

高端PCB制板核心 工艺与技术分享

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一博珠海PCB板厂





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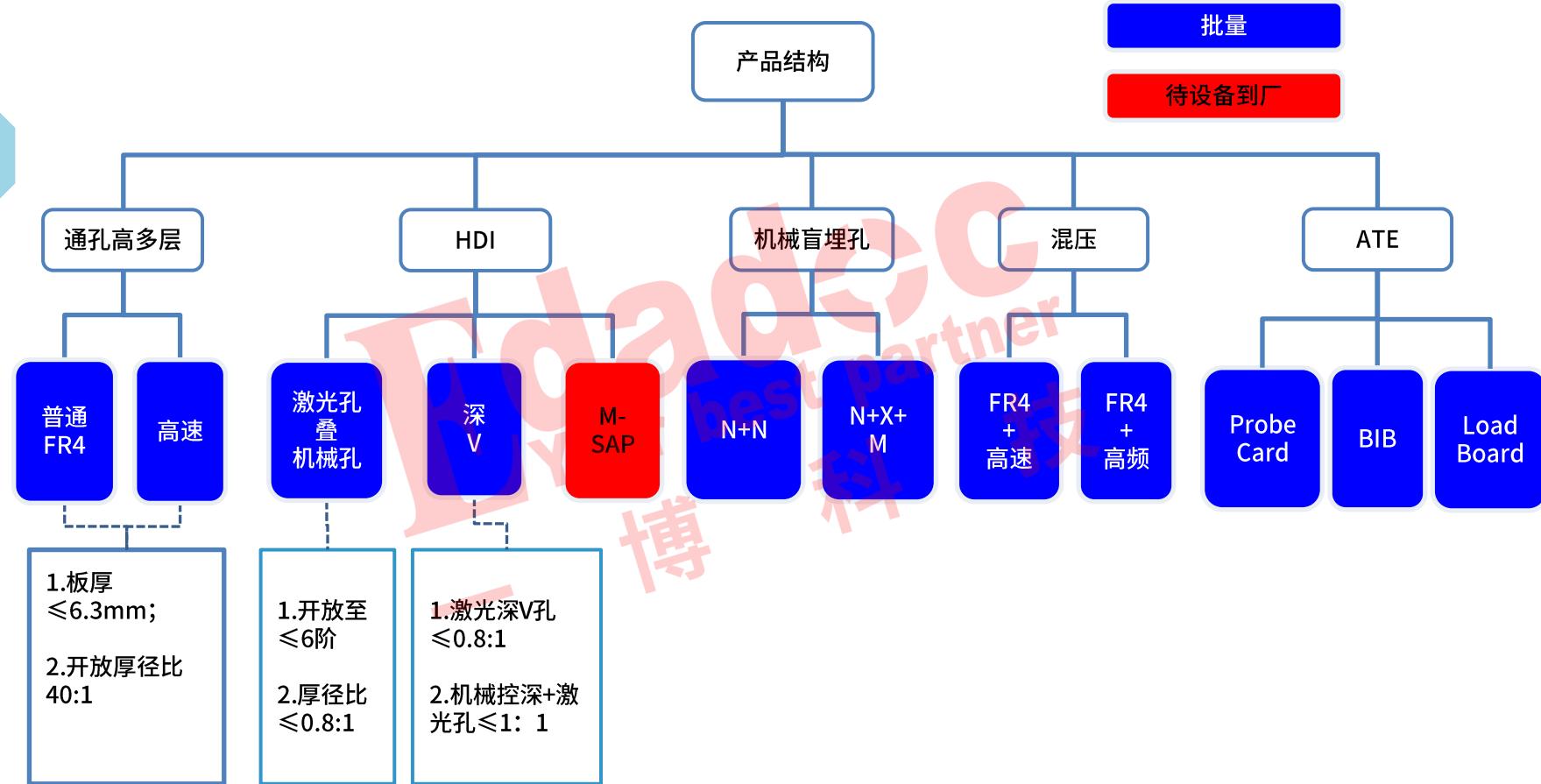
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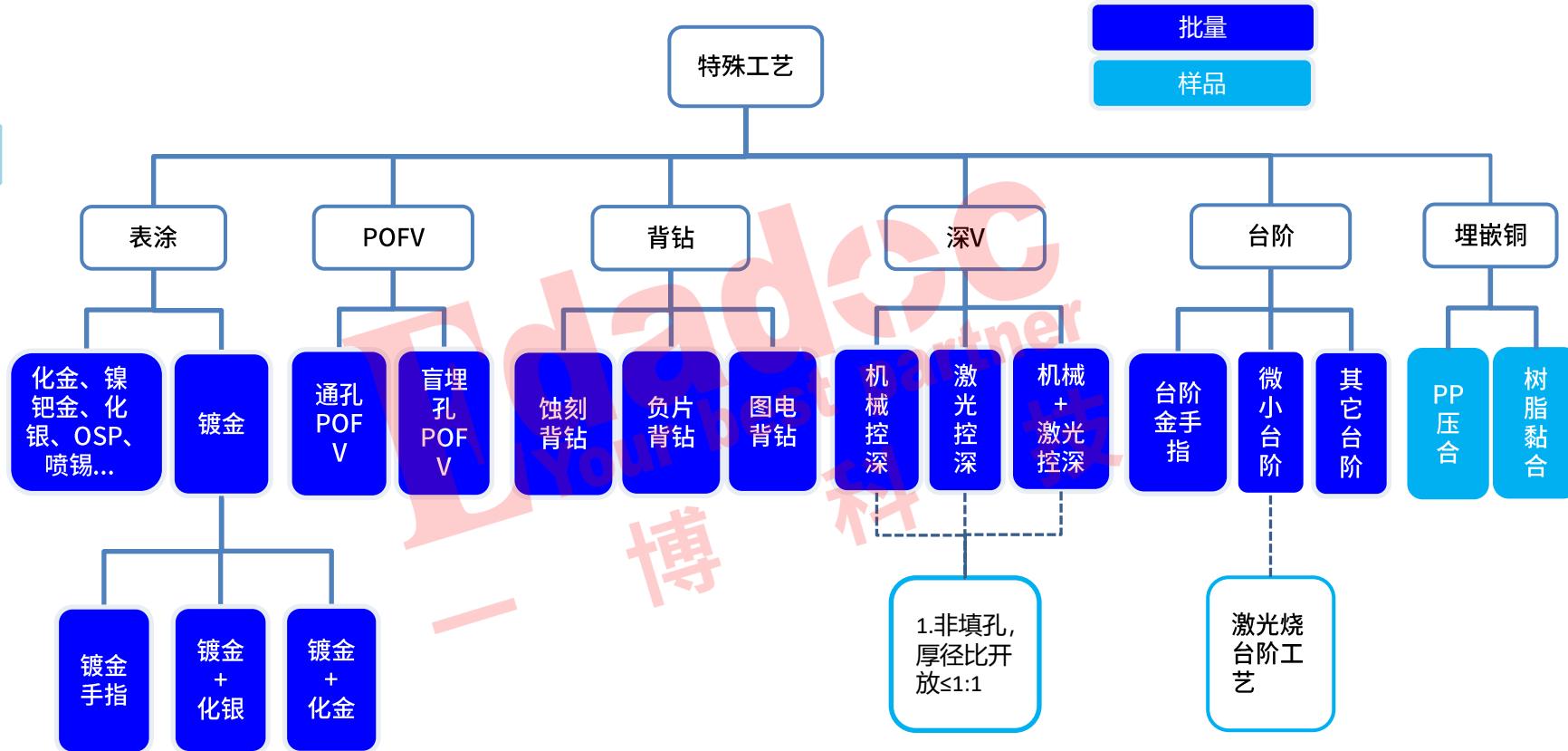
产品结构&工艺总览



产品结构



工艺总览



Part 02

产品与技术展示





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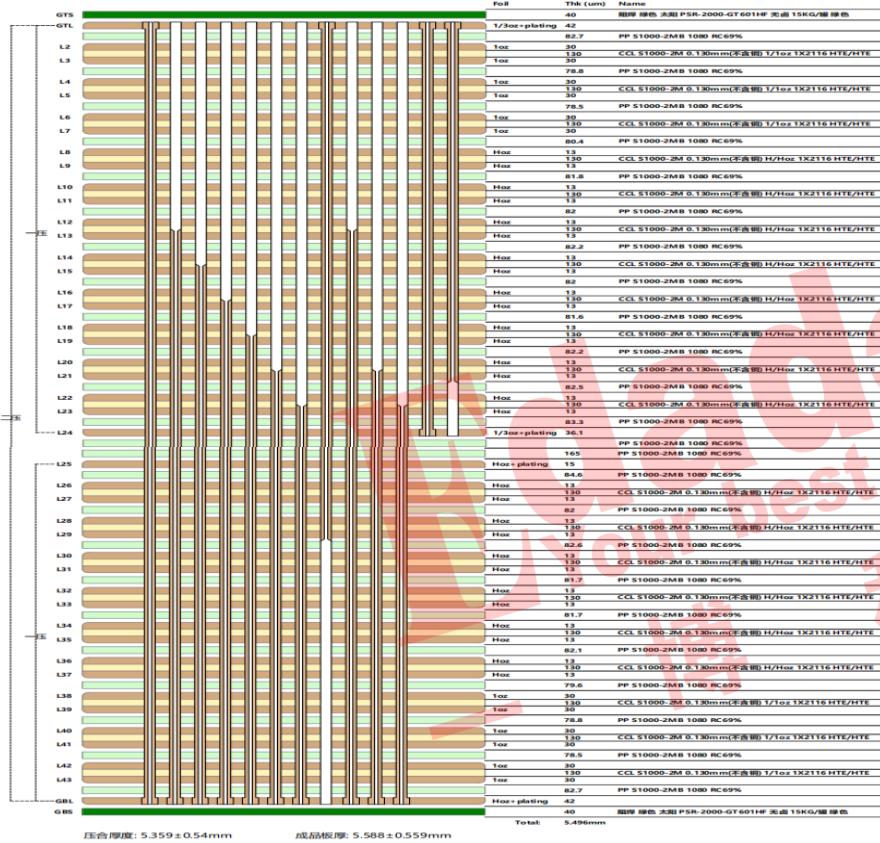
CONNECTS

Part 01 产品结构&工艺总览

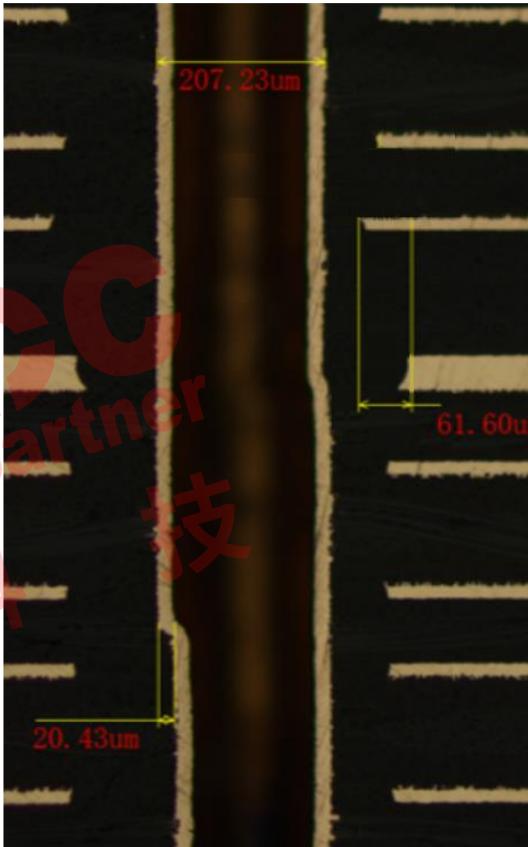
Part 02 产品与技术展示

Part 03 工艺能力规划

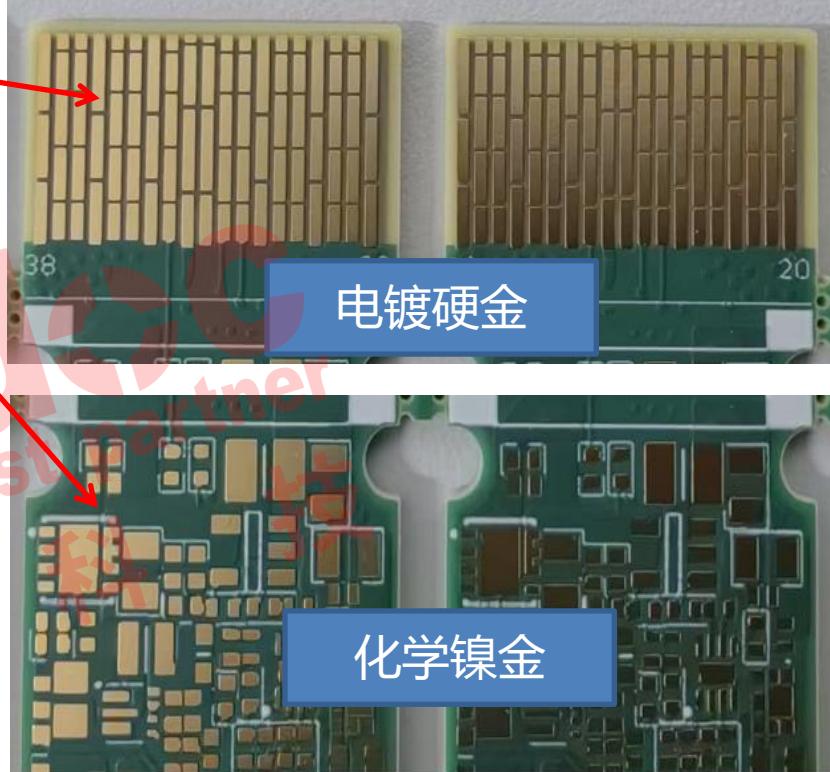
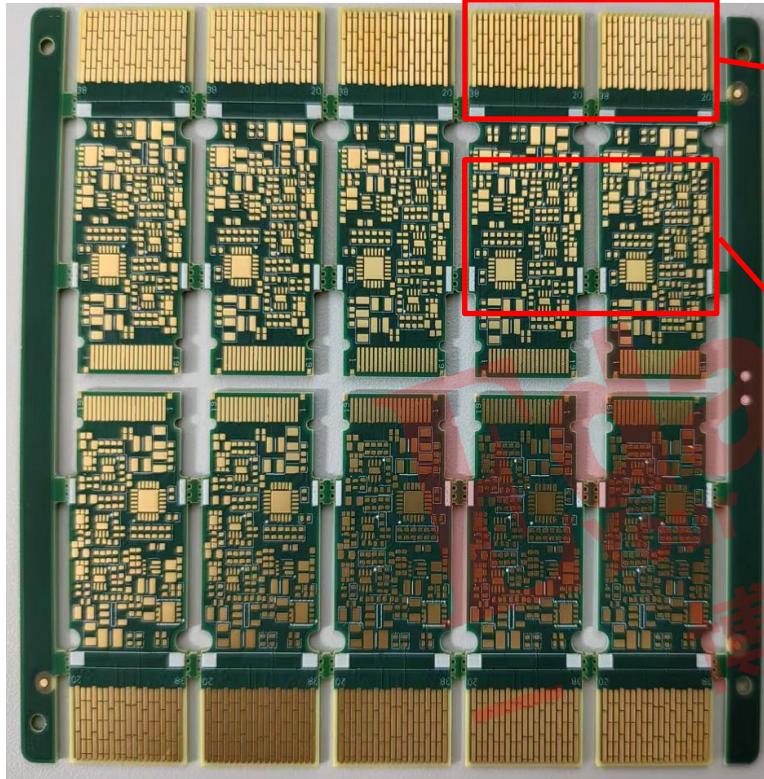
N+M 机械埋盲孔技术



