

# 高端PCB制板核心 工艺与技术分享

• 演讲人：徐明

一博珠海PCB板厂



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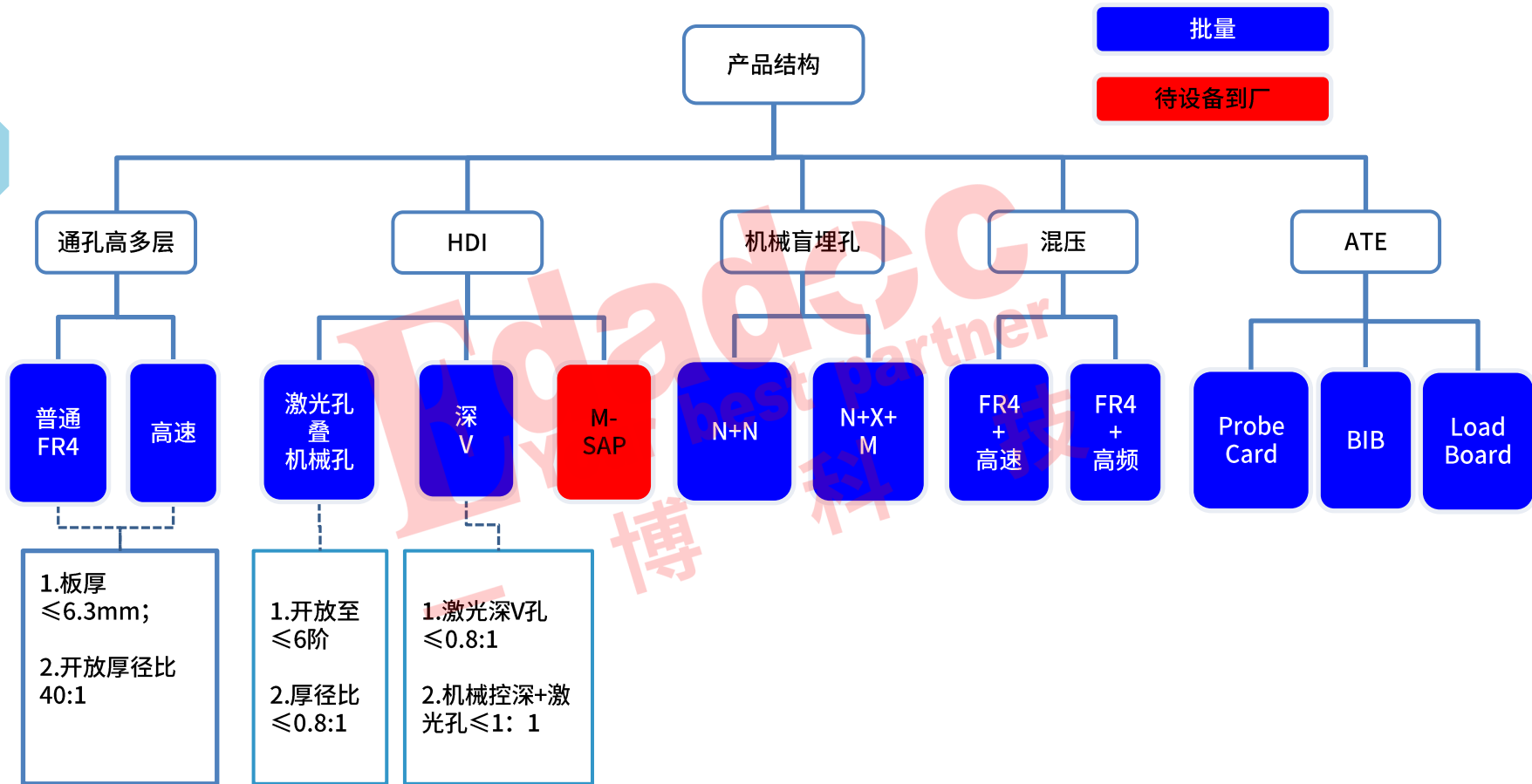
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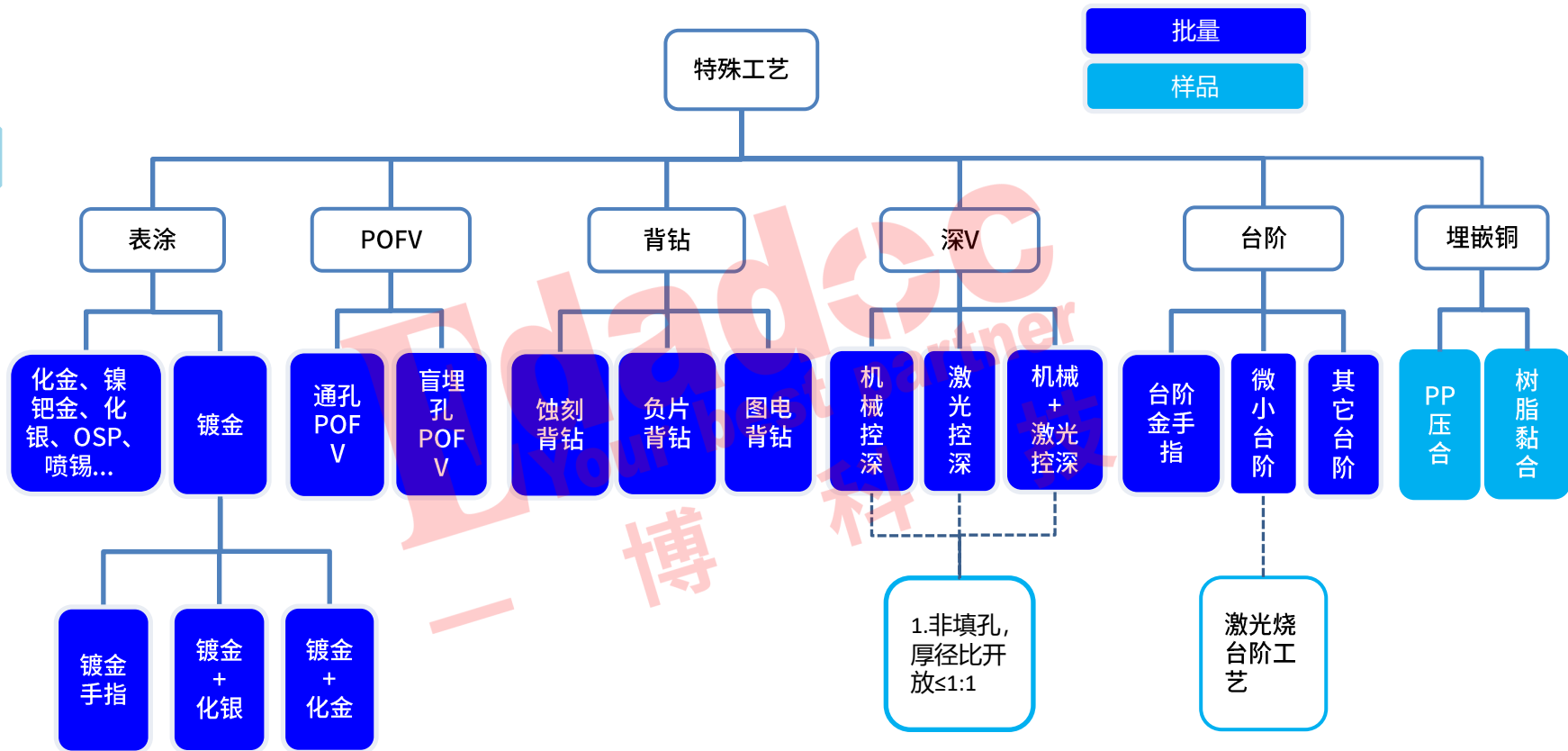
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## Part 01

# 产品结构&工艺总览







## Part 02

# 产品与技术展示



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## CONNECTS

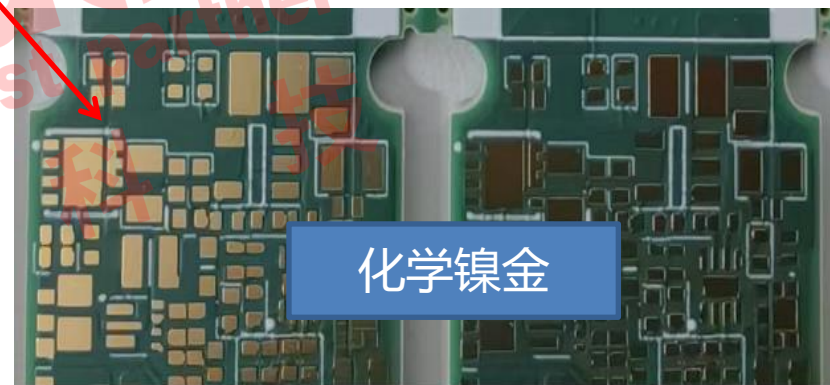
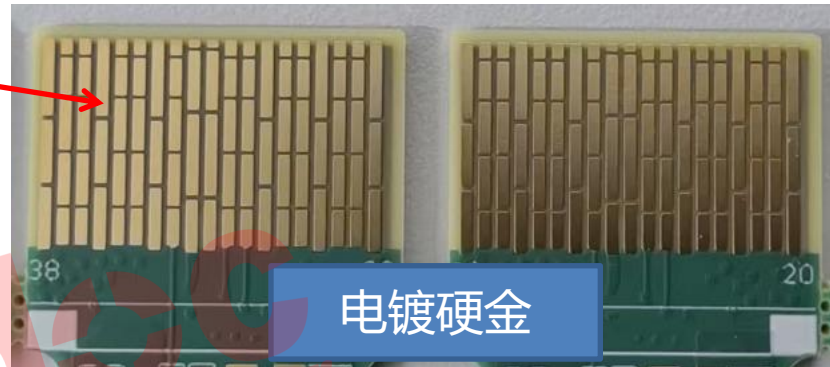
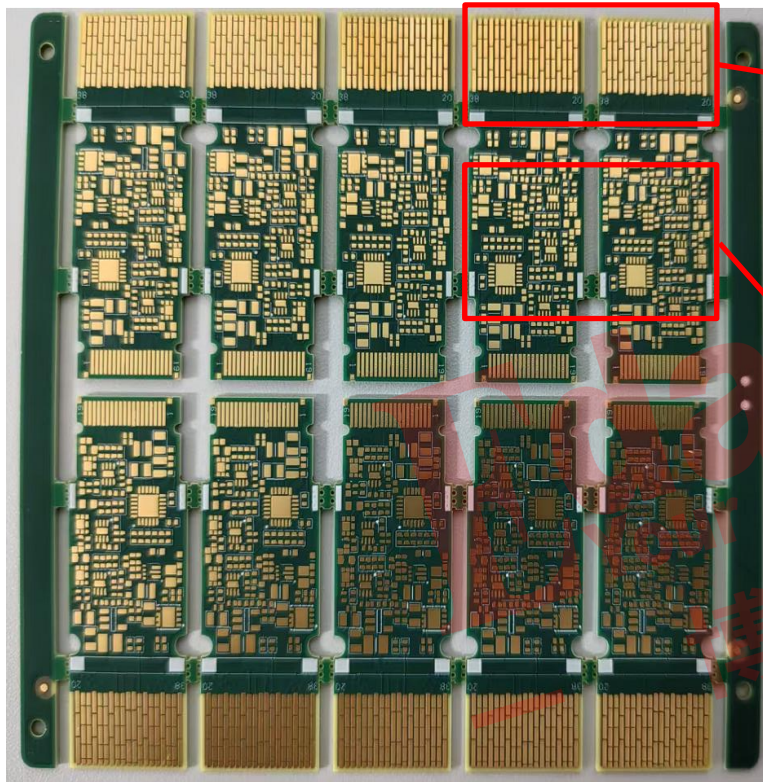
Part 01 产品结构&工艺总览

Part 02 产品与技术展示

Part 03 工艺能力规划



# 选择性表涂技术



➤ 分段间距 $\geq 6\text{mil}$

➤ 金手指间距:  $\geq 7\text{mil}$

➤ 镀金+化金

	Foil	Thk (um)	Name
GTS		40	阻焊 铜绿 太阳 PSR-4000 MPHIF 无卤 1KG/卷 铜绿色
-GTL	1/3oz+plating	54	
		99.7	PP TU-87P SLK 3313 RC56% 18*24IN
L2	Hoz	13	
		76	CCL TU-872 SLK 0.076mm(不含铜) H/Hoz 1078*1 37*49IN RTF/RTF
L3	Hoz	13	
		91.1	PP TU-87P SLK 3313 RC56% 18*24IN
L4	Hoz	13	
		76	CCL TU-872 SLK 0.076mm(不含铜) H/Hoz 1078*1 37*49IN RTF/RTF
L5	Hoz	13	
		91.7	PP TU-87P SLK 3313 RC56% 18*24IN
L6	Hoz	13	
		76	CCL TU-872 SLK 0.076mm(不含铜) H/Hoz 1078*1 37*49IN RTF/RTF
L7	Hoz	13	
		92.4	PP TU-87P SLK 3313 RC56% 18*24IN
L8	Hoz	13	
		76	CCL TU-872 SLK 0.076mm(不含铜) H/Hoz 1078*1 37*49IN RTF/RTF
L9	Hoz	13	
		96.2	PP TU-87P SLK 3313 RC56% 18*24IN
-L10	1/3oz+plating	34.8	
		114.8	PP TU-87P SLK 106 RC76% 18*24IN
L11	1oz	30	
		76	CCL TU-872 SLK 0.076mm(不含铜) H/Hoz 1078*1 37*49IN RTF/RTF
L12	1oz	30	
		114.5	PP TU-87P SLK 106 RC76% 18*24IN
-L13	1/3oz+plating	34.8	
		95.9	PP TU-87P SLK 3313 RC56% 18*24IN
L14	Hoz	13	
		76	CCL TU-872 SLK 0.076mm(不含铜) H/Hoz 1078*1 37*49IN RTF/RTF
L15	Hoz	13	
		92.9	PP TU-87P SLK 3313 RC56% 18*24IN
L16	Hoz	13	
		76	CCL TU-872 SLK 0.076mm(不含铜) H/Hoz 1078*1 37*49IN RTF/RTF
L17	Hoz	13	
		92.5	PP TU-87P SLK 3313 RC56% 18*24IN
L18	Hoz	13	
		76	CCL TU-872 SLK 0.076mm(不含铜) H/Hoz 1078*1 37*49IN RTF/RTF
L19	Hoz	13	
		92.4	PP TU-87P SLK 3313 RC56% 18*24IN
L20	Hoz	13	
		76	CCL TU-872 SLK 0.076mm(不含铜) H/Hoz 1078*1 37*49IN RTF/RTF
L21	Hoz	13	
		99.7	PP TU-87P SLK 3313 RC56% 18*24IN
-GBL	1/3oz+plating	54	
GBS		40	阻焊 铜绿 太阳 PSR-4000 MPHIF 无卤 1KG/卷 铜绿色

