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Technical Data | October 2016

3M™ Thermally Conductive Silicone Interface Pad 5591

Product Description

3M™ Thermally Conductive Silicone Interface Pad (TCSIP) 5591 is designed to provide a preferential heat transfer path between heat generating components and heat sinks, heat spreaders or other cooling devices. 3M TCSIP 5591 consists of a highly conformable and slightly tacky silicone elastomer sheet filled with thermally conductive ceramic particles, which helps provides enhanced thermal conductivity and excellent electrical insulation performance.

Key Features

- Very good softness and conformability even to non-flat surfaces
- Good thermal conductivity
- Good electrical insulation properties
- Compression relaxation properties help reduce pressure to electric components
- Slight tack allows pre-assembly
- Good wettability for improved and lower thermal resistance

Product Construction/Material Description

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

3M™ Thermally Conductive Silicone Interface Pad 5591	
Property	**Value**
Color	White
Base resin	Silicone
Thickness	0.5 – 3.0mm*
Primary Filler Type	Ceramic
Product Liner	PET Film Liners

* Standard thickness range. Custom thickness options available up to 10mm. Contact your local 3M representative for more information.

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Applications

- Integrated chip (IC) packaging heat conduction
- Heat sink interface
- Chip on film (COF) heat conduction
- LED board thermal interface material (TIM)
- HDTV integrated chip (IC)
- General gap filling in electronic device

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Application Techniques

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

Substrate surfaces should be clean and dry prior to the thermal pad application to ensure best thermal performance. A clean surface can improve the thermal performance of an application.

- Isopropyl alcohol (isopropanol) applied with a lint-free wipe or swab should be adequate for removing surface contamination such as dust or fingerprints. Do not use "denatured alcohol" or glass cleaners, which often contain oily components. Allow the surface to dry for several minutes before applying the thermal pad. 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.
- Apply the thermal pad to one substrate at a modest angle with the use of a squeegee, rubber roller or finger pressure to help reduce the potential for air entrapment under the thermal pad during its application.
- Remove the release liner before application.
- Assemble the part by applying compression to the substrates to ensure a good wetting of the substrate surfaces with the thermal pads. Rigid substrates are more difficult to assemble without air entrapment as most rigid parts are not flat. Flexible substrates can be assembled to rigid or flexible parts with much less concern about air entrapment because one of the flexible substrate can conform to the other substrates during application.

Typical Physical Properties and Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is provided once the product is approved by 3M for general commercialization and development work is completed.

3M™ Thermally Conductive Silicone Interface Pad 5591		
Property	**Method[a]**	**Value**
Thermal Conductivity (W/m-K)[b]	ASTM D5470	1.0 W/m-K
Density (g/cm^3, @ 25°C)	ASTM D6111	2.0
Operating Temperature Range	3M test method	-50°C to 125°C
Hardness Shore 00	Modified ASTM D2240	10 ~ 15
Dielectric Breakdown	Modified ASTM D149 (3M test method)	8 KV/mm
Volume Resistivity	ASTM D257	2 x 10^{12} Ohms

[a]Methods listed as ASTM are tested in accordance with the ASTM method noted

[b]Thermal K without permanent film is 5 W/m-K (based on testing of 3M TCSIP 5591). Effective thermal K and thermal resistance will be somewhat reduced with the addition of the polymeric film of the 3M TCSIP 5591S constructions.

Storage and Shelf Life

The shelf life of 3M™ Thermally Conductive Silicone Interface Pads 5591 is 12 months from the date of manufacture when stored in the original packaging materials and stored at 21°C (70°F) and 50% relative humidity.

Certificate of Analysis (COA)

The 3M Certificate of Analysis (COA) for this product is established when the product is commercially available from 3M. The commercially available product will have a COA specification established. The COA contains the 3M specifications and test methods for the products performance limits that the product will be supplied against. The 3M product is supplied to 3M COA test specifications and the COA test methods. Contact your local 3M representative for this product's COA.

This technical data sheet may contain preliminary data and may not match the COA specification limits and/or test methods that may be used for COA purposes.

Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is shipped with the commercialized product.

3M™ Thermally Conductive Silicone Interface Pad 5591

Safety Data Sheet: Consult Safety Data Sheet before use.

Regulatory: For regulatory information about this product, contact your 3M representative.

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use: Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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