➤ 层数: 24L+20L ➤ 板厚: 5.6mm ➤ 对位要求: ≤4.5mil ➤ 机钻孔径: 0.2mm ➤ 对钻精度: ≤40um



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

N+N+M+N+选化

Foil	Thk (um)	Name
GTS	40	阳极 银绿 太阳 PSR-4000 MPHF 无卤 1KG/板 绿绿色
-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
	PP TU-87P SLK 106 RC76% 18*24IN	
	114.8	PP TU-87P SLK 106 RC76% 18*24IN
L11	1oz	30
	76	CCL TU-872 SLK 0.076mm(不含铜) 1/oz 1078*1 37*49IN RTF/RTF
L12	1oz	30
	PP TU-87P SLK 106 RC76% 18*24IN	
	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	阳极 银绿 太阳 PSR-4000 MPHF 无卤 1KG/板 绿绿色



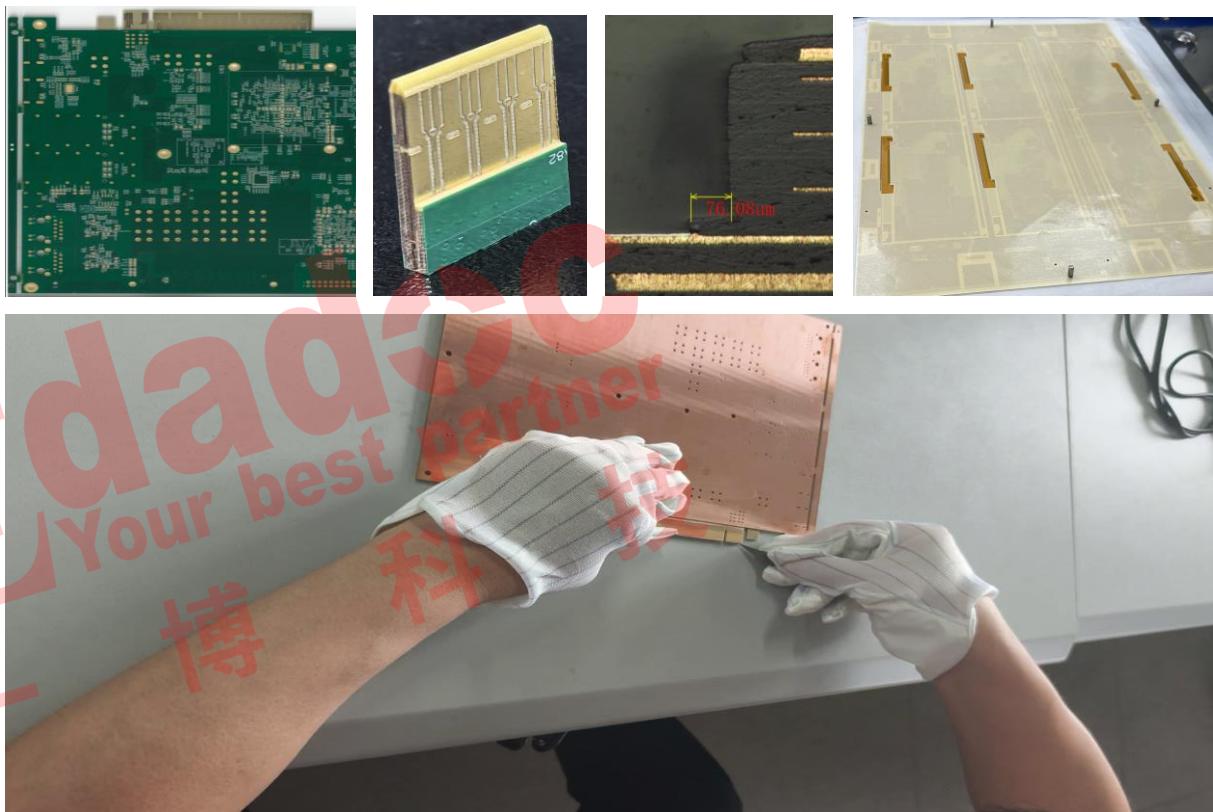
➤ 层数: 10L+2L+10L

➤ 对准度要求: ≤5mil

➤ 镀金手指+化金

N+M+台阶金手指技术

		层	材料	厚度	备注
		GTS	阻焊 绿色 PSR	40	
		GTL	1/3oz+plating	43.3	
		L2		104.2	PP R-5670(G) 331
	一压	L3	Hoz	13	
		L4	Hoz	100	CCL R-5775(G) 0.1
		L5	Hoz	13	
		L6		123.2	PP R-5670(G) 211
		L7	Hoz	13	
		L8	Hoz	100	CCL R-5775(G) 0.1
		L9	Hoz	13	
		L10		124.9	PP R-5670(G) 211
	二压	L11	Hoz	13	
		L12	Hoz	100	CCL R-5775(G) 0.1
		L13		123.2	PP R-5670(G) 211
		L14	Hoz	13	
		L15		179.5	PP IT-180ABS 106
		L16	Hoz	63	PP IT-180ABS 108
		L17	Hoz	30	
		GBL		128.4	PP R-5670(G) 211
		GBS	1/3oz+plating	35.3	
					PP R-5670(G) 103
					PP R-5670(G) 103
					112.2
					PP R-5670(G) 103
					26.4
					124.5
					PP R-5670(G) 211
					Hoz
					13
					100
					CCL R-5775(G) 0.1
					Hoz
					13
					121.5
					PP R-5670(G) 211
					Hoz
					13
					100
					CCL R-5775(G) 0.1
					Hoz
					13
					104.2
					PP R-5670(G) 331
			1oz+plating	43.3	
					阻焊 绿色 PSR
			Total:	2.494mm	
			压合厚度:	2.369±0.23mm	
			成品板厚:	2.5±0.25mm	



➤ 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%

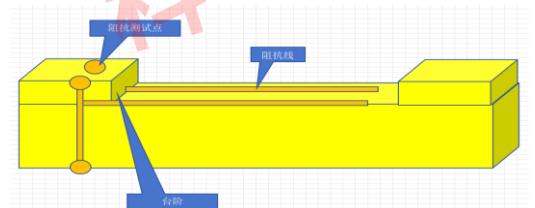
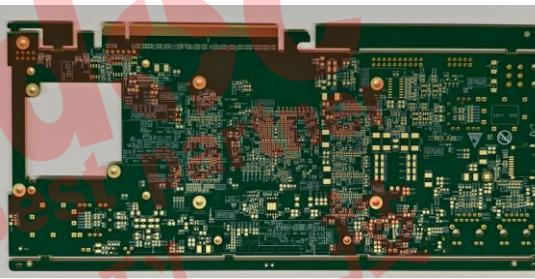
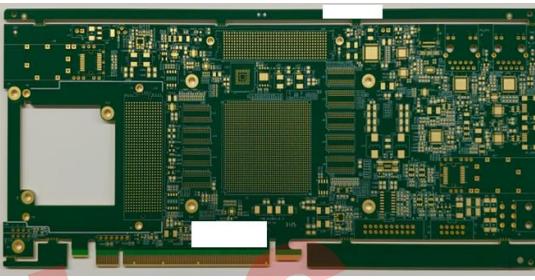
技术 N+M台阶金手指技术

Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			40	阻焊 绿色 太阳 PSR-2000-GT601
GTL		Hoz + plating	44.4	HTE
L2			63.9	PP R-5670(G) 1035 RC 75%
L3		Hoz	15.2	CCL R-5775(G) 0.075mm(不含)
L4		Hoz	15.2	PP R-5670(G) 1078 RC 68%
L5			73.9	PP R-5670(G) 1078 RC 68%
L6		Hoz	15.2	CCL R-5775(G) 0.075mm(不含)
L7		Hoz	15.2	PP R-5670(G) 1078 RC 68%
L8			74.6	PP R-5670(G) 1078 RC 68%
L9		Hoz	15.2	CCL R-5775(G) 0.075mm(不含)
L10		Hoz	15.2	PP R-5670(G) 1078 RC 68%
L11			161.9	PP R-5670(G) 1078 RC 68%
L12		HTE	15.2	PP R-5670(G) 1035 RC 75%
L13			125.9	PP R-5670(G) 1035 RC 75%
L14		1oz	32.2	CCL R-5775(G) 0.075mm(不含)
L15		2oz	75	PP R-5670(G) 1080 RC 68%
L16			122.5	PP R-5670(G) 1080 RC 68%
L17		2oz	66.2	CCL R-5775(G) 0.200mm(不含)
L18			200	PP R-5670(G) 1080 RC 68%
L19		1oz	32.2	CCL R-5775(G) 0.075mm(不含)
L20		Hoz	71.1	PP R-5670(G) 1078 RC 68%
L21		Hoz	15.2	CCL R-5775(G) 0.075mm(不含)
GBL			75	PP R-5670(G) 1078 RC 68%
GBS		Hoz + plating	15.2	CCL R-5775(G) 0.075mm(不含)
			74.9	PP R-5670(G) 1078 RC 68%
		Hoz	15.2	CCL R-5775(G) 0.075mm(不含)
			75	PP R-5670(G) 1078 RC 68%
		Hoz	15.2	CCL R-5775(G) 0.075mm(不含)
			74.9	PP R-5670(G) 1078 RC 68%
		Hoz	15.2	CCL R-5775(G) 0.075mm(不含)
			75	PP R-5670(G) 1078 RC 68%
		Hoz	15.2	CCL R-5775(G) 0.075mm(不含)
			64.1	PP R-5670(G) 1035 RC 75%
		HTE	44.4	阻焊 绿色 太阳 PSR-2000-GT601
			40	
			Total:	2.469mm
			压合厚度:	2.334 ± 0.23mm
			成品板厚:	2.5 ± 0.25mm

➤ 台阶槽溢胶:
≤0.1mm

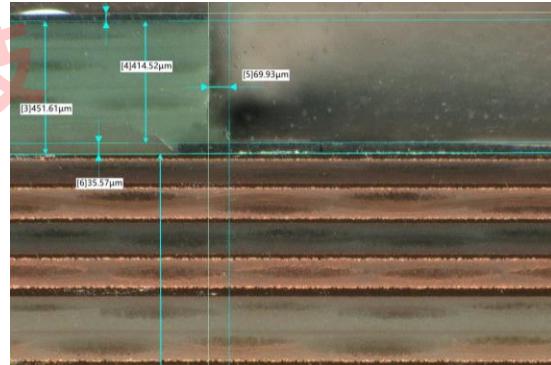
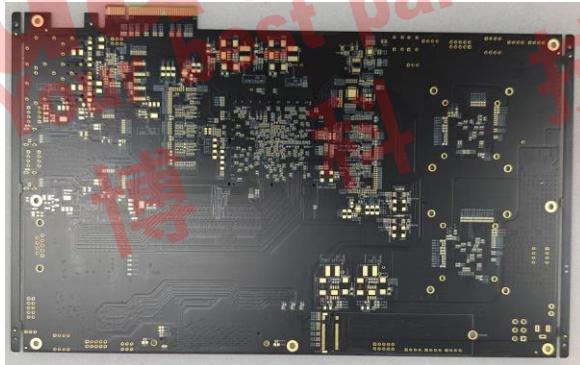
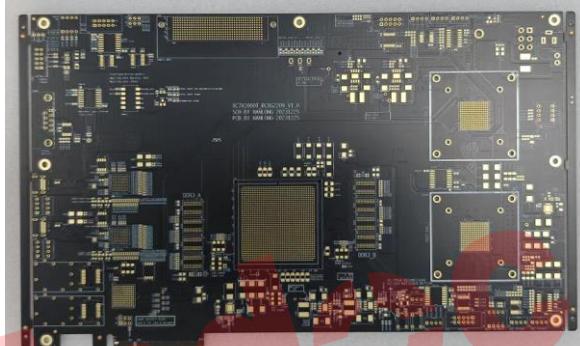
➤ N+M对位: ≤3.5mil

不对称设计翘曲度: ≤0.75%



台阶金手指技术

Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			40	粗焊 哑黑 太阳 PSR-2000 ME8H 无面 11
GTL		Hoz	44.6	
	压	Hoz	80	CCL IT-180ATC 0.080mm(不含铜) H/F
L2		Hoz	15.2	
			113.2	PP IT-180ABS 2116 RC55%
L3		Hoz	15.2	
			107	CCL IT-180ATC 0.107mm(不含铜) H/F
L4		1oz	32.2	
				PP IT-180ABS 106 RC74%
			99.9	PP IT-180ABS 106 RC74%
L5		Hoz	15.2	HTE
			83.9	PP IT-180ABS 1080 RC68%
L6		Hoz	15.2	
			100	CCL IT-180ATC 0.100mm(不含铜) H/F
L7		Hoz	15.2	
			108	PP IT-180ABS 3313 RC61%
L8		Hoz	15.2	
			107	CCL IT-180ATC 0.107mm(不含铜) H/F
L9		1oz	32.2	
			104.4	PP IT-180ABS 3313 RC61%
L10		1oz	32.2	
			107	CCL IT-180ATC 0.107mm(不含铜) H/F
L11		Hoz	15.2	
			108	PP IT-180ABS 3313 RC61%
L12		Hoz	15.2	
			100	CCL IT-180ATC 0.100mm(不含铜) H/F
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/F
L15		1oz	32.2	
			105.9	PP IT-180ABS 3313 RC61%
L16		Hoz	15.2	
			100	CCL IT-180ATC 0.100mm(不含铜) H/F
L17		Hoz	15.2	
			83.8	PP IT-180ABS 1080 RC68%
GBL		Hoz+plating	44.6	HTE
GBS			40	粗焊 哑黑 太阳 PSR-2000 ME8H 无面 11
				压合厚度: 2.068±0.19mm
				成品板厚: 2.1±0.21mm
				Total: 2.203mm

