

ABLEBOND[®] 84-1LMISR4

Electrically Conductive Die Attach Adhesive

Product Description :

ABLEBOND 84-1LMISR4 is an electrically conductive die attach adhesive. The rheology of ABLEBOND 84-1LMISR4 allows minimum adhesive dispense and die put down dwell times, without tailing or stringing problems. The unique combination of adhesive properties makes ABLEBOND 84-1LMISR4 one of the most widely used die attach materials in the semiconductor industry.

Features :

- Excellent dispensability with minimal tailing and stringing
- Box oven cure

Applications :

ABLEBOND 84-1LMISR4 has been formulated for use in high throughput, automatic die attach equipment.

ABLEBOND 84-1LMISR4 is available in a variety of package sizes, ranging from 1cc to 30cc and 1 ounce to 1 pound.

Instructions For Use :

Please refer to the "Application Guidelines" below.

Properties Of Material As Supplied :

Property	Test Method	Unit	Typical Value
Chemistry			Epoxy
Appearance	PT-56		
Density	PT-1	g/cc	3,5
Filler Type			Silver
Viscosity at 25°C (Brookfield CP51 @ 5 rpm)	PT-42	Pa.s	8
Thixotropic Index (Visc. @ 0,5 / Visc. @ 5 rpm)	PT-61		5,6
Work Life @ 25°C (Physical Work Life by % Filler)	PT-12	hours	18
Storage Life @ 40°C	PT-13	year	1

The figures shown are typical values only; If you need to write a specification, please request our current Standard Release Specification.

Cure Process Data :

Recommended Cure Condition		1 h @ 175°C
Alternate Cure Condition	(the ramp cure was observed to yield reduced bondline voiding and increased strength)	3-5°C/min ramp to 175°C + 1 h @ 175°C

Property	Test Method	Unit	Typical Value
Weight Loss on Cure (10 x 10 mm Si die on glass slide)	PT-80	%	5,3

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Properties Of Material After Application :

Physiochemical Property	Test Method	Unit	Typical Value
Extractable Ionic Data Chloride (Teflon flask) Sodium (5 g sample / 20-40 mesh) Potassium (50 g DI water)	CT-13	ppm ppm ppm	5 3 1
Water Extract Conductivity pH	CT-6 CT-7	µmhos/cm	13 6
Weight Loss @ 300°C (thermogravimetric analysis)	PT-20	%	0,35
Glass Transition Temperature (TMA penetration mode)	MT-14	°C	120
Coefficient of Thermal Expansion (TMA expansion mode) Below Tg Above Tg	MT-9	K ⁻¹ K ⁻¹	40 ppm/°C 150 ppm/°C
Dynamic Tensile Modulus (dynamic mechanical thermal analysis using < 0,5 mm thick sample)	MT-12 @ -65°C @ 25°C @ 150°C @ 250°C	MPa MPa MPa MPa	4380 3940 1960 300
Moisture Absorption at Saturation (dynamic vapour sorption after 85°C/85% RH exposure)	PT-65	%	0,6

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Thermal Electrical Property	Test Method	Unit	Typical Value
Thermal Conductivity (C-Matic conductance tester)	PT-40 @ 121°C	W/m.K	2,5
Volume Resistivity (4-point probe)	PT-46	Ohm.cm	0,0001

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Mechanical Property	Test Method	Unit	Typical Value
Die Shear Strength @ 25°C (2 x 2 mm Si die)	MT-4	kg/die	19
Die Shear Strength versus Temperature (3 x 3 mm Si die)	MT-4		
- Ag/Cu leadframe @ 25°C		kg/die	21,0
@ 200°C		kg/die	2,9
@ 250°C		kg/die	1,7
- Bare Cu leadframe @ 25°C		kg/die	11,0
@ 200°C		kg/die	2,6
@ 250°C		kg/die	1,4
- Pd/Ni/Cu leadframe @ 25°C		kg/die	27,0
@ 200°C		kg/die	2,4
@ 250°C		kg/die	2,0
Die Shear Strength after 85°C/85% RH Exposure for 168 Hours (3 x 3 mm Si die)	MT-4		
- Ag/Cu leadframe @ 25°C		kg/die	12,0
@ 200°C		kg/die	1,8
- Bare Cu leadframe @ 25°C		kg/die	10,0
@ 200°C		kg/die	2,5
- Pd/Ni/Cu leadframe @ 25°C		kg/die	23,0
@ 200°C		kg/die	1,8
Chip Warpage @ 25°C versus Chip Size (0,38 mm thick Si die on 0,2 mm thick Ag/Cu leadframe)	MT-15		
- Chip Size		mm	7,6 x 7,6
Warpage		µm	19
- Chip Size		mm	10,2 x 10,2
Warpage		µm	32
- Chip Size		mm	12,7 x 12,7
Warpage		µm	51