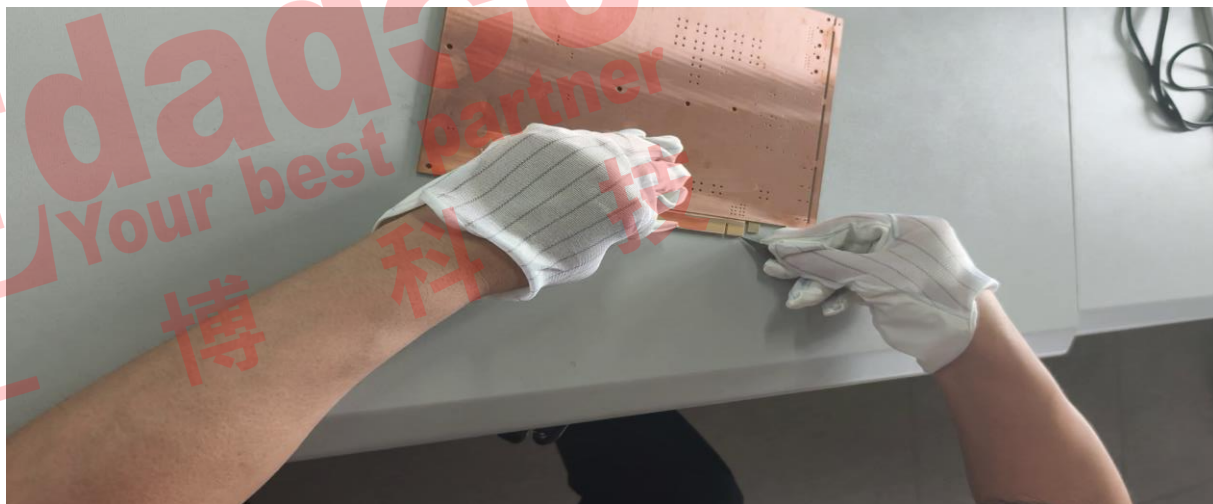
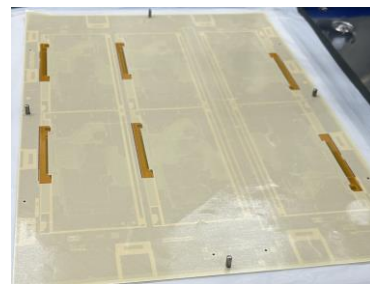
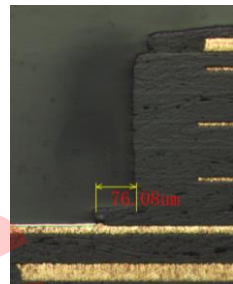
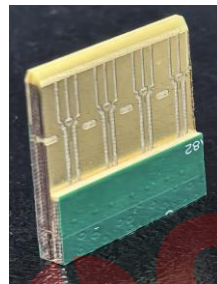
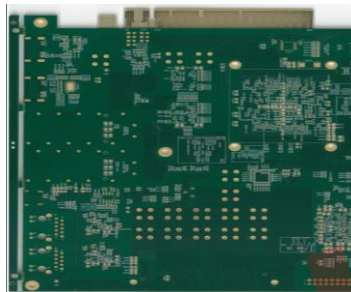
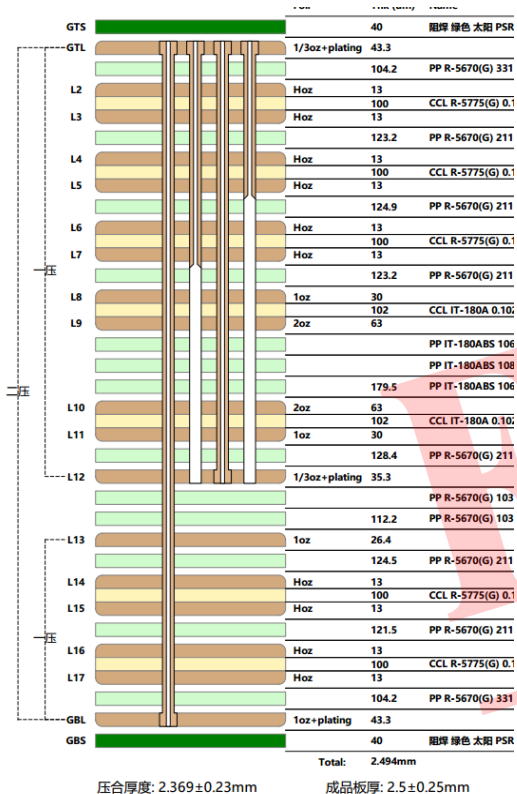


➤ 层数：10L+2L+10L

➤ 对准度要求：≤5mil

➤ 镀金手指+化金

# N+M+台阶金手指技术

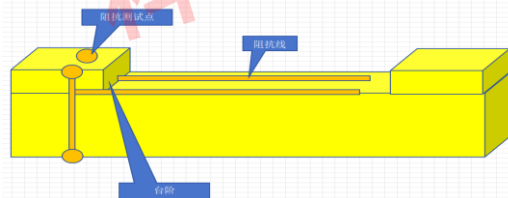
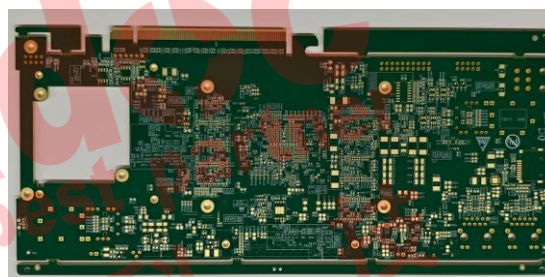
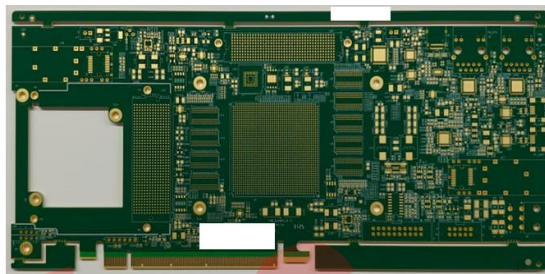
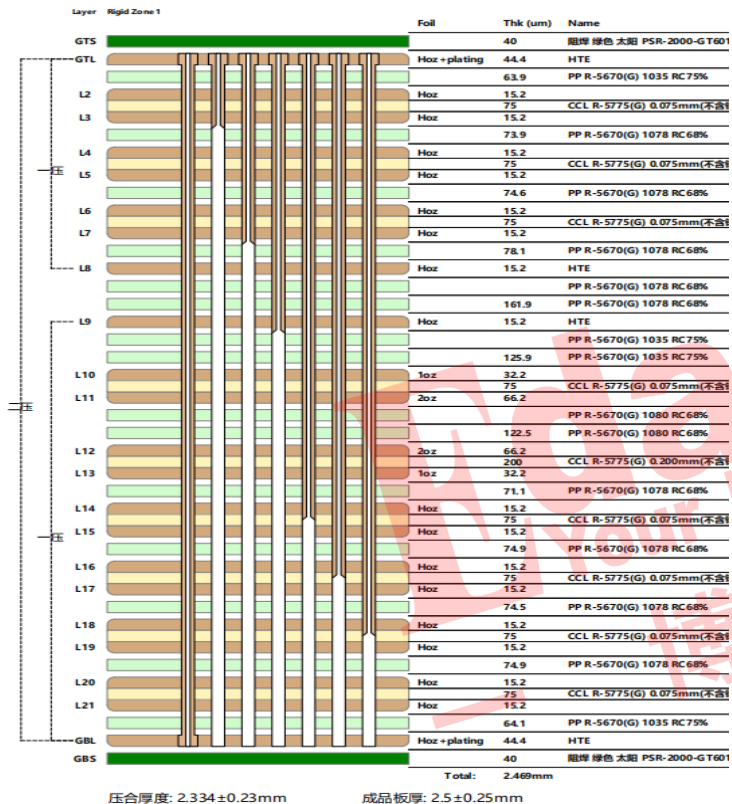


➤ 台阶金手指：台阶溢胶≤0.1mm

➤ N+M对位要求：≤4.5mil

➤ 不对称：翘曲≤0.75%

# N+M台阶金手指技



➤ 台阶槽溢胶:  $\leq 0.1\text{mm}$

➤ N+M对位:  $\leq 3.5\text{mil}$

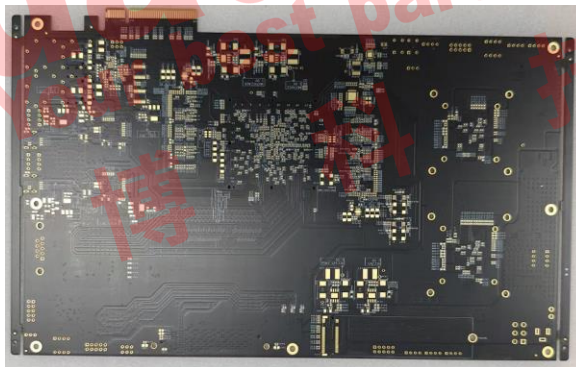
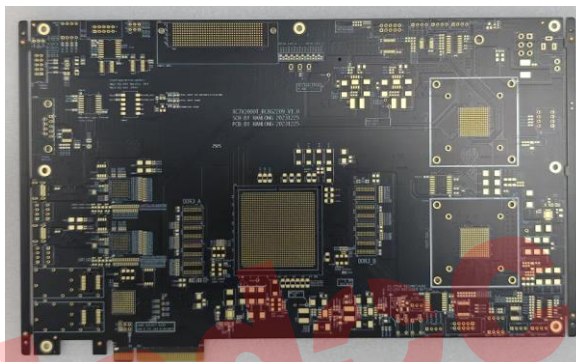
不对称设计翘曲度:  $\leq 0.75\%$

# 台阶金手指技术

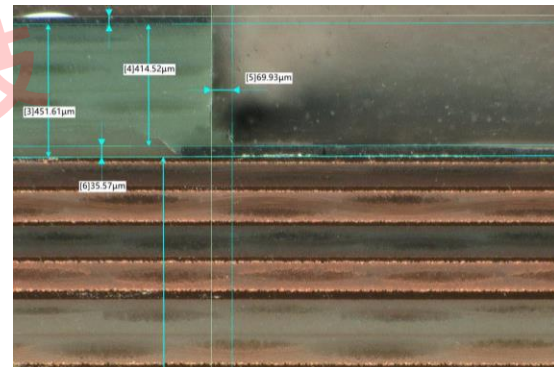
Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			40	阻焊 烟黑 PSR-2000 M8H 无卤 11
GTL		Hoz	44.6	
		Hoz	80	CCL IT-180ATC 0.080mm(不含铜) H/1
L2			15.2	
			113.2	PP IT-180ABS 2116 RC55%
L3		Hoz	15.2	
			107	CCL IT-180ATC 0.107mm(不含铜) H/1
L4		Toz	32.2	
				PP IT-180ABS 106 RC74%
			99.9	PP IT-180ABS 106 RC74%
			83.9	PP IT-180ABS 1080 RC68%
L5		Hoz	15.2	HTE
			15.2	
L6		Hoz	15.2	
			100	CCL IT-180ATC 0.100mm(不含铜) H/1
L7		Hoz	15.2	
			108	PP IT-180ABS 3313 RC61%
L8		Hoz	15.2	
			107	CCL IT-180ATC 0.107mm(不含铜) H/1
L9		Toz	32.2	
			104.4	PP IT-180ABS 3313 RC61%
L10		Toz	32.2	
			107	CCL IT-180ATC 0.107mm(不含铜) H/1
L11		Hoz	15.2	
			108	PP IT-180ABS 3313 RC61%
L12		Hoz	15.2	
			100	CCL IT-180ATC 0.100mm(不含铜) H/1
L13		Hoz	15.2	
			107.6	PP IT-180ABS 3313 RC61%
L14		Hoz	15.2	
			107	CCL IT-180ATC 0.107mm(不含铜) H/1
L15		Toz	32.2	
			105.9	PP IT-180ABS 3313 RC61%
L16		Hoz	15.2	
			100	CCL IT-180ATC 0.100mm(不含铜) H/1
L17		Hoz	15.2	
			83.8	PP IT-180ABS 1080 RC68%
GBL		Hoz+plating	44.6	HTE
GBS			40	阻焊 烟黑 PSR-2000 M8H 无卤 11
Total:			2.203mm	

