epoxy technology inc®

# EPO-TEK® H20E

Electrically Conductive, Silver Epoxy

E = 400,000 psi = 280 kgf/mm²

Na 25~30 ppm Coh 500ppt
K —
Cl 100~140 ppm
NH4 200~250 ppm

## SPECIFICATIONS

MIXING RATIO PARTS BY VOLUME (or wt.)
Part "A" (epoxy resin and silver powder) ..... 1
Part "B" (hardener and silver powder) ..... 1

NOTE: Mix contents of Part "A" container and contents of Part "B" (hardener) container thoroughly before mixing the two together.

CURING SCHEDULE
(minimum bond line temperature)
175°C ..... 45 seconds
150°C ..... 5 minutes
120°C ..... 15 minutes
80°C ..... 90 minutes
50°C ..... 12 hours

PHYSICAL PROPERTIES
Specific Gravity ..... 2.6
Color ..... Silver-Bright
Consistency ... Very soft, smooth, thixotropic paste
Lap Shear Strength ..... 1500 psi
Pass Thermal Shock — Gold backed silicon chips bonded to a gold metallized ceramic substrate will pass: 5 cycles from −62°C to +125°C
Bonded Silicon Chips (100 x 100 mils) when placed on a 300 −340°C heat column will resist a shear force of 16 oz.

THERMAL RESISTANCE: (Junction to Case)
TO−18 package with nickel-gold metallized 20 x 20 mil chips and bonded with EPO-TEK H20E (2 mils thick)
Eutectic Die attach ..... 4.8 to 5.3°C/watt
EPO-TEK H20E ..... 6.7 to 7.0°C/watt

ELECTRICAL PROPERTIES
Volume Resistivity (rigid specification)
0.0001 to 0.0004 ohm-cm

OUTGASSING PROFILE FOR AEROSPACE ENVIRONMENT
H20E mixed 1:1 by weight and cured at 100°C for 2 hours — Results as follows:
Total weight loss (%) ..... 1.18
VCM (volatile condensable materials) (%) by weight ..... 0.01

Tg, GLASS TRANSITION TEMPERATURE
50°C − 60°C
When mixed 1:1 by weight and cured within 48 hours at 150°C for 10 minutes

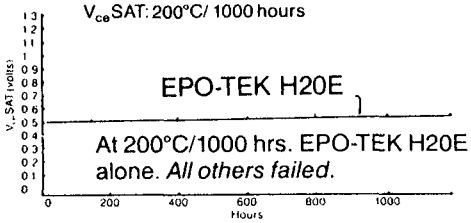
SCHOTTKY DIODE

| INITIAL | 2 WEEKS @ 200°C |
|---|---|
| $C_j$ 1pF (typical) | |
| $V_b \geq 5V$ @ 10 μa | 4.8V @ 10 μa |
| $V_f \leq 0.4V$ @ 1 ma | 0.32V @ 1 ma |

POT LIFE ..... 4 days

SHELF LIFE
One year when stored at room temperature.
REFRIGERATION NOT REQUIRED

TO-3 package, 2N3055 chips, medium power transistor - 4 amp pulse




### H20E EXHIBITS SUPERIOR $V_{ce}$SAT PERFORMANCE.

EPO-TEK H20E is a 100%, two component silver filled epoxy designed specifically for chip bonding in microelectronic and optoelectronic applications.

EPO-TEK H20E is a very soft, smooth, thixotropic paste. The excellent handling characteristics and the extremely long pot life at room temperatures for this unique two component system is obtained without the use of solvents. In addition to the high electrical conductivity, the short curing cycles, and the high and proven reliability of using a pure silver powder (no alloys used), EPO-TEK H20E is extremely simple to use. The pure silver powder is dispersed in both the resin and hardener and the system is designed so that it can be used in a convenient 1:1 mixing ratio by volume that is non-critical. In fact the EPO-TEK H20E is the easiest-to-use two component silver epoxy that has ever been developed for the microelectronic industry.

EPO-TEK H20E is especially recommended for use in high speed epoxy chip bonding systems where very fast cures are highly desirable. This cannot be obtained with single component systems. Because EPO-TEK H20E can be cured very rapidly it is an excellent material to use for making fast circuit repairs. EPO-TEK H20E can be screen printed, machine dispensed or stamped.

EPO-TEK H20E is designed to be used in the 300°C to 400°C range for wire bonding operations.

AVAILABILITY : 1 oz. trial evaluation kit, price on request, FOB Billerica, Mass. Production price schedule available on request. When placing an order please specify whether EPO-TEK H20E is to be used by volume or weight.