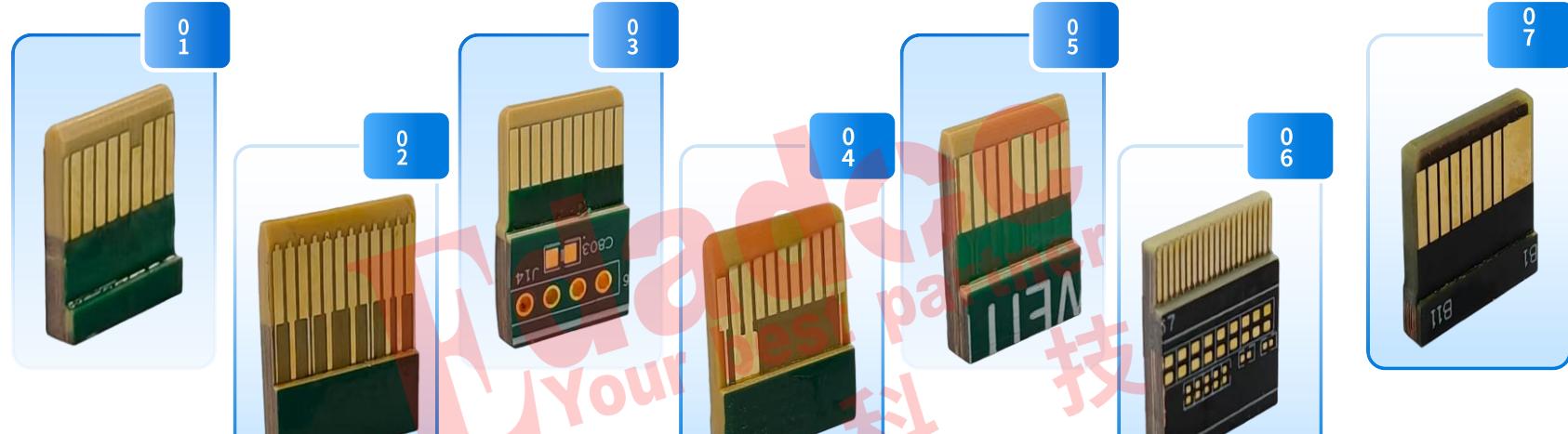


➤ 台阶槽溢胶：
≤0.1mm

➤ 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

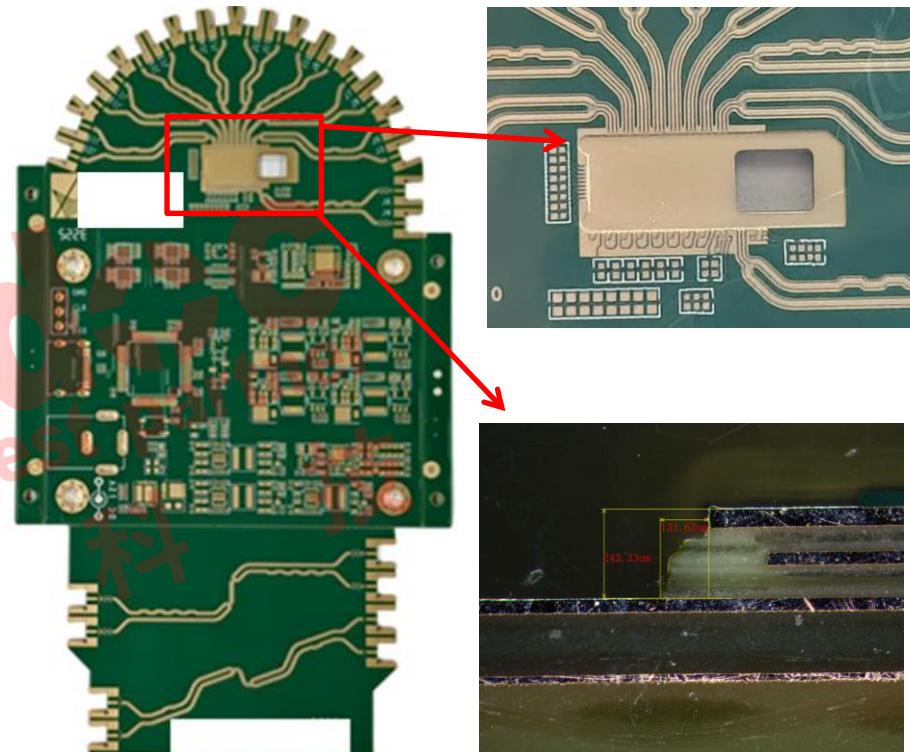
微小台阶技术

Layer	Rigid Zone 1	Foil	Thk (um)
GTS			40
GTL		1/3oz+plating	45.1
L2			80.8
L3		1/3oz+plating	30
			81.1
L4		1/3oz+plating	33.9
			168.6
L5		Hoz	15.2
			610
L6		Hoz	15.2
			168.7
L7		1/3oz+plating	33.9
			80.9
GBL		1/3oz+plating	30
			82.4
GBS		1/3oz+plating	45.1
			40
		Total:	1.601mm
		压合厚度:	1.455±0.14mm
		成品板厚:	1.6:

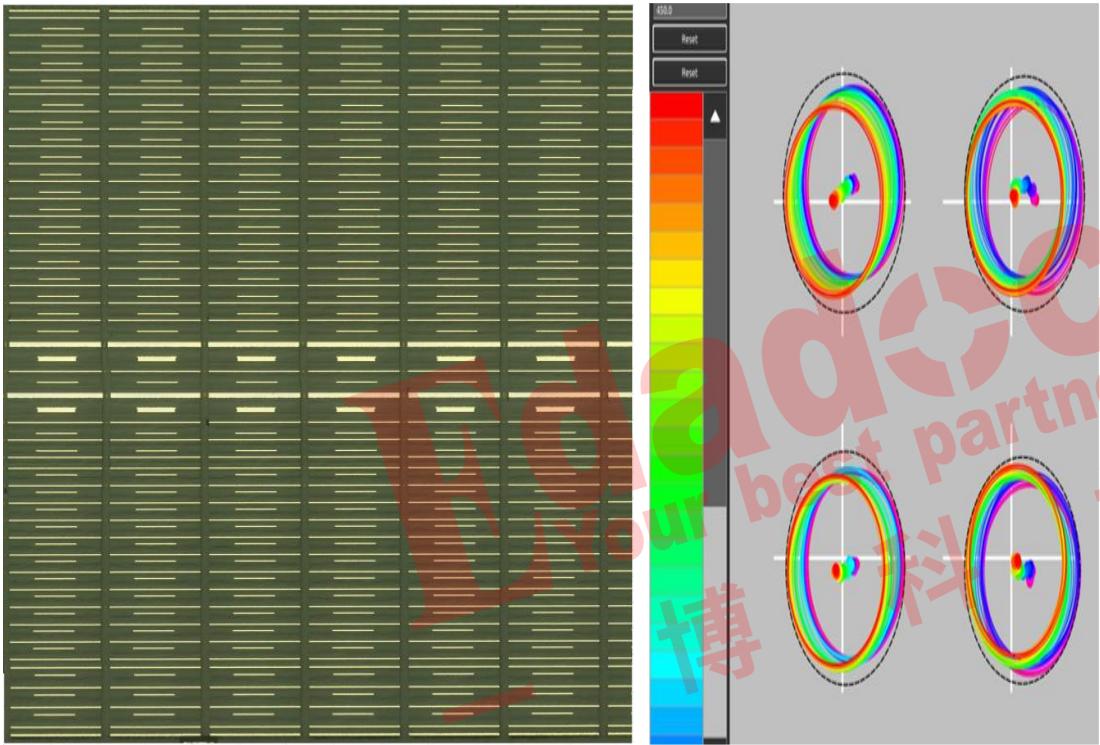
➤ 台阶槽深度: 243um

➤ 台阶槽尺寸: 6*17mm

➤ 图形到槽底距离:132um



高多层对位技术

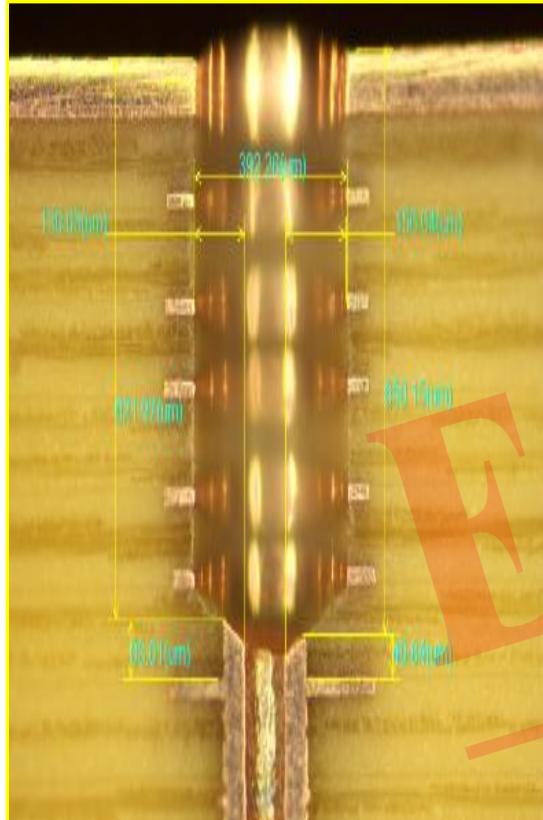


- 层数: 80L
- 板厚: 10mm

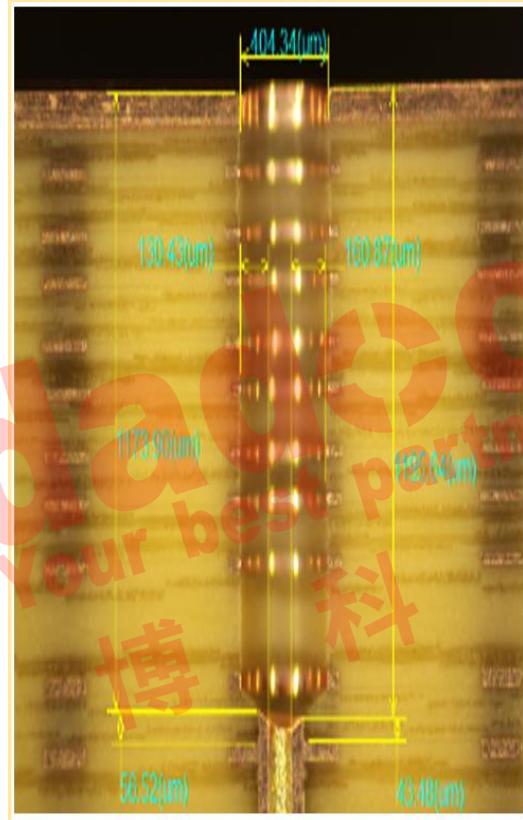
- 钻孔孔径: 0.15mm
- 钻孔厚径比: 66:1 (待新电镀线安装后电镀)

Offset	Dimension				NonLinearErrors					
	x [mm]	y [mm]	phi [°]	x [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

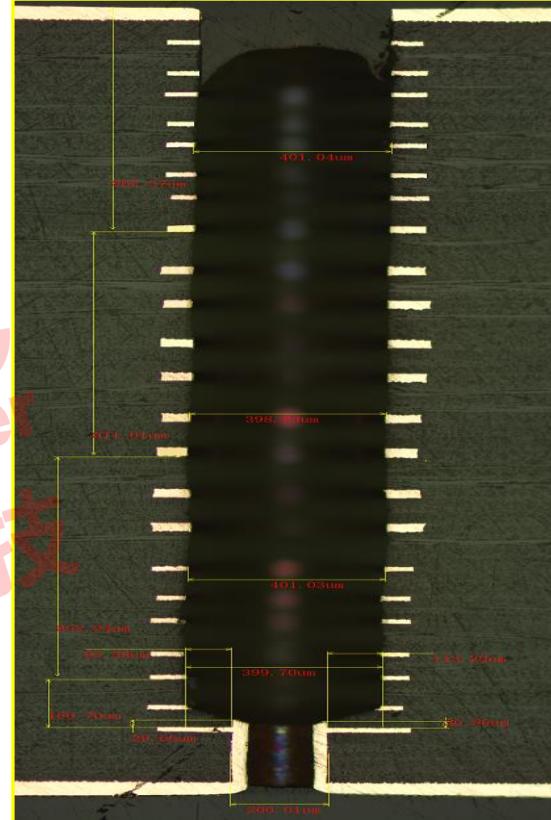
背钻STUB技术



➤ 背钻深度: $\leq 3\text{mm}$



➤ Stub: 1-4mil



➤ 背钻孔径D: $d+6\text{mil}$ (d 通孔孔径)

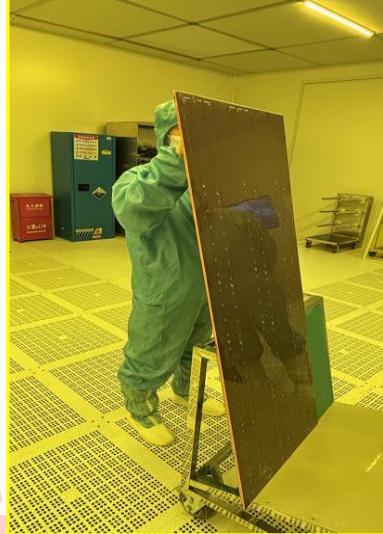
超大尺寸技术



➤ 交付尺寸: 97.8*1320mm



➤ 层数: 32L



➤ 板厚: 6.8mm



高阶HDI技术

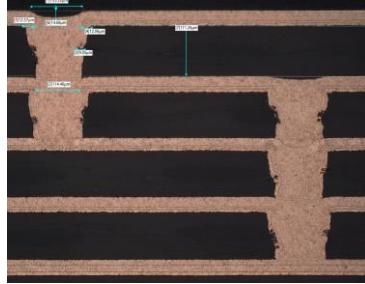
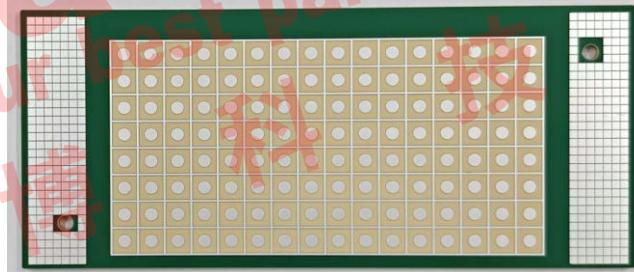
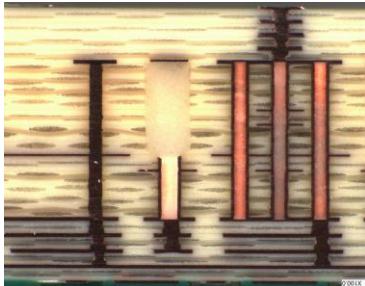
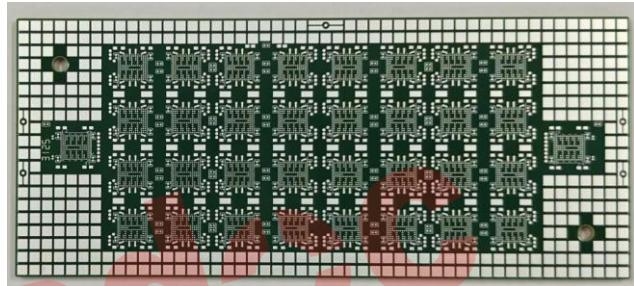
	GTL	1/3oz+plating	33.6	HTE
			87.7	PP R-568Y(GE) 1078 RC72%
L2		1/3oz+plating	34.6	HTE
			87.7	PP R-568Y(GE) 1078 RC72%
L3		1/3oz+plating	34.6	HTE
			87.7	PP R-568Y(GE) 1078 RC72%
L4		1/3oz+plating	34.6	HTE
			87	PP R-568Y(GE) 1078 RC72%
L5	Hoz	37		
		400	CCL R-578Y(GE) 0.400mm(不含铜)	
L6	Hoz	15.9		
		104.2	PP R-568Y(GE) 1078 RC75%	
L7	Hoz	15.9		
		250	CCL R-578Y(GE) 0.250mm(不含铜)	
L8	Hoz	15.9		
		108.1	PP R-568Y(GE) 1078 RC75%	
L9	Hoz	15.9		
		400	CCL R-578Y(GE) 0.400mm(不含铜)	
L10	Hoz	37		
		98.8	PP R-568Y(GE) 1078 RC72%	
L11	1/3oz+plating	34.6	HTE	
		94.2	PP R-568Y(GE) 1078 RC72%	
L12	1/3oz+plating	34.6	HTE	
		92.1	PP R-568Y(GE) 1078 RC72%	
L13	1/3oz+plating	34.6	HTE	
		91.9	PP R-568Y(GE) 1078 RC72%	
GBL	1/3oz+plating	33.6	HTE	

