



Changzhou Tiger Electronic Materials
Technology Co., Ltd.

POWER YOUR
CHIPS



Company Introduction

- Changzhou Tiger Electronic Materials Tehnology Co., Ltd. is mainly engaged in the technical development and consulting of heat dissipation components in the field of power semiconductor IGBT packaging, and provides the overall scheme, technical services, production and sales of heat dissipation materials. The company focuses on the third generation of electronic packaging materials - aluminum-based silicon carbide research and development, production and sales. A variety of AlSiC, MoCu, W-Cu, MoCuMo, Kovar and Invar and so on products have been developed to meet the needs of users, providing professional thermal management materials and technical solutions for manufacturers of microwave devices, high-power devices and microelectronic devices.
- In conjunction with many well-known universities and research institutes in China, the company independently develops the preparation, plating process and production equipment of aluminium-based silicon carbide composites, with high production efficiency and stable product performance.
- The company has advanced production equipment and various supporting production and testing equipment, has strong production and testing capabilities, and has established a relatively perfect quality management system of ISO 9001. With abundant scientific research achievements, rich practical experience and advanced production equipment, Tiger is in the leading international level in product performance and production technology.
- The company's main products: IGBT module heat dissipation baseplate, rectifier heat dissipation baseplate, solid-state relay, thyristor element heat dissipation baseplate, high-end LED display heat dissipation baseplate and other special heat dissipation baseplate. The company's products are widely used in rail transit, new energy vehicles, power systems, aerospace and national defense and other fields. They are the key materials in the field of new generation power electronic packaging.



铝碳化硅应用

Aluminum silicon carbide application

● 铝碳化硅IGBT基板

铝碳化硅复合材料良好的电子封装材料, 高热导率、低热膨胀系数、高比刚度、易成形、低成本, 使其从出现伊始, 就得到封装热管理行业的青睐, 也是目前高功率IGBT模块封装最佳的选择。

● 铝碳化硅基板在电子封装领域的先天优势

铝碳化硅复合材料的天然优势大幅提高了其在振动、粉尘等恶劣工作环境中功率模块的工作稳定性, 这使铝碳化硅成为高铁、新能源汽车、风力发电、焊接应用上IGBT模块的标配。



Performance Data

SiC	55~70%
Thermal Conductivity ((W/mK)@25°C)	200~240
Specific heat ((J/gK)@25°C)	0.803
Density (g/cm ³)	2.97~3.01
CTE (ppm/°C)	(25°C - 100°C)7.42
	(25°C - 150°C)7.93
	(25°C - 200°C)8.35
Bending Strength (MPa)	≥ 300
Elongation at Rupture (%)	0.28
Fracture Toughness	12
Electrical Resistance (μOhm-cm)	20
Hermeticity (atm-cm ³ /sHe)	<10 ¹⁰

AISiC Performance in Different Companies

Company	Model	Si(vol %)	TC/(W.m ⁻¹ .K ⁻¹)	CTE/(× 10 ⁻⁶ K ⁻¹)	Density/(g . c m ⁻³)
TTC	MCX-703		185	7	3
	MCX-724		165	7.2	2.94
AMETEK	SiC/Al	55	190~200	9.77~10.56	2.96
CPS	AlSiC9	63	180~200	8~8.75	3.01
	AlSiC10	68	210	8.75	3.03
DENKA	Al-SiC		180-200	7.5	2.96
Alpha Materials	SiC/Al	—	170~200	6.5~9.5	2.95~3.0
SEI		70	140	8	2.6
	SiC/Al	65	130	9	2.6
Xi'an Miqan Microelectronics Materials		55		9.8	2.96
	AlSiC	63	180	8	3
		70		7	3.02
Hunan Harvest Technology Development	AlSiC-11		175	11.2	2.89
	AlSiC-9		180	9.3	2.93
	AlSiC-7		180	7.2	3.01
Beijing Baohang Advanced Materials	Al/SiC	50~70	170	8~12	—
Tiger (泰格尔)	AlSiC	55~70	200~240	7.42	2.97~3.1

Alloy Materials



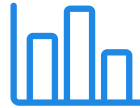
Molybdenum-copper (Mo-Cu), tungsten-copper (W-Cu), CMC and other materials combine the low expansion coefficient of molybdenum and tungsten with the high thermal conductivity of copper, which can effectively release the heat of electronic devices, and can be used in large-scale integrated circuits and high-power microwave devices. According to customer requirements, the surface can be plated with nickel, gold, silver, etc.

