



Z-Axis Adhesive Film (ZAF)

7303

Technical Data

April, 1999

(Supersedes September, 1998)

Product Description

3M™ Z-Axis Adhesive Film (ZAF) 7303 is an electrically conductive thermoset adhesive film used to interconnect flexible circuits to printed circuit boards or other flexible circuits. Conductive particles loaded into the adhesive allow interconnection through the adhesive thickness (the Z-Axis) but they are spaced far enough apart for film 7303 to be electrically insulating in the plane of the adhesive.

Construction

Film 7303 is comprised of a 62.5 micron (2.5 mil) thick, thermosetting Acrylate/Epoxy adhesive loaded with silver coated glass beads. Film 7303 is coated on a poly-coated Kraft paper with silicone release. Film 7303 is a light tan color and has a slight amount of tack. The standard roll is 5 mm (0.2 in.) wide by 20 meters (18 yds.). Custom widths are available.

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Typical Properties

Note: The values in the table below are to be considered representative or typical and should not be used for specification purposes. Electronic circuit materials, surface preparations and assembly conditions vary widely; users are responsible for thoroughly evaluating the product under the conditions of intended use to determine the performance characteristics to be expected in their application.

Property	Value	Units
Adhesive Type	Acrylate / Epoxy Blend	
Liner Type	Poly-coated Kraft with Silicone Release	
Adhesive Thickness	62.5 (2.5)	micron (mil)
Liner Thickness	100 (4)	micron (mil)
Filler Particles	Silver-coated glass spheres	
Average Particle Size	35 (1.4)	micron (mil)
Interconnect Resistance ^(1,2)	< 0.2	Ohms
Minimum Space Between Conductors	0.25 (10)	mm (mil)
Minimum Overlap Area	0.8 (1200)	mm ² (mil ²)
Temperature Cycling Range ^(3,4)	-40 to 80 (-40 to 177)	°C (°F)
Resistance Stability ^(1,3,5)	5 or better	Ohms
Shear Strength ⁽¹⁾	14.1-17.6 (200-250)	Kg/cm ² (lbs/in ²)
Peel Strength ^(1,3)	533 (3)	g/cm ² (lbs/in ²)
Bonding Conditions ⁽¹⁾		
Temperature	135 (275)	°C (°F)
Pressure	17.6 (250)	Kg/cm ² (lbs/in ²)
Time	25	seconds

(1)For a given application, values may differ depending on particular flex circuit and PCB materials used.

(2)Measured for gold-coated copper/polyimide flex circuits bonded to solder-coated copper/FR-4 PCB's.

(3)Measured for silver-ink/polyester flex circuits bonded to gold- or solder-coated copper/FR-4 PCB (no solder mask in bond area).

(4)Long-term outdoor use may require additional reinforcement.

(5)Maximum measured resistance change in parts aged for two weeks at 77°C (170°F)/90% RH or after thermal cycling between -20°C and 70°C (-4°F and 158°F).

Available Sizes

Rolls: 5 mm (0.2 in.) wide x 20 meters (18 yds.) long. Custom widths greater than 5 mm up to 355 mm (14 inches) wide are available upon request. Rolls are provided upon 3 inch (76.2 mm) diameter plastic cores.

Sheets: Custom sizes are available up to 355 mm (14 inch) wide.

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Application Techniques

Bonding: Film 7303 requires a two part procedure: room temperature tacking of film 7303 to the flexible circuit (or to the PWB) and removal of the paper release liner, followed by bonding the flex to the second substrate using a thermocompression bonder. Detailed bonding instructions are available in the “Notes on 3M Z-Axis Film 7303 Bonding Sequence” Technical Service Bulletin, and these instructions must be followed to obtain good electrical and mechanical bonding.

Repair: Bonds made with 3M™ Z-Axis Adhesive Film 7303 are repairable without causing damage to a standard metal/FR-4 printed circuit board. Printed-ink/ polyester flex circuits may suffer damage to the ink (depending on the ink) such that a fresh bond area on the flex may need to be used (or a new flex). The following rework procedure is recommended: 1.) Peel the flex circuits from the PCB. Heating the substrates (70-100°C) [158-212°F] can reduce the force needed to peel them apart; 2.) Scrub the old adhesive away using a solvent such as methyl ethyl ketone or acetone (**Note:** Carefully read and follow the manufacturer’s precautions and directions for the use of solvents); 3.) Apply a fresh length of film and repeat the bonding process.

Shelf Life: For long-term storage, product should be maintained at a temperature no higher than 25°C (77°F); temperatures during shipping should not exceed 40°C (104°F). Storage at 23°C (73°F) and 50% RH will afford a shelf life of at least 9 months after receipt of the product. Keeping the product refrigerated or frozen may extend the shelf life further.

General Information

Film 7303 mechanical and electrical performance meets or exceed the performance of silver-ink polyester flexible circuits in environmental testing. Film 7303 has shown good electrical stability in testing such as temperature cycling between -20°C to 70°C (-4°F to 158°F) or high humidity storage at 77°C (170°F)/90% RH. The data contained in the Typical Properties Table was obtained on a specific flex to PCB interconnection, and the results in a customer application may differ. For specific performance information please contact your 3M Technical Service representative.

Application Ideas

3M Z-Axis Film 7303 can connect and mechanically bond flexible printed circuits – especially printed silver-ink/polyester circuits to printed circuit boards or other flexible circuits. The minimum conductor spacing is 0.25 mm (10 mil) and the minimum pad overlap is 0.8 mm (1200 mil). Film 7303 is ideal for a wide variety of electronic interconnection applications. It is easy to use and suitable for systems requiring low electrical interconnect resistance even after weeks of exposure to difficult environmental conditions. The adhesive is tacky allowing for room temperature application to the flex circuit as well as alignment and temporary attachment of the flex to the PCB prior to hot bar bonding. For specific application recommendations please contact your 3M Technical Service representative.

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For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-362-3550. Address correspondence to: 3M Bonding Systems Division, 3M Center, Building 220-7E-01, St. Paul, MN 55144-1000. Our fax number is 651-733-9175. In Canada, phone: 1-800-364-3577. In Puerto Rico, phone: 1-809-750-3000. In Mexico, phone: 5-728-2180.

Certification/Recognition

Meets IPC 3408 General Requirements for Anisotropic Conductive Adhesive Films.

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ISO 9002

This Bonding Systems Division product was manufactured under a 3M quality system registered to ISO 9002 standards.



Bonding Systems Division

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