压合厚度: 2.068±0.19mm      成品板厚: 2.1±0.21mm

➤ 台阶槽溢胶:  
≤0.1mm

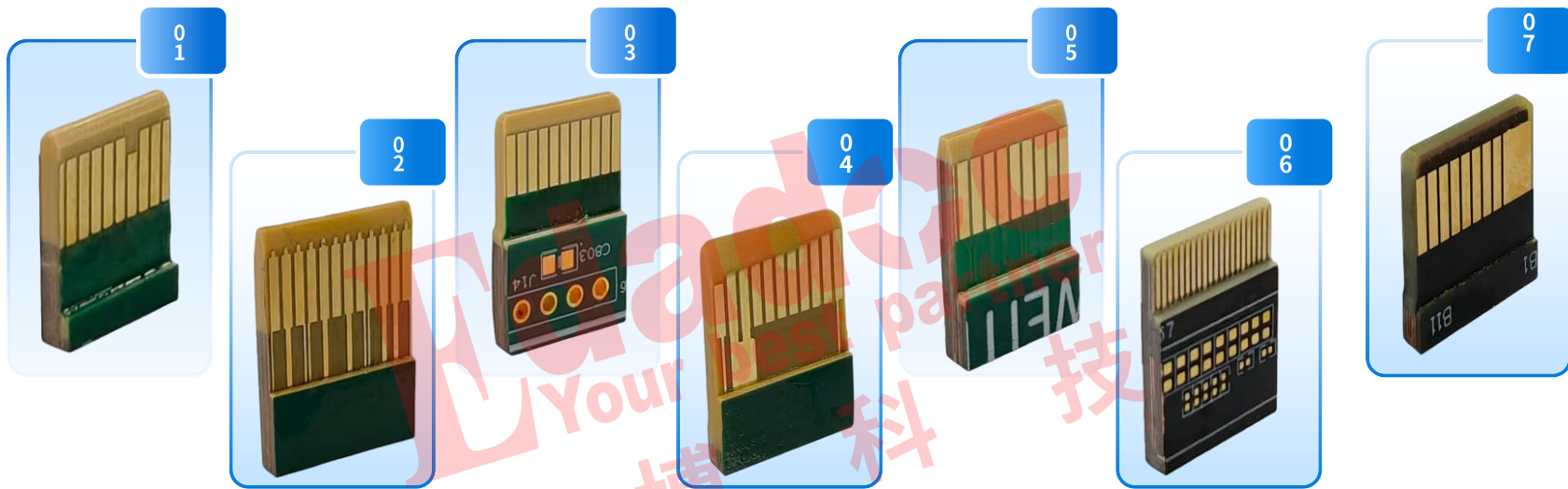


➤ N+M对位: ≤3.5mil



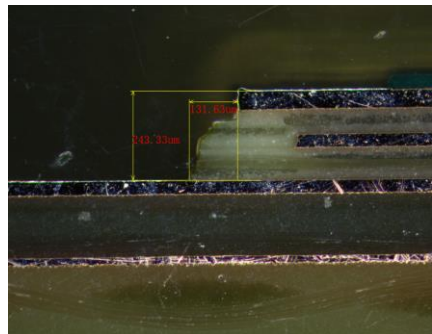
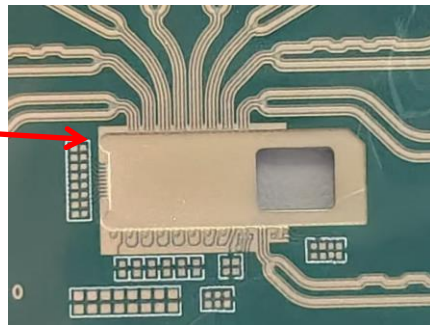
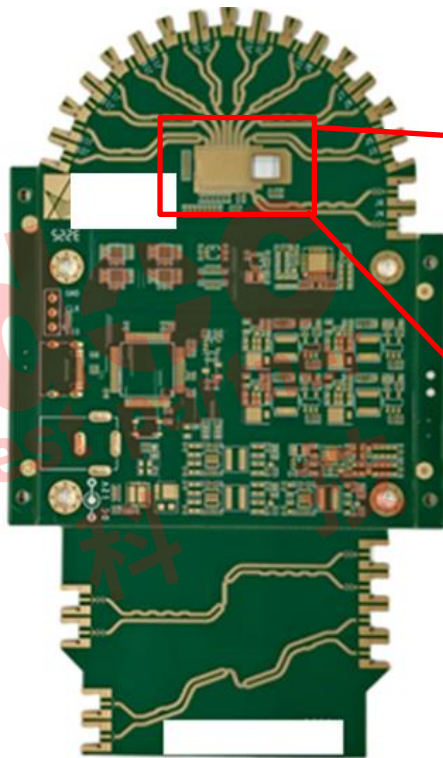
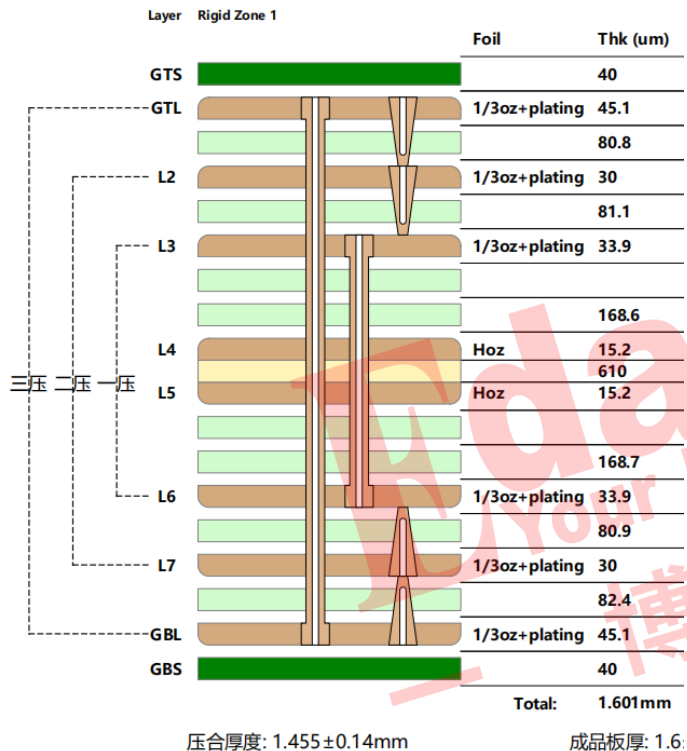
不对称设计翘曲度: ≤0.75%

# 台阶金手指技术



台阶金手指典型结构局部成品图

# 微小台阶技术

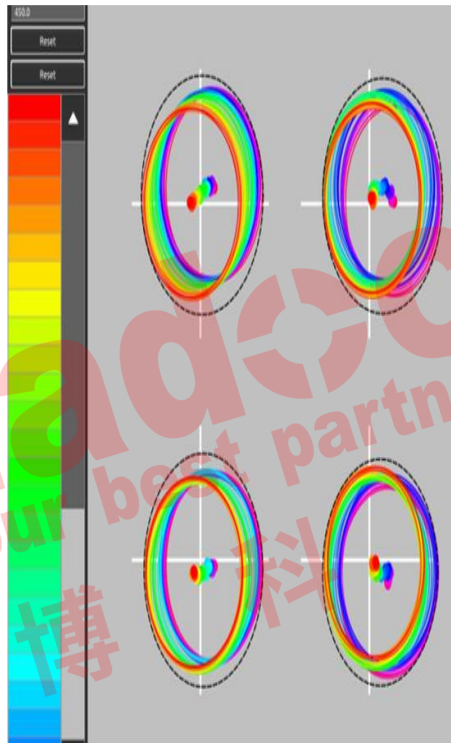


➤ 台阶槽深度: 243um

➤ 台阶槽尺寸: 6\*17mm

图形到槽底距离: 132um

# 高多层对位技术



Offset			Dimension				NonLinearErrors			
x (mm)	y (mm)	phi (°)	x (ppm)	y (ppm)	x (mm)	y (mm)	Std x (mm)	Std y (mm)	Max x (mm)	Max y (mm)
-0.012	-0.004	-0.03587	160	60	0.065	0.026	0.010	0.011	0.035	0.027
-0.006	-0.007	-0.03662	160	80	0.065	0.035	0.008	0.009	0.020	0.028
-0.014	-0.014	-0.03696	140	60	0.057	0.026	0.010	0.009	0.026	0.034
-0.016	-0.005	-0.03793	130	80	0.053	0.035	0.007	0.007	0.019	0.021
-0.023	-0.002	-0.03704	140	80	0.057	0.035	0.008	0.009	0.023	0.028
-0.013	-0.008	-0.03857	130	90	0.053	0.039	0.003	0.006	0.009	0.017
-0.008	-0.012	-0.03767	120	110	0.049	0.048	0.004	0.003	0.009	0.017
-0.012	-0.010	-0.03779	130	100	0.053	0.043	0.004	0.007	0.013	0.020
-0.013	-0.006	-0.03803	110	120	0.044	0.052	0.001	0.004	0.006	0.011
-0.021	-0.010	-0.03851	110	130	0.044	0.056	0.001	0.003	0.007	0.011
-0.012	-0.004	-0.03846	110	130	0.044	0.056	0.002	0.004	0.011	0.011
-0.014	-0.005	-0.03753	90	130	0.036	0.056	0.005	0.002	0.014	0.009
-0.012	-0.013	-0.03801	90	150	0.036	0.065	0.006	0.005	0.020	0.015
-0.010	-0.003	-0.03809	60	150	0.024	0.065	0.009	0.003	0.026	0.009
-0.008	-0.001	-0.03903	50	160	0.020	0.069	0.013	0.005	0.037	0.015
-0.008	0.004	-0.03787	60	170	0.024	0.074	0.014	0.008	0.038	0.019
-0.011	0.003	-0.03723	70	160	0.028	0.069	0.009	0.008	0.031	0.023
-0.003	0.001	-0.03801	60	170	0.024	0.074	0.010	0.006	0.043	0.015
-0.008	0.002	-0.03723	-9	150	-0.004	0.065	0.018	0.003	0.051	0.014
-0.005	0.002	-0.03706	40	180	0.016	0.078	0.015	0.009	0.050	0.022
-0.000	0.010	-0.03810	-5	140	-0.002	0.061	0.022	0.002	0.065	0.021
-0.002	0.011	-0.03860	40	150	0.016	0.065	0.014	0.009	0.056	0.028
-0.003	0.012	-0.03918	40	160	0.016	0.069	0.013	0.009	0.061	0.031
0.006	0.005	-0.03884	60	160	0.024	0.069	0.010	0.008	0.069	0.023
0.010	0.004	-0.03821	70	160	0.028	0.069	0.008	0.006	0.072	0.020
0.010	0.012	-0.03785	100	160	0.040	0.069	0.006	0.006	0.067	0.030
0.015	0.010	-0.03779	120	180	0.049	0.078	0.008	0.010	0.079	0.034

➤ 层数：80L

➤ 板厚：10mm

➤ 钻孔孔径：0.15mm

➤ 钻孔厚径比：66:1（待新电镀线安装后电镀）

➤ 层间偏移：<3mil

[illegible][illegible][illegible]

**Edadoc, your best partner.**

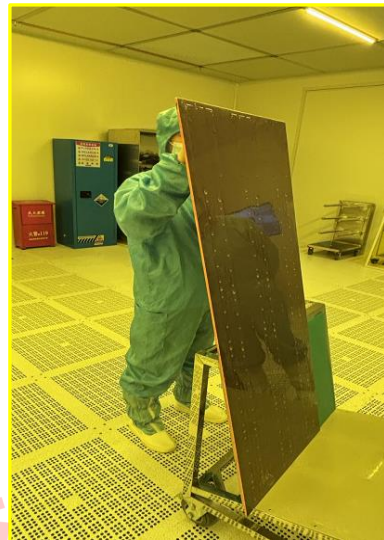
# 超大尺寸技术



➤ 交付尺寸: 97.8\*1320mm



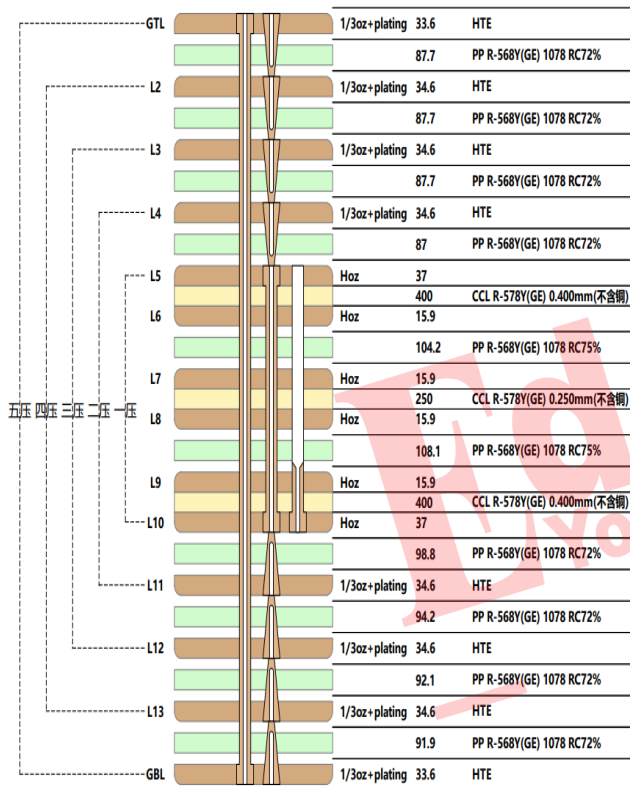
➤ 层数: 32L



➤ 板厚: 6.8mm



# 高阶工D二技术

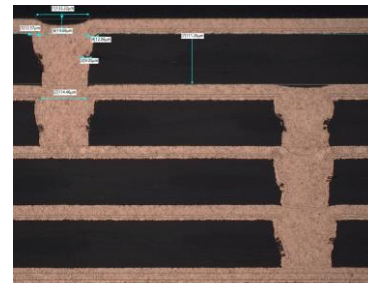
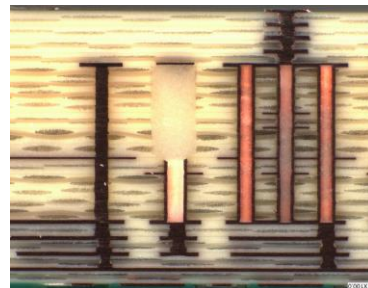
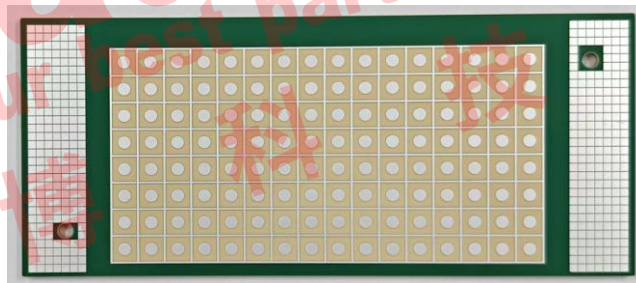
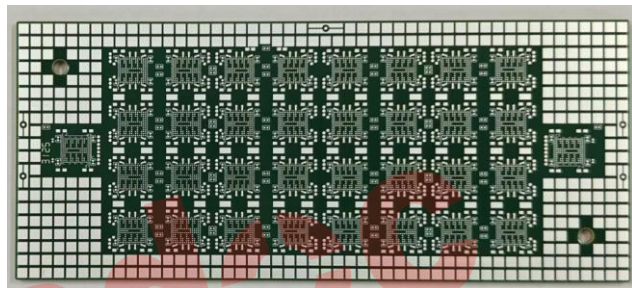


➤ 阶数：4阶

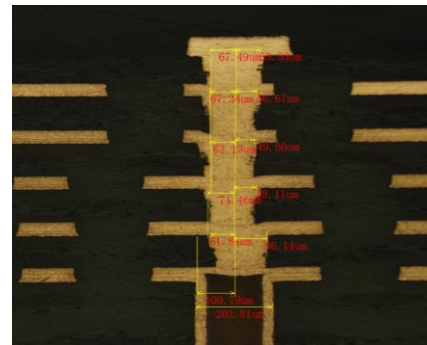
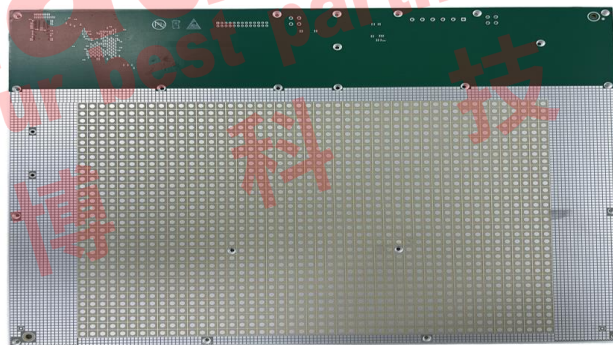
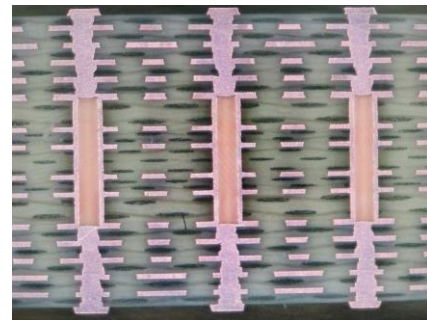
➤ 整体对位：≤3mil