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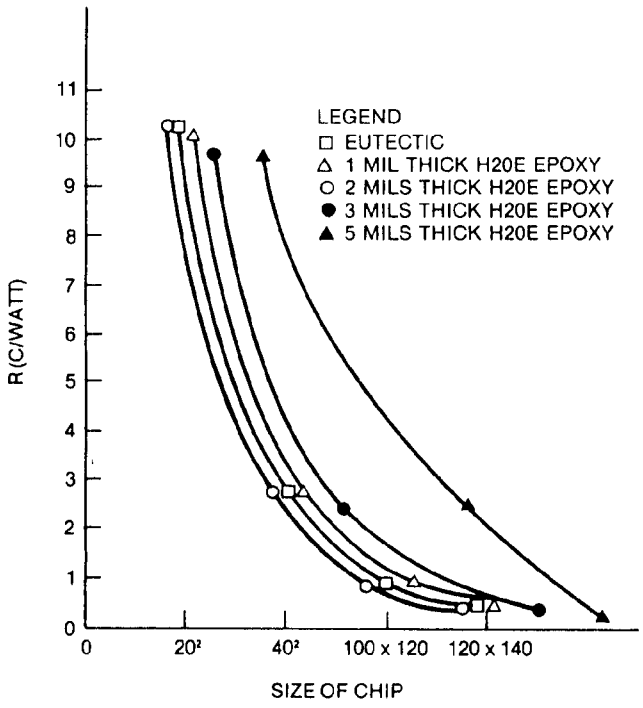
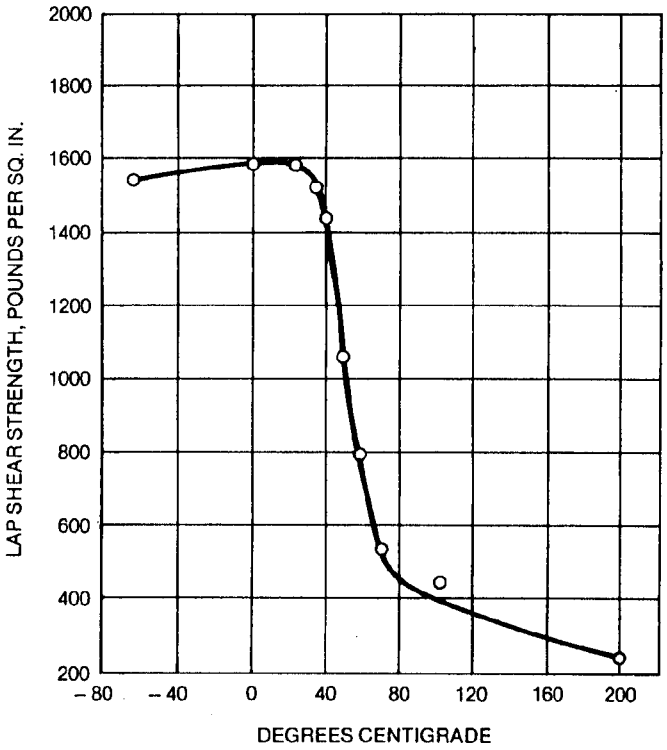
# SOME PHYSICAL & ELECTRICAL CHARACTERISTICS OF epo-tek® H20E

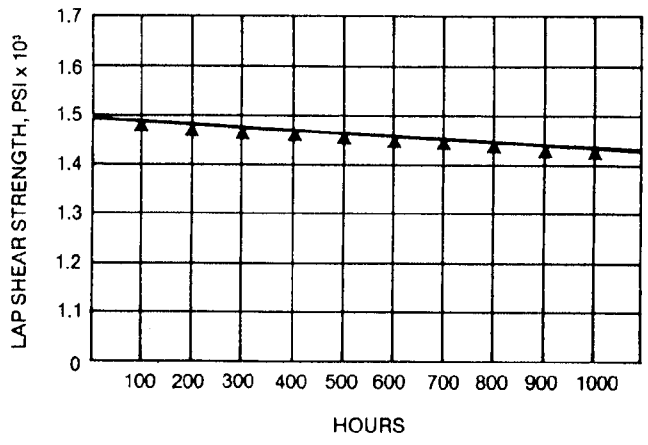
Thermal resistance of medium-power, gold-backed silicon chips of varying sizes mounted with eutectic preforms (98% Au—2% Si) and Epo-Tek H20E silver epoxy.




Epo-Tek H20E Two-Part Silver Epoxy - Lap Shear Strength as a function of temperature, epoxy cured at 150°C for 15 minutes.




Epo-Tek H20E subjected to 200°C for 1000 hours. Lap Shear Strength was determined to be between .375″ x .750″ x .020″ Alumina and .375″ x .750″ x .007″ Nickel A.




$V_{SAT}$ curve derived during a standardization bake at 200°C for 1000 hours using Epo-Tek H20E for die attach.