



HYSOL®FP4402

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PRODUCT DESCRIPTION

Hysol® FP4402 is a low stress, liquid epoxy encapsulant designed for advanced chip on board applications. High purity and low thermal expansion characteristics provide excellent resistance to moisture and thermal shock, and reduced warpage of substrates. It is suitable for protecting a wide range of bare semiconductor devices, including LSI chips such as static RAM's, mask ROM's and gate arrays. The unique combination of low stress and excellent resistance to moisture and process fluids also provides good performance for special potting applications such as automotive sensors.

TYPICAL APPLICATIONS

Encapsulant for advanced chip on board applications.

PROPERTIES OF UNCURED MATERIAL

Color	Black
Filler content, %, (ITM3A)	74
Specific Gravity	1.7
Shelf Life @-40°C, (-40°F), months	5
Typical Value	
Viscosity @ 25°C, (77°F) (ITM2A)	
Brookfield RVF	
Spindle 7, Speed 2, Cp	100,000
Spindle 7, Speed 20, Cp	55,000

PHYSICAL PROPERTIES, CURED MATERIAL

Color	Black
Glass Transition (T _g), °C (ITM65B)	155
Coefficient of Linear Thermal Expansion, In/in/°C, (ASTM D3386) (40-120°C)	22 x 10 ⁻⁶
Extractable Ionic Content, (ITM107B)	
Chloride (Cl ⁻), ppm	15
Sodium (Na ⁺), ppm	15
Potassium (K ⁺), ppm	15
Hardness, Shore D, (ASTM D2240)	97
Specific Gravity (ASTM D792)	1.80

Electrical Properties

Volume Resistivity, Ohms-cm (ASTM D257)	6.34 x 10 ¹⁴
Surface Resistivity, Ohms, (ASTM D257)	7.10 x 10 ¹⁵
Dissipation Factor (D), ASTM D150	
1 KHz	0.003
10 KHz	0.006
100 KHz	0.014
Dielectric Constant (K), (ASTM D150)	
1 KHz	3.34
10 KHz	3.32
100 KHz	3.20

Handling

Gel Time @ 121°C, (250°F), minutes, (ITM10N)	22
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Pot Life @ 25°C, (77°F), hours (ITM10T),	24
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Frozen storage at -40°C or lower is required for maximum shelf life. Frozen packages must be completely thawed before use. Warm at room temperature until no longer cool to the touch (normally 20-60 minutes). Do not thaw in an oven or water bath. For best results FP4402 should be dispensed onto a substrate warmed to approximately 90°C. This will help minimize air entrapment under bonding wire.

GENERAL INFORMATION

For safe handling information on this product, consult the Material Safety Data Sheet, (MSDS).

This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or their strong oxidizing materials

Cure Schedule

Recommended Cure	5 hour @ 150°C
Alternate Cure (Low Stress)	3 hours @ 125°C plus 3 hours @ 160°C

Use suggested cure conditions as general guidelines. Other cure conditions may yield satisfactory results. FP4402 should be cured in less than 1 hour after dispensing to prevent contamination and obtain best results.

Note

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Loctite Electronics

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