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## Thermally Conductive Tape 9892FR

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**Product Description**

3M™ Thermally Conductive Tape 9892FR consists of a highly conformable pressure-sensitive film composed of an acrylic adhesive filled with ceramic particles and supported on a protective release liner. It features a unique combination of attributes that include ease-of-use, high thermal conductivity, good dielectric properties and high bond strength (with re-workability).

3M™ Thermally Conductive Tape 9892FR is designed for bonding heat sinks to a wide variety of heat-generating electronic components – for example, IC packages, circuit boards and plasma-type flat-panel displays (PDPs) – and can easily be die-cut to meet specific application requirements. Permanent yet re-workable bonds are achieved at room temperature in just seconds without the need for an extended curing cycle and mechanical fixturing. Due to the absence of a stiff carrier as part of the tape construction, 3M™ Thermally Conductive Tape 9892FR provides excellent conformability to non-flat or otherwise irregular surfaces and acts as an effective gap-filler. Improved surface contact helps achieve high bond strength and low thermal interface resistance between the two substrates without the use of clamps, brackets or screws. In many applications, the high dielectric strength of 3M™ Thermally Conductive Tape 9892FR will also allow the elimination of discrete electrical insulation layers.

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**Product Construction**

Tape Color	White
Adhesive Type	Acrylic
Adhesive Thickness	1.0 mm
Filler Type	Ceramic
Release Liner Type	Silicone-Treated Polyester
Release Liner Thickness	50 µm

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### Typical Properties and Performance Characteristics

**Note: The following technical information should be considered representative or typical only and should not be used for specification purposes.**

Property		Value
Density (g/cm <sup>3</sup> )		1.6
Thermal Conductivity (W/m-K) (by Kemtherm QTM-D3)		0.7
Hardness (Asker-C)		44
Maximum Use-Temperature (°C)		80
Flame-Retardancy Rating (UL-94)		V-2 (File No. E176845)
90° -Peel Adhesion (N/cm)	<i>on Aluminum</i>	5
	<i>on Glass</i>	4
Shear adhesion (N/cm <sup>2</sup> )	<i>Aluminum to Glass</i>	38
Dielectric Strength (kV/mm)		15.7
Dielectric Constant	<i>at 50 Hz</i>	5.1
	<i>at 1 kHz</i>	4.9
	<i>at 1 MHz</i>	4.5
Shelf Life (at 25°C)		6 months
Outgassing (Total Mass-Loss during 100°C/30 min. Exposure)		0.17 %

### Available Sizes

**Standard Rolls:** 280 mm wide by 33 m long

**Custom Sizes:** Contact your local 3M sales representative for information and availability of custom sizes (width and length or sheet format) or die-cut parts of tape 9892FR

### Application Techniques

1.) 3M™ Thermally Conductive Tape 9892FR is a homogeneous adhesive film supported on a protective release liner. Do not remove this release liner prior to application of the tape to the surface of one of the substrates; the product is not intended to be handled as a free-standing film. Avoid touching the exposed surface of the tape as this may deposit finger oils and introduce wrinkles.

2.) 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 applying the tape.

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More aggressive solvents (such as acetone, methyl ethyl ketone (MEK) or toluene) 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.

Some molded-plastic electronic packages may be heavily contaminated with low-surface-energy mold-release agents and may require abrasive action and/or priming to make them amenable to bonding.

**Note:** Be sure to read and follow the manufacturers' precautions and directions when using primers and solvents.

3.) With the release liner still in place, apply the tape to the surface of one of the substrates in a manner that will avoid or minimize air entrapment; a roller or other lamination system is recommended. Tape and substrate temperatures at application should exceed 15°C (60°F) to prevent the tape from becoming too stiff and losing its conformability.

4.) Remove the release liner to expose the second face of the adhesive tape.

5.) Align the second substrate with respect to the first and press the two parts together (or use a roller if one of the substrates is flexible) for a few seconds. Optimal thermal and mechanical performance will be obtained when the adhesive entirely wets both substrates surfaces and displaces all remaining air from the interfacial region. The pressure and time necessary to achieve this condition will depend on the roughness of one or both surfaces, the degree of co-planarity between the two surfaces, as well as the stiffness of the substrates; heating the parts to 70 – 100°C (158° – 212°F) will help reduce the required pressure and process time.

6.) Reworking the bond by mechanically separating the parts, using torque action for rigid parts and peel if at least one is flexible. Remove the adhesive by rubbing it with an abrasive pad, clean up the site and apply new adhesive. The force required to separate the parts and remove the adhesive can be reduced by weakening the adhesive, either by heating it to 70–100°C (158° – 212°F) or applying a solvent such as acetone or MEK.

### General Information

Product	Thickness (mm)	Thermal Conductivity (W/m-K)	Typical applications
<b>Thermally Conductive Tapes</b>			
9882	0.051	0.45	Applications requiring thin bonding with good thermal transfer; CPU, flex circuit and power transformer bonding to heat sinks and other cooling devices.
9885	0.127	0.45	
9890	0.25	0.45	
9892FR	1.0	0.70	Applications requiring gap filling and bonding with good thermal transfer, plasma display, IC packages and PCB bonding to heat sinks, metal cases and other cooling devices.
<b>Thermally Conductive Pads</b>			
5507	0.5 to 2.5	2.5	Applications requiring gap filling and superior thermal performance without bonding. IC package and PCB thermal interfacing with heat sinks or other cooling devices and metal cases.
5507S	0.25, 0.5 to 2.5	2.5	

Product selection table for 3M™ Thermally Conductive Materials

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<b>Application Ideas</b>	3M™ Thermally Conductive Tape 9892FR is designed to provide bonding and preferential heat-transfer path between heat-generating devices (such as IC packages, printed circuit boards and plasma displays) and cooling devices (e.g., heat sinks, metal cases and frames). The acrylate chemistry renders tape 9892FR extremely soft and compliant, allowing the tape to conform intimately to non-flat substrates, even at moderate pressures.
<b>For Additional Information</b>	To request additional product information or to arrange for sales assistance, call toll free 1-800-362-3550. Address correspondence to 3M Bonding Systems Division, 3M Center, Building 220-7E-01, St. Paul, MN 55144-1000. Our fax number is 651-733-9175. In Canada, phone: 1-800-364-3577. In Puerto Rico, phone: 1-809-750-3000. In Mexico, phone 5-728-2180.
<b>Certification/Recognition</b>	<p>MSDS: 3M has not prepared a MSDS for this product which is not subject to the MSDS requirements of the Occupational Safety and Health Administration's Hazard Communication Standard, 29 C.F.R. 1910.1200(b)(6)(v). When used under reasonable conditions or in accordance with the 3M directions for use, the product should not present a health and safety hazard. However, use or processing of the product in a manner not in accordance with the directions for use may affect its performance and present potential health and safety hazards.</p> <p>TSCA: This product is defined as an article under the Toxic Substances Control Act and therefore, it is exempt from inventory listing requirements.</p> <p>UL: This product has been recognized by Underwriters Laboratories Inc. under Standard UL-94 (File No. E176845). For further information of the recognition including the card, please use the Fax-On-Demand system @ 1-800-_____.</p>
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