Materials	(Gt%)	TC/ (W.m ⁻¹ .K ⁻¹)	CTE/(× 1 0 ⁻⁶ K ⁻¹)	Density /(g . c m ⁻³)
W-Cu	W94Cu6-W50Cu50	140-340	6-12.5	17.6-12
Mo-Cu	Mo90Cu10-Mo50Cu50	150-270	5.6-10.0	10-9.54
Cu-Mo-Cu	Cu/Mo/Cu13: 74: 13-Cu/Mo/Cu1: 1: 1	200-305 (X) 170-250 (Y)	5.6-8.8	9.88-9.3
Cu-MoCu-Cu	-	200-300	7.3-11.5	9.5-9.1
W	-	167	4.67	19.3
Mo	-	138	4.90	10.2
Cu	W94Cu6-W50Cu50	394	17.1-19.4	8.93
Kovar (4J29)	-	17	5.8	8.2
4J36	-	11	0.4	8.04



Stable

**Good uniformity
without bad stress**



**Better
Performance**

**Top level heat
dissipation performance
with best uniformity**



**Advanced
Creativity**

**Perfect realizing the
design intention**

◆ Advantages

1

World-class performance

Our flat baseplates have the World-class performance and with best uniformity at every point of the plate.

2

Scientific production methods

Our scientific production process enables our production capacity to meet a large number of customer needs. We now can manufacture 2000 PCS/Day, and expecting 10000 PCS/Day until 2020.

3

Electroplating process

We have a powerful plating process, with a plating plant of 30,000 sqm.



Advantages

4

We are all AISiC

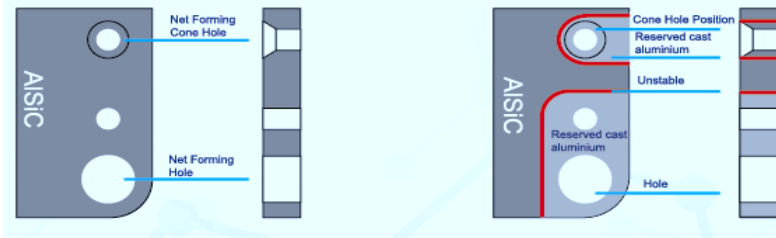
Our baseplates are Net Forming by AISiC. There will be no fracture and shedding between aluminium and silicon carbide, because we are all AISiC.

5

Double arc processing effect

We can achieve the international requirements of double arc processing effect, and make the two radii different.

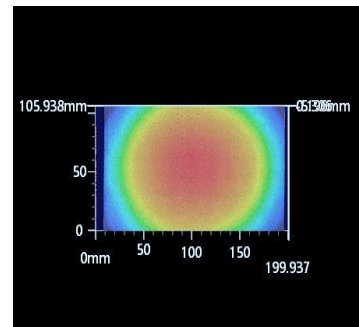
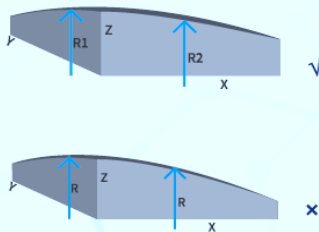
The holes shall be fully AISiC instead of Cast aluminum.



