or/and 8-9 (buried); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90, 2,40, 2,90 mm

1-2-4-2-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0, 2,5, 3,0 +/- 10%			
	Layer			Thickness, um	Material
Nr. 23	SMT TOP	1		20	Solder mask
				18	Final Copper Foil
				75	Laser prepreg
	INT1	2		18	Copper Foil
					Core
	INT2	3		18	Copper Foil
					Preprag
	INT3	4		18	Copper Foil
					Core
	INT4	5		18	Copper Foil
			Preprag		
INT5	6	18	Copper Foil		
			Core		
INT6	7	18	Copper Foil		
			Preprag		
INT7	8	18	Copper Foil		
			Core		
INT8	9	18	Copper Foil		
			Laser prepreg		
BOTTOM SMB	10	75	Final Copper Foil		
			20	Solder mask	

Possible types of holes: 1-2, 9-10 (microvia); 2-3 or/and 4-7 or/and 8-9 (buried); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90, 2,40, 2,90 mm

1-4-4-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0, 2,5, 3,0 +/- 10%			
	Layer		Thickness, um	Material	
Nr. 24	SMT TOP	1	20	Solder mask	
			18	Final Copper Foil	
			75	Laser prepreg	
	INT1	2	18	Copper Foil	1x1080
				Core	
	INT2	3	18	Copper Foil	
				Preprag	
	INT3	4	18	Copper Foil	
				Core	
	INT4	5	18	Copper Foil	
			Preprag		
INT5	6	18	Copper Foil		
			Core		
INT6	7	18	Copper Foil		
			Preprag		
INT7	8	18	Copper Foil		
			Core		
INT8	9	18	Copper Foil	1x1080	
			75	Laser prepreg	
BOTTOM SMB	10	18	Final Copper Foil		
			20	Solder mask	

Possible types of holes: 1-2, 9-10 (microvia); 2-5 or/and 6-9 (buried); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90, 2,40, 2,90 mm

1-6-2-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0, 2,5, 3,0 +/- 10%			
	Layer		Thickness, um	Material	
Nr. 25	SMT TOP	1	20	Solder mask	
			18	Final Copper Foil	
			75	Laser prepreg	
	INT1	2	18	Copper Foil	1x1080
				Core	
	INT2	3	18	Copper Foil	
				Preprag	
	INT3	4	18	Copper Foil	
				Core	
	INT4	5	18	Copper Foil	
			Preprag		
INT5	6	18	Copper Foil		
			Core		
INT6	7	18	Copper Foil		
			Preprag		
INT7	8	18	Copper Foil		
			Core		
INT8	9	18	Copper Foil	1x1080	
			75	Laser prepreg	
BOTTOM SMB	10	18	Final Copper Foil		
			20	Solder mask	

Possible types of holes: 1-2, 9-10 (microvia); 2-7 or/and 8-9 (buried); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90, 2,40, 2,90 mm

1-2-6-1 Structure		Required possible board thickness: 1,0, 1,6, 2,0, 2,5, 3,0 +/- 10%		
	Layer		Thickness, um	Material
Nr. 26	SMT TOP	1	20	Solder mask
			18	Final Copper Foil
			75	Laser prepreg
	INT1	2	18	Copper Foil
				Core
	INT2	3	18	Copper Foil
				Preprag
	INT3	4	18	Copper Foil
				Core
	INT4	5	18	Copper Foil
			Preprag	
INT5	6	18	Copper Foil	
			Core	
INT6	7	18	Copper Foil	
			Preprag	
INT7	8	18	Copper Foil	
			Core	
INT8	9	18	Copper Foil	
			Laser prepreg	
BOTTOM	10	75	Final Copper Foil	
SMB		20	Solder mask	

Possible types of holes: 1-2, 9-10 (microvia); 2-3 or/and 4-9 (buried); 1-10 (PTH)
 Approximate board thickness: 0,95, 1,55, 1,90, 2,40, 2,90 mm