➤ 阶数: 4阶

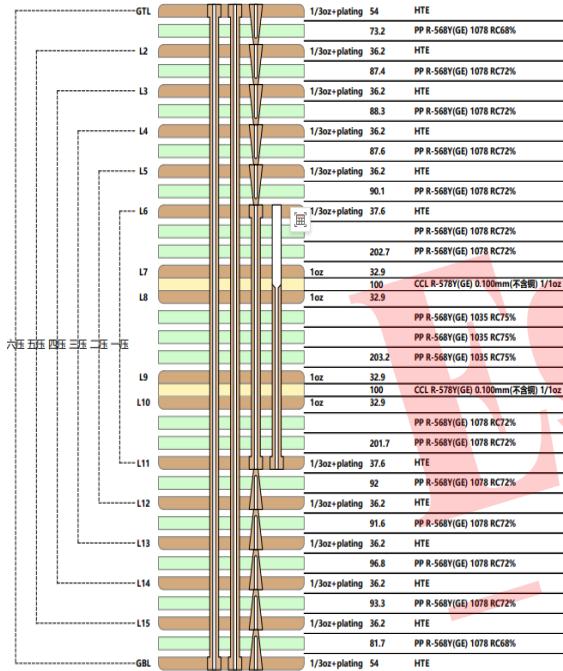
➤ 整体对位: $\leq 3\text{mil}$

➤ 激光盲孔对位: $\leq 1.5\text{mil}$

激光孔叠机械埋孔

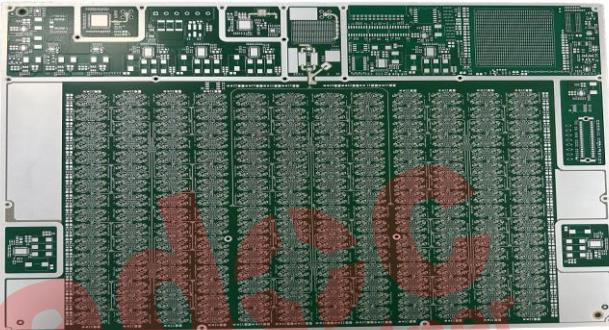


高阶HDI技术

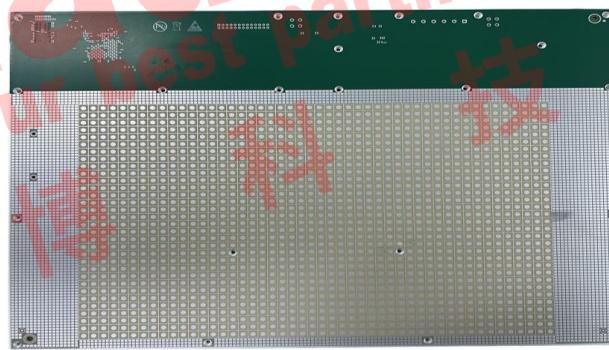


阶数: 5阶

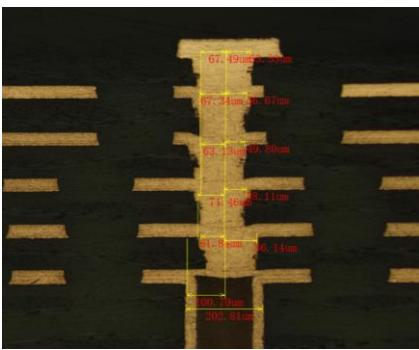
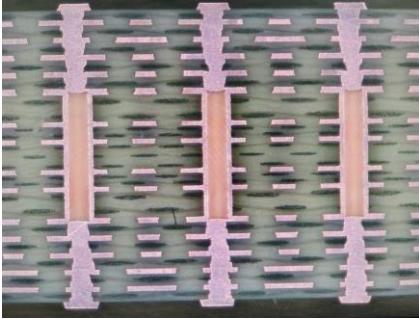
整体对位: ≤3mil



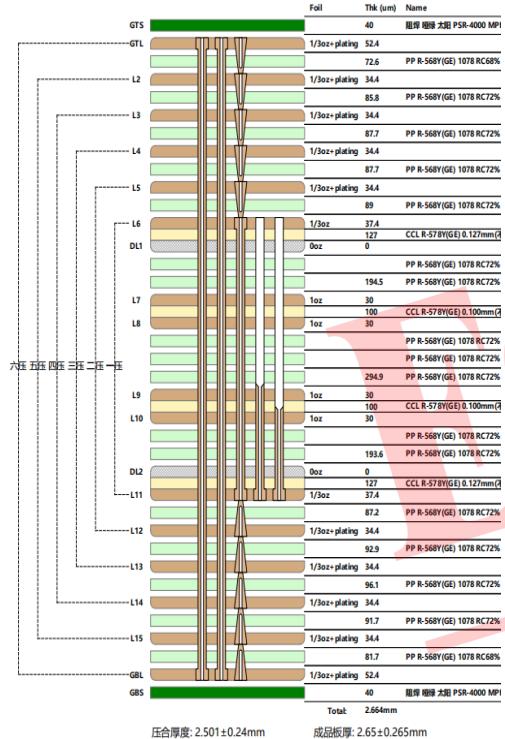
激光盲孔对位: ≤1.5mil



激光孔叠埋盲孔



高阶HDI技术

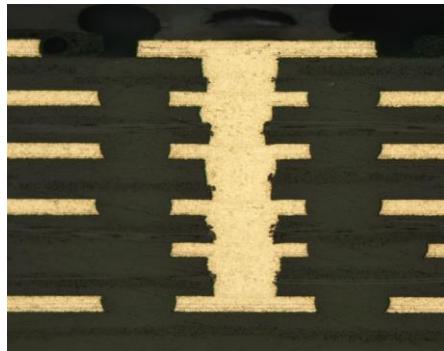
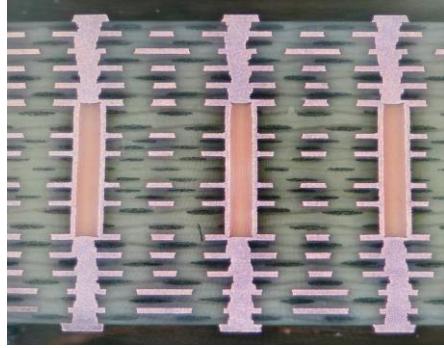
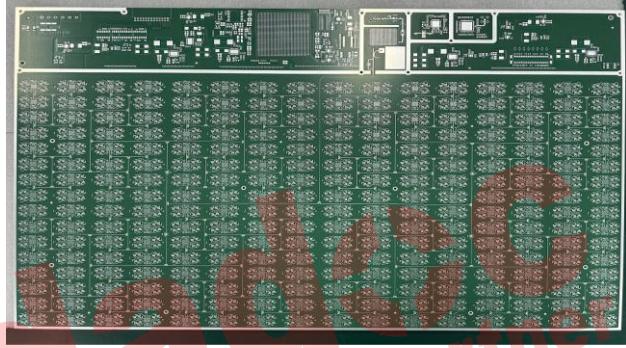


➤ 阶数: 5阶

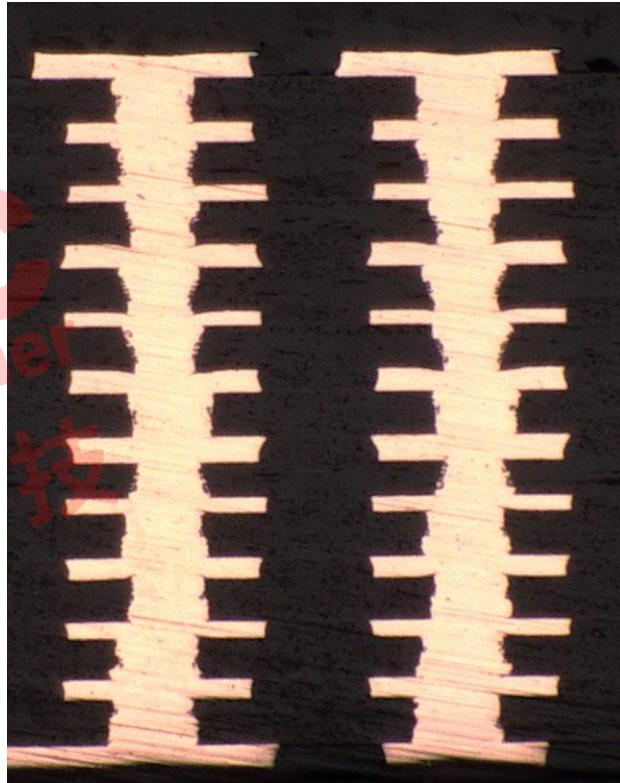
➤ 整体对位: ≤3mil

➤ 激光盲孔对位: ≤1.5mil

激光孔叠埋盲孔



Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			40	阻焊 绿色 太阳 PSR-2000-GT601HF 无卤
GTL		1/3oz+plating	41.8	HVL
			74.2	PP R-568Y(GT) 1078 RC66%
L2		1/3oz+plating	29.7	HVL
			74.3	PP R-568Y(GT) 1078 RC66%
L3		1/3oz+plating	24.4	HVL
			74.2	PP R-568Y(GT) 1078 RC66%
L4		1/3oz+plating	29.7	HVL
			74.4	PP R-568Y(GT) 1078 RC66%
L5		1/3oz+plating	24.4	HVL
			73.6	PP R-568Y(GT) 1078 RC66%
L6		1oz	38.2	
			75	CCL R-578Y(GT) 0.075mm(不含铜) 1/1c
L7		1oz	38.2	
			71.8	PP R-568Y(GT) 1078 RC66%
L8		1/3oz+plating	24.4	HVL
			74.8	PP R-568Y(GT) 1078 RC66%
L9		1/3oz+plating	29.7	HVL
			73.4	PP R-568Y(GT) 1078 RC66%
L10		1/3oz+plating	24.4	HVL
			74.1	PP R-568Y(GT) 1078 RC66%
L11		1/3oz+plating	29.7	HVL
			74	PP R-568Y(GT) 1078 RC66%
GBL		1/3oz+plating	41.8	HVL
GBS			40	阻焊 绿色 太阳 PSR-2000-GT601HF 无卤
Total				1.27mm
压合厚度: $1.131 \pm 0.11\text{mm}$		成品板厚: $1.27 \pm 0.127\text{mm}$		



➤ 阶数: 6阶 (任意阶)

➤ 整体对位: $\leq 2\text{mil}$

➤ anylayer

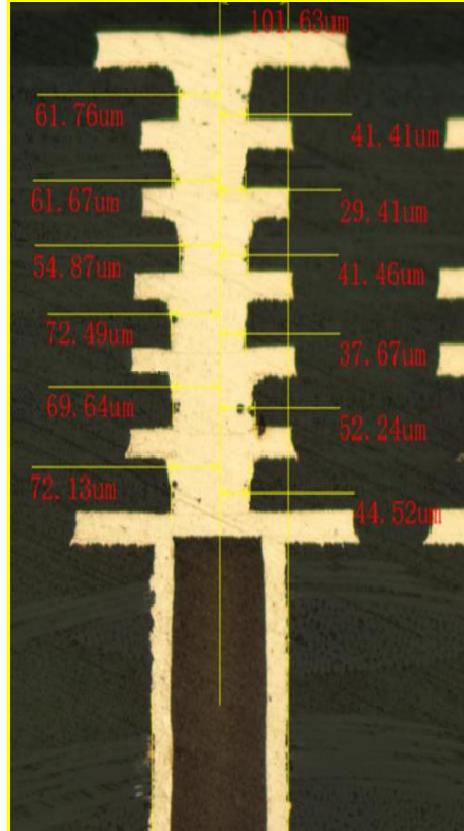
高阶HDI技术

	Foil	Thk (um)	Name
GTS		35	阻焊 绿色太阳 PSR-4000 SP08
---GTL	1/3oz+plating	31	
		61.1	PP EM-398 106 RC75%
---L2	1/3oz+plating	21	
		53.3	PP EM-398 106 RC75%
---L3	1/3oz+plating	21	
		61.7	PP EM-398 106 RC75%
---L4	1/3oz+plating	21	
		54.8	PP EM-398 106 RC75%
---L5	1/3oz+plating	21	
		61.7	PP EM-398 106 RC75%
---L6	1/3oz+plating	21	
		58.9	PP EM-398 106 RC75%
L7	Haz	38	
玉	Haz	533	CCL EM-390 0.533mm(不含铜)
L8	Haz	38	
		59.3	PP EM-398 106 RC75%
---L9	1/3oz+plating	21	
		61.7	PP EM-398 106 RC75%
---L10	1/3oz+plating	21	
		55.4	PP EM-398 106 RC75%
---L11	1/3oz+plating	21	
		61.7	PP EM-398 106 RC75%
---L12	1/3oz+plating	21	
		55.6	PP EM-398 106 RC75%
---L13	1/3oz+plating	21	
		61.7	PP EM-398 106 RC75%
---GBL	1/3oz+plating	31	
GBS		35	阻焊 绿色太阳 PSR-4000 SP08
Total: 1.658mm			

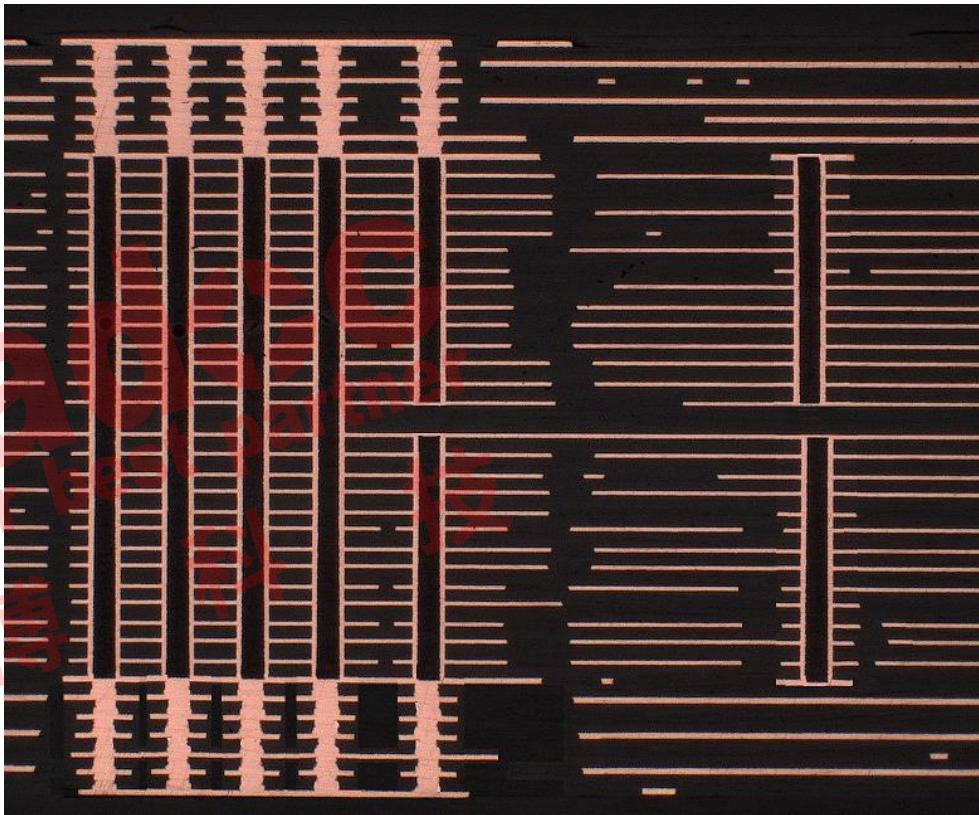
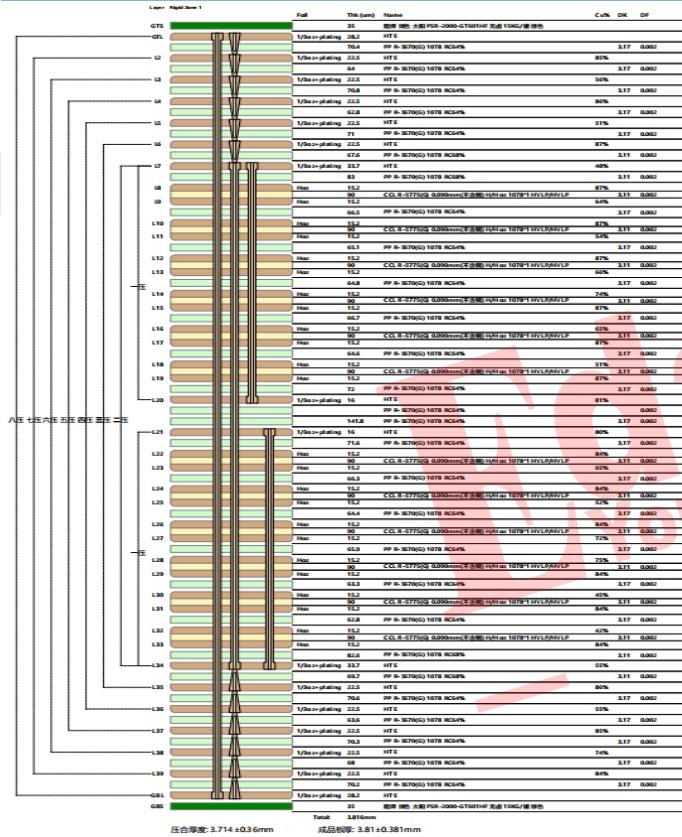
➤ 阶数: 6阶