➤ 激光盲孔对位：≤1.5mil

激光孔叠机械埋孔



GT1	1/3oz+plating	54	HTE
		73.2	PP R-568Y(GE) 1078 RC68%
L2	1/3oz+plating	36.2	HTE
		87.4	PP R-568Y(GE) 1078 RC72%
L3	1/3oz+plating	36.2	HTE
		88.3	PP R-568Y(GE) 1078 RC72%
L4	1/3oz+plating	36.2	HTE
		87.6	PP R-568Y(GE) 1078 RC72%
L5	1/3oz+plating	36.2	HTE
		90.1	PP R-568Y(GE) 1078 RC72%
L6	1/3oz+plating	37.6	HTE
		202.7	PP R-568Y(GE) 1078 RC72%
L7	1oz	32.9	
		100	CCL R-578Y(GE) 0.100mm(不含铜) 1/1oz
L8	1oz	32.9	
			PP R-568Y(GE) 1035 RC75%
			PP R-568Y(GE) 1035 RC75%
		203.2	PP R-568Y(GE) 1035 RC75%
L9	1oz	32.9	
		100	CCL R-578Y(GE) 0.100mm(不含铜) 1/1oz
L10	1oz	32.9	
			PP R-568Y(GE) 1078 RC72%
		201.7	PP R-568Y(GE) 1078 RC72%
L11	1/3oz+plating	37.6	HTE
		92	PP R-568Y(GE) 1078 RC72%
L12	1/3oz+plating	36.2	HTE
		91.6	PP R-568Y(GE) 1078 RC72%
L13	1/3oz+plating	36.2	HTE
		96.8	PP R-568Y(GE) 1078 RC72%
L14	1/3oz+plating	36.2	HTE
		93.3	PP R-568Y(GE) 1078 RC72%
L15	1/3oz+plating	36.2	HTE
		81.7	PP R-568Y(GE) 1078 RC68%
GBL	1/3oz+plating	54	HTE



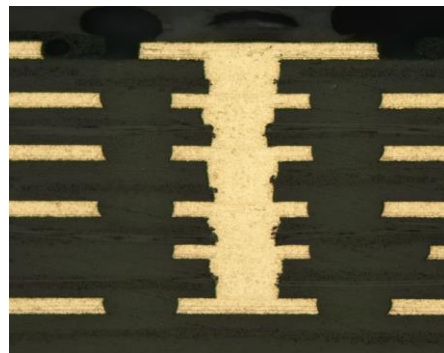
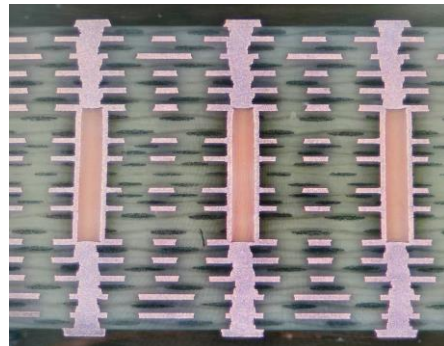
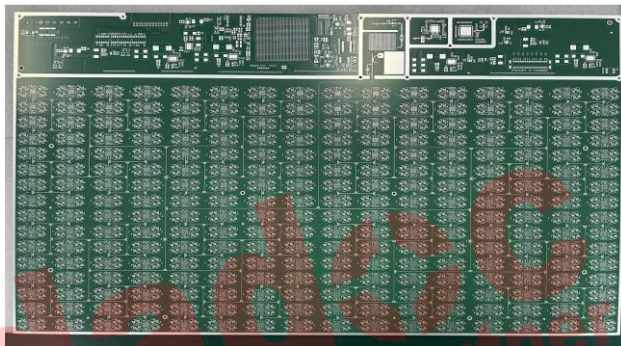
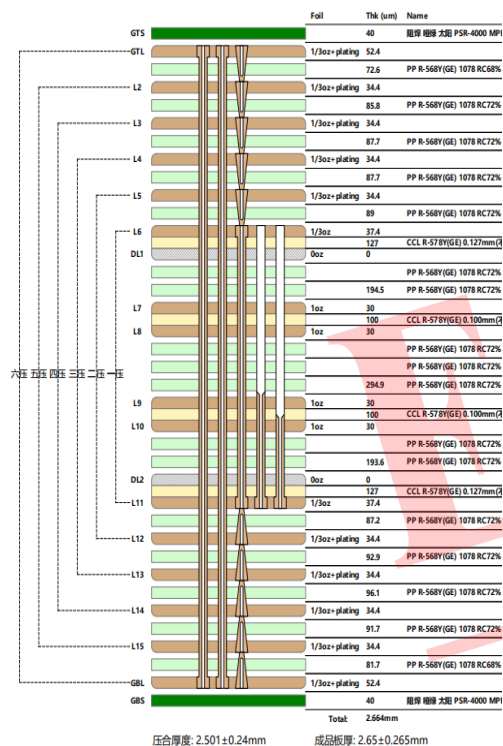
➤ 阶数：5阶

➤ 整体对位：≤3mil

➤ 激光盲孔对位：≤1.5mil

激光孔叠埋盲孔

# 高阶工D二技术

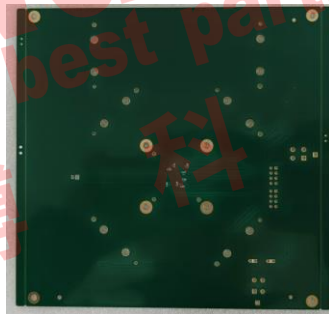
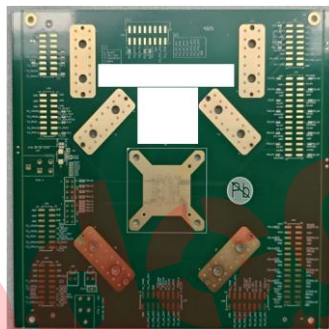
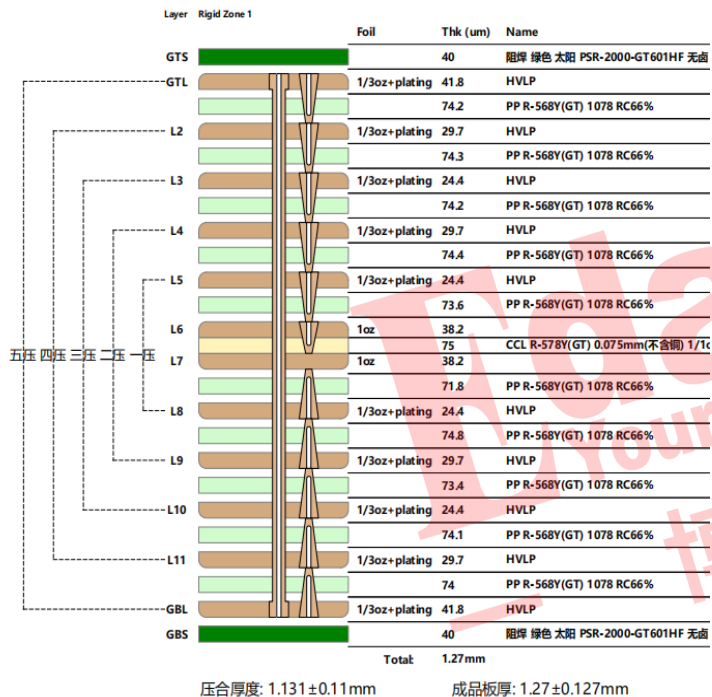


➤ 阶数：5阶

➤ 整体对位：≤3mil

➤ 激光盲孔对位：≤1.5mil

激光孔叠埋盲孔



➤ 阶数：6阶（任意阶）

➤ 整体对位：≤2mil

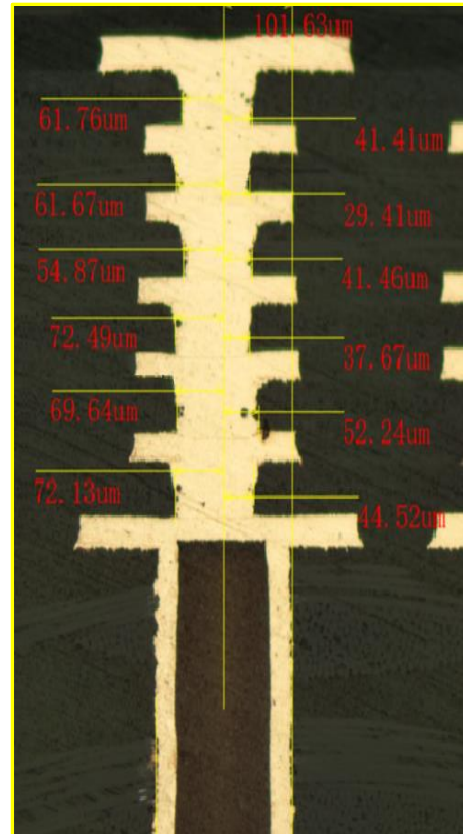
➤ anylayer

	Foil	Thk (um)	Name
GTS		35	阻焊 绿色 太阳 PSR-4000 SP08
----GTL	1/3oz+plating	31	
		61.1	PP EM-39B 106 RC75%
----L2	1/3oz+plating	21	
		53.3	PP EM-39B 106 RC75%
----L3	1/3oz+plating	21	
		61.7	PP EM-39B 106 RC75%
----L4	1/3oz+plating	21	
		54.8	PP EM-39B 106 RC75%
----L5	1/3oz+plating	21	
		61.7	PP EM-39B 106 RC75%
----L6	1/3oz+plating	21	
		58.9	PP EM-39B 106 RC75%
L7	Hoz	38	
		533	CCL EM-390 0.533mm(不含铜)
L8	Hoz	38	
		59.3	PP EM-39B 106 RC75%
----L9	1/3oz+plating	21	
		61.7	PP EM-39B 106 RC75%
----L10	1/3oz+plating	21	
		55.4	PP EM-39B 106 RC75%
----L11	1/3oz+plating	21	
		61.7	PP EM-39B 106 RC75%
----L12	1/3oz+plating	21	
		55.6	PP EM-39B 106 RC75%
----L13	1/3oz+plating	21	
		61.7	PP EM-39B 106 RC75%
----GBL	1/3oz+plating	31	
GBS		35	阻焊 绿色 太阳 PSR-4000 SP08
Total:		1.658mm	

➤ 阶数：6阶



➤ 整体对位：≤1mil



➤ 填孔激光盲孔叠机械埋孔

Layer	Item	Top	Thk (mm)	Name	Cu%	DK	DF
G05	20	0.00	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G15	20	0.05	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G25	20	0.10	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G35	20	0.15	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G45	20	0.20	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G55	20	0.25	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G65	20	0.30	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G75	20	0.35	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G85	20	0.40	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G95	20	0.45	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G105	20	0.50	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G115	20	0.55	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G125	20	0.60	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G135	20	0.65	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G145	20	0.70	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G155	20	0.75	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G165	20	0.80	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G175	20	0.85	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G185	20	0.90	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G195	20	0.95	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G205	20	1.00	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G215	20	1.05	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G225	20	1.10	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G235	20	1.15	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G245	20	1.20	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G255	20	1.25	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G265	20	1.30	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G275	20	1.35	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G285	20	1.40	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G295	20	1.45	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G305	20	1.50	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G315	20	1.55	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G325	20	1.60	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G335	20	1.65	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G345	20	1.70	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G355	20	1.75	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G365	20	1.80	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G375	20	1.85	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G385	20	1.90	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G395	20	1.95	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G405	20	2.00	0.05	PP 40-307000 1078 RIGID	80%	3.17	0.002
G41							

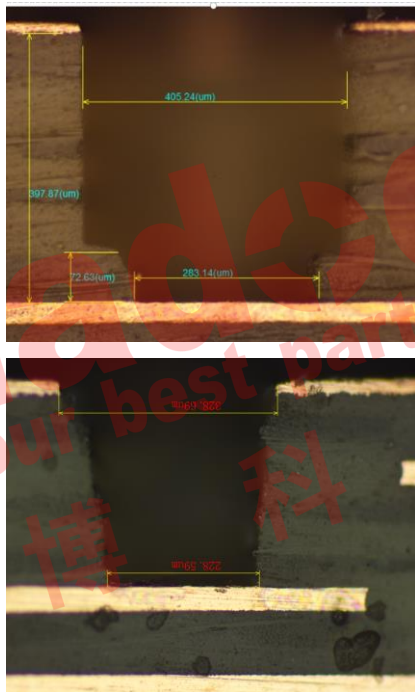
➤ 内层N+N(14+14)



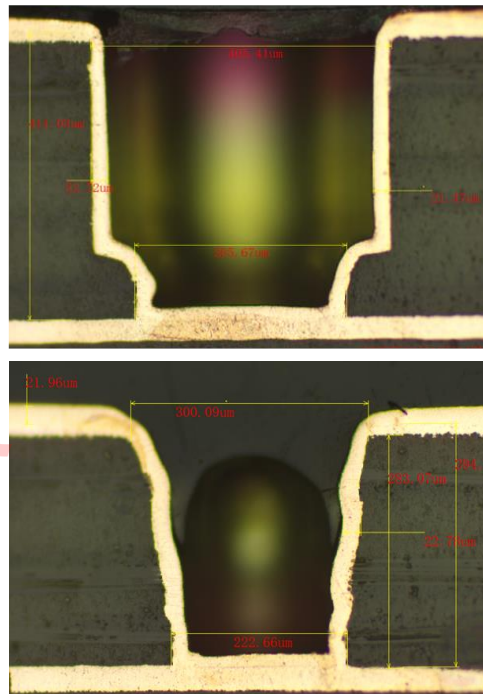
Layer Rigid Zone 1

	Foil	Thk (um)	Name
GTS		40	阻焊 绿色 太阳 PSR-4000 S
GTL		Hoz+plating	40
		100.4	PP R-5670(G) 1078 RC75
L2	1oz	30	
		90	CCL R-5775(G) 0.090mm
L3	1oz	30	
		96.4	PP R-5670(G) 1078 RC75
L4	1oz	30	
		146	CCL R-5775(G) 0.146mm
L5	1oz	30	
		100.1	PP R-5670(G) 1078 RC75
GBL		Hoz+plating	40
GBS		40	阻焊 绿色 太阳 PSR-4000 S

电镀前切片图



电镀后切片图



➤ 孔径: 400um

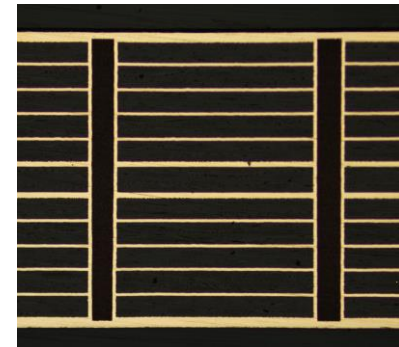
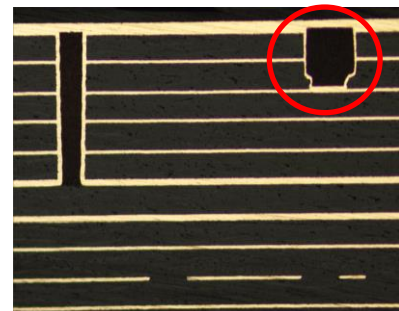
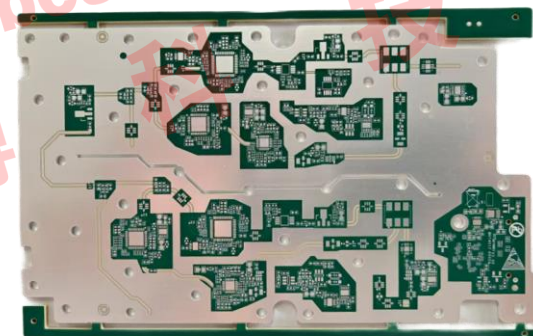
➤ 深度: 400um

