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HA50(铝基板)

产品简介/ Product description

华正新材铝基板具有高导热性、高耐热性、良好的电绝缘性和极佳的环境可靠性的特点，其导热系数为传统覆铜板的4-15倍。采用该基板制作的PCB能将电子元件产生的热量经由基板结构，快速传导至后端散热基座或其他散热模组。其结构由铜箔电路层、导热绝缘层以及金属基板所组成，导热层是由特殊的高分子树脂和导热填充料制作而成，相关产品已通过多项苛刻的长时间环境测试，获得国际认证。

华正新材拥有强大的研发实力，相续开发出多款高性能铝基板产品。热导率为 $1.0\sim 5.0\text{ W/m}\cdot\text{K}$ ，可满足中高端产品需求，性价比高。所有产品均通过RoHS等国际规范的禁用物质检验，兼顾良好的产品特性与低碳环保之趋势。

Thermal conduct Al-Substrate CCL provides the advantages of high thermal conductivity, Excellent solder heat endurance, Excellent Breakdown Voltage, reliability, Thermal Conductivity is about four~ fifteen times higher than the FR-4, PCB produced by the substrate can transfer heat, which is electronic components generate, throughing the substrate structure rapid conduct to the back-end cooling base or other cooling modules. Al-Substrate CCL is a sandwich structure, which includes layers of conductor, insulator and metal base. In general, this insulator is made of epoxy resin and high thermal Conductivity filler. The products have been through a number of demanding for a long time environmental testing, access to international certification. Huazheng new material has a strong R&D strength, which continued to develop avariety of high Thermal Conductivity products. Thermal conductivity $1.0\sim 5.0\text{ W/m}\cdot\text{K}$, It can fit the demand of high end and mid-range products, with high cost performance. All products pass RoHS standard, have good property andmeet low-carbon environmental trend.

特性/ Features

优异的散热性能	Excellent thermal conductivity
电气绝缘性能佳	Excellent Breakdown Voltage
符合RoHS要求	RoHS compliance
良好的耐热性能	Excellent solder heat endurance
良好的机械加工性能	Excellent mechanical properties
电磁屏蔽性能	Excellent electromagnetic shielding
可直接外接散热装置	Can use external cooling device directly
优良的性价比	High cost performance

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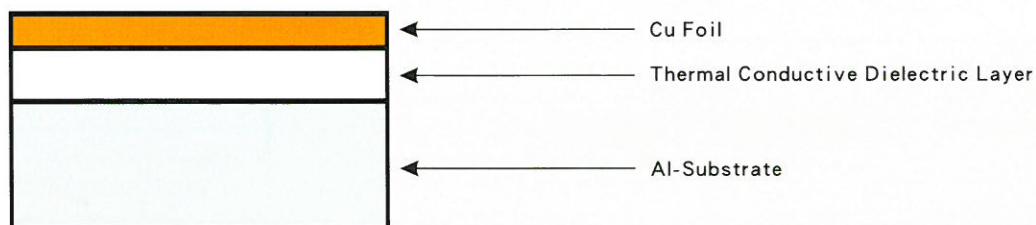
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基本结构/ Basic Structure

典型结构

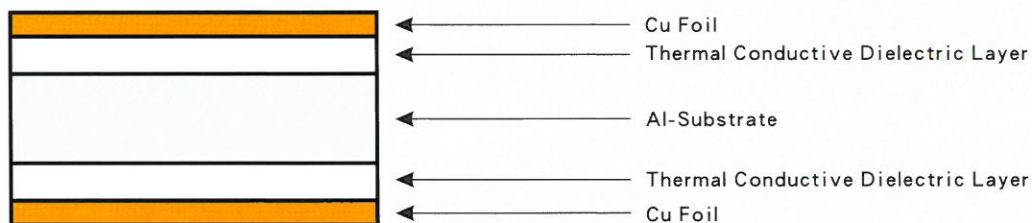


单面铝基板Single Al-Substrate CCL



单面铝基板产品能够针对各种铜厚、绝缘层特性、铝板规格需求，提供符合客户要求的高性能产品；
Single Al-Substrate CCL offers various kinds of aluminum alloy plate, copper foil, and dielectric layers to meet the general requirement of single layer thermal conductive printed circuit board

双面铝基板Double Al-Substrate CCL



双面铝基板产品其为导热绝缘层双面黏贴铜箔的结构，适用于一般用途多层板。

Double Al-Substrate CCL is good for general requirement of multilayer or thinner shape printed circuit board. A-CCL is a sandwich structure, which includes layers of copper foil, thermal conductive dielectric layer.

