

3M™ Thermally Conductive Acrylic Interface Pad 5578H

Product Description

3M™ Thermally Conductive Acrylic Interface Pad 5578H is designed to provide a preferential heat transfer path between heat generating components like integrated circuit (IC) chips and heat spreaders such as aluminum heat sinks. 3M pad 5578H consists of a highly conformable slightly tacky acrylic elastomeric sheet filled with conductive ceramic particles.

Key Features

- High thermal conductivity
- Good softness and conformability even to non-flat IC surfaces and heat spreading blocks
- Good flame retardant, UL 94 V-0 equivalent material
- No siloxane gas / oil bleeding, which often causes electric connection failure
- Soft compliant material allows for pressure relaxation, preventing high pressure zones on components
- Good electrical insulation properties
- Slight tack allows pre-assembly
- Good wettability for better thermal conductivity

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 Acrylic Interface Pad 5578H	
Property	Value
Color	White with light gray dots
Base resin	Acrylic
Pad thickness	0.5, 1.0, 1.5, 2.0mm
Primary filler type	Ceramic
Product liner	PET film

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PET liner
Thermally conductive firm layer (less tack)
Thermally conductive conformable layer
PET liner

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Applications

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

Application Techniques

Note: Be sure to follow manufacturer's safety precautions and directions for use 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 Acrylic Interface Pad 5578H		
Property	Method ^a	Typical Value
Thickness (mm)	-	0.5, 1.0, 1.5, 2.0
Thermal conductivity (W/mK) ^b	3M method	3.5
Hardness (Shore 00)	TS-KOR-217	70
Density (grams/cm ³)	3M method	2.5
Flammability	UL94	V-0
Dielectric Strength (kV/mm)	JIS K6249	19
Volume Resistivity (Ω-cm)	JIS K6249	1.7 x 10 ¹²
Relative Temperature Index (RTI)	UL registration: file no. E239181	140°C (Electric Grade)

*Note : Tolerances of 1 mm and 1.5 mm = +/-10%, 0.5 mm +/- 0.1 mm.

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Typical Operating Temperature Range for Acrylic-Based PSAs

3M acrylic conductive pressure sensitive adhesives (CPSAs) contain conductive fillers. The grounding and/or substrate interconnection performance of the conductive fillers within the acrylic PSA in an application will vary based on many factors including substrate types, contact grounding area, surface geometry in the bond line, flexibility of substrates, bonding conditions, applied voltage/current, application environment and environmental aging conditions/exposure.

In general, the acrylic PSA polymer itself used in acrylic CPSAs have good short term and long term environmental stability with respect to the PSAs macro-adhesion performance to many substrates. The acrylic polymers typical long term (days-weeks) performance and short term performance (minutes-hours) based on an adhesion test method is generally 85°C (185°F) long term and 121°C (250°F) short term.

3M CPSAs should be tested in the desired application to ensure the product is appropriate for use based on the application's specific requirements, including substrate types, contact grounding area, surface geometry in the bond line, flexibility of substrates, bonding conditions, applied voltage/current, application environment and environmental aging conditions/exposure.

Heat Resistance

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Duration (hrs)	Initial	500	1000	2000
Hardness (Shore 00)	70	70	71	71
Appearance	-	No effect	No effect	No effect

¹Aged by dwelling at 130°C high temperature chamber.

²The end use customer application, design and verification testing will determine the final in use effective temperature range based on each application's environmental conditions.

Storage and Shelf Life

The shelf life of 3M™ Thermally Conductive Acrylic Interface Pad 5578H 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.

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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 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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