➤ 厚径比: 1:1

➤ 机械孔深与激光盲孔对位精度:  $\leq 0.5\text{mil}$

Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			50	阻焊 绿色 太阳 PSR-2000-GT601H
GTL		1/3oz+plating	59	
				PP R-5670(G) 1035 RC70%
			111.8	PP R-5670(G) 1035 RC70%
L2		Hoz	15	
L3			127	CCL R-5775(G) 0.127mm(不含铜)
		Hoz	15	
				PP R-5670(G) 1035 RC70%
L4			110.1	PP R-5670(G) 1035 RC70%
		Hoz	15.2	
			127	CCL R-5775(G) 0.127mm(不含铜)
L5		Hoz	15.2	
				PP R-5670(G) 1035 RC70%
			111.9	PP R-5670(G) 1035 RC70%
L6		1/3oz+plating	28.4	
				PP R-5670(G) 1080 RC64%
			146.1	PP R-5670(G) 1080 RC64%
L7		1/3oz+plating	28.4	
				PP R-5670(G) 1035 RC70%
			112.2	PP R-5670(G) 1035 RC70%
L8		Hoz	15.2	
			127	CCL R-5775(G) 0.127mm(不含铜)
		Hoz	15.2	
L9				PP R-5670(G) 1035 RC70%
			110.1	PP R-5670(G) 1035 RC70%
L10		Hoz	15	
			127	CCL R-5775(G) 0.127mm(不含铜)
		Hoz	15	
L11				PP R-5670(G) 1035 RC70%
			111.5	PP R-5670(G) 1035 RC70%
		1/3oz+plating	59	
GBL				
GBS			50	阻焊 绿色 太阳 PSR-2000-GT601H
Total:			1.617mm	

压合厚度: 1.523±0.15mm      成品板厚: 1.6±0.16mm



➤ N+N: 6+6

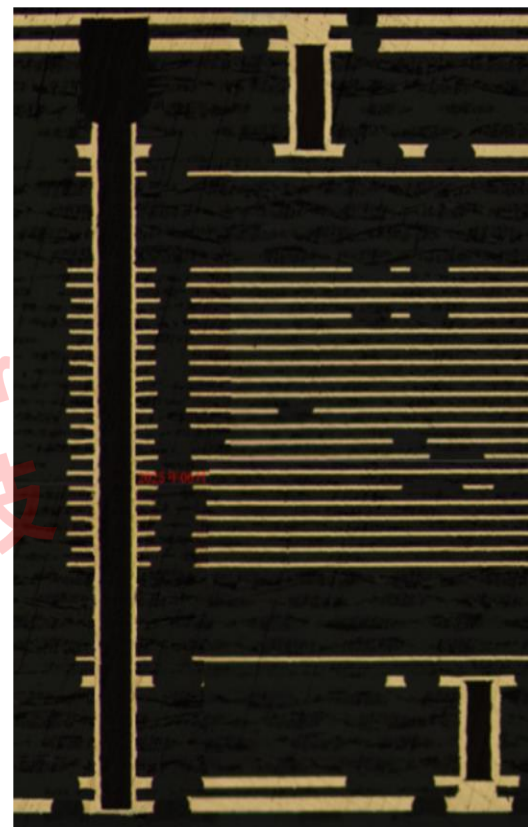
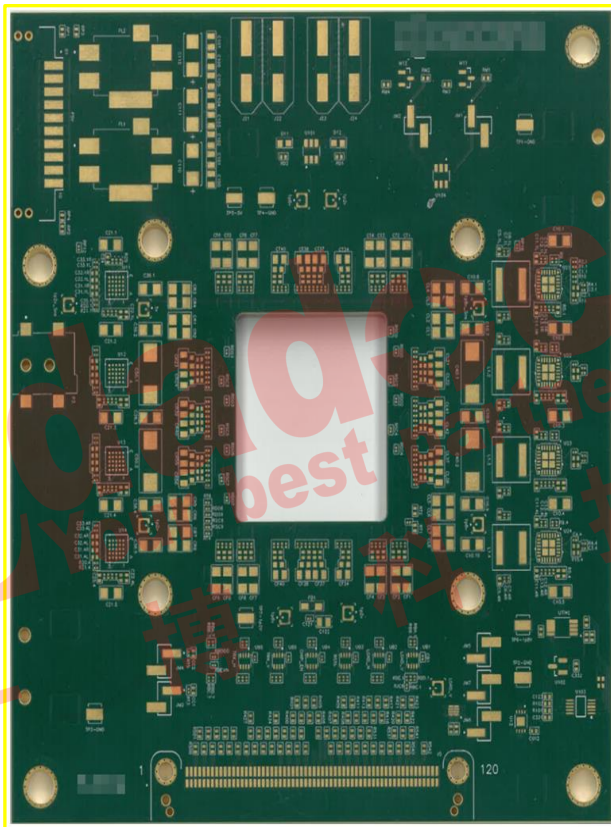
➤ 深V孔: 350um

➤ 厚径比: 0.8:1

# 机械盲埋孔+激光盲孔技术

Layer	Material	Thk (mm)	Name	Cu%	DK	DF
GTS	1/2oz copper	62.3	阻焊 铜箔 太星 PSM-2000-GT601HF 光通 150G 铜箔 绿色	0%		
G11	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	2.08	0.002
L2	Prepreg	47.7	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.31	0.002
L3	Prepreg	47.7	PP R-5679(5) 1055 RCT9%	78%	2.08	0.002
L4	Prepreg	71.4	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L5	Prepreg	47.7	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.31	0.002
L6	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	2.08	0.002
L7	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L8	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L9	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L10	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L11	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L12	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L13	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L14	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L15	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L16	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L17	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L18	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L19	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L20	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L21	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L22	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L23	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L24	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L25	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L26	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	3.01	0.002
L27	Prepreg	55.6	CCL R-4775(5) 0.405mm(2 叠) H/Hoz 131 P4 H0L5H/VLP	74%	3.16	0.002
L28	Prepreg	55.6	PP R-5679(5) 1055 RCT9%	78%	2.08	0.002
GTS	1/2oz copper	62.3	阻焊 铜箔 太星 PSM-2000-GT601HF 光通 150G 铜箔 绿色	0%		

压合厚度: 3.307±0.32mm 成品板厚: 3.4±0.34mm



➤ 层数：28L

➤ 板厚：3.4mm

➤ 对位要求：整体<2mil

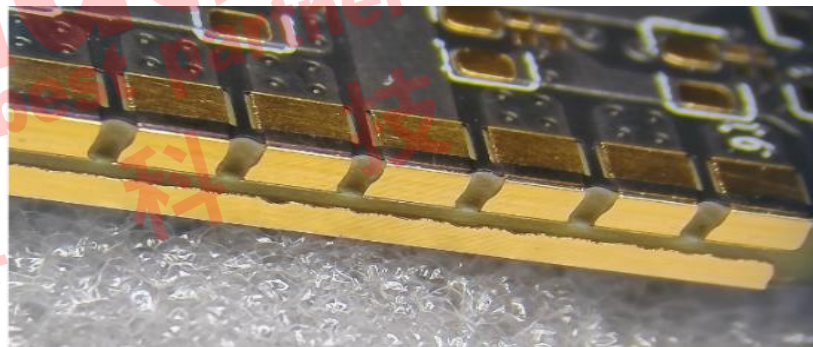
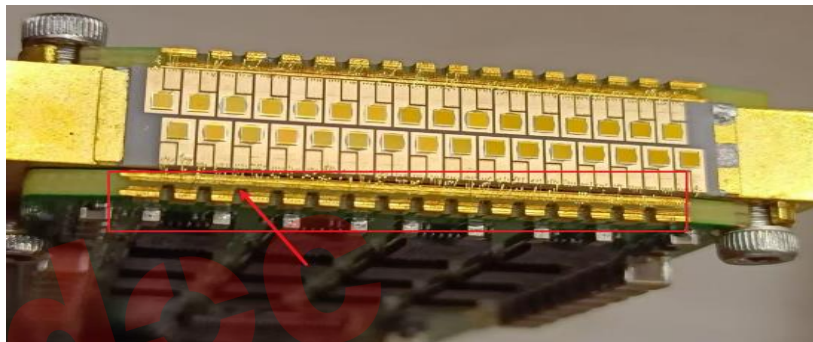
➤ 盲孔孔径填孔：200um

# 侧壁分层、分段镍钯金

Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			50	阻焊 哑黑 太阳 PSR-2000 ME8H 无卤 1KG/罐 哑黑色
GTL		2oz+plating	80.3	HTE
				PP S1000HB 1080 RC68%
			146.1	PP S1000HB 1080 RC68%
L2		2oz	66.2	
L3			200	CCL S1000H 0.200mm(不含铜) 2/2oz 7628*1 HTE/HTE
		2oz	66.2	
				PP S1000HB 2116 RC57%
			221.4	PP S1000HB 2116 RC57%
L4		2oz	66.2	
L5			200	CCL S1000H 0.200mm(不含铜) 2/2oz 7628*1 HTE/HTE
		2oz	66.2	
				PP S1000HB 2116 RC57%
			220.4	PP S1000HB 2116 RC57%
L6		2oz	66.2	
L7			200	CCL S1000H 0.200mm(不含铜) 2/2oz 7628*1 HTE/HTE
		2oz	66.2	
				PP S1000HB 1080 RC68%
			144.6	PP S1000HB 1080 RC68%
GBL		2oz+plating	80.3	HTE
GBS			50	阻焊 哑黑 太阳 PSR-2000 ME8H 无卤 1KG/罐 哑黑色
Total:			1.99mm	

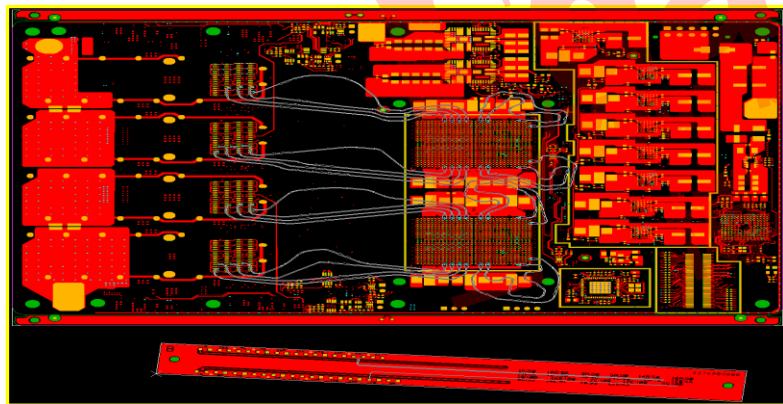
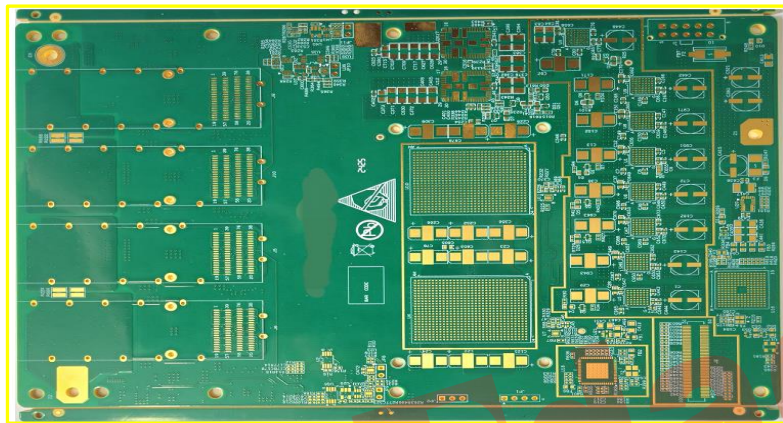
压合厚度: 1.866±0.18mm

成品板厚: 2±0.2mm



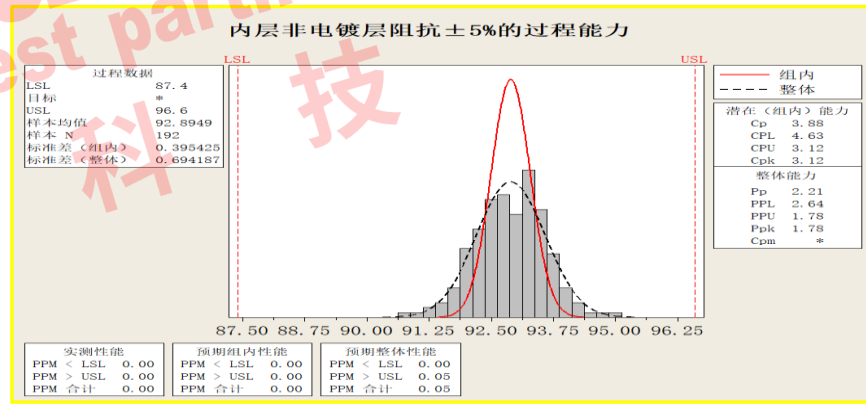
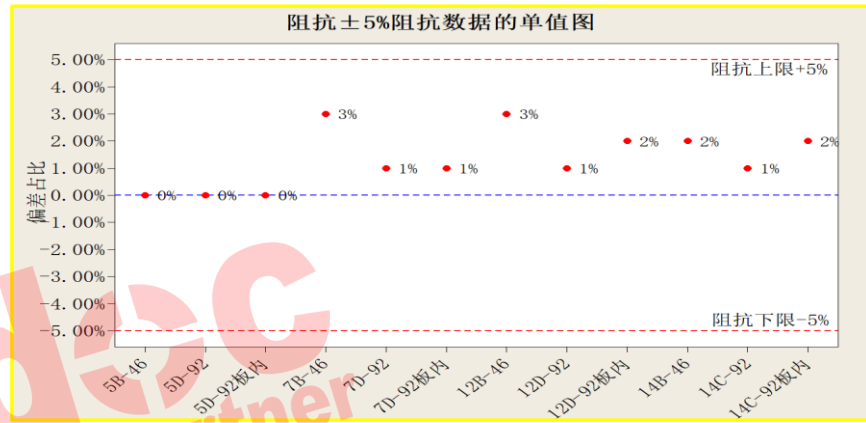
## ➤ 侧壁分层、分段镍钯金