说明 / Instruction

导电层—电解铜箔 / Circuit Layer Electrolysis copper foil

导热绝缘层—以最小的热阻提供电学上的绝缘，分为玻璃布增强型和无玻璃布增强型两种

Thermally Conductive Dielectric Layer This offers electrical isolation with minimum thermal resistance. two types: Fiberglass support & non-fiberglass support.

铝基层—是整个结构的支撑和热量的发散，材料为铝合金板

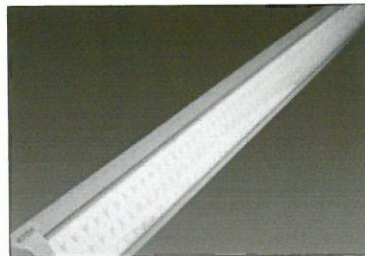
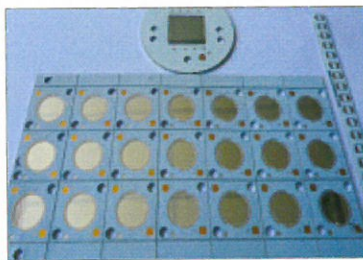
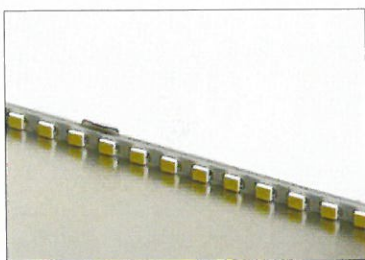
Aluminum Substrate It supports the entire structure and conducts the heat. The material is aluminum alloy plate.

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应用领域 / Application

照明、LED显示	LED lighting、Public lighting、Backlight module、outdoor LED display
汽车应用	Automotive (Vehicle lighting、regulator、converters、Power module)
工业电子	Industrial electronics (DC-DC converter、Power supplies、Solid-State Relays transistor modules)
通讯产品	Digital、PC、Audio
需要高散热的领域	The area needs high heat dissipation



产品分类 / Type

Type1: 普通型, 一般应用在家用照明、户外显示屏、背光源领域
General purpose. It is used widely in consumer lighting、outdoor LED display and backlight applications

Type2: 标准导热型, 广泛应用在公用照明、通讯、数码、汽车应用领域
Standard thermal conductivity. It is used in public lighting、Digital、PC、Audio、Automotive applications

Type3: 高导热型, 应用在高亮度LED、汽车应用、工业电子领域
High thermal conductivity. It is used in high power LED lighting、Automotive applications、Industrial electronics

Type4: 高导热低热阻型, 可使用需要高导热及高功率方面
High thermal conductivity、Low thermal resistance. It is used in high power applications

Type5: 高韧性型, 具有良好的折弯性能, 应用在非平面空间领域;
High toughness. It is used in the field of no-plat, with good bending properties.

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主要性能 Main property

项目 Item	处理条件 Test condition	单位 Units	指标值 Spec	典型值 Typical Value				
				类型1 Type1	类型2 Type2	类型3 Type3	类型4 Type4	类型5 Type5
				1.0瓦	1.5瓦	2.0瓦	3.0瓦	2.0瓦
热阻* Note 1 thermal resistance	ASTM E1461	K.m ² /W	< 1.0	0.77	—	—	—	—
			< 0.7	—	0.61	—	—	—
			< 0.5	—	—	0.41	—	0.41
			< 0.4	—	—	—	0.33	—
热导率* Note 1 Thermal Conductivity	ASTM E1461	W/ m.K	≥ 1.0	1.1	—	—	—	—
			≥ 1.5	—	1.6	—	—	—
			≥ 2.0	—	—	2.2	—	2.2
			≥ 3.0	—	—	—	3.0	—
剥离强度 10Z Peel Strength	热应力前	N/mm	≥ 1.2	1.82	1.83	1.80	1.75	1.80
	热应力后			1.75	1.73	1.76	1.70	1.76
热应力 Thermal Stress	288℃, solder dip	S	≥ 120	180S No delamination				
	300*10s/cycle solder dip	Cycle	≥ 6次	6次No delamination				
表面电阻 Surface Resistivity	C96/35/90	MΩ	≥ 10 ⁴	10 ⁶	10 ⁶	10 ⁶	10 ⁶	10 ⁶
	E-24/125		≥ 10 ³	10 ⁵	10 ⁵	10 ⁵	10 ⁵	10 ⁵
体积电阻 Volume Resistivity	C96/35/90	MΩ·cm	≥ 10 ⁶	10 ⁷	10 ⁷	10 ⁷	10 ⁷	10 ⁷
	E-24/125		≥ 10 ³	10 ⁵	10 ⁵	10 ⁵	10 ⁵	10 ⁵
击穿电压 (AC) * Note 2 空气环境 Dielectric Breakdown	IPC-TM-650 2.5.6.2	KV	≥ 3 100μm	4.3	4.3	4.3	4.3	4.3
			≥ 4 125μm	5.0	5.0	5.0	—	—
			≥ 5 150μm	6.0	6.0	6.0	—	—
介电常数 (1MHz) Dielectric Constant	C 24/23/50	—	—	5.1	5.3	5.5	5.8	5.5
	IPC-TM-650 2.5.5.2							
耐电弧 Arc Resistance	D48/50+ D0.5/23	S	≥ 60	120	120	120	120	120
	IPC-TM- 650 2.5.1							
燃烧性 Flammability	E-24/125	—	V-0	V-0	V-0	V-0	V-0	V-0
玻璃化温度 T _g	DSC	℃	≥ 110	121.2	122.6	121.8	122.3	121.8
热分解温度T _d	TGA(Wt5%loss)	℃	≥ 360	400	400	400	400	400
吸水率 Water Absorption	D-24/23	%	≤ 1.5	0.51	0.43	0.56	0.49	0.56
	IPC-TM-650 2.6.2.1							
CTI	IEC60112	V	≥ 600	600	600	600	600	600