Convex shape of flat convex plate ($X \neq Y$)

Right

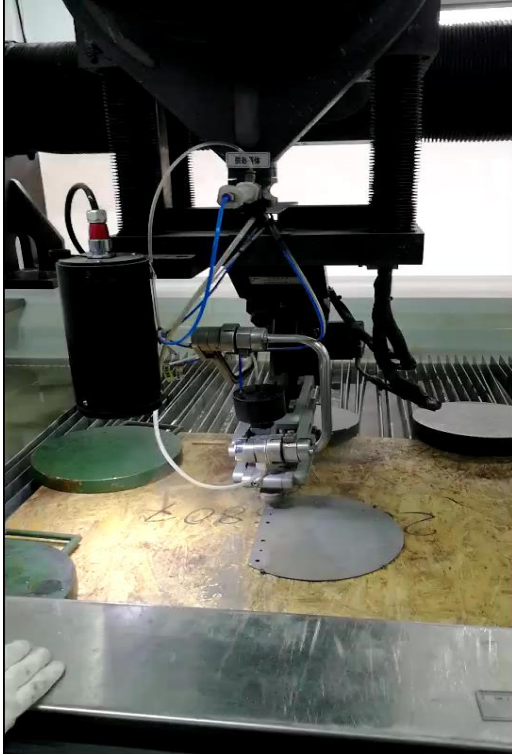
Wrong



Equipment

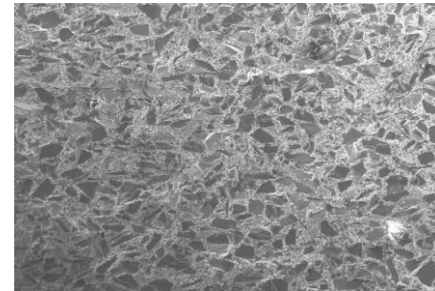
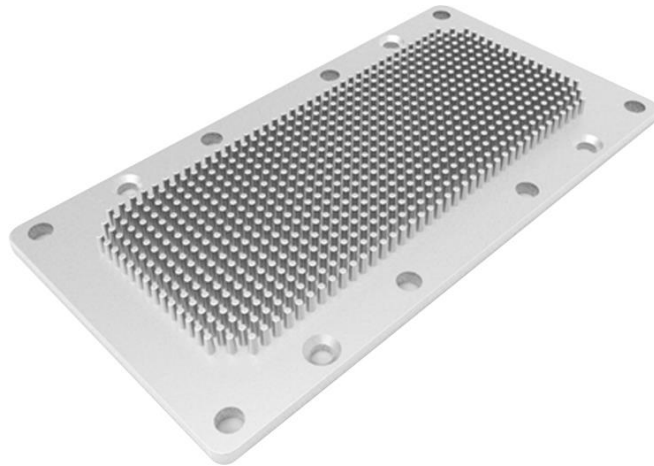
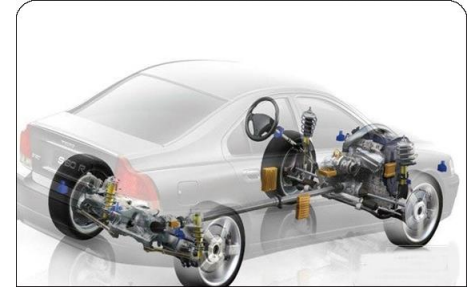
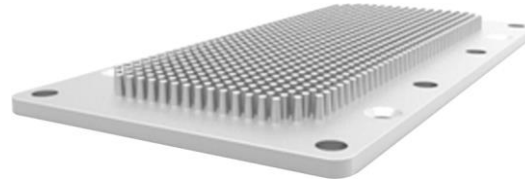
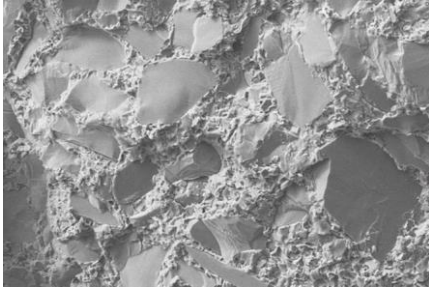


