Adhaero ergo sum

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FAREWELL POLYIMIDE, HELLO COUPLER:

FLEXIBLE DIELECTRIC ELECTRONIC SUBSTRATE OF TOMORROW

On December 26, 2006 AI Technology was granted a new patent for its Flexible Dielectric Electronic Substrate technology.

Coupler is AI Technology's molecularly flexible substrate with modulus of elasticity less than 1400 km/sq.cm (20,000 psi). Unlike AI Technology's Coupler, mundane flexible substrates such as polyimide have high modulus of elasticity greater than 70,000 kg/sq.cm (1,000,000) and their artificial flexibility comes from small thickness rather than the material's inherent molecular structure.

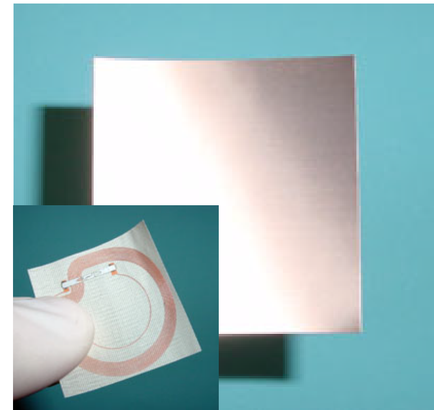
Resistant to moisture, chemicals, and heat, Coupler can be used in electronic packages to manage stress, dissipate heat, or provide vias filled with electrically conductive flexible adhesives.

Coupler substrate is typically available coupled to sheet of copper (with no adhesive layer between the substrate and copper), which is etched away per circuit design. In conjunction with conductive vias, coupler provides reliability and simplifies complex manufacturing process of three dimensional, multi-layer chips and circuits.

Coupler withstands lead-free solder re-flow temperature over 275 degrees Celsius for ten minutes. It provides more reliable adhesion to widely available epoxy based encapsulants than polyimide substrates.

Ideal for use in microwave, photovoltaic, LCD, RFID applications, and QFN packages, Coupler is a newer, smarter, and more cost effective alternative to polyimide substrates.

For more information, AI Technology's patent, 7154046 B2 can be viewed at http://patft.uspto.gov/netahtml/PTO/srchnum.htm by entering the patent number for the query, or by contacting AI Technology at ait@aitechnology.com.



US007154046B2

(12) **United States Patent**
Chung

(10) **Patent No.: US 7,154,046 B2**
(45) **Date of Patent: Dec. 26, 2006**

(54) **FLEXIBLE DIELECTRIC ELECTRONIC SUBSTRATE AND METHOD FOR MAKING SAME**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/774,882**

(22) Filed: **Feb. 9, 2004**

(65) **Prior Publication Data**

US 2004/0159462 A1 Aug. 19, 2004

Related U.S. Application Data

(63) Continuation of application No. 09/578,583, filed on May 25, 2000, now Pat. No. 6,717,819, which is a continuation-in-part of application No. 09/412,052, filed on Oct. 4, 1999, now Pat. No. 6,288,905, and a continuation-in-part of application No. 09/524,148, filed on Mar. 14, 2000, now Pat. No. 6,376,769.

(60) Provisional application No. 60/180,907, filed on Feb. 8, 2000, provisional application No. 60/180,544, filed on Feb. 7, 2000, provisional application No. 60/150,869, filed on Aug. 26, 1999, provisional application No. 60/150,437, filed on Aug. 24, 1999, provisional application No. 60/141,344, filed on Jun. 28, 1999, provisional application No. 60/136,917, filed on Jun. 1, 1999.

(51) **Int. Cl.**
H05K 1/02 (2006.01)

(52) **U.S. Cl.** **174/259**; 174/254; 174/255; 174/260; 361/776; 361/777

(58) **Field of Classification Search** 174/258–264; 361/782–784, 792–795; 29/830–832, 852–854; 156/306.6, 275.1, 275.3; 257/787–790, 723–724; 428/209–210, 901, 473.5, 195.1
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,555,364	A	1/1971	Matcovich
4,734,825	A	3/1988	Peterson
5,043,794	A	8/1991	Tai et al.
5,148,265	A	9/1992	Khandros et al.
5,172,303	A	12/1992	Bernardoni et al.

(Continued)

FOREIGN PATENT DOCUMENTS

WO WO 98/26476 6/1998

(Continued)

OTHER PUBLICATIONS

Co Van Veen, *IC Packaging And Assembly Issues For Next Generation Miniaturised Consumer Electrons*, Future Fab International,, pp. 379-382 (4 Pages).

(Continued)

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(57) **ABSTRACT**

A molecularly flexible dielectric electronic substrate for receiving an electronic device has a modulus of elasticity less tan about 500,000 psi. The molecularly flexible dielectric substrate comprises one or more sheets or layers of a molecularly flexible dielectric adhesive having a modulus of elasticity less than about 500,000 psi and having patterned metal foil electrical conductors thereon. The molecularly flexible dielectric adhesive may have a low glass transition temperature and the ability to withstand soldering.

23 Claims, 7 Drawing Sheets

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