➤ 整体对位: ≤1mil



➤ 填孔激光盲孔叠机械埋孔



➤ 阶数: 6阶 (40层: 6+28+6)

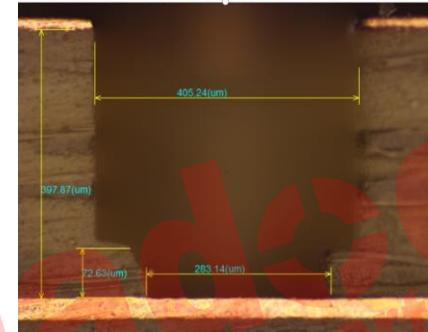
➤ 整体对位: $\leq 1.5\text{mil}$

➤ 填孔激光盲孔叠机械埋孔

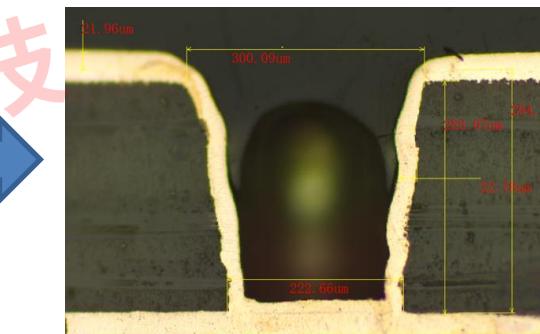
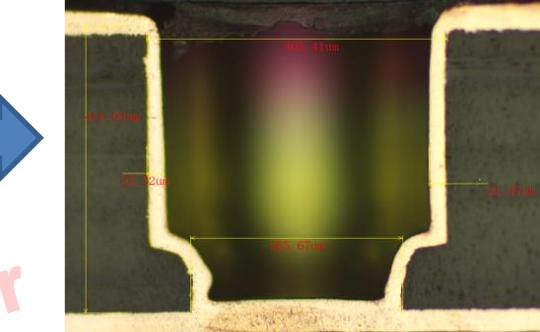
➤ 内层N+N(14+14)

Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			40	阻焊绿色 太阳 PSR-4000S
GTL		Hoz+plating	40	
			100.4	PP R-5670(G) 1078 RC72
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 RC72
GBL		Hoz+plating	40	
GBS			40	阻焊绿色 太阳 PSR-4000S

电镀前切片图



电镀后切片图



➤ 孔径: 400um

➤ 深度: 400um

➤ 厚径比: 1:1

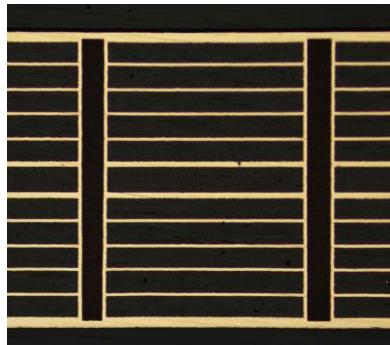
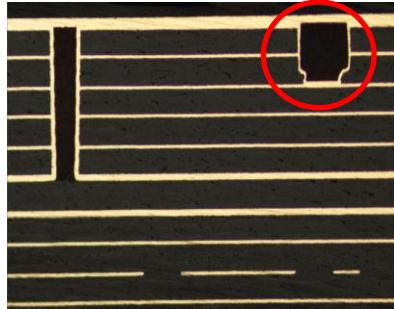
➤ 机械孔深与激光盲孔对位精度: ≤0.5 mil

Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			50	阻焊 绿色 太阳 PSR-2000-GT601†
GTL			1/3oz+plating	59
L2				PP R-5670(G) 1035 RC70%
L3				111.8 PP R-5670(G) 1035 RC70%
	压			Hoz 15
				127 CCL R-5775(G) 0.127mm(不含铜)
				Hoz 15
L4				PP R-5670(G) 1035 RC70%
L5				110.1 PP R-5670(G) 1035 RC70%
	压			Hoz 15.2
				127 CCL R-5775(G) 0.127mm(不含铜)
L6				Hoz 15.2
	压			PP R-5670(G) 1035 RC70%
				111.9 PP R-5670(G) 1035 RC70%
			1/3oz+plating	28.4
				PP R-5670(G) 1080 RC64%
L7				146.1 PP R-5670(G) 1080 RC64%
	压			1/3oz+plating 28.4
				PP R-5670(G) 1035 RC70%
				112.2 PP R-5670(G) 1035 RC70%
L8				Hoz 15.2
L9				127 CCL R-5775(G) 0.127mm(不含铜)
	压			Hoz 15.2
L10				PP R-5670(G) 1035 RC70%
L11				110.1 PP R-5670(G) 1035 RC70%
	压			Hoz 15
				127 CCL R-5775(G) 0.127mm(不含铜)
GBL				Hoz 15
GBS				PP R-5670(G) 1035 RC70%
			1/3oz+plating	111.5 59
				PP R-5670(G) 1035 RC70%
				50 阻焊 绿色 太阳 PSR-2000-GT601†
Total				1.617mm
压合厚度: 1.523±0.15mm				
成品板厚: 1.6±0.16mm				

➤ N+N: 6+6

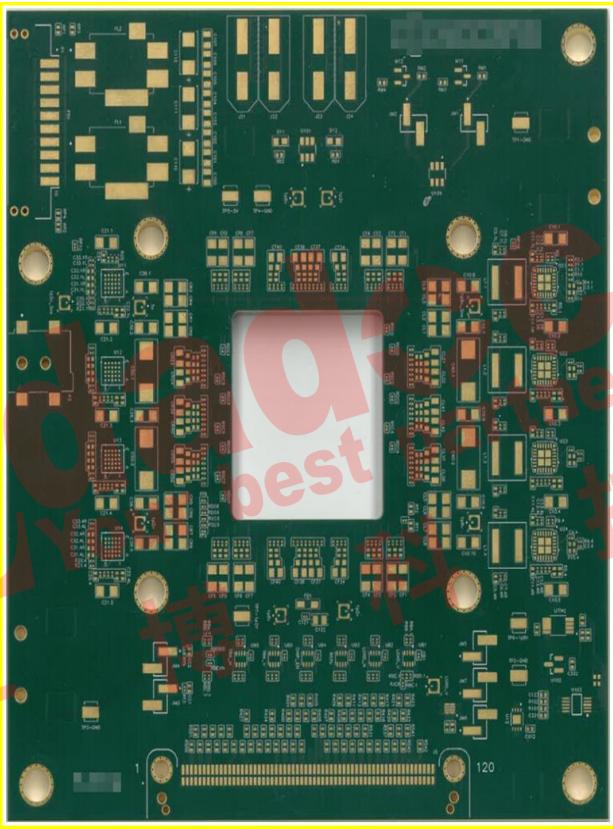
➤ 深V孔: 350um

➤ 厚径比: 0.8:1



机械盲埋孔+激光盲孔技术

Layer	Right Zone 1	Foil	Thk (um)	Name	Cu%	DK	DF
GTS			50	聚酰亚胺PSR-2000-GT601HF 先走15Kg/镀镍	0%		
G1		1/2oz+plating	42.3		0%		
L1		55.6	PP R-5070(G) 1055 RC75%		2.98	0.002	
Hoz		47.7	400	CCL R-5775(G 0.40mm(不含锡) H/Hoz 3.13 34 HVLP/HVLP	74%	3.31	0.002
L3		47.7	PP R-5070(G) 1057 RC72%		76%		
L4		70.1	PP R-5070(G) 1057 RC72%		3.01	0.002	
Hoz		13	400	CCL R-5775(G 0.40mm(不含锡) H/Hoz 3.13 34 HVLP/HVLP	76%	3.31	0.002
L5		13	50.4	PP R-5070(G) 1055 RC70%		3.05	0.002
L6		13	50	CCL R-5775(G 0.25mm(不含锡) H/Hoz 1055 RC75% HVLP/HVLP	72%	3.16	0.002
L7		13	50.5	PP R-5070(G) 1055 RC70%		77%	
L8		13	50	CCL R-5775(G 0.25mm(不含锡) H/Hoz 1055 RC75% HVLP/HVLP	3.05	0.002	
L9		13	50.6	PP R-5070(G) 1055 RC70%		71%	
L10		13	50.8	PP R-5070(G) 1055 RC70%		77%	
L11		13	50	CCL R-5775(G 0.25mm(不含锡) H/Hoz 1055 RC75% HVLP/HVLP	75%	3.16	0.002
L12		13	50.9	PP R-5070(G) 1055 RC70%		77%	
L13		13	50	CCL R-5775(G 0.25mm(不含锡) H/Hoz 1055 RC75% HVLP/HVLP	76%	3.16	0.002
L14		13	50.6	PP R-5070(G) 1055 RC70%		74%	
L15		13	50.8	CCL R-5775(G 0.25mm(不含锡) H/Hoz 1055 RC75% HVLP/HVLP	77%	3.16	0.002
L16		13	50.6	PP R-5070(G) 1055 RC70%		77%	
L17		13	50	CCL R-5775(G 0.25mm(不含锡) H/Hoz 1055 RC75% HVLP/HVLP	3.05	0.002	
L18		13	50.6	PP R-5070(G) 1055 RC70%		74%	
L19		13	50	CCL R-5775(G 0.25mm(不含锡) H/Hoz 1055 RC75% HVLP/HVLP	3.16	0.002	
L20		13	50.8	PP R-5070(G) 1055 RC70%		77%	
L21		13	50	CCL R-5775(G 0.25mm(不含锡) H/Hoz 1055 RC75% HVLP/HVLP	3.16	0.002	
L22		13	50.6	PP R-5070(G) 1055 RC70%		74%	
L23		13	50	CCL R-5775(G 0.25mm(不含锡) H/Hoz 1055 RC75% HVLP/HVLP	77%	3.16	0.002
L24		13	50.2	PP R-5070(G) 1055 RC70%		3.05	0.002
L25		13	400	CCL R-5775(G 0.40mm(不含锡) H/Hoz 3.13 34 HVLP/HVLP	74%	3.31	0.002
L26		400	47.7	PP R-5070(G) 1057 RC72%		3.01	0.002
L27		400	47.7	PP R-5070(G) 1057 RC72%		74%	
GTS		400	55.6	PP R-5070(G) 1055 RC75%		2.98	0.002
		1/2oz+plating	42.3		0%		
		50	聚酰亚胺PSR-2000-GT601HF 先走15Kg/镀镍				
		Total	3.307 ± 0.32mm	成品板厚: 3.4 ± 0.34mm			

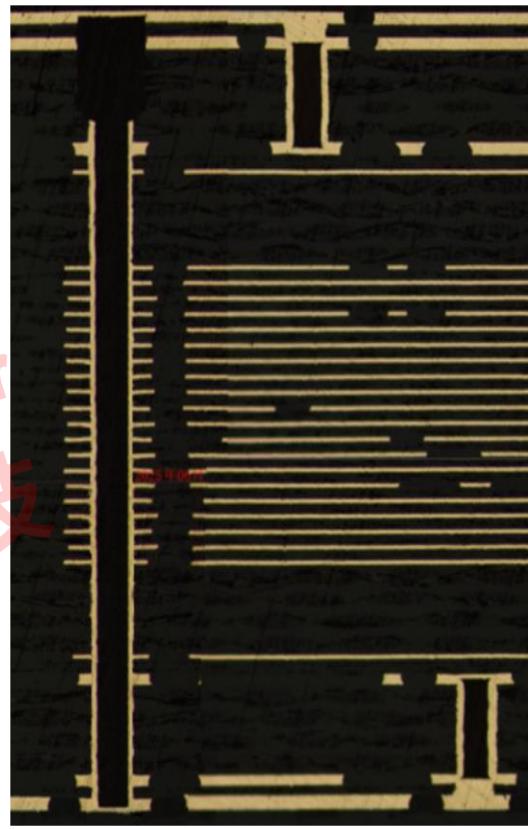


➤ 层数: 28L

➤ 板厚: 3.4mm

➤ 对位要求: 整体<2mil

➤ 盲孔孔径填孔: 200um

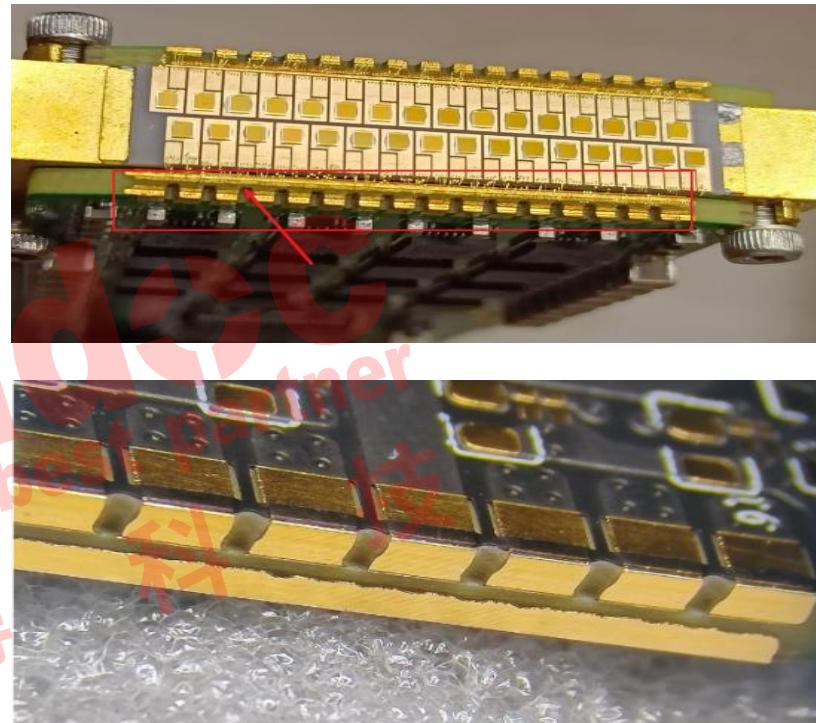


侧壁分层、分段镍钯金

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

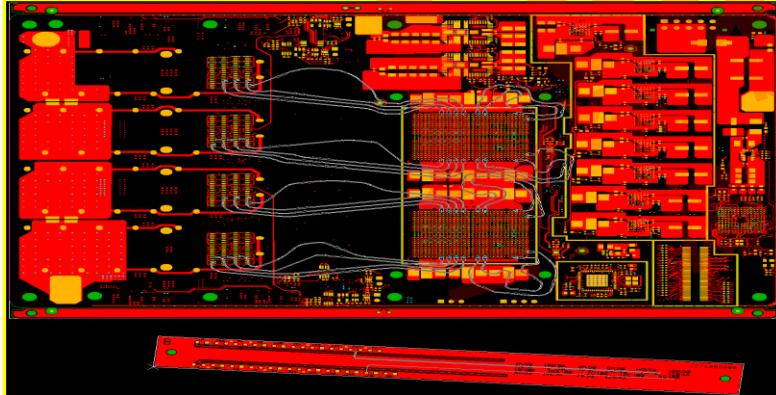
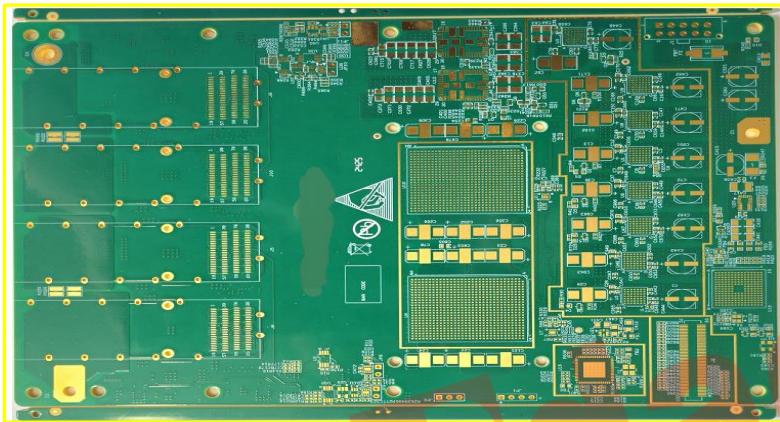
压合厚度: 1.866 ± 0.18 mm