# 5%阻抗技术



➤ 层数：18L

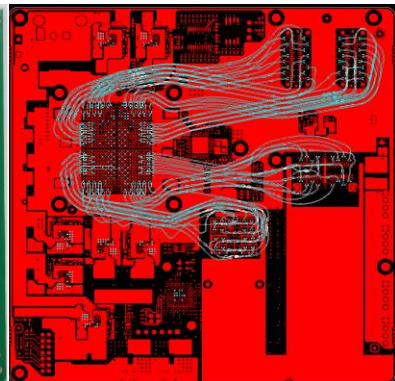
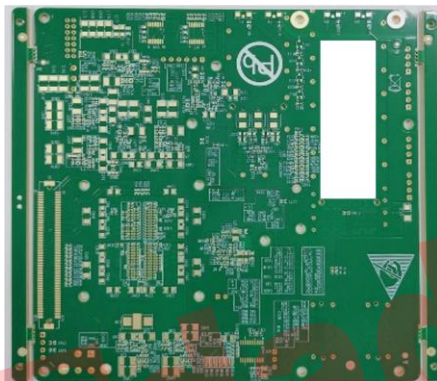
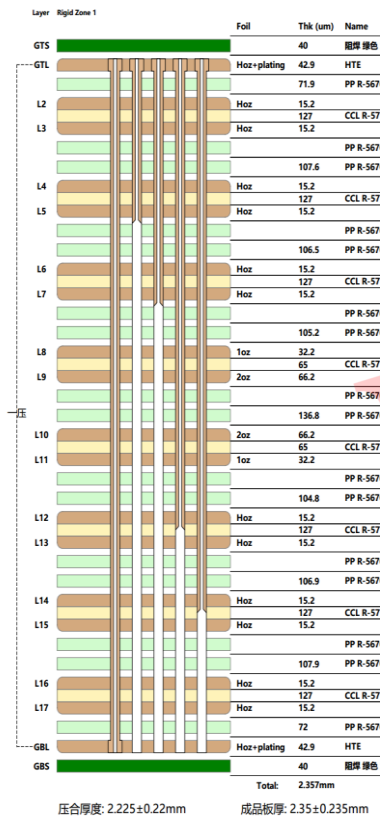
➤ 材料：M6



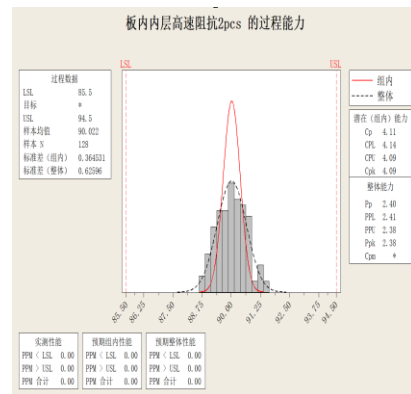
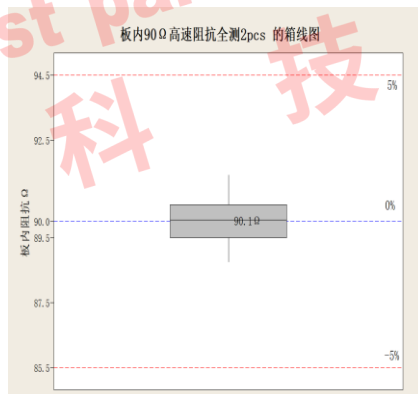
➤ 阻抗要求：+/-5%

➤ 对位要求：<4mil

# 5%阻抗技术



阻抗科邦	公差	阻抗值	偏差
1C-90	±5%	88.03	-2.2%
5B-45	±5%	44.29	-1.6%
5C-90	±5%	87.67	-2.6%
7B-45	±5%	44.46	-1.2%
7C-90	±5%	88.03	-2.2%
12B-45	±5%	45.17	0.4%
12D-90	±5%	89.41	-0.7%
14B-45	±5%	44.58	-0.9%
14D-90	±5%	88.53	-1.6%



➤ 层数: 18L

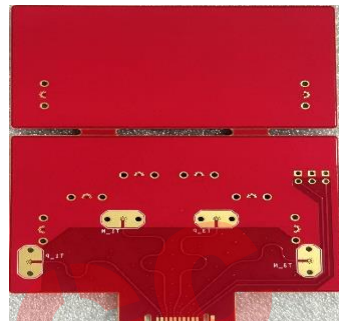
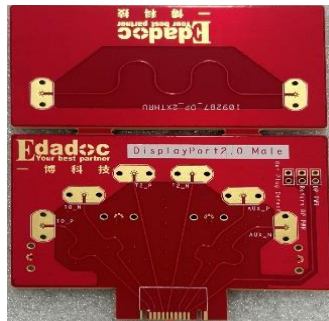
➤ 材料: M6

➤ 阻抗要求: +/-5% CPK4.09

➤ 对位要求: <4mil

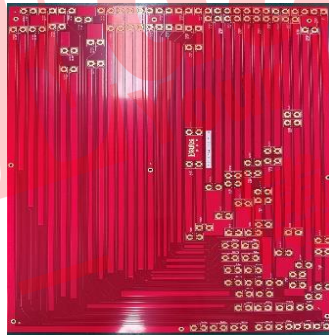
# 5%阻抗技术

Layer Rigid Zone 1				
	Foil	Thk (um)	Name	
GTS		40	铜厚 红色 PSR-4000 RDS 无通 1KG/覆 红色	
GTL	Hoz	47.9		
		203	CCL IT-170GRA2TC 0.203mm(不含铜) H/Hoz 3313*2 RTF/RTF	
L2	Hoz	15.2		
L3		115.6	PP IT-170GRA2BS 2116 RC55%	
	1oz	32.2		
L4	Toz	711	CCL IT-170GRA2TC 0.711mm(不含铜) 1/1oz 762P*4 RTF/RTF	
	1oz	32.2		
L5		115.6	PP IT-170GRA2BS 2116 RC55%	
	Hoz	15.2		
GBL	Hoz	203	CCL IT-170GRA2TC 0.203mm(不含铜) H/Hoz 3313*2 RTF/RTF	
	Hoz	47.9		
GBS		40	铜厚 红色 PSR-4000 RDS 无通 1KG/覆 红色	
Total:		1.619mm		
压合厚度: 1.477±0.14mm			成品板厚: 1.6±0.16mm	

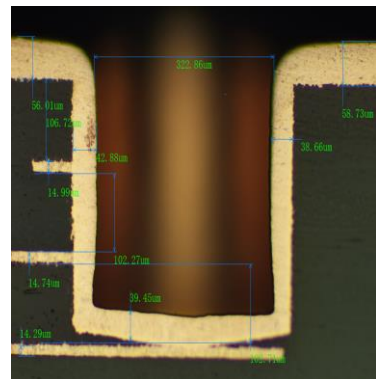
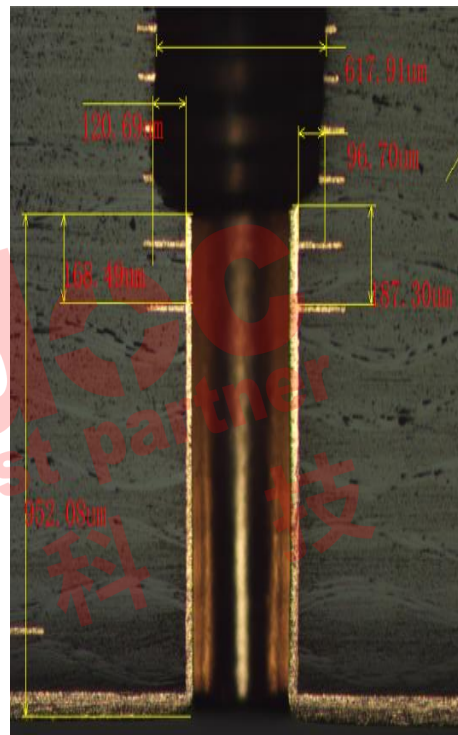
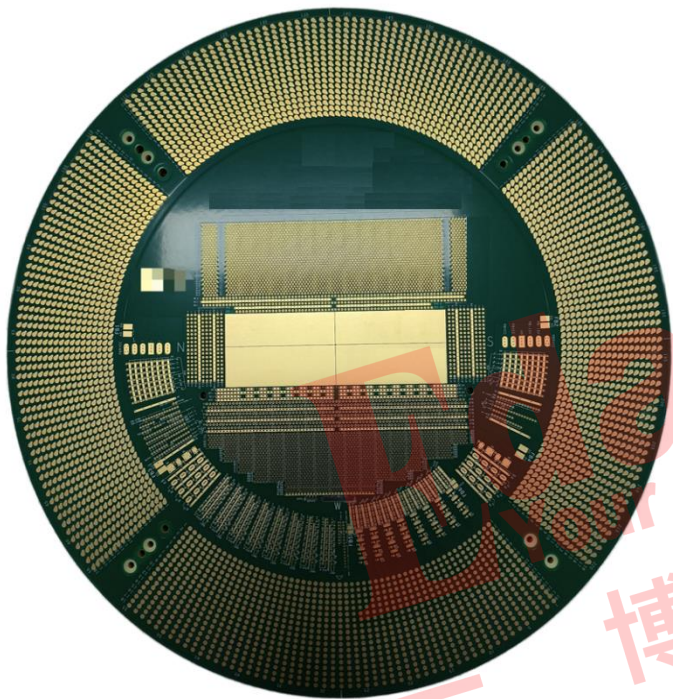


S/N	PIN	LOT	Position	Spec (ohm)	Mean (ohm)	Result	偏移
1	P0002941	成品板内	1	1B	50	50.94	Pass 2%
1	P0002941	成品板内	1	1B	50	50.74	Pass 1%
1	P0002941	成品板内	1	1B	50	50.94	Pass 2%
1	P0002941	成品板内	1	1B	50	51.12	Pass 2%
1	P0002941	成品板内	1	1B	50	51.55	Pass 3%
1	P0002941	成品板内	1	6B	50	51.29	Pass 3%
1	P0002941	成品板内	1	6B	50	50.84	Pass 2%
1	P0002941	成品板内	1	6B	50	51.67	Pass 3%
1	P0002941	成品板内	1	6B	50	51.68	Pass 3%
1	P0002941	成品板内	1	6B	50	51.43	Pass 3%

Layer Rigid Zone 1				
	Foil	Thk (um)	Name	
GTS		40	铜厚 红色 太阳 PSR-4000 RDS 无通 1KG/覆 红色	
GTL	Hoz	43.9		
		102	CCL IT-170GRA27C 0.102mm(不含铜) H/Hoz 3313*1 RTF2/RTF2	
L2	Hoz	15.2		
		240.2	PP IT-170GRA2BS 3313 RC60%	
L3		32.2		
		653	CCL IT-170GRA27C 0.653mm(不含铜) 1/Hoz 2116*6 RTF2/RTF2	
L4	Toz	32.2		
		240.9	PP IT-170GRA2BS 3313 RC57%	
L5		15.2		
	Hoz	102	CCL IT-170GRA27C 0.102mm(不含铜) H/Hoz 3313*1 RTF2/RTF2	
GBL	Hoz	43.9		
		40	铜厚 红色 太阳 PSR-4000 RDS 无通 1KG/覆 红色	
GBS		40		
Total:		1.601mm		
压合厚度: 1.467±0.14mm		成品板厚: 1.6±0.16mm		



S/N	PIN	LOT	Position	Spec (ohm)	Mean (ohm)	Result	偏移
1	P0002943	0	L1B	85	88.50	Pass	4%
1	P0002943	0	L1B	85	86.86	Pass	2%
1	P0002943	0	L1B	85	88.53	Pass	4%
1	P0002943	0	L1B	85	87.82	Pass	3%
1	P0002943	0	L1B	85	88.26	Pass	4%



➤ 交付尺寸: 300mm\*300mm

➤ 钻孔孔径: 0.3mm

➤ 层数: 58L

板厚: 6.3mm

➤ 平整度: 整板 < 100um, 中心关键区 < 50um

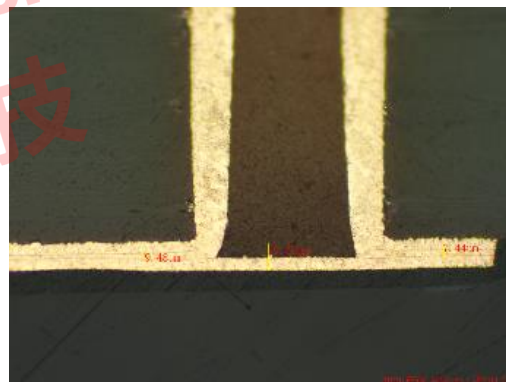
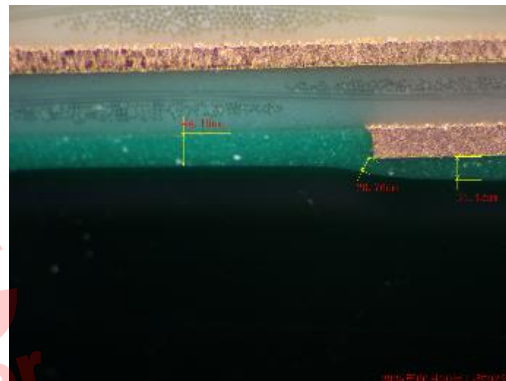


➤ 交付尺寸: 570mm680mm

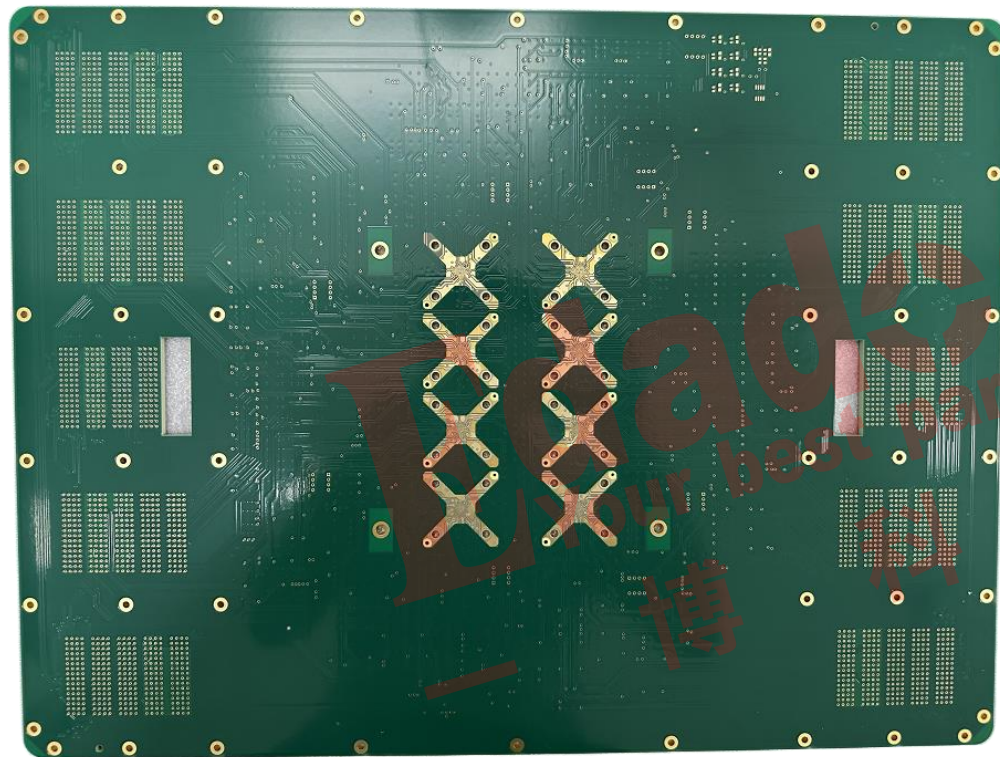
➤ 层数: 28L

➤ 钻孔孔径: 0.3mm

➤ 对接钻精度:  $\leq 1\text{mil}$



板厚: 6.0mm

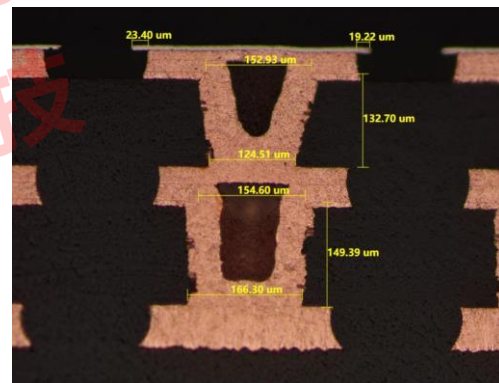
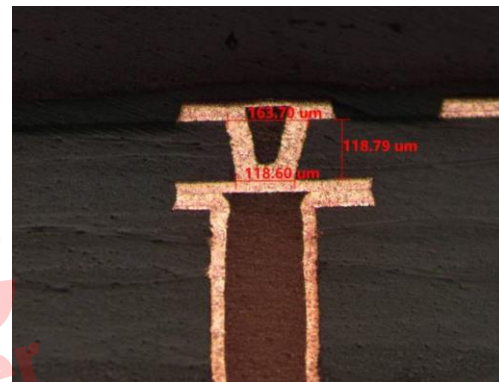