上述测试数据为典型值而非保证值。

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备注1

热阻试样采用铝合金板厚度1.0mm、铜箔厚度35 μ m、绝缘层厚度75 μ m的铝基板试样测试并计算所得（引用标准：CPCA4105-2010《印制电路用金属基覆铜箔层压板》行业标准）。

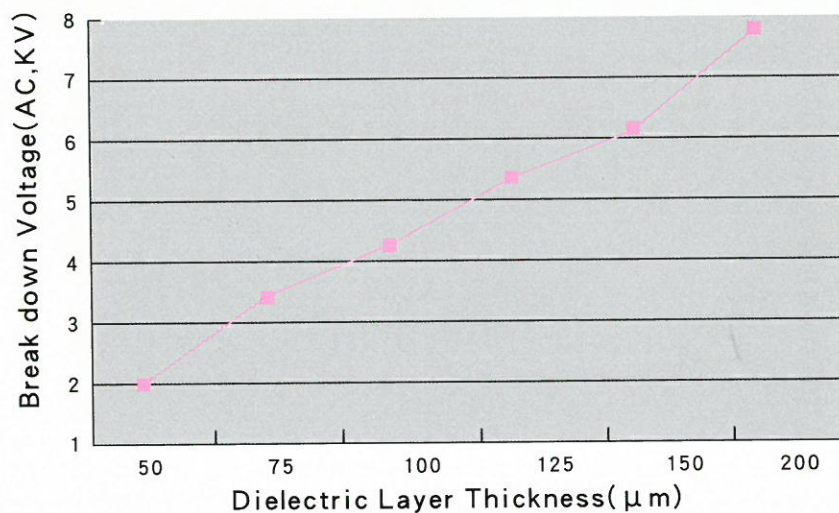
*Note1: Thermal resistance samples use Aluminum Substrate with 1mm aluminium alloy plate, 35 μ m copper foil and 75 μ m Dielectric layer, Using ASTM E-1461 test method and calculate the result (According to CPCA 4105-2010《Printed Circuit Metal Base Copper-Clad Laminate》)。

备注2

绝缘层耐电压测试值采用铝基覆铜板测试所得，而非制作成PCB的测试值。由于客户线路设计及空气导电等因素，MPCB的测试值会低于基板的值。

*Note2: Dielectric Breakdown Voltage test value refers to the value of Al-Substrate CCL, and not Al-Substrate PCB test value. Because of design and the air factor, the Al-Substrate PCB test value will be lower than the value of substrate.

绝缘层厚度与耐电压关系 Relationship of Dielectric Layer Thickness and Breakdown Voltage



产品规格Specification

标准尺寸 Standard Size (mm)	500x610mm、550x610mm、500x1220mm、550x1220mm、1000x1220mm、1100x1220mm
导电层 Circuit Layer (电解铜箔 Copper foil)	18 μ m、35 μ m、70 μ m、105 μ m (Hoz、1oz、2oz、3oz)
导热绝缘层厚度 Dielectric Layer Thickness	100 μ m、125 μ m、150 μ m (1.0~2.0瓦) 100 μ m (non-fiberglass support)
铝基板厚度 Thickness	0.6mm、0.8mm、1.0mm、1.2mm、1.5mm、1.6mm、2.0mm、3.0mm (厚度 $\leq$ 1.0或3oz铜箔建议铝型选用5052)
铝板类型及处理方法 Aluminum Substrate Type	1100、1060、3003、5052、6061 阳极氧化法 Anodization
保护膜类型 Masking Film	PE、PET、PI

如有特殊要求，可定制 any specific inquiry could be available upon request.