Equipment

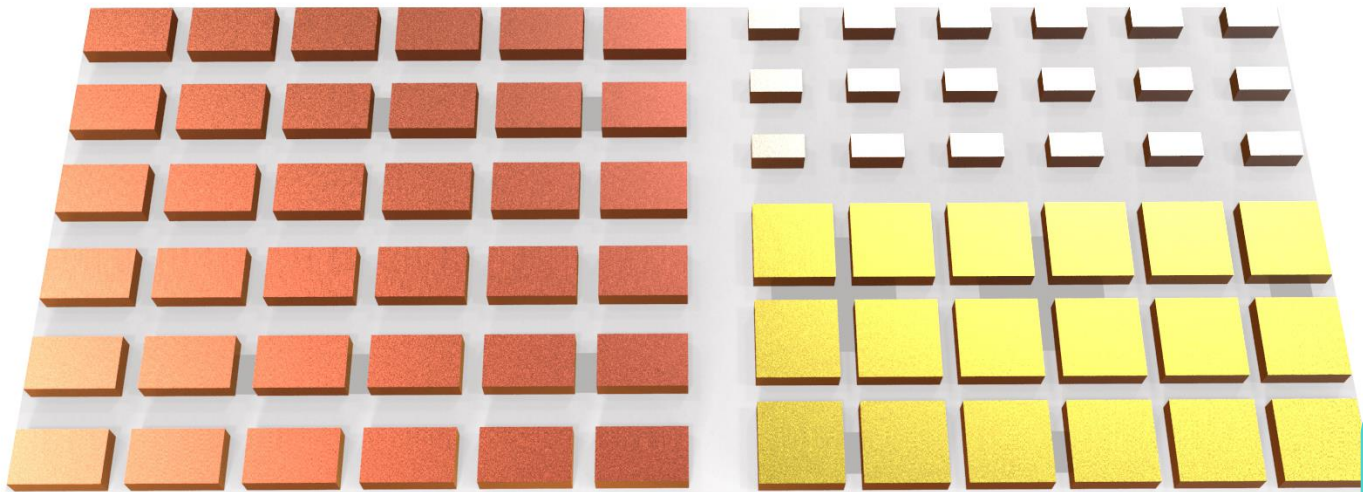


Equipment





Small Sizes Display(Both Mo alloy materials and AlSiC materials)

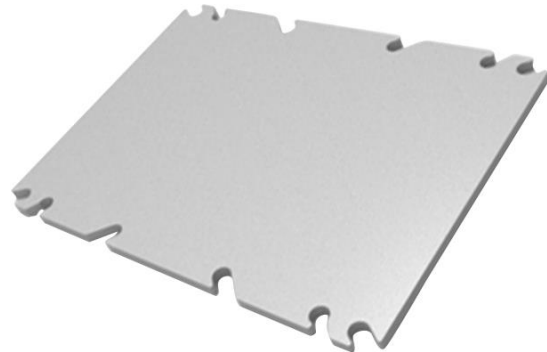
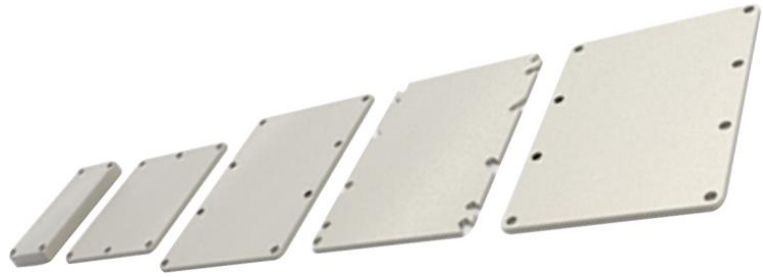
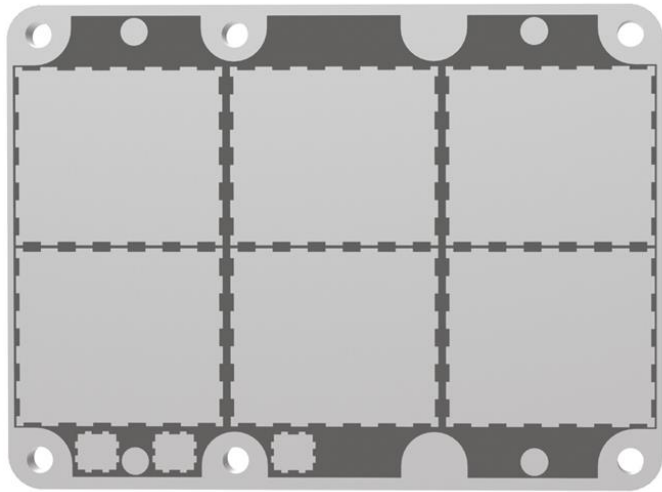


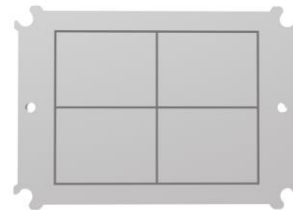
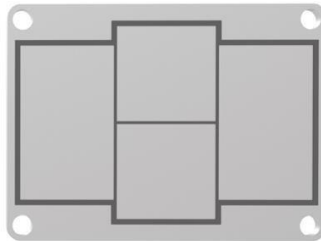
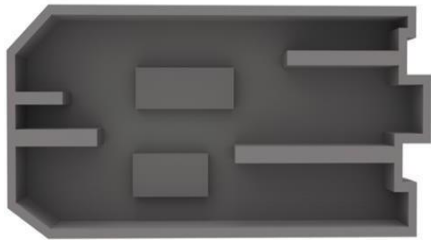
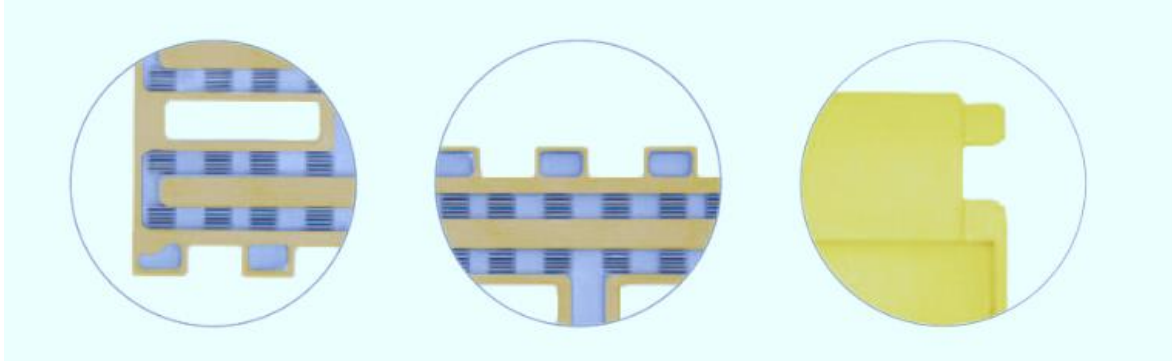
Flat Baseplates

Min. Thickness 0.5mm

Min. Length&Width 2mm* 1mm

The micro-high-end heat sink has excellent performances such as high thermal conductivity, low expansion and high power. It is the best alternative to traditional heat-dissipating materials such as Cu-Mo. Our daily production capacity can reach 200,000 pieces, and the surface can be plated with nickel, gold, copper, silver, etc.







NETZSCH

LFA 467 HT
High Temperature
HyperFlash

闪射法导热仪 LFA 467 HyperFlash® 系列

热扩散系数与导热系数的测量方法、技术、应用

Leading Thermal Analysis



激光闪射法

测定热物性的最佳方法

使用激光脉冲加热样品下表面，并通过红外检测器测量样品上表面温度变化，就能得出热扩散系数。结合样品的密度和比热（可由激光法测定，亦可由DSC测定），可得到材料的导热系数：

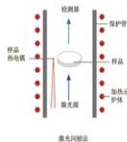
$$\lambda(T) = a(T) \cdot c_p(T) \cdot \rho(T)$$

其中：

- λ = 热导率 [W/(m·K)]
- a = 热扩散系数 [mm²/s]
- c_p = 比热 [J/(kg·K)]
- ρ = 密度 [g/cm³]

激光闪射法是一种快速的非破坏性、非接触式的测量技术，可同时有效测定以上提到的热物性参数，包括比热。这些数据可用于：

- 得到合金热物性参数，例如热扩散系数 (a)、比热容 (c_p) 和导热系数 (λ)；这些都是进行热模拟计算时必须的数据。
- 根据所需热性能调整某一个参数，从而达到材料改性目的。



LFA 467 HyperFlash®

自由选择测试气氛

仪器可配备三转子或累计称重量高精度烘箱 (50°C) 烘箱，用以控制测试气氛。用户可根据自身需求自由设置两路进气和保护区，所有气流均经催化氧化性、惰性、动态或静态气氛。对于敏感样品来说，可保证纯净测试环境。如配备空压泵，还可使样品处于真空或低压气氛下进行测试。



优化结构设计 与闪射光源

LFA 467 HyperFlash® 仪器整体设计为垂直式结构。其中，激光源位于仪器底部，样品置于中间部位。检测器在顶部。脉冲能量可通过软件自动调节，并可高达比激光光源能量进一步优化。脉冲宽度可在 20µs 至 1200µs 范围内调节。



NETZSCH

热膨胀仪系列
DIL 402 Expedit Classic
方法, 技术, 应用

Leading Thermal Analysis.

优化的操作环境

操作简便 新款热膨胀仪在操作便捷性方面有很多创新。首先, 使用者可建立测量方法, 由此大大简化例行操作流程; 其次, 仪器独特的MultiTouch功能可提高样品与推杆的接触稳定性; 第三, 在预设的接触力下, 可自动调节样品的初始长度。只需几次点击操作, 便能开始测试, 炉体的更换也十分简单, 无需专门的训练。




设计紧凑 DIL 402 Expedit Classic既可配备为样品系统, 也可配备为双样品/差动 (differential) 系统。仪器为一体式设计, 主机集成了精确测量热膨胀所需的

使用寿命长 DIL 402 Expedit Classic操作安全简单, 免维护, 使用寿命长。系统独特的设计使得样品支架更换十分简便, 避免了损坏支架的风险。

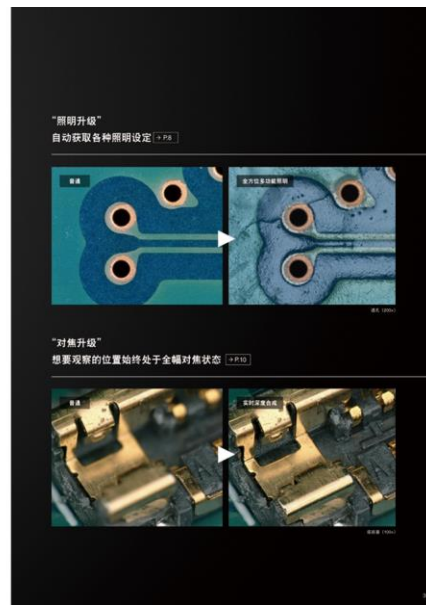
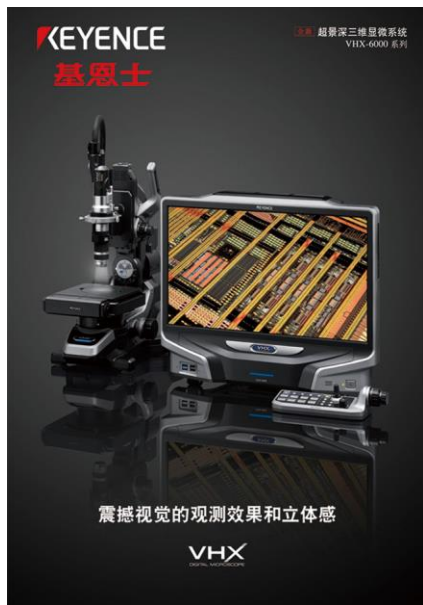
准确测量样品温度

热电偶位置可调, 以适应不同长度的样品。通过导杆可以调节热电偶的位置, 使其能够移动到指定位置, 无需弯曲。



NanoEye - 精确测量样品形变

创新的Nanoeye位移传感系统使得仪器在全量程范围内都具有完美的线性度和最高的分辨率。这在之前是无法实现的。Nanoeye的核心是光电传感器, 它能够精确测量样品长度变化并转化为数字信号。线性编码器的优点是分辨率、精度和线性度在测量全程以及全温度范围内都能保持恒定。此外, Nanoeye稳定性高, 无需特殊维护。





THANK YOU

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