➤ 交付尺寸: 372mm\*495mm

➤ 层数: 18L

➤ 钻孔孔径: 0.2mm

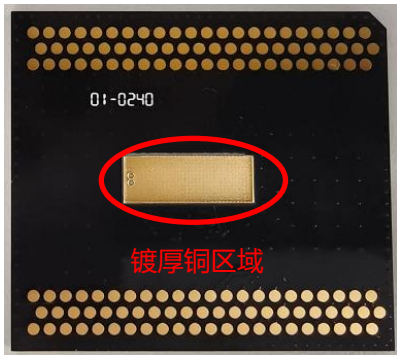
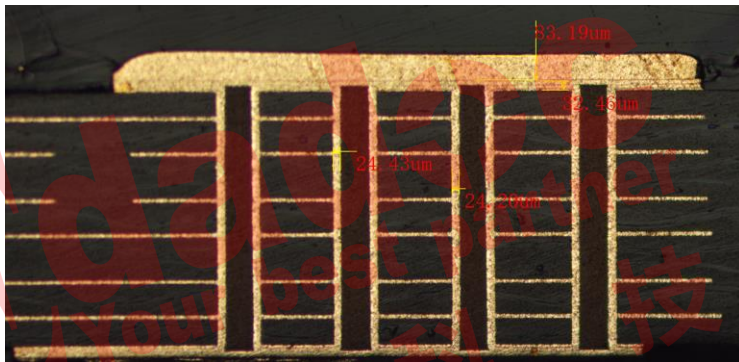
➤ 对接钻精度:  $\leq 1\text{mil}$



板厚: 5.5mm

➤ 悬金:  $\leq 30\text{um}$

# 局部厚铜技术

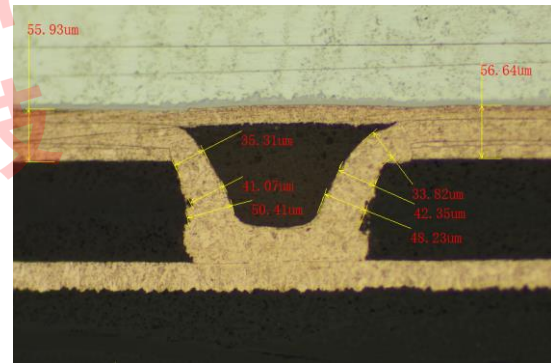
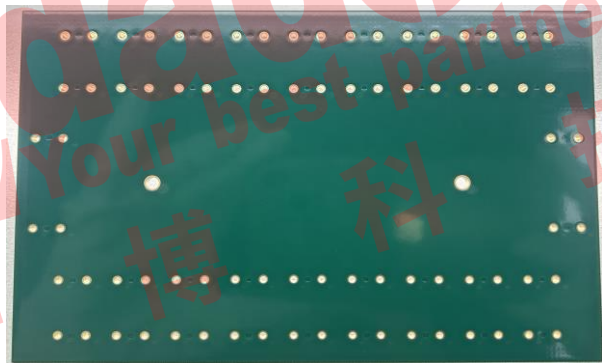
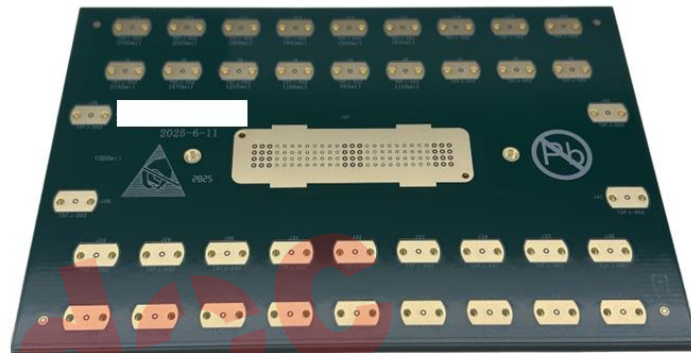
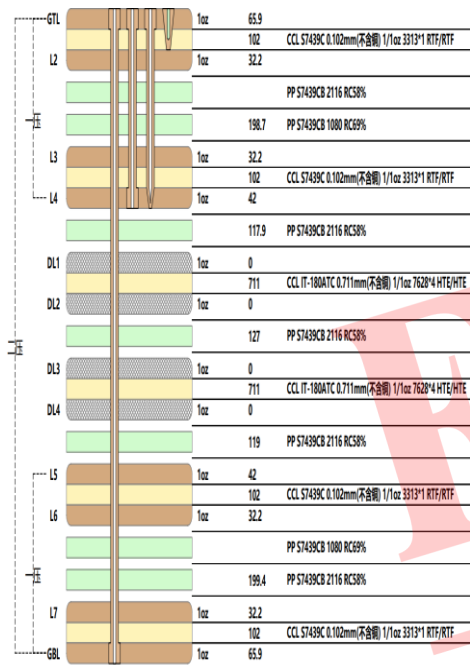


➤ 厚铜区域铜厚： $\geq 2\text{oz}$

➤ 铜厚阶梯： $\geq 50\mu\text{m}$

局部厚铜区域对位： $\leq 1\text{mil}$

# 高速混压技术



➤ 材料: S7439C+IT180A混压

➤ 对位:  $\leq 3\text{mil}$

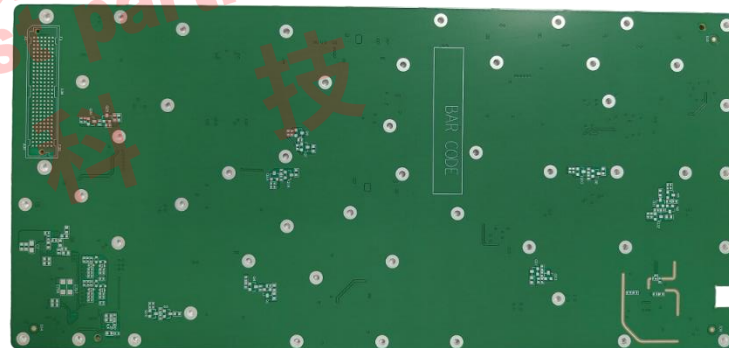
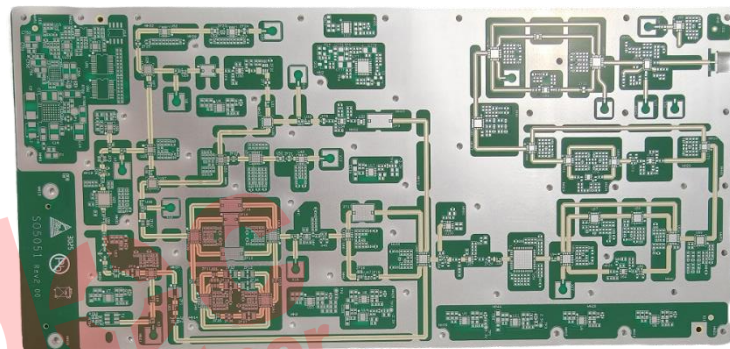
非对称翘曲度:  $\leq 0.75\%$

# 高频混压技术

	Foil	Thk (um)	Name
GTS		40	阻焊 哑绿 太阳 PSR-4000 MPHf 无卤 1KG/罐 哑绿
GTL	Hoz	46.9	
		272	CCL RO4350B LoPro 0.272mm(不含铜) H/Hoz
L2	Hoz	15.2	
		114.4	PP S1000-2MB 2116 RC58%
L3	1oz	32.2	
		360	CCL S1000-2M 0.360mm(不含铜) 1/1oz 7628*2
L4	1oz	32.2	
			PP S1000-2MB 1080 RC69%
压		163	PP S1000-2MB 1080 RC69%
L5	1oz	32.2	
		360	CCL S1000-2M 0.360mm(不含铜) 1/1oz 7628*2
L6	1oz	32.2	
		116.3	PP S1000-2MB 2116 RC58%
L7	Hoz	15.2	
		300	CCL S1000-2M 0.300mm(不含铜) H/Hoz 1506*
GBL	Hoz	46.9	
GBS		40	阻焊 哑绿 太阳 PSR-4000 MPHf 无卤 1KG/罐 哑绿
Total:		2,019mm	

压合厚度: 1.879±0.18mm

成品板厚: 2±0.2mm

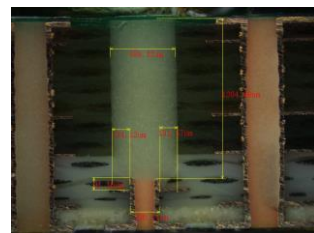
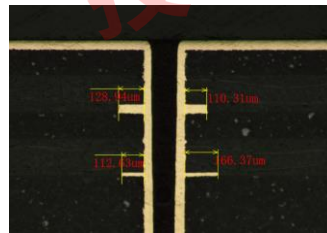
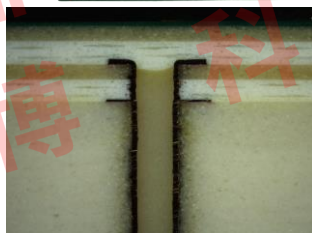
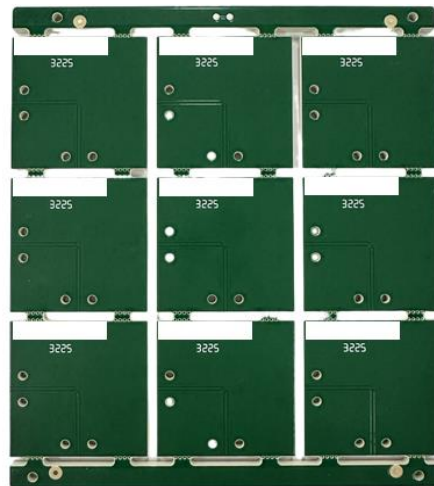
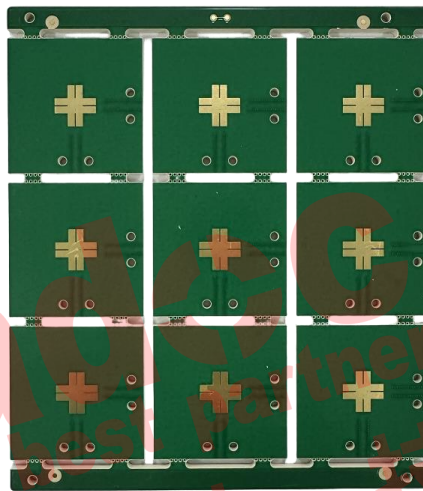
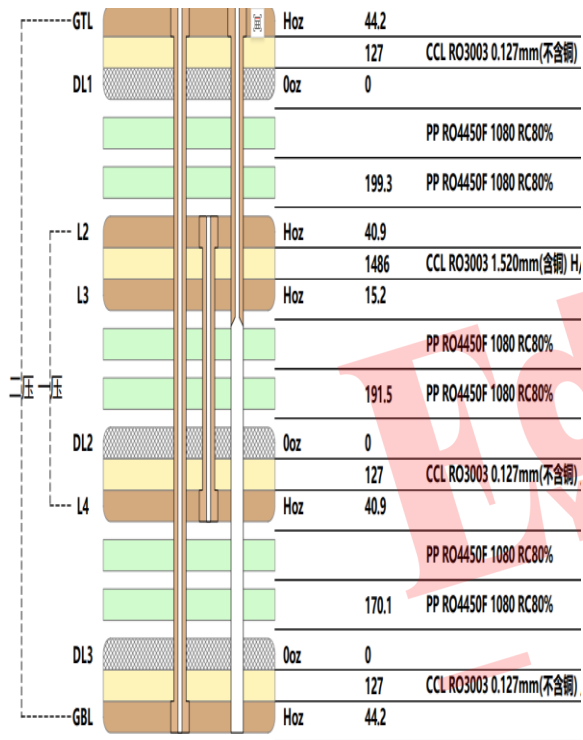


➤ 材料: RO4350+S1000-2M混压

➤ 对位: ≤4mil

➤ 非对称翘曲度: ≤0.75%

# 高频混压技术



➤ 材料: RO3003+RO4450

➤ 对位:  $\leq 3\text{mil}$

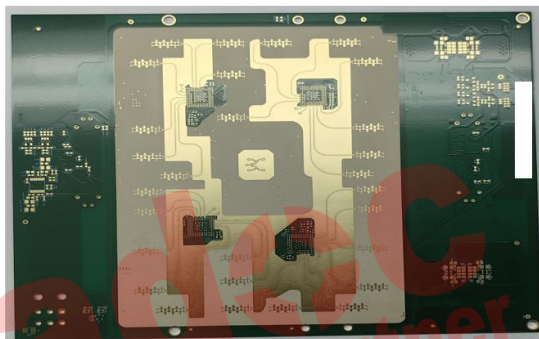
➤ 背钻对位:  
 $\leq 1\text{mil}$

➤ 背钻stub:  $\leq 4\text{mil}$

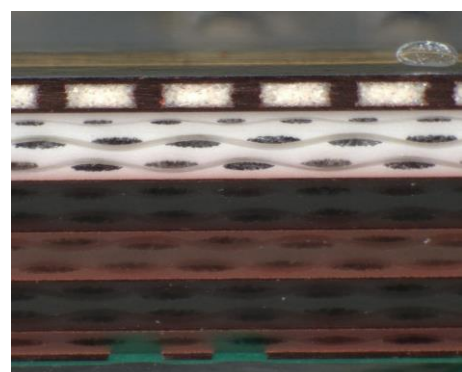
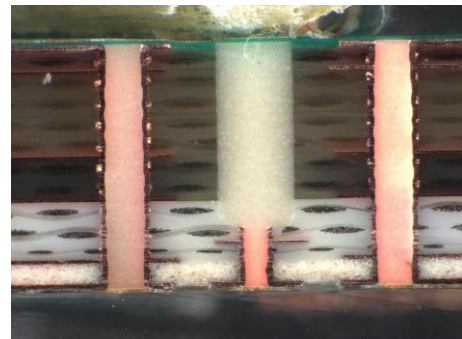
# 高频混压技术