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Mechanical Property (Continued)	Test Method	Unit	Typical Value
Chip Warpage versus Post Cure Thermal Process (7,6 x 7,6 x 0,38 mm Si die on 0,2 mm thick LF) (data generated using alternate ramp cure condition)	MT-15		
- Ag/Cu leadframe			
Post Cure		µm	20
+ Wirebond (1 min @ 250°C)		µm	29
+ Post Mold Bake (4 h @ 175°C)		µm	28
- Bare Cu leadframe			
Post Cure	µm	22	
+ Wirebond (1 min @ 250°C)	µm	30	
+ Post Mold Bake (4 h @ 175°C)	µm	28	

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Application Guidelines :

Shipment

This product is packed and shipped in dry ice at -80°C. Inside every dry ice shipment of these products is a small packet containing the ABLECUBE. This is a small blue cube which retains its shape at -40°C or colder. If the ABLECUBE is exposed to temperatures higher than -40°C, the cube will melt.

Please check the state of the ABLECUBE to ensure the integrity of the shipment. If the ABLECUBE has melted upon receiving inspection, place the entire shipment in a -40°C or colder freezer and contact your Customer Service or Sales Representative.

Unpacking

Transfer the syringes from the dry ice to a -40°C freezer without ANY delays. Freeze-thaw voids will form in the syringes if the syringes are repeatedly thawed and refrozen.

Storage

This product should be stored at -40°C or colder. If stored at these conditions, ABLEBOND 84-1LMISR4 may be usable for up to one (1) year. Alternate storage conditions may be used as follows :

Storage Temperature (°C)	Usable Shelf Life
0 to 5	Syringes : 8 days Jars : 1 month (*)
-15 to -10	Syringes : 2 months Jars : 6 months (*)

(*) jar rolling required)

The shelf life of the material is only valid when the material has been stored at the correct storage condition. Incorrect storage conditions will degrade the performance of the material in both handling (e.g. dispensing) and final cured properties.

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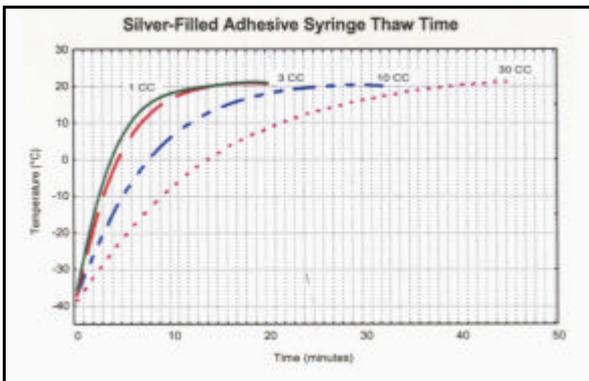
Application Guidelines (Continued) :

Thawing

Allow the container to reach room temperature before use. After removing from the freezer, set the syringes vertically for thawing. Refer to syringe thaw time chart below for the thaw time recommendation.

DO NOT open the container before contents reach ambient temperature. Any moisture that collects on the thawed container should be removed prior to opening the container.

DO NOT re-freeze. Once thawed to room temperature, the adhesive should not be refrozen.



Adhesive Application

Thawed adhesive should be immediately placed on dispense equipment for use. If the adhesive is transferred to a final dispensing reservoir, cure must be exercised to avoid entrapment of contaminants and/or air into the adhesive. Adhesive must be completely used within the 18-hour period. Silver-resin separation may occur if the adhesive is left out at ambient beyond the recommended work life.

Apply enough adhesive to achieve a 25-50 μm wet bondline thickness, dispensed with approximately 25% - 50% filleting on all sides of the die. Alternate dispense amounts may be used depending on the application requirements. Star or cross shaped dispense patterns will yield fewer bondline voids than the matrix style of the dispense pattern.

Contact the Technical Service Department for detailed recommendations on adhesive application, including dispensing.

Cure

ABLEBOND 84-1LMISR4 should be cured in conventional box oven per the recommended cure condition. Refer to the cure process data section of the technical data sheet for the recommended cure cycles.

For the recommended cure cycle, the oven should be pre-heated to 175°C before introducing the leadframe magazines.

Health & Safety :

It is recommended to consult the Emerson & Cuming product literature, including material safety data sheets, prior to using Emerson & Cuming products. These may be obtained from your local sales office.

Attention Specification Writers :

The technical information contained herein is consistent with the properties of the material and should not be used in the preparation of specifications, as it is intended for reference only. For assistance in preparing specifications, please contact your local Emerson & Cuming office for details. Please contact Emerson & Cuming Quality Assurance for test method details.

(ABLEBOND® is a registered trademark of National Starch and Chemical Company)

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