

## PRODUCT DATA SHEET

### I. DESCRIPTION

**DM6032Hk-SD/J182** is a new addition to the DM6032Hk product family designed specifically for very small die and applications such as LED attachment. The product has been formulated to have an exceptional resistance to drying out when dispensing and attaching large arrays of die. It has also been formulated to resist resin bleedout prior to curing.

The other unique properties of high thermal and electrical conductivity of the standard DM6032Hk are retained by the same patented organic system with high filler loading of Ag powders/flake combinations. Processing parameters remain unchanged. This technology provides a highly conductive polymer matrix when cured with a k greater than most solders. Unlike typical epoxy systems, the DM6032Hk-SD/J182 product can also be shipped and stored at room temperature.

### II. KEY FEATURES

- Unmatched **thermal conductivity** -60W/m-k
- Very long **open time**
- **Replaces solder** – eliminates Pb metal and plating requirements
- Electrical resistivity as low as **5.0 $\mu\Omega$ -cm**
- Room temperature shipping and storage – **no dry ice necessary**
- **Excellent rheology** for both dispensing and /or screen printing
- Minimal **bleed-out**

### III. APPLICATIONS

DM6032Hk-SD/J182 Ag/epoxy is recommended for attaching devices in very high power density applications such as:

- LED's
- Power Semiconductors
- Laser Diodes
- Power Hybrids
- RF Power Devices
- GaAs Devices
- MMIC's
- Solder replacement

#### IV. TYPICAL PROPERTIES

##### Paste Properties:

|                                        |          |
|----------------------------------------|----------|
| 25°C Viscosity, kcps @ 10 rpm, #RVT/TC | 30       |
| Thixotropic Index, 10/50 rpm @ 25°C    | 2.2      |
| Shelf Life, 25°C, months               | 6 mos.*  |
| -40°C, months                          | 12 mos.* |
| Weight % Silver                        | 90       |
| Fired Weight % Silver                  | 96       |
| Density, g/cc                          | 5.6      |

##### Processed Properties: (1)

|                                          |           |
|------------------------------------------|-----------|
| Resistivity, $\mu\Omega$ -cm             | 5         |
| Adhesion, psi (2)                        | 2,500     |
| Thermal Conductivity, W/m <sup>2</sup> K | Up to 60* |
| Thermal Expansion, ppm/°C                | 26*       |
| Flexural Modulus, psi                    | 600,000*  |
| Ionic Impurities: Na+, Cl-, K+, F-, ppm  | < 30      |

(1) 110°C/60' then 200°C/30' processing (2) 0.250" die shear, bare ceramic  
\* estimated

#### V. STORAGE AND HANDLING

This material is shipped in jars without dry ice. After receipt, storing on a jar roller at 1 to 5 rpm at room temperature is the most preferred. Failure to roll the jars adequately could result in non-homogeneity and an inconsistent dispense. If not jar-rolled, gentle stirring is recommended before use. Cold storage is not necessary or recommended. If the paste is homogeneous (no solvent on top or thick solid felt in bottom of the jar), it can be poured into a syringe and used immediately. This product is also available packaged in syringes and shipped at -40°C. For more information please refer to the document *SYRINGE-PACKAGED ADHESIVE PASTES*.

#### VI. PROCESSING GUIDELINES

##### Application

The DM6032Hk-SD/J182 rheology has been designed to be utilized in automated high speed dispensing equipment without tailing or dripping. The DM6032Hk-SD/J182 should be uniform and essentially free of air bubbles prior to use. Unlike our DM6032Hk/F956 and DM6032H k-PT/H582 products, this material provides several hours of open time between material application and component placement. This can be important in the attachment of small components.

A 22-gage needle (16 mil ID) is typically recommended for dispensing of the DM6032Hk-SD/J182. Needles smaller than 25 gage (10 mil ID) may not produce uniform dispense weights. The material should be dispensed as an "X" pattern for larger die with sufficient quantity to produce fillets wicking up the side of the attached component. Deposition weights will vary according to component size. Typical dispense quantities are 75 µL or 290 mg per square inch of die area. Components should be pressed all the way into the DM6032Hk-SD/J182 material wet deposit such that a 1.3 – 1.9 mil wet bondline exists with fillet formation around the perimeter. Final cured bondline thickness should be approximately 0.8 to 1.2 mil.

### Curing Profile

For smaller die (<0.250 inches), no prebake is necessary. Larger die require this predrying step before the cure cycle. Simply place attached materials into a ventilated, forced-air convection oven at room temperature, and set for your desired peak temperature. If using a belt furnace or other type of oven, ramp rates should be controlled for optimal results. The following options for ramp rate, time and temperature guidelines are recommended for components smaller than 0.400 in. (10 mm) square attach area. Recommended profiles are die size related and are shown on the following tables:

Prebake for Die Size 0.250 – 0.400 inches (choose one of these below, if applicable):

| <u>Peak Temp.</u> | <u>Ramp Rate</u> | <u>Dwell</u> |
|-------------------|------------------|--------------|
| 100°C             | 5 - 10°C/min.    | 75 min.      |
| 110°C             | 5 - 10°C/min.    | 60 min.      |
| 125°C             | 5 - 10°C/min.    | 30 min.      |

Curing for Die Size ≤ 0.400 inches (choose one of these below):

| <u>Peak Temp.</u> | <u>Ramp Rate</u> | <u>Dwell</u> |
|-------------------|------------------|--------------|
| 175°C             | 5 - 10°C/min.    | 45 min.      |
| 200°C             | 5 - 10°C/min.    | 30 min.      |
| 225°C             | 5 - 10°C/min.    | 15 min.      |

## **VII. MORE INFORMATION**

For more information on DM6032Hk-SD/J182 and other Diemat product, please contact us by:

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