GT1	1oz	31.4	
		127	CCL RO3003 0.127mm(不含铜) 1/1
L2	1oz	27	
		84	PP R-5470X 1067 RC83%
L3	Hoz	20.1	
		254	CCL R-5575X 0.254mm(不含铜) H/
L4	Hoz	15.2	
			PP IT-180ABS 2116 RC57%
		251.3	PP IT-180ABS 2116 RC57%
L5	Hoz	15.2	
		254	CCL IT-180ATC 0.254mm(不含铜)
L6	Hoz	15.2	
			PP IT-180ABS 2116 RC57%
		248.8	PP IT-180ABS 2116 RC57%
L7	Hoz	27	
		130	CCL IT-180ATC 0.130mm(不含铜)
GBL	Hoz	31.4	

➤ 材料：RO3003+R-5575X+IT180A



➤ 对位：≤4mil

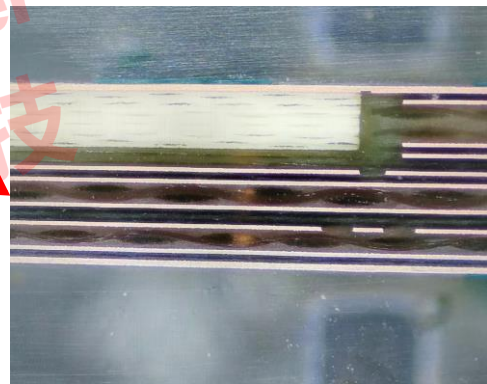
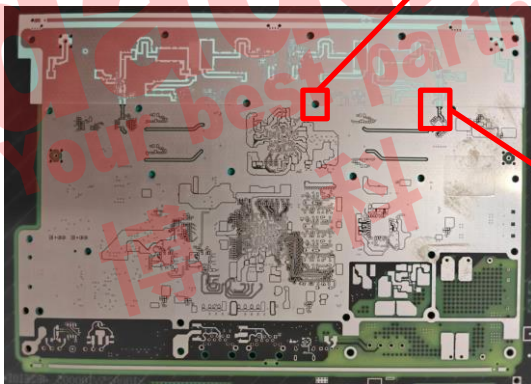
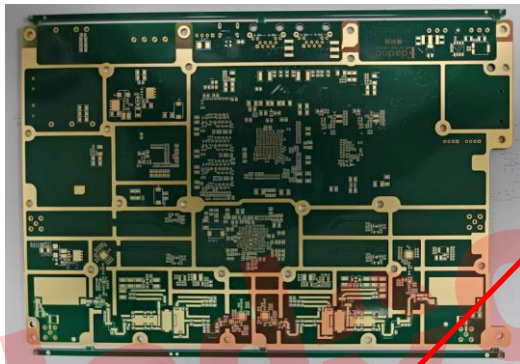


➤ 背钻stub：≤4mil

# 局部混压技术

Layer	Rigid Zone 1	Foil	Thk (um)
GTS			40
-GTL		1oz+plating	43.7
			80.4
L2		1oz	32.2
L3		1oz	200
		1oz	32.2
-压			159.3
		1oz	32.2
L4		1oz	200
L5		1oz	32.2
			80.6
-压		1oz	31.2
			155.6
L7		1oz	31.2
			74.8
L8		1oz	32.2
-压		1oz	360
		1oz	32.2
			76.1
-GBL		1oz+plating	43.7
GBS			40
Total:			1.81mm

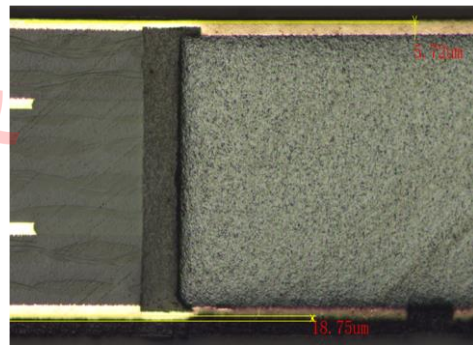
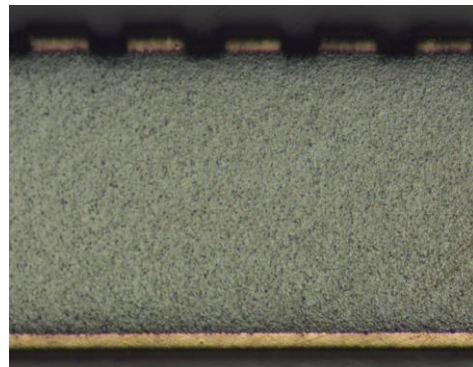
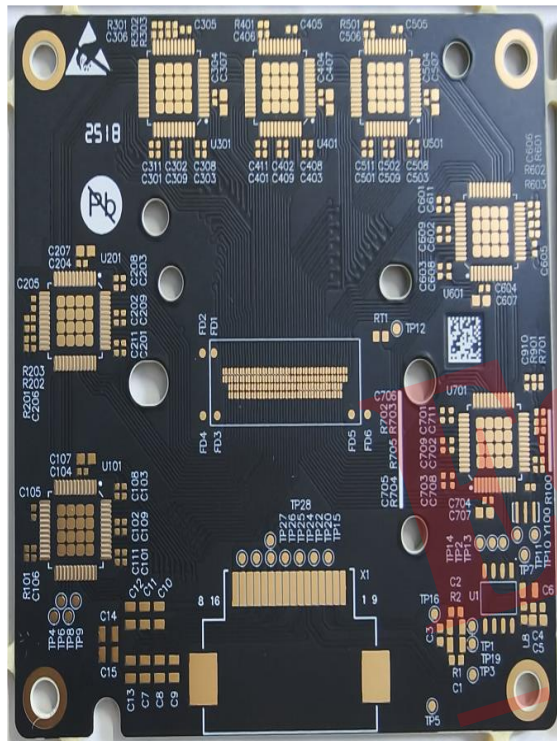
压合厚度: 1.708±0.16mm      成品



➤ 材料: S1000-2M+RO4350B混压

➤ 对位: ≤3mil

高度差: ≤20um



➢ 阻焊开窗位置精度：12um CPK1.67

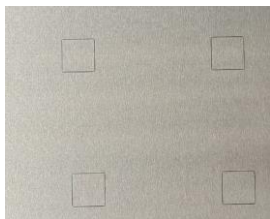
➢ 槽孔尺寸精度：±35um CPK1.67

陶瓷基表面高度差：≤±20μm

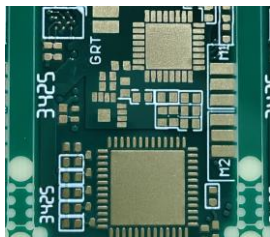
外观图



压合前



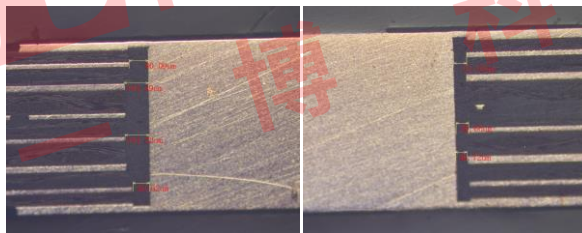
压合后



成品图

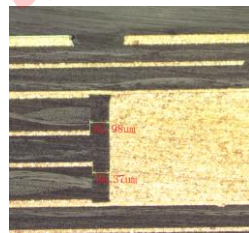
- 工艺：嵌入式 (PP压合)
- 铜基尺寸：7\*7mm&8\*8mm

直通式切片图



- 结构：直通式&埋入式
- 铜基与激光盲孔同层共存

埋入式切片图

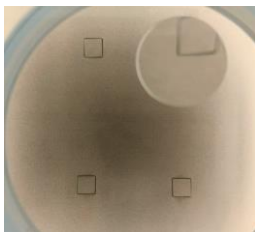


- 铜基高度差： $\leq 15\mu\text{m}$
- 铜基对位： $\leq 2\text{mil}$

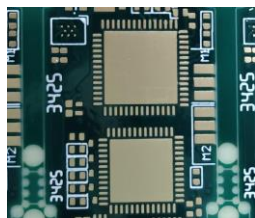
外观图



塞树脂前



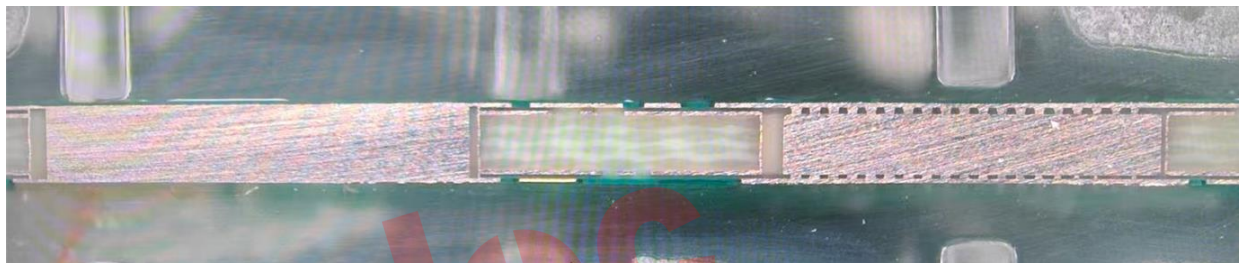
塞树脂后



成品图片

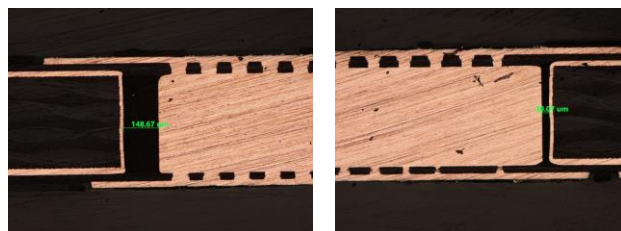
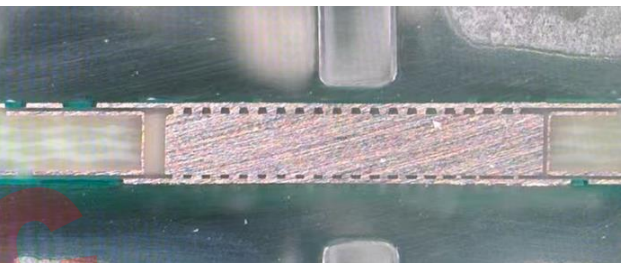
- 工艺：塞入式（树脂黏合）
- 铜基尺寸：5\*5mm&6\*6mm

直通式切片图



- 结构：直通式&埋入式
- 铜基叠激光盲孔填平

埋入式切片图



- 铜基高度差： $\leq 20\mu\text{m}$
- 铜基对位： $\leq 3\text{mil}$

# 目 录

## CONNECTS

Part 01 产品结构&工艺总览

Part 02 产品与技术展示

Part 03 工艺能力规划

## Part 03

# 工艺能力规划



规划周期		2025年度			
维度	核心因子	Q1	Q2	Q3	Q4
工艺能力	产品类型	高多层/服务器/ATE产品 (含POFV、背钻、机械盲埋孔、深V孔、台阶金手指) HDI (4阶)、混压	高多层/服务器/ATE产品 (含POFV、背钻、机械盲埋孔、深V孔、台阶金手指) HDI (6阶)、混压	高多层/服务器/ATE产品 (含POFV、背钻、机械盲埋孔、台阶、埋嵌铜) HDI (6阶)、混压	高多层/服务器/ATE产品 (含POFV、背钻、机械盲埋孔、台阶、埋嵌铜) HDI (任意阶)、混压
	材料	中高TgFR4、 M4/M6/M7/M8系列高速、 陶瓷基材料	中高TgFR4、 M4/M6/M7/M8系列高速、 陶瓷基	中高TgFR4、 M4/M6/M7/M8系列高速、 陶瓷基、PTFE	中高TgFR4、 M4/M6/M7/M8系列高速、 陶瓷基、PTFE
	板厚	0.3-6.3mm	0.3-6.3mm	0.3-6.3mm	0.3-6.3mm
	层数	50	60	70	80
	机械钻直径	0.2mm	0.15mm	0.13mm	0.13mm
	通孔厚径比	30:1	35:1	40:1	45:1
	阻抗	电镀层：±10% 非电镀层：±8%	电镀层：±10% 非电镀层：±5%	电镀层：±10% 非电镀层：±5%	电镀层：±8% 非电镀层：±5%
	背钻Stub	控深<1.0mm, 2-4mil 控深<2.0mm, 2-6mil	控深<1.5mm, 2-4mil 控深<2.5mm, 2-6mil	控深<2.0mm, 2-4mil 控深<3.0mm, 2-6mil	控深<2.2mm, 2-4mil 控深<3.2mm, 2-6mil
	对位精度	4mil	4mil	4mil	4mil

规划周期		2025年度			
维度	核心因子	Q1	Q2	Q3	Q4
工艺能力	铜厚	内层: 3oz 外层: 3oz	内层: 4oz 外层: 4oz	内层: 5oz 外层: 5oz	内层: 6oz 外层: 6oz
	激光孔直径	普通: 75-150um 深V:250um	普通: 75-170um 深V:300um	普通: 75-200um 深V:350um	普通: 70-200um 深V:400um
	激光盲孔厚径比	批量: 0.8:1 样品: 1:1	批量: 0.8:1 样品: 1:1	批量: 0.8:1 样品: 1:1	批量: 0.8:1 样品: 1:1
	最小阻焊桥	亮绿油: 100um 黑油&白油: 125um 其他杂色油墨: 125um	亮绿油: 90um 黑油&白油: 110um 其他杂色油墨: 110um	亮绿油: 80um 黑油&白油: 100um 其他杂色油墨: 100um	亮绿油: 75um 黑油&白油: 100um 其他杂色油墨: 100um
	外形公差	±0.075mm	±0.075mm	±0.05mm	±0.05mm
	线宽线距	内层: 0.5OZ:65/65um 1OZ:75/75um 外层: 1/3OZ+plating:过程面铜 ≤45um: 60/60um 0.5OZ+plating:过程面铜 ≤55um: 70/70um	内层: 0.5OZ:60/60um 1OZ:60/70um 外层: 1/3OZ+plating:过程面铜 ≤45um: 60/60um 0.5OZ+plating:过程面铜 ≤55um: 70/70um	内层: 0.5OZ:50/50um 1OZ:60/60um 外层: 1/3OZ+plating:过程面铜 ≤45um: 60/60um 0.5OZ+plating:过程面铜 ≤55um: 70/70um	内层: 0.5OZ:50/50um 1OZ:60/60um 外层: 1/3OZ+plating:过程面铜 ≤45um: 60/60um 0.5OZ+plating:过程面铜 ≤55um: 70/70um
	表面处理	化金, 镀金、镍钯金, OSP, 喷锡, 化银, 化锡, 选择性镀金			

# THANKS



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