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可靠性测试数据/ Reliability Testing Data

测试基板: HA50-type3 (铝板厚度: 1.4 mm, 绝缘层厚度: 100 μ m, 铜箔厚度: 1oz)

Tested substrate: HA50-type3 (Aluminum thickness: 1.36mm, thermal conductive dielectric layer thickness: 100 μ m, copper foil thickness: 1oz)

(1) 绝缘层耐电压测试 Dielectric Breakdown Voltage

HA50产品在经过漂锡后以及长期环境冷热冲击后仍然可保持良好的耐电压特性。

HA50 product has excellent dielectric Breakdown Voltage even after solder dipping

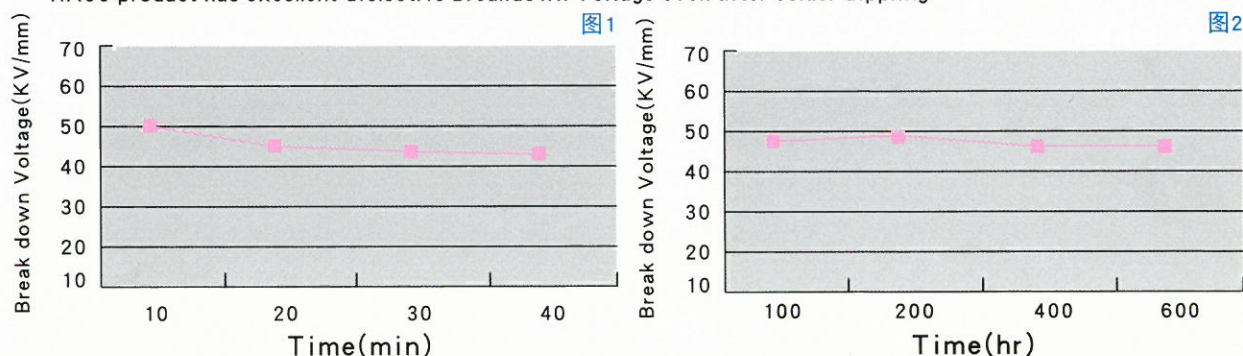


图1. 漂锡测试260°C Figure 1. Breakdown Voltage after aging test at 260°C

图2. 冷热环境测试-40°C/30min至150°C/30min

Figure 2. Breakdown Voltage after aging test at -40°C/30min & 150°C/30min

(2) 剥离强度测试 Peeling Strength

HA50产品在经过漂锡后以及长期环境冷热冲击后仍然可保持良好的剥离强度。

HA50 product has excellent Peeling Strength even after solder dipping

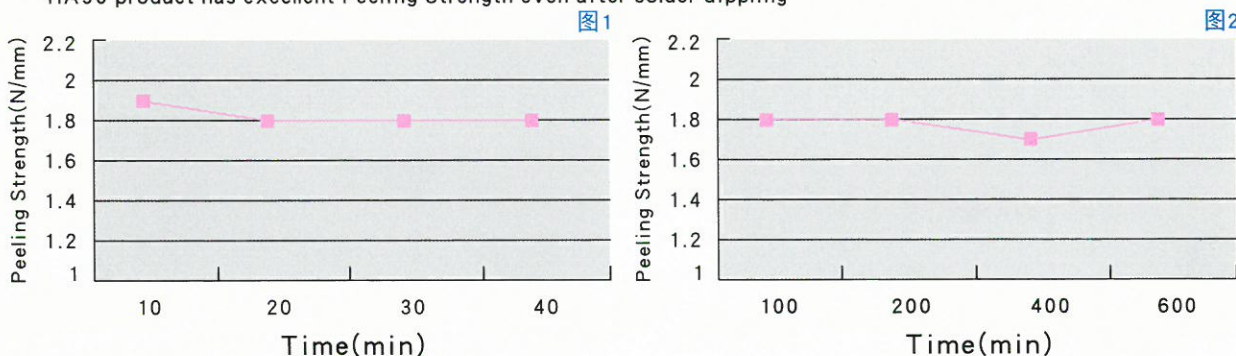


图1. 漂锡测试260°C Figure 1. Peeling Strength after aging test at 260°C

图2. 冷热环境测试-40°C/30min至150°C/30min

Figure 2. Breakdown Voltage after aging test at -40°C/30min & 150°C/30min