3. PCB fabrication capabilities

Multilayer and HDI PCB

Parameter	Typical	Advanced
Number of layers	4-16	4-28
Minimum trace width, mm	0,1	0,075
Minimum spacing, mm	0,1 / 0,075	0,075 / 0,075
Trace to board edge distance (outer/inner layers), mm	0,5 / 0,5 (V-cut)	0,25 / 0,4 (routing)
Minimum laser hole size, mm	0,1	0,075
Minimum drill hole size, mm	0,2	0,15
Minimum annular ring (outer/inner layers), mm	0,15 / 0,1	0,127 / 0,1
Aspect ratio	1:8	1:12
Via-in-Pad technology	yes	yes
Buried (hidden) holes	yes	yes
Blind holes	yes	yes
Stacked and staggered microvias	yes	yes
Solder mask opening/ expansion, mm	0,05	0,05

Solder bridge, mm	0,1	0,1
Minimum width of marking line (silkscreen), mm	0,15	0,15
Minimum height of marking text (silkscreen), mm	1	0,8

Flexible PCB

Parameter	Typical	Advanced
Number of layers	1-2	4
Material	Polyimide, PET	
Minimum trace width, mm	0,15	0,1
Minimum spacing, mm	0,15	0,1
Trace to board edge distance, mm	0,5	0,25
Minimum drill hole size, mm	0,3	0,2
Coverlay opening/expansion, mm	0,15	0,15
Possibility of manufacturing a stiffener for flex PCB	Yes (Polyimide or FR4)	

Rigid-flex PCB

Parameter	Typical	Advanced
Number of layers	4-16	4-28
Minimum trace width, mm	0,1	0,075
Minimum spacing, mm	0,1	0,075
Trace to board edge distance (outer/inner layers), mm	0,5 / 0,5 (V-cut)	0,25 / 0,4 (routing)
Minimum drill hole size, mm	0,25	0,2
Minimum annular ring (outer/inner layers), mm	0,15 / 1	0,127 / 0,1
Via-in-Pad technology	yes	yes
Buried (hidden) holes (rigid part)	yes	yes
Blind holes (rigid part)	yes	yes
Solder mask (coverlay) opening/ expansion, mm	0,05 / 0,15	0,05 / 0,15
Solder bridge, mm	0,1 / 0,2	0,1 / 0,2
Minimum width of marking line (silkscreen), mm	0,15	0,15
Minimum height of marking text (silkscreen), mm	1	0,8
Possibility of manufacturing a stiffener for flex PCB	Yes (Polyimide or FR4)	

Aluminum core PCB

Parameter	Typical	Advanced
Number of layers	1-2	1-4
Board Thickness, mm	0,5 – 3,2	
Copper thickness, μm	35	
Dielectric thickness, μm	50, 75, 100, 150	
Thermal conductivity, $\text{W}/(\text{m}\cdot\text{K})$	1-4	
Dielectric strength, kV	2-6	
Maximum size, mm	550,0 x 950,0	
Minimum trace width, mm	0,2	0,15
Minimum spacing, mm	0,2	0,15
Trace to board edge distance, mm	0,5	0,25
Minimum drill hole size, mm	0,9	0,6
Solder bridge, mm	0,1	0,05

Notes:

Standard copper via wall thickness is up to 20 μm .

Gold thickness in IG coating — 0,05-0,11 μm , Hard Gold (Gold Fingers) — 0,07-1,27 μm

Below there are the conductor/spacing restrictions on the PCB for different thicknesses of copper:

Outer layers

Finished copper thickness	35 μm	70 μm	105 μm	140 μm	210 μm
Minimum trace width	0,1mm	0,20mm	0,23mm	0,30mm	0,60mm
Minimum clearance	0,1mm	0,20mm	0,24mm	0,35mm	0,70mm

Inner layers

Finished copper thickness	35 μm	70 μm	105 μm	140 μm	210 μm
Minimum trace width	0,1mm	0,20mm	0,27mm	0,34mm	0,60mm
Minimum clearance	0,1mm	0,20mm	0,30mm	0,45mm	0,85mm