Thermoset ME-543 Underfill Encapsulant

Description

LORD Thermoset ME-543 encapsulant is an anhydride-free, thermally conductive, semiconductor grade epoxy underfill product developed for the encapsulation of densely populated area array flip chip devices. It is formulated with the necessary structural strength to handle over-molding processes.

Thermoset ME-543 encapsulant can be fast cured and is engineered to withstand 260°C peak reflow temperatures of lead-free solders.

Features and Benefits

High Thermal Conductivity – provides thermal conductivity for applications where superior heat dissipation is required.

Jettable – provides low viscosity for high speed jetting dispense.

Self-Filleting – provides surface tension and viscosity flow properties to achieve full coverage without producing bulky fillet on top of device.

Rapid Flow – formulated to flow consistently without voids while maintaining a fast flow rate; can be used under small or large dies with high-density interconnects and under devices with stand-off heights below 25 micron.

Low Coefficient of Thermal Expansion – minimizes the possibility of cracking during temperature cycling (-40 to +150°C); provides excellent thermal shock performance.

Good Adhesion – provides good adhesion to laminate, ceramic, solder mask and metal surfaces.

Device Reliability – provides high Tg and high fracture toughness, reducing the amount of thermally induced stress placed on the solder interconnects.

Typical Properties*

Uncured	
Appearance	Black Liquid
Viscosity, cps @ 25°C TA Rheometer	21,000
Specific Gravity	2.2
Gel Time, min @ 150°C	3
Working Life, hr @ 25°C	36
Cured	
Volume Resistivity, ohm-cm @ 25°C	$>1 \times 10^{15}$
Thermal Conductivity, W/mK	1.2
Coefficient of Linear Thermal Expansion, ppm/°C	
alpha 1	27
alpha 2	95
Glass Transition Temperature (Tg), °C by TMA	135
Die Shear Strength, MPa	62
Storage Modulus, MPa	5500
Moisture Absorption, %	0.7
Extractable Ionic Contaminants, ppm	
Chloride	100
Sodium	10
Potassium	5

*Data is typical and not to be used for specification purposes.

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Application

Applying – Before use with dispensing equipment, allow encapsulant to be warmed to room temperature (ideally 20-25°C). Thaw encapsulant by placing the syringe in a vertical (upright) position with dispense tip facing downward in an ambient environment. Consult handling instructions** for specific guidelines.

To decrease underfill time, preheat substrate to 100°C prior to encapsulant application.

Mount the syringe onto the dispensing equipment that has been thoroughly cleaned and purge encapsulant through the system until an unbroken flow of encapsulant is extruded. Dispense underfill encapsulant as a corner dot, line or L-shaped extrusion.

Curing – Allow material to cure for 7-20 minutes at 160-165°C. This time-at-temperature profile refers to the time the material should be allowed to cure once it reaches the target temperature. Allowance should be made for oven ramp rates, parts with large thermal mass and other circumstances that may delay material actually reaching the target temperature.

Material can be cured at temperatures lower than 160°C with a longer duration.

Cleanup – Remove uncured encapsulant using common organic solvents such as acetone or isopropanol.

Shelf Life/Storage

Shelf life is six months from date of manufacture when stored at -40°C in original, unopened container. Syringe must be maintained at -40°C in a vertical (upright) position with the dispense tip facing down. Do not store syringe on its side (horizontally).

This material is shipped and stored frozen. Consult handling instructions** for thawing.

Cautionary Information

Before using this or any LORD product, refer to the Material Safety Data Sheet (MSDS) and label for safe use and handling instructions.

For industrial/commercial use only. Must be applied by trained personnel only. Not to be used in household applications. Not for consumer use.

***Handling instructions are available on LORD.com.*

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