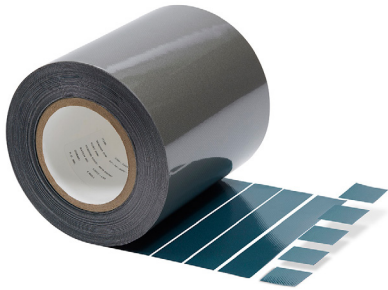


# THERMATTACH® Double-Sided Thermal Tapes

## Thermally Conductive Attachment Tapes



### Description

THERMATTACH® double-sided thermal interface tapes provide exceptional bonding properties between electronic components and heat sinks, eliminating the need for mechanical fasteners.

THERMATTACH® tapes are proven to offer excellent reliability when exposed to thermal, mechanical, and environmental conditioning. They are offered in a variety of configurations, as detailed in the typical properties table.

### Features / Benefits

- Offered in various forms to provide thermal, dielectric, and flame retardant properties
- Offered in custom die-cut configurations to suit a variety of applications
- Eliminates the need for mechanical attachment (i.e. screws, clips, rivets, fasteners)
- Proven reliability under various mechanical, thermal, and environmental stresses
- Embossed version available
- UL recognized V-0 flammability
- Meets RoHS specifications
- No curing required, unlike epoxy or acrylic preforms or liquid systems
- Easily reworkable

### Typical Applications

- Mount heat sinks to components dissipating < ~25 W
- Attach heat sinks to PC (esp. graphics) processors
- Heat sink attachment to motor control processors
- Telecommunication infrastructure components

### Product Attributes

#### T418

- Superior adhesive strength
- Best conformability to components
- UL94 V-0 rated
- Good thermal performance

#### T412

- Good adhesion
- Superior thermal performance
- General use tape with added thermal conductivity of Al foil layer

#### T411

- Designed for adhesion to plastic packages
- Attaches to low surface energy packages
- UL94 V-0 rated

#### T404/T414

- Excellent dielectric strength due to polyimide carrier
- Good thermal performance
- UL94 V-0 rated

#### T405

- General use tape with added thermal conductivity of Al foil layer
- Excellent thermal performance
- UL94 V-0 rated

THERMATTACH® Thermally Conductive Attachment Tapes

| Thermally Conductive Attachment Tapes |   |                           |                           |                           |                           |                           |                         |
|---------------------------------------|---|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-------------------------|
| Typical Properties                    |   | T418                      | T412                      | T404 / T414               | T405 / T405-R             | T411                      | Method                  |
| Physical                              | Recommended for Plastic Component Attachment  | No                        | No                        | No                        | No                        | Yes                       | --                      |
|                                       | Color   | Light Yellow              | Gray                      | Beige                     | White                     | Clear / Metallic          | --                      |
|                                       | Embossed  | Optional                  | Standard                  | Standard                  | Standard                  | No                        | --                      |
|                                       | Reinforcement Carrier   | Fiberglass                | Aluminum Mesh             | Filled Polyimide          | Aluminum                  | Aluminum Mesh             | Visual                  |
|                                       | Thickness, inch (mm)  | 0.010 (0.25)              | 0.009 (0.23)              | 0.005 (0.127)             | 0.006 (0.15)              | 0.010 (0.25)              | ASTM D374               |
|                                       | Thickness Tolerance, inch (mm)  | ± 0.001 (0.025)           | ± 0.001 (0.025)           | ± 0.001 (0.025)           | ± 0.001 (0.025)           | ± 0.001 (0.025)           | --                      |
|                                       | Adhesive CTE, ppm/°F  | 300                       | 300                       | 300                       | 300                       | 400                       | ASTM D3386              |
|                                       | Glass Transition Temperature Range °F (°C)  | -4 (-20)                  | -22 (-30)                 | -22 (-30)                 | -22 (-30)                 | -58 (-50)                 | ASTM D1356              |
|                                       | Operating Temperature Range, °F (°C)  | -22 to +257 (-30 to +125) | -22 to +257 (-30 to +125) | -22 to +257 (-30 to +125) | -22 to +257 (-30 to +125) | -58 to +302 (-50 to +150) | --                      |
| Thermal                               | Thermal Impedance °C-in <sup>2</sup> / W (°C-cm <sup>2</sup> /W) @ 300psi                     | 1.2 (7.7)                 | 0.30 (2.0)                | 0.6 (3.7)                 | 0.5 (3.4)                 | 1.0 (6.5)                 | ASTM D5470              |
|                                       | Thermal Conductivity W/m-K  | 0.5                       | 1.4                       | 0.4                       | 0.5                       | 0.5                       | ASTM D5470              |
| Electrical                            | Voltage Breakdown (kVac)  | 5                         | N/A                       | 5                         | N/A                       | NA                        | ASTM D149               |
|                                       | Volume Resistivity, (ohm-cm)  | 1.0 X 10 <sup>13</sup>    | 1.0 X 10 <sup>2</sup>     | 3.0 X 10 <sup>14</sup>    | N/A                       | NA                        | ASTM D257               |
| Mechanical / Adhesion                 | Lap Shear Al-Al @25°C, psi (kPa)  | 150 (1,034)               | 70 (480)                  | 100 (689)                 | 100 (689)                 | 40 (270)                  | ASTM D1002              |
|                                       | 90° Peel Adhesion to 0.002" aluminum foil, lbf /in (N/cm)                                     | 4.0 (6.9)                 | 1.0 (1.76)                | 1.5 (2.6)                 | 1.5 (2.6)                 | 2.0 (3.5)                 | ASTM D1000              |
|                                       | Die Shear Adhesion after 400 psi attachment, psi (kPa) – 2 hour sample dwell time 77°F (25°C) | 150 (1,034)               | 135 (931)                 | 130 (897)                 | 125 (862)                 | 110 (759)                 | Chomerics # 54          |
|                                       | Creep Adhesion, days<br>77°F (15°C)<br>302°F (125°C)  | >50<br>>10                | >50<br>>10                | >50<br>>10                | >50<br>>10                | >50<br>>10                | PSTC-7                  |
| Regulatory                            | Flammability Rating (See UL File E140244)   | V-0                       | Not Tested                | V-0                       | V-0                       | V-0                       | UL94                    |
|                                       | RoHS Compliant  | Yes                       | Yes                       | Yes                       | Yes                       | Yes                       | Chomerics Certification |
|                                       | Shelf-Life, months from shipment  | 12                        | 12                        | 12                        | 12                        | 12                        | Chomerics               |
|                                       | Outgassing, % TML (% CVCM)  | Not Tested                | 0.14 (0.00)               | 0.56 (0.02)               | 0.25 (0.01)               | Not Tested                | ASTM E595               |

## Ordering Information

These attachment tapes are available in the following formats.  
Contact Chomerics for custom widths, part sizes, etc.

Sheets form, roll form, or die-cut parts. Offered on continuous rolls.  
A general ordering information table is included below for reference.

Part Number: 6W — XX — YYYY — ZZZZ

|                          |  |   |   |
|--------------------------|--|---|---|
| W = 0 (Standard Part)    | XX = 13 for PSA two sides                          | YYYY = 4 digit alpha/numeric part number.<br>Contact Chomerics.   | Material Type<br>ZZZZ =<br>T405<br>T405-R<br>T411<br>T412<br>T418 |
| W = 7 (Roll of material) | