United Adhesives

各向異性導電膠

Anisotropic Electrically Conductive Adhesives

▶ 各向异性导电胶 Anisotropic Electrically Conductive Adhesives

美国联合粘合剂公司(United Adhesives Inc)所研发生产的各向异性导电胶（ACA），通过精确地控制导电填料（镀金或银粒子）在胶粘剂基体中的分布，从而达到只在z轴方向上的导电和粘结。而x，y方向上则形成良好的绝缘。

当受热和受压之后,导电粒子在芯片隆起焊盘与基板焊盘之间形成Z方向上的连续导通。而基板焊盘之间的区域，环氧基体与其余的颗粒则作为绝缘体，防止任何其他方向上的电流流过。

这些导电胶可用于点滴，模板或丝网印刷。固化可以在180℃,一定压力下，在7至11秒钟内完成。即便在高湿度和热循环时，金颗粒亦具有稳定的接触电阻及导电性。

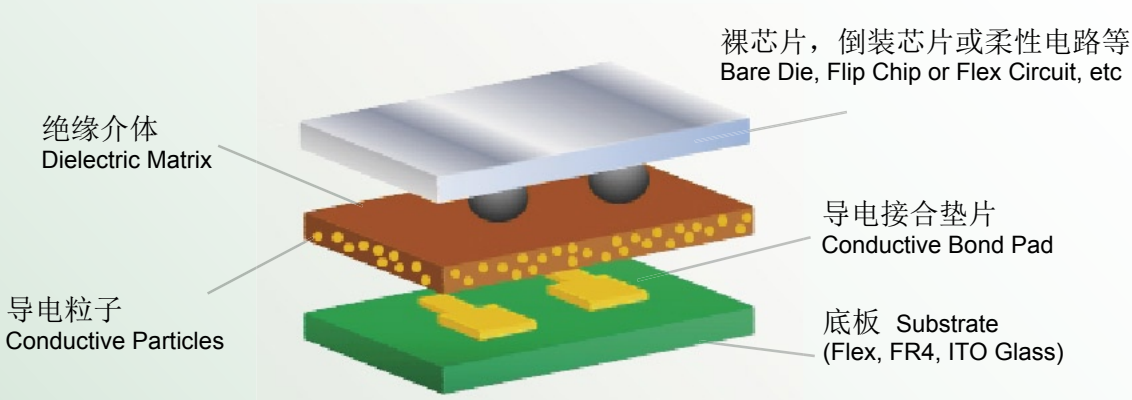
美国联合粘合剂公司的各向异性导电胶为精细电路间距,提供了强力的导电粘结,以及快速的组装过程。测试显示，80微米（70微米焊盘10微米间隔）的精细电路间距没有出现短路现象。

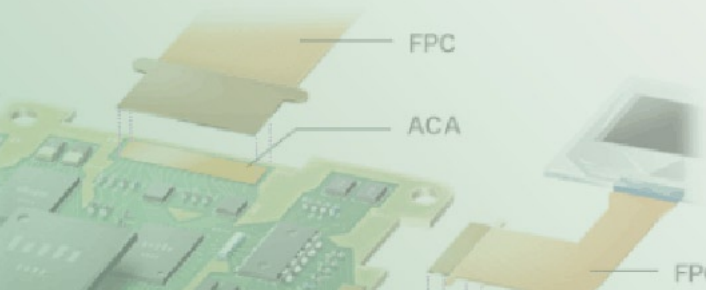
The Anisotropic Conductive Adhesives (ACA) made by United Adhesives conduct only in z-axis due to careful control of the distribution of the electrically conductive filler (gold coated, or silver particles) in the adhesive matrix.

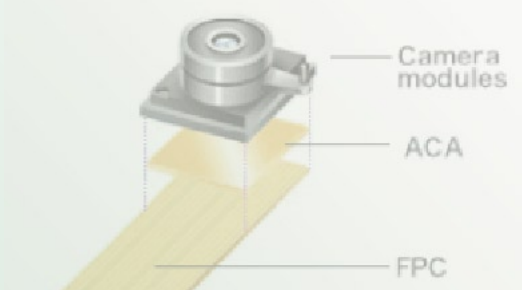
Conductivity is achieved through continuous contact of the fillers with the bumps and bond pads of the opposing substrates after heat and pressure being applied to compress the entrapped conductive particles. The epoxy matrix with the remaining particles between the raised areas of the substrates acts as an insulator, preventing current flow in any other directions.

These adhesives can be applied with dispensing, stencil or screen-printing. Cure can be completed at 180°C under the compression force in 7 to 11 seconds. The gold particles have stable electrical contact resistance when subjected to humidity and thermal cycling.

United Adhesives provides strong bonds to fine pitches with very fast assembling process. Testing results show that pitches of 80 microns (70 micron bumps with 10 micron separation) showed no circuit short.







▶ 技术参数和特点 Technical Datasheets and Features

	具体技术参数 TDS	AE6080	AE6075	AE6025
固化前性能 Property Before cure	化学基础 Chemical Base	环氧树脂 Epoxy	环氧树脂 Epoxy	环氧树脂 Epoxy
	颜色/组分 Color / Component	深棕色 Dark Brown	深棕色 Dark Brown	浅棕色 Light Brown
	粘度 Viscosity at 25°C @10 1/s (cP.s)	26,000	25,000	25,000
	指数Thixtropic Index	2.5	1.5	1.5
	密度 Density (Gram /cc)	1.3	1.3	1.3
	导电颗粒型 Conductive Particle Type	Ni-Au	Ni-Au	Ag-Cu
	导电粒子的尺寸 Conductive Particle Size (um)	2.5	5.0	6.0
	固化中失重 Weight loss in cure (Weight %)	< 0.8 %	< 0.5 %	< 0.5 %
固化后性能 Property as Cured	颜色 Color	深棕色 Dark Brown	深棕色 Dark Brown	浅棕色 Light Brown
	硬度 Hardness (25 °C) (Shore D)	88	86	82
	接触电阻率 Contact Resistivity (z direction, 24°C) (Ohm/mm^2)	< 0.1	< 0.1	< 0.5 >10E+12
	体积电阻率 Volume Resistivity, (x,y direction, 24°C)(Ohm-cm)	>10E+12	>10E+12	>10E+12
	热膨胀系数 Coefficient of Thermal Expansion (ppm/C)	< 160 (> Tg) < 60 (< Tg)	< 165 (> Tg) < 62 (< Tg)	< 162 (> Tg) < 65 (< Tg)
	附着力 Ahesive (Al/Al,lap shear), Psi	>1800	>1600	>1600
	Tg (°C) Ahesive (Al/Al,lap shear), Psi	125	125 - 135	125 - 135
	热稳定性 Thermal Stability (°C)	– 40 to 180	– 40 to 180	– 40 to 180
	提取离子含量 Extractable Ionic Content (Na+, K+, Cl-, ppm)	< 30	< 30	< 30
固化条件。 数据仅做参考，应通过调试来 决定适当的生产条件。 Cure Profile (as reference. Need to test for real conditions)	150 °C固化 Cure at 150 °C (Second)	15 ~ 30	15 ~ 30	15 ~ 30
	160 °C固化 Cure at 160 °C (Second)	9 ~ 12	9 ~ 12	9 ~ 12
	170 °C固化 Cure at 170 °C (Second)	7 ~ 9	7 ~ 9	7 ~ 9
	180 °C固化 Cure at 180 °C (Second)	6 ~ 7	6 ~ 7	6 ~ 7
	工作 Pot / Work Life at 25°C (weeks)	> 2	> 2	> 2
	保质期（在冰箱推荐存储) Shelf Life (recommended store in freezer (< -15°C) (Month)	6 @ -18°C	6 @ -18°C	6 @ -18°C

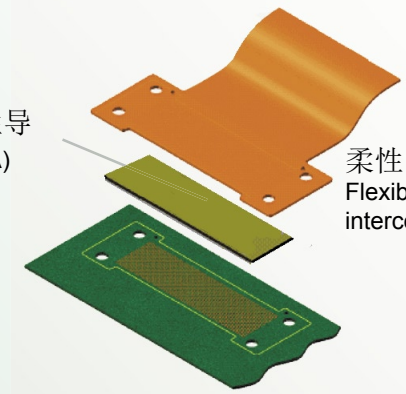
特点 Features

- 良好的z方向导电性（z方向, xy 方向绝缘）Excellent anisotropic electrical conductivity in z-direction (x,y dielectric)
- 快速固化。在180℃下固化7秒可固化。Extremely rapid cure at elevated temperature, e.g. 180°C 7 second cure.
- 在常温下较长的贮存期。30℃下2周的品质保证。减少设备的清扫次数。 Long pot life in room temperature
- 高可靠性。没有凝集物, 异物颗粒沉淀等。85℃/85%RH 500 小时稳定。 High reliability. No foreign materials
- 低吸湿性。85℃/85% RH吸湿< 0.1%. Low moisture absorption < 0.1% at 85C/85%RH
- 高温稳定性。 Tg125℃ High temperature stability. Tg = 125°C
- 良好的附着力。与PET，FR4，铝，铜，银等表面形成良好粘结。Strong bonding to PET, FR4, Al, Cu, Ag etc
- 低渗流无挥发性。 Low bleeding, no volatile

▶ 典型应用 Applications

各向异性导电胶（ACA）为各种芯片部件提供z方向上的高速互连和导通, 这包括倒装芯片(Flip Chip)，细间距覆晶薄膜（COF)，和芯片在玻璃上（COG）的LCD的包装，柔性印刷电路（FPC）电缆，及各种细间距组件。它们经常被用作在主体应用方面的互连材料，如平板显示器，液晶显示器，智能标签，智能卡，相机模块，手机，薄膜太阳能电池，直接访问传感器，半导体封装和RFID标签等。

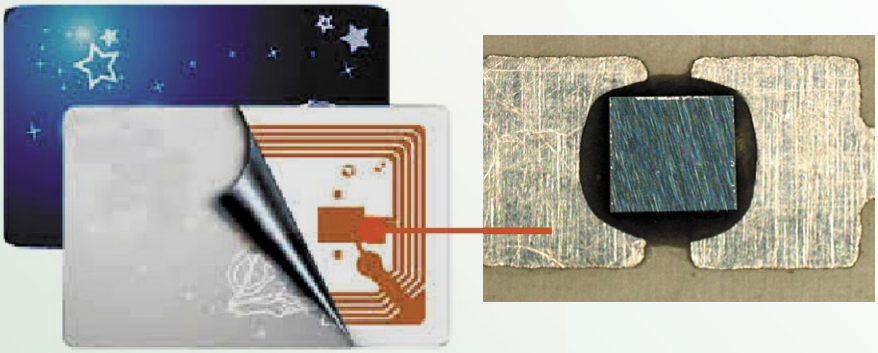
Anisotropic conductive adhesives (ACA) provide in z-direciton high-speed interconnection for flip chip, fine pitch chip-on-film (COF), and chip-on-glass (COG) LCD packaging, flexible printed circuits (FPC) cables, and various fine pitch assemblies. They are often used as interconnecting materials in mainstream applications such as flat panel displays, LCD, smart label, smart cards, camera modules, mobile phones, thin-film solar cells, direct access sensors, semiconductor packages and RFID tags.



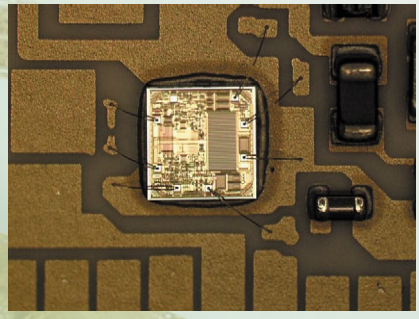
各向异性导电胶(ACA)

柔性电路板互连
Flexible circuit board interconnection

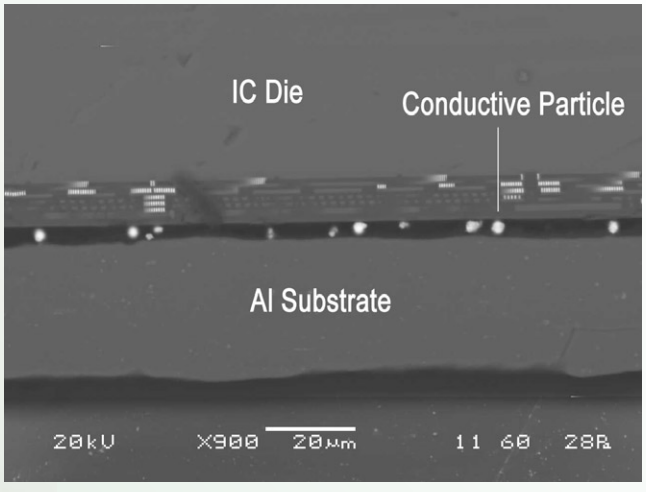
本产品有5, 10, 30毫升注射器三种规格
There are 5, 10, 30 ml syringes available