成品板厚: 2 ± 0.2 mm



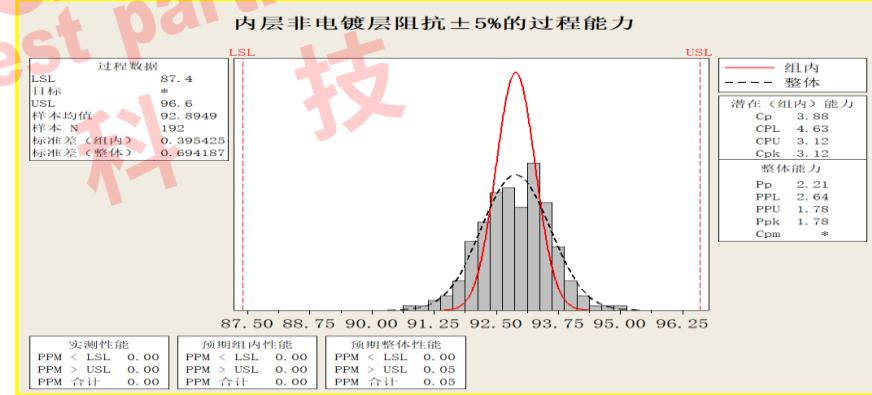
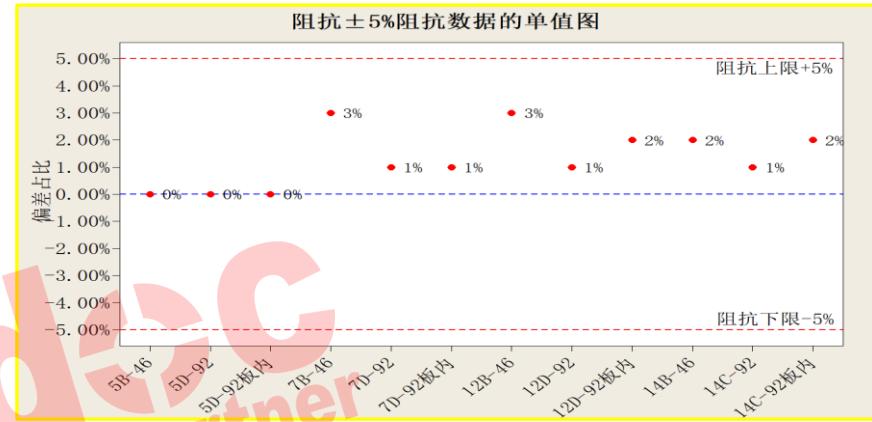
➤ 侧壁分层、分段镍钯金

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

Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			40	阻焊 绿色
GTL		Hoz+plating	42.9	HTE
L2		Hoz	71.9	PP R-567
L3		Hoz	15.2	CCL R-57
L4		Hoz	12.7	PP R-567
L5		Hoz	15.2	CCL R-57
L6		Hoz	107.6	PP R-567
L7		Hoz	12.7	CCL R-57
L8		Hoz	15.2	PP R-567
L9		Hoz	106.5	PP R-567
L10		Hoz	12.7	CCL R-57
L11		Hoz	15.2	PP R-567
L12		Hoz	105.2	PP R-567
L13		1oz	32.2	CCL R-57
L14		Hoz	65	PP R-567
L15		Hoz	66.2	CCL R-57
L16		Hoz	136.8	PP R-567
L17		2oz	66.2	PP R-567
GBL		2oz	65	CCL R-57
GBS		PP R-567	104.8	PP R-567
		Hoz	12.7	CCL R-57
		Hoz	15.2	PP R-567
		Hoz	106.9	PP R-567
		Hoz	12.7	CCL R-57
		Hoz	15.2	PP R-567
		Hoz	107.9	PP R-567
		Hoz	12.7	CCL R-57
		Hoz	15.2	PP R-567
		Hoz+plating	72	PP R-567
		GTS	40	阻焊 绿色
压合厚度: 2.225±0.22mm		成品板厚: 2.35±0.235mm		Total: 2.357mm



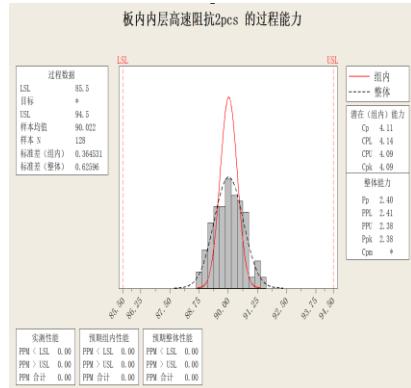
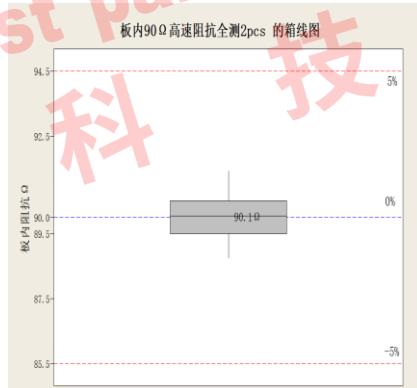
阻抗科邦	公差	阻抗值	偏差
1C-90	±5%	88.03	-2.2%
5B-45	±5%	44.29	-1.6%
5C-90	±5%	87.67	-2.6%
7B-45	±5%	44.46	-1.2%
7C-90	±5%	88.03	-2.2%
12B-45	±5%	45.17	0.4%
12D-90	±5%	89.41	-0.7%
14B-45	±5%	44.58	-0.9%
14D-90	±5%	88.53	-1.6%

➤ 层数: 18L

➤ 材料: M6

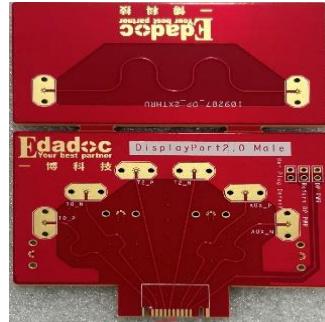
➤ 阻抗要求: +/-5% CPK4.09

➤ 对位要求: <4mil

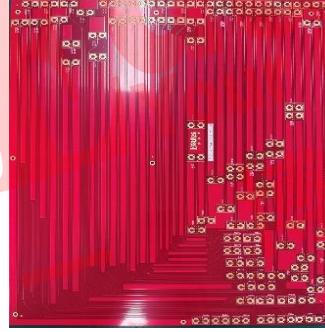


5% 阻抗技术

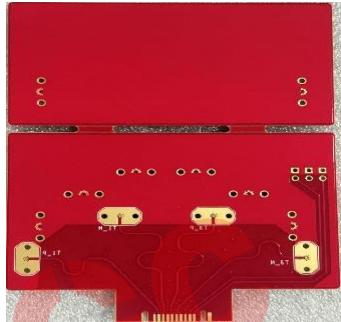
Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			40	阻焊红色 太阳 PSR-4000 RD5 无油 1KG/罐 红色
GTL		Hoz	47.9	
		203	CCL IT-170GRAZTC 0.203mm(不含铜) H/Hoz 3313*2 RTF/RTF	
L2		Hoz	15.2	
		115.6	PP IT-170GRAZB5 2116 RC55%	
L3		1oz	32.2	
		711	CCL IT-170GRAZTC 0.711mm(不含铜) H/Hoz 3313*2 RTF/RTF	
L4		1oz	32.2	
		115.6	PP IT-170GRAZB5 2116 RC55%	
L5		Hoz	15.2	
		203	CCL IT-170GRAZTC 0.203mm(不含铜) H/Hoz 3313*2 RTF/RTF	
GBL		Hoz	47.9	
GTS			40	阻焊红色 太阳 PSR-4000 RD5 无油 1KG/罐 红色
Total:				1.619mm
层合厚度: 1.477±0.14mm		成品板厚: 1.6±0.16mm		



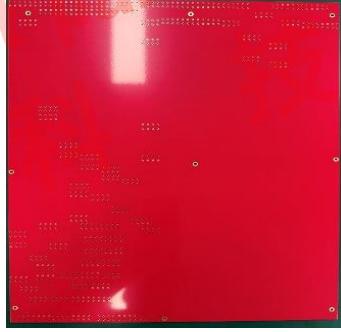
Layer	Rigid Zone 1	Foil	Thk (um)	Name
GTS			40	阻焊红色 太阳 PSR-4000 RD5 无油 1KG/罐 红色
GTL		Hoz	43.9	
		102	CCL IT-170GRAZTC 0.102mm(不含铜) H/Hoz 3313*1 RTF2/RTF2	
L2		Hoz	15.2	
		240.2	PP IT-170GRAZB5 3313 RC60%	
L3		1oz	32.2	
		653	CCL IT-170GRAZTC 0.653mm(不含铜) 1/1oz 2116*6 RTF2/RTF2	
L4		1oz	32.2	
		240.9	PP IT-170GRAZB5 2116 RC57%	
L5		Hoz	15.2	
		102	CCL IT-170GRAZTC 0.102mm(不含铜) H/Hoz 3313*1 RTF2/RTF2	
GBL		Hoz	43.9	
GTS			40	阻焊红色 太阳 PSR-4000 RD5 无油 1KG/罐 红色
Total:				1.601mm
层合厚度: 1.467±0.14mm		成品板厚: 1.6±0.16mm		

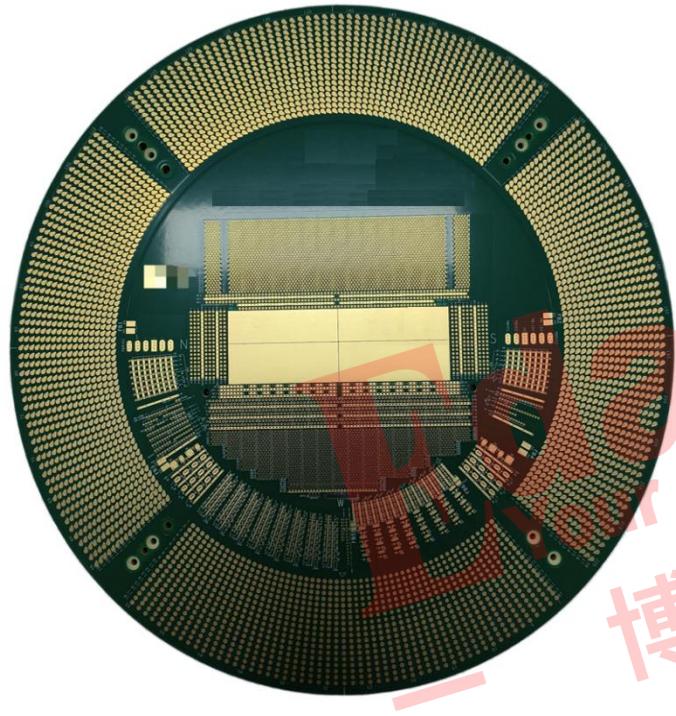


S/N	P/N	LOT	Position	Spec (ohm)	Mean (ohm)	Result	偏移	
1	P0002941	成品板内	1	1B	50	50.94	Pass	2%
1	P0002941	成品板内	1	1B	50	50.74	Pass	1%
1	P0002941	成品板内	1	1B	50	50.94	Pass	2%
1	P0002941	成品板内	1	1B	50	51.12	Pass	2%
1	P0002941	成品板内	1	1B	50	51.55	Pass	3%
1	P0002941	成品板内	1	6B	50	51.29	Pass	3%
1	P0002941	成品板内	1	6B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

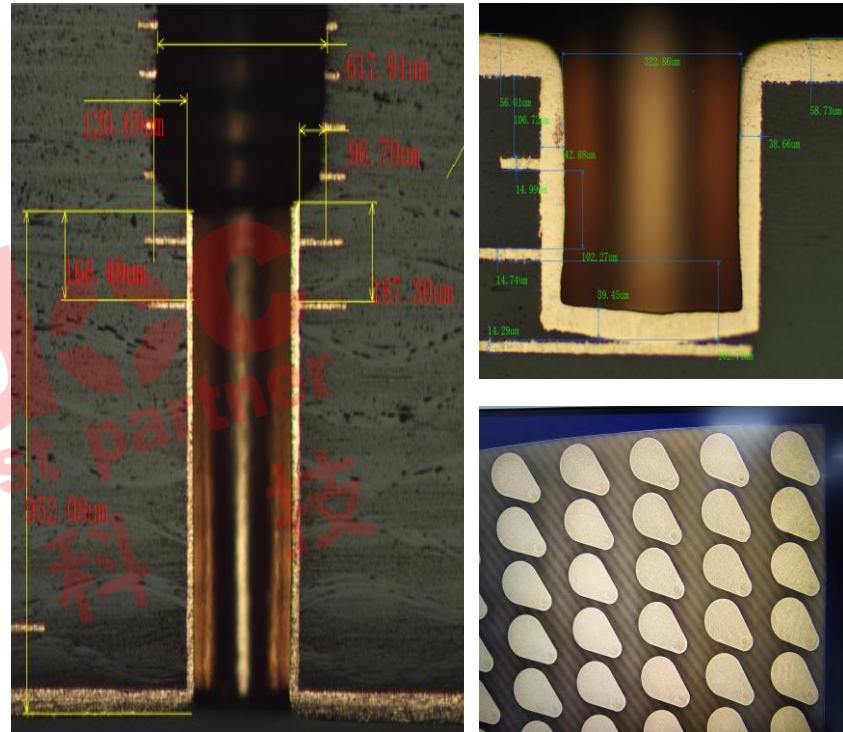


S/N	P/N	LOT	Position	Spec (ohm)	Mean (ohm)	Result	偏移
1	P0002943	0	L1B	85	88.50	Pass	4%
1	P0002943	0	L1B	85	86.86	Pass	2%
1	P0002943	0	L1B	85	88.53	Pass	4%
1	P0002943	0	L1B	85	87.82	Pass	3%
1	P0002943	0	L1B	85	88.26	Pass	4%

