



3M™ Thermally Conductive Adhesive Tape 8940 / 8943

Product Information Sheet

11.04.2007

Supersedes Version 01.10.2005

Product Description 3M™ Thermally Conductive Adhesive Tapes 8940 / 8943 are designed to provide an efficient heat transfer path between heat generating components and heat sinks or other cooling devices.

The tapes consist of a carrier, highly loaded with thermally conductive fillers, coated on either one side (3M™ 8943) or both sides (3M™ 8940) with a high temperature resistance acrylic pressure sensitive adhesive.

The specialized construction securely bonds the heat generating components to heat sinks and offer both, good thermal conductivity and excellent electrical insulation properties.

Product Construction

| | 3M 8940 | 3M 8943 |
|------------------------|---------------------------|---------------|
| Color | Beige | |
| Carrier | Filled Copolymer | |
| Adhesive type | Modified Acrylic Adhesive | |
| Tape type | Double coated | Single coated |
| Tape Thickness | 0.190mm | 0.170 mm |
| Liner Thickness | 0,075 mm | |

The film liner is a double sided siliconized Polyester Film with a differential release system.

Typical Applications Applications requiring good thermal transfer and thin bonding. Typical applications are assembling of power devices as bare dies in chip on board technique or flip chip assemblies with a directly mounted heat sink.

The tape performance properties have been primarily adapted to fit thermal requirements in applications such as Engine Control Units bonding, ABS Systems, High power LED's, and other electronic increased power devices.

3M™ Thermally Conductive Adhesive Tapes 8940 / 8943

Typical Properties and Performance Characteristics

Note: The following technical information for 3M™ Thermally Conductive Tape 8940 / 8943 should be considered representative or typical only and should not be used for specification purposes.

| Thermal Properties | Test | Unit | Value | Test Method |
|--------------------|---|-------|-----------|-------------|
| | Thermal Conductivity at 25 °C | W/m*K | 0,9 | ASTM D 5470 |
| | Coefficient of Thermal Expansion (-40 to 150°C) | mm/°C | 140 E -06 | TMA |

| Electrical Properties | Test | Unit | Value | | Test Method |
|-----------------------|-------------------------------------|-------|------------------------|------|-------------|
| | | | 8940 | 8943 | |
| | Breakdown Voltage typical value * | kV | 10.3 | 9.8 | IEC 60243-1 |
| | Dielectric Strength typical value * | kV/mm | 55 | 52 | IEC 60243-1 |
| | Volume Resistivity | Ω*cm | 2,5 x 10 ¹³ | | ASTM D257 |

* Average value (not for specification purposes)

| Mechanical Properties | Test | Unit | Value | Test Method |
|---|---|-------------------|-----------------|--------------|
| 90° Peel Adhesion to Aluminium Substrate (AlMg ₃ ; R _a : 0,48 μm; R _z :)μm) | 20 min dwell time at room temp. | N/cm | 5,0 | AFERA 5001 |
| | 24 h dwell time room temp. | N/cm | 6,0 | AFERA 5001 |
| | at 150 °C | N/cm | 4,9 | AFERA 5001 |
| | at 180 °C | N/cm | 2,4 | AFERA 5001 |
| Overlap Shear | 20 min dwell time at room temp. | MPa | 5,3 | ASTM D 1002 |
| | 24 h dwell time room temp. | MPa | 9,0 | ASTM D 1002 |
| | After 24 h @ 150 °C | MPa | 6,8 | ASTM D 1002 |
| | After 24 h @ - 40 °C | MPa | 9,0 | ASTM D 1002 |
| Holding Power | 1000 g load @ room temp. | Minutes | 10000+ | AFERA 4012 |
| | 500 g load @ 70 °C | Minutes | 10000+ | AFERA 4012 |
| Tensile strength | Tensile Strength | N/mm ² | 6-7 | EN ISO 527-2 |
| | Elongation at break | % | 80-120 | EN ISO 527-2 |
| Liner properties | Liner release | cN/25,4 mm | 15 | FINAT TM3 |
| Temperature Performance | Thermal Stability 225 °C Dwell @ 60 min (Tape was applied between a glass and an aluminium panel) | Visual | No Change | 3M |
| | Solder Reflow process according to JEDEC J-STD-020C (Level 1) | Visual | Test in process | 3M |
| | Continuous Operating Temperature Range | °C | - 40 up to 150 | 3M |

3M™ Thermally Conductive Adhesive Tapes 8940 / 8943

| Thermal Resistance Properties | Test | Unit | Value | Test Method |
|-------------------------------|--------------------------------|------|-------|-------------|
| | Thermal Gravimetric Analysis * | % | | 3M |
| | Mass loss at 200 °C | | < 0,2 | |
| | Mass loss at 150 °C after 4 h | % | < 0,3 | |

| | |
|---------------------|---|
| Flame Class: | UL 94 V-0, File E253171, Flame rating applies to adhesive film (3M™ Thermally conductive Tape 8940) bonded to 3.0 mm minimum thickness aluminium on one side and 0.86 mm minimum thickness FR-4 laminate on other side. |
|---------------------|---|

| Application Guidelines | |
|------------------------|--|
| | <p>1.) Substrate surfaces should be clean and dry prior to tape application. Isopropyl alcohol (isopropanol) applied with a lint-free wipe or swab should be adequate for removing surface contamination such as dust or finger prints. Do not use “denatured alcohol” or glass cleaners which often contain oily components. Allow the surface to dry for several minutes before applying the tape. More aggressive solvents (such as acetone, methyl ethyl ketone (MEK) or heptane) may be required to remove heavier contamination (grease, machine oils, solder flux, etc.) but should be followed by a final isopropanol wipe as described above.</p> <p>Note: Be sure to read and follow the manufacturers’ precautions and directions when using primers and solvents.</p> <p>2) Apply the tape to one substrate at a modest angle with the use of a squeegee, rubber roller pressure to help reduce the possibility of air entrapment under the tape during its application. The liner can be removed after positioning the tape onto the first substrate.</p> <p>3) Assemble the part by applying compression to the substrates to ensure a good wetting of the substrate surfaces with the tape. Proper application of pressure (amount of pressure, time applied, temperature applied) will depend upon design of the parts. The preferred pressure at room temperature is a minimum of 1 kg/cm² for 5 seconds. For fragile parts lower pressure may be needed.</p> <p>Rigid substrates are more difficult to bond without air entrapment as most rigid parts are not flat. Flexible substrates can be bonded to rigid or flexible parts with much less concern about air entrapment because one of the flexible substrates can conform to the other substrate.</p> |
| Shelf Life | Product shelf life is 2 years from date of manufacture when stored at room temperature conditions 22°C and 50% r.h. in the products original packaging. |

3M™ Thermally Conductive Adhesive Tapes 8940 / 8943

Important Notice

All statements, technical information and recommendations herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of application. Please remember that many factors can affect the use and performance of a 3M product in a particular application. The materials to be bonded with the product, the surface preparation of those materials, the product selected for use, the conditions in which the product is used, and the time and environmental conditions in which the product is expected to perform are among the many factors that can affect the use and performance of a 3M product. Given the variety of factors that can affect the use and performance of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application. All questions of liability relating to the 3M product are governed by the terms of the sale subject, where applicable, to the prevailing law.

3M is a registered trademark of 3M Company.

3M

3M Deutschland GmbH
Electronics Markets and Materials Division

Carl-Schurz-Straße 1, 41453 Neuss
Telefon 0 21 31 / 14 33 30
Telefax 0 21 31 / 14 38 17

Gedruckt auf chlorfrei gebleichtem Papier