智能卡芯片封装后的显微照片
Microscope photo of IC die after bonding



芯片的绑定 Die Bonding



封装芯片断面SEM照片 SEM of cross-section of die

▶ 流程指南 Process Guidance

使用准备

AE导电胶要求存储在冰箱中（-18℃）。使用前需要在室温解冻（例如，22至25℃）。5至10毫升的注射器，解冻时间是30分钟。 30毫升的注射器，解冻时间为60分钟。接触表面必须清洁，无油，油脂和其他污染物，以达到最佳的粘接强度。

该导电胶通常可以通过用针管点滴使用，亦还可以通过印刷方法来使用。对于点滴法，建议使用螺旋式的控制阀门。各种其它类型的阀门亦可以适用，例如时间压力阀; 线性活塞泵和喷射阀门等。但它们事先应为特定的应用进行测试。

我们通常建议从黄色20号（ID 0.6mm时，OD 0.9毫米），以薰衣草(淡紫色)30号（ID 0.15毫米，OD 0.30毫米）针头大小用于点滴。针尖到底板表面要控制在0.02至0.05毫米距离。

使用过程

• 将导电胶点滴（或印刷）到连接基板上。必须保证该导电胶层无气泡。
• 取出和放置半导体芯片到导电胶上。
• 按一定的压力按压热电极（或IR）到半导体芯片上，并在160至170℃温度下保持7到11秒。热电极的压力通常为2至5千克/ cm^2左右。具体的压力，温度和保持时间，应该事先按照特定的应用情况进行测试，然后确定下来。
• 对于特别高的要求，推荐再加上140℃2分钟后的后续固化。
• 此过程可参考下面的示意图。

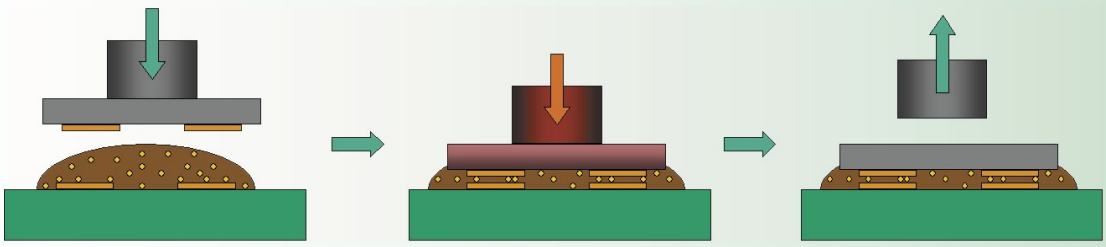
Preparation

AE adhesives are required to store at a freezer (-18°C). They need to thaw to room temperature (e.g. 22 to 25 °C) before use. For 5 to 10 ml syringe, the thaw time is 30 min. For 30ml syringe, the thaw time is 60 min. The contact surfaces must be clean and free of oil, grease and other contaminations in order to achieve optimal bond strength.

The adhesives are normally applied by dispensing with needle, but also can be applied by printing. For dispensing, an auger style valve is recommended. A variety of other type valves may be suitable such as time pressure valve; linear piston pump and jet valve. They should be tested for the specific application in advance. We typically recommend needle size from yellow 20 gauge (ID 0.6 mm, OD 0.9mm) to lavender 30 gauge (ID 0.15mm, OD 0.30mm) for dispensing the adhesives. Ensure that needle tip is about 0.02 to 0.05 mm from substrate surface.

Processing

• Apply adhesive onto substrate. It must be ensured that the adhesives layer has no bubble.
• Pick and Place the semiconductor (.e.g bare die) and register onto the adhesive
• Press the semiconductor with a thermode (or IR) under a defined pressure at temperatures of 160 to 180°C and hold for 7 to 11 seconds. The compressing force is typically 2 to 5 kg / cm^2. Exact compressing force, holding time and temperature should be tested for the specific application task in advance.
• By specifically high demands, a post curing of 2 min at 140°C is recommended.



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The data presented in this leaflet are in accordance with the present state of our knowledge, but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this leaflet should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used. The recommendations do not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the products for a particular purpose. For technical, quality, or product safety questions, please contact directly to United Adhesives Inc.

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