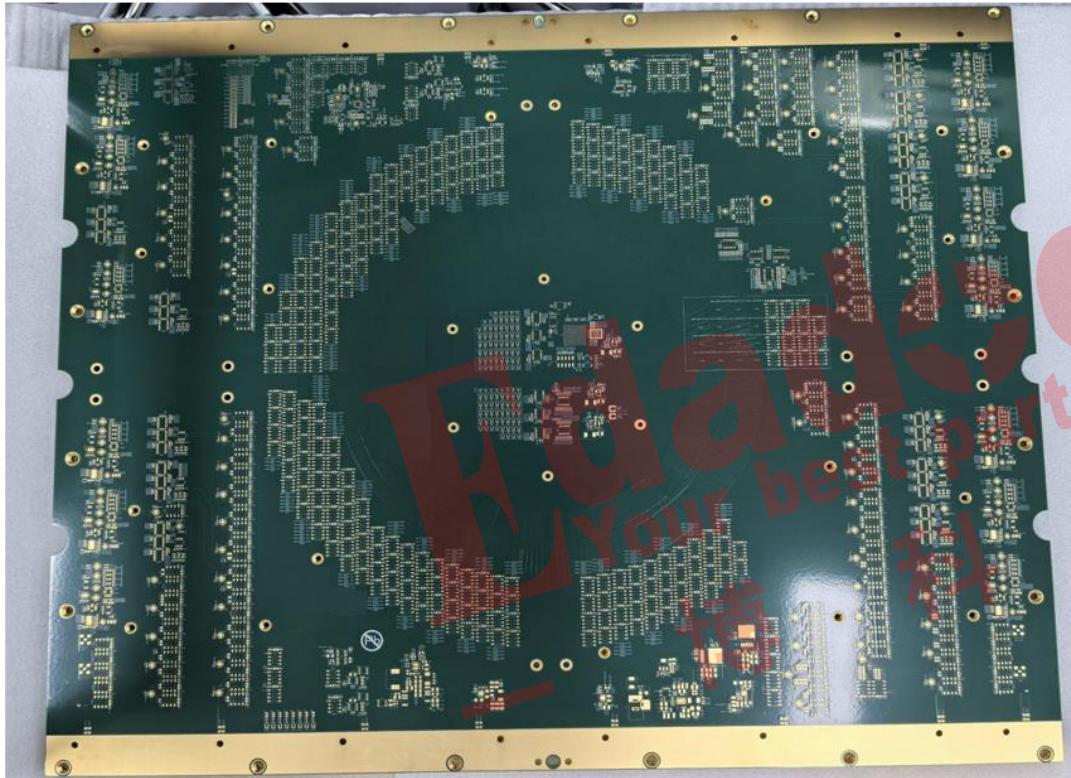




- 交付尺寸: 300mm*300mm
- 钻孔孔径: 0.3mm



- 层数: 58L
- 板厚: 6.3mm
- 平整度: 整板 < 100μm, 中心关键区 < 50μm



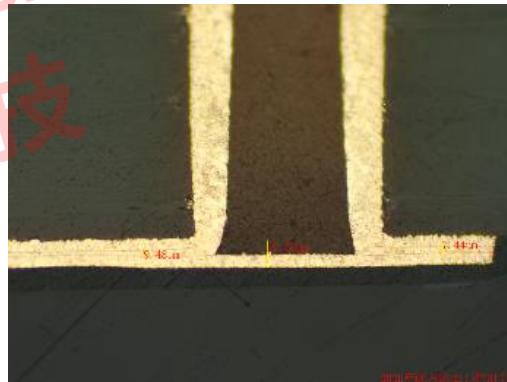
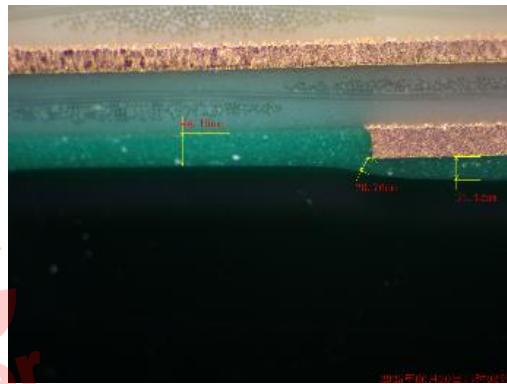
➤ 交付尺寸: 570mm680mm

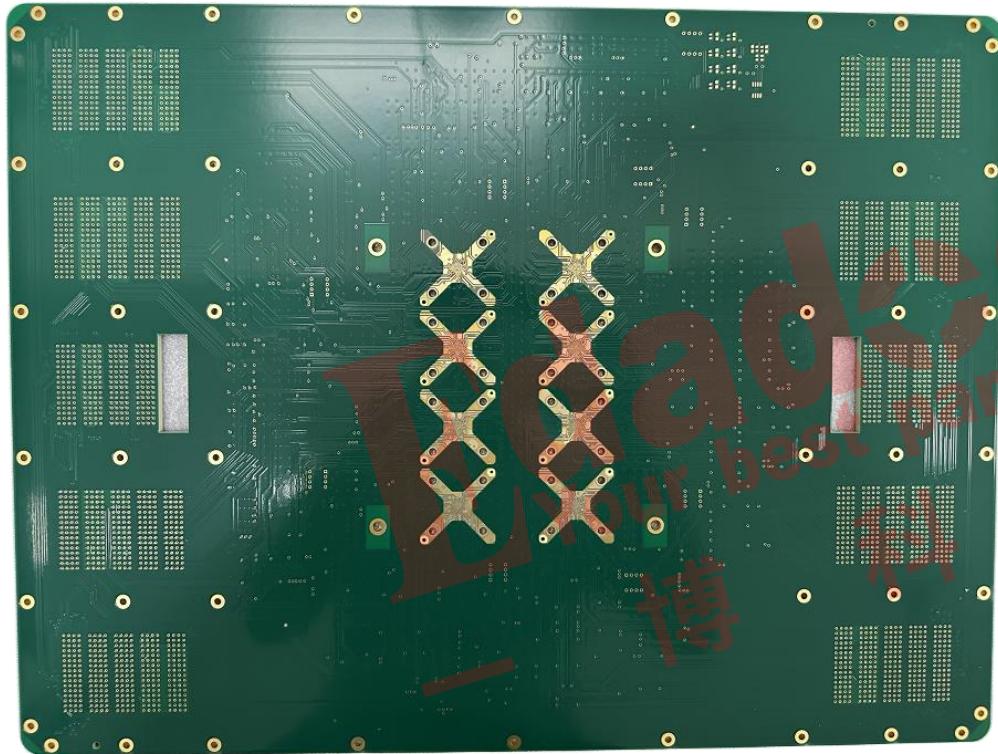
➤ 钻孔孔径: 0.3mm

➤ 层数: 28L

➤ 对接钻精度: $\leq 1\text{mil}$

板厚: 6.0mm



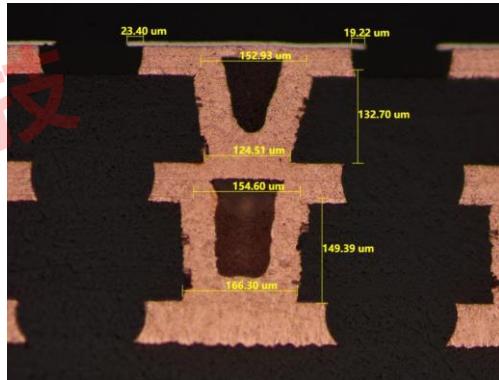
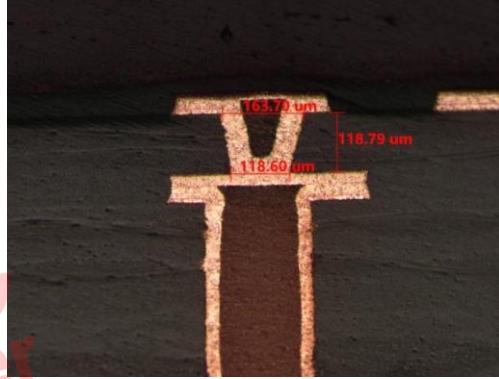


➤ 交付尺寸: 372mm*495mm

➤ 层数: 18L

➤ 钻孔孔径: 0.2mm

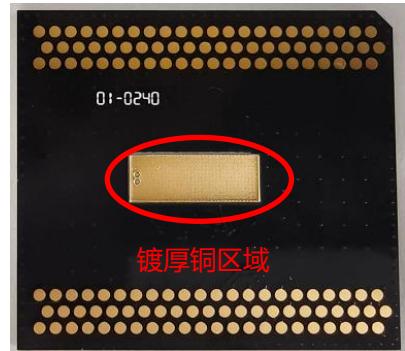
➤ 对接钻精度: $\leq 1\text{mil}$



➤ 板厚: 5.5mm

➤ 悬金: $\leq 30\mu\text{m}$

局部厚铜技术



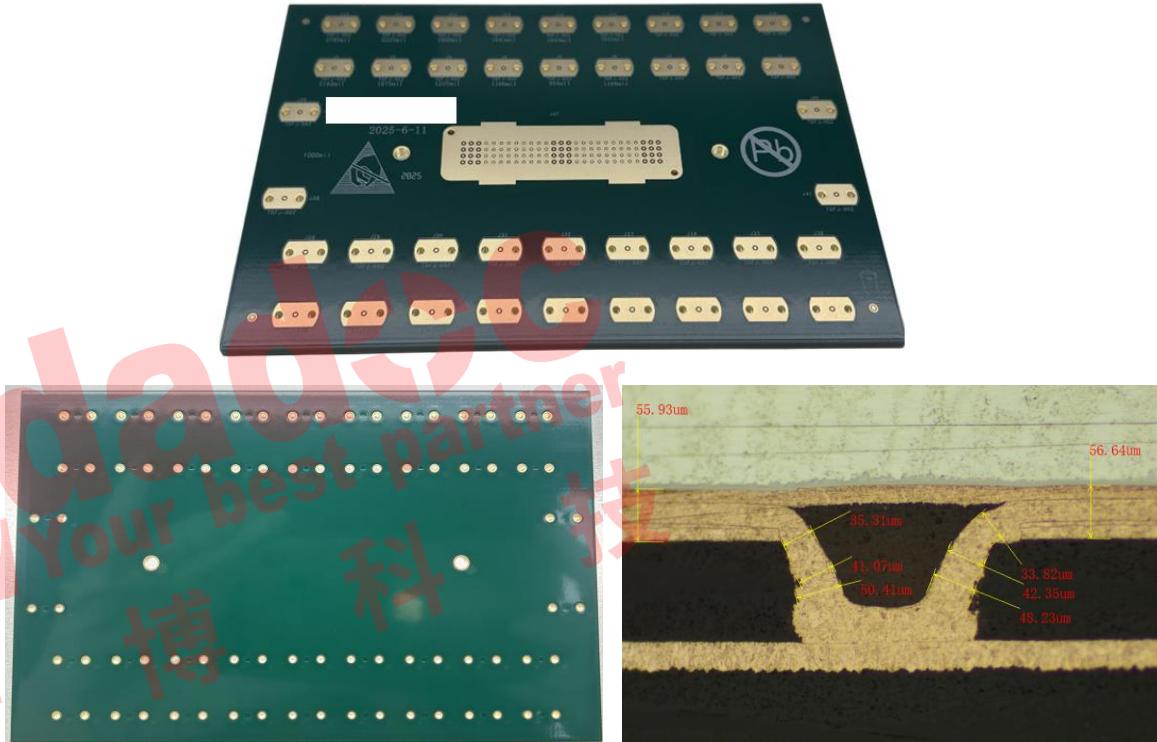
➤ 厚铜区域铜厚: $\geq 2\text{oz}$

➤ 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

GTL	1oz	65.9	
L2	1oz	32.2	CCL S7439C 0.102mm(不含铜) 1/1oz 3313*1 RTF/RTF
	PP S7439CB 2116 RCS5%		
	198.7	PP S7439CB 1080 RCS5%	
L3	1oz	32.2	CCL S7439C 0.102mm(不含铜) 1/1oz 3313*1 RTF/RTF
L4	1oz	42	PP S7439CB 2116 RCS5%
		117.9	PP S7439CB 2116 RCS5%
DL1	1oz	0	CCL IT-180ATC 0.711mm(不含铜) 1/1oz 762*4 HTE/HTE
DL2	1oz	0	PP S7439CB 2116 RCS5%
		711	PP S7439CB 2116 RCS5%
DL3	1oz	0	CCL IT-180ATC 0.711mm(不含铜) 1/1oz 762*4 HTE/HTE
DL4	1oz	0	PP S7439CB 2116 RCS5%
		119	PP S7439CB 2116 RCS5%
L5	1oz	42	CCL S7439C 0.102mm(不含铜) 1/1oz 3313*1 RTF/RTF
L6	1oz	32.2	PP S7439CB 1080 RCS5%
		199.4	PP S7439CB 2116 RCS5%
L7	1oz	32.2	CCL S7439C 0.102mm(不含铜) 1/1oz 3313*1 RTF/RTF
GBL	1oz	65.9	



➤ 材料: S7439C+IT180A混压

➤ 对位: ≤3mil

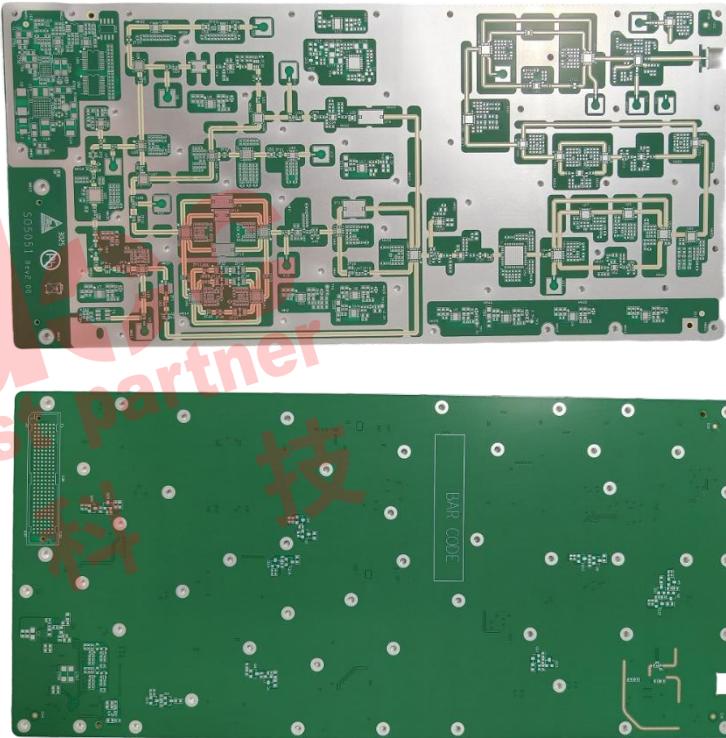
非对称翘曲度: ≤0.75%

高频混压技术

	Foil	Thk (um)	Name
GTS		40	阳焊 喷绿 太阳 PSR-4000 MPHF 无卤 1KG/罐 喷绿
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	
		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	阳焊 喷绿 太阳 PSR-4000 MPHF 无卤 1KG/罐 喷绿
Total:		2.019mm	

压合厚度: $1.879 \pm 0.18\text{mm}$

成品板厚: $2 \pm 0.2\text{mm}$



➤ 材料: RO4350+S1000-2M混压

➤ 对位: $\leq 4\text{mil}$

➤ 非对称翘曲度: $\leq 0.75\%$

高频混压技术

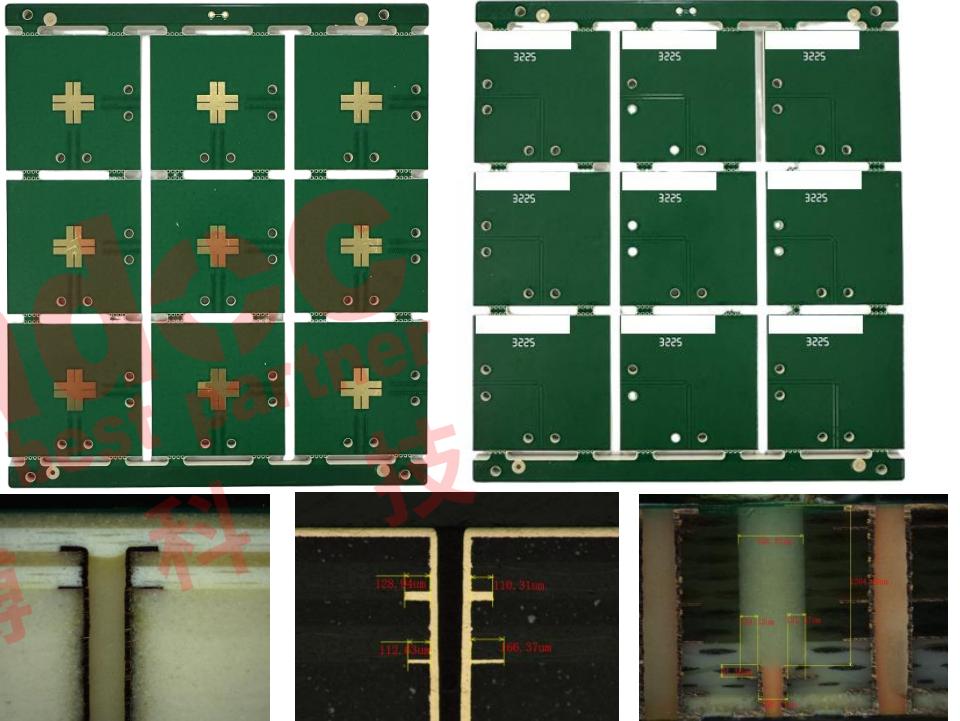
GTL	44.2	Hoz	44.2	CCL RO3003 0.127mm(不含铜)
DL1	127	0oz	0	PP RO4450F 1080 RC80%
	199.3			PP RO4450F 1080 RC80%
L2	40.9	Hoz	40.9	CCL RO3003 1.520mm(含铜) H,
L3	1486			
	15.2	Hoz		
	PP RO4450F 1080 RC80%			
	191.5			PP RO4450F 1080 RC80%
DL2	0oz	0	127	CCL RO3003 0.127mm(不含铜)
L4	40.9	Hoz	40.9	PP RO4450F 1080 RC80%
	170.1			PP RO4450F 1080 RC80%
DL3	0oz	0	127	CCL RO3003 0.127mm(不含铜)
GBL	44.2	Hoz	44.2	

➤ 材料: RO3003+RO4450

➤ 对位: $\leq 3\text{mil}$

➤ 背钻对位:
 $\leq 1\text{mil}$

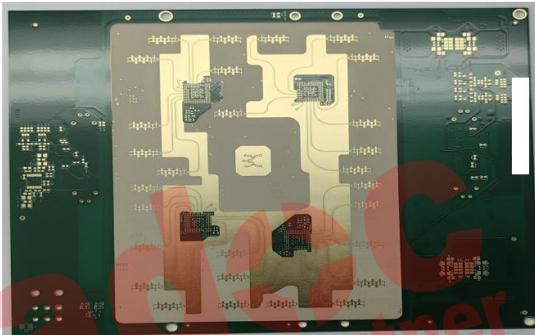
➤ 背钻stub: $\leq 4\text{mil}$



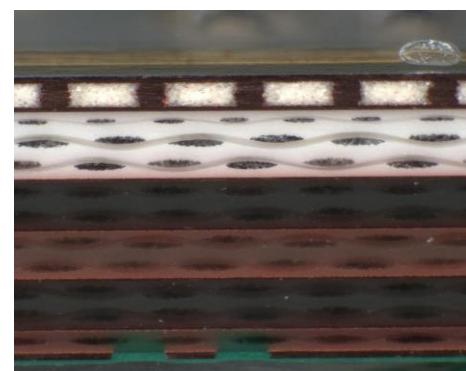
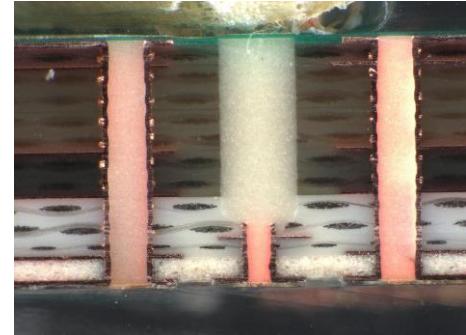
高频混压技术

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

➤ 材料: RO3003+R-5575X+IT180A



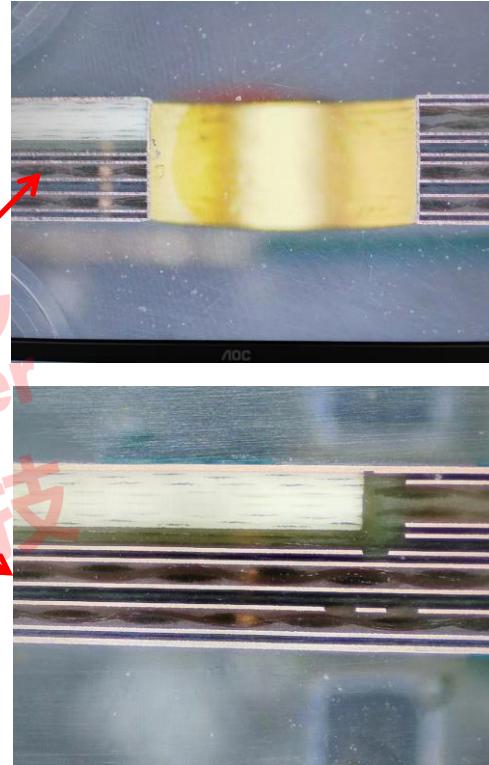
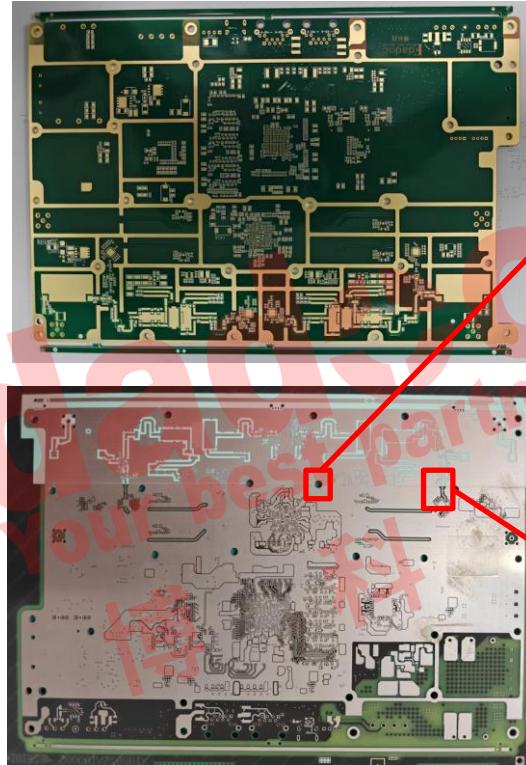
➤ 对位: ≤4mil



➤ 背钻stub: ≤4mil

局部混压技术

Layer	Rigid Zone 1	Foil	Thk (um)
GTS			40
GTL		1oz+plating	43.7
L2			80.4
L3		1oz	32.2
	压		200
L4		1oz	32.2
L5		1oz	32.2
	压		159.3
L6		1oz	32.2
	压		200
L7		1oz	32.2
	压		32.2
L8		1oz	360
	压		32.2
L9		1oz	32.2
	压		76.1
GBL		1oz+plating	43.7
GBS			40
压合厚度: $1.708 \pm 0.16\text{mm}$		成品	
Total: 1.81mm			

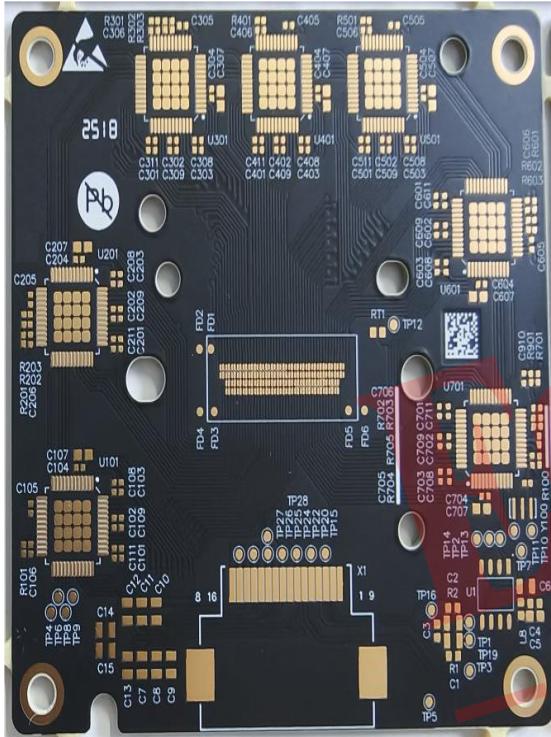


➤ 材料: S1000-2M+RO4350B混压

➤ 对位: $\leq 3\text{mil}$

高度差: $\leq 20\text{um}$

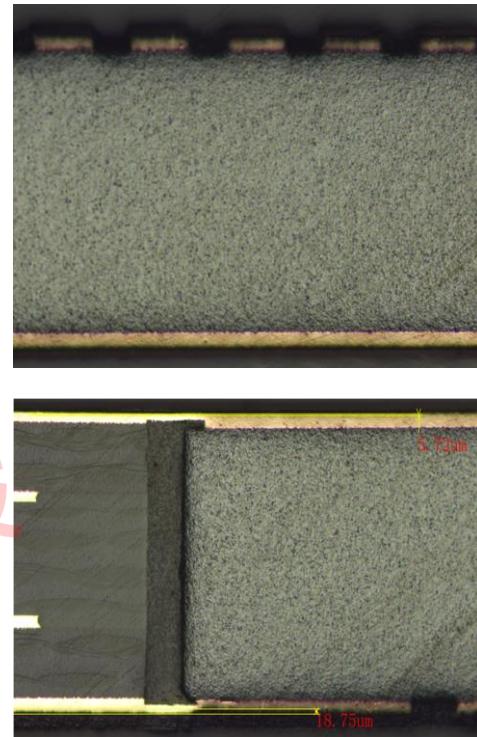
埋陶瓷技术



➤ 阻焊开窗位置精度: 12um CPK1.67

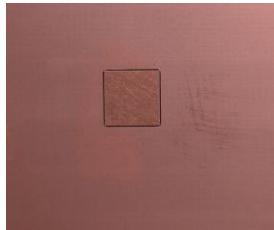


➤ 槽孔尺寸精度: ±35um CPK1.67



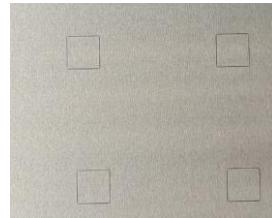
➤ 陶瓷基表面高度差: <±20μm

埋 嵌 铜 技 术

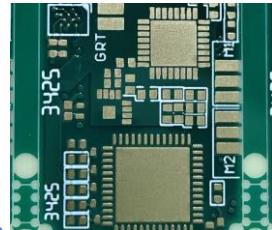


外观图

压合前



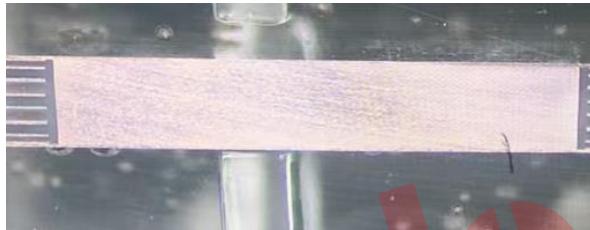
压合后



成品图

➤ 工艺：嵌入式（PP压合）

➤ 铜基尺寸: 7*7mm&8*8mm

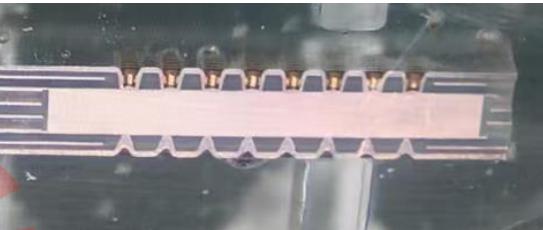


直通式切片图

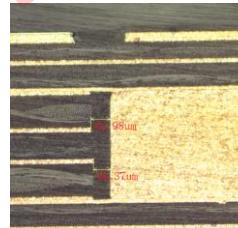


➤ 结构：直通式&埋入式

➤ 铜基与激光盲孔同层共存



埋入式切片图

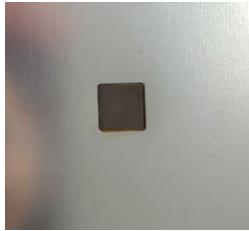


➤ 铜基高度差： $\leq 15\mu\text{m}$

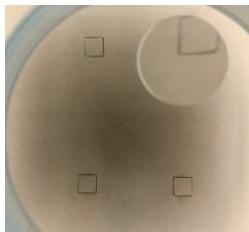
➤ 铜基对位: $\leq 2\text{ mil}$

埋 嵌 铜 技 术

外观图

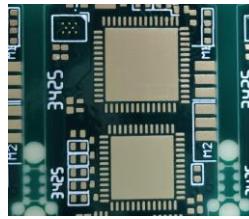


塞树脂前



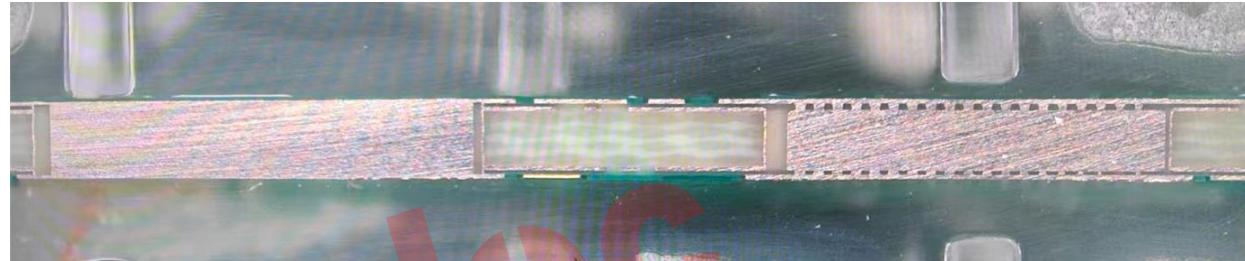
塞树脂后

成品图



- 工艺：塞入式（树脂黏合）
- 铜基尺寸：5*5mm&6*6mm

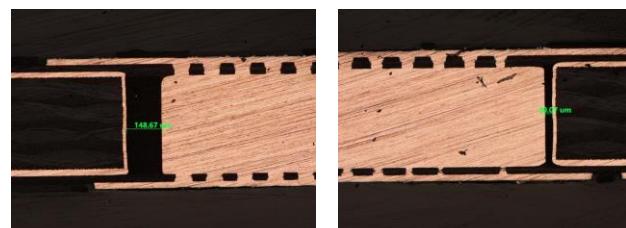
直通式切片图



埋入式切片图



- 结构：直通式&埋入式
- 铜基叠激光盲孔填平



- 铜基高度差：≤20um
- 铜基对位：≤3mil



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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



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

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	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: 0.50Z:65/65um 10Z:75/75um 外层: 1/30Z+plating:过程面铜 ≤45um: 60/60um 0.50Z+plating:过程面铜 ≤55um: 70/70um	内层: 0.50Z:60/60um 10Z:60/70um 外层: 1/30Z+plating:过程面铜 ≤45um: 60/60um 0.50Z+plating:过程面铜 ≤55um: 70/70um	内层: 0.50Z:50/50um 10Z:60/60um 外层: 1/30Z+plating:过程面铜 ≤45um: 60/60um 0.50Z+plating:过程面铜 ≤55um: 70/70um	内层: 0.50Z:50/50um 10Z:60/60um 外层: 1/30Z+plating:过程面铜 ≤45um: 60/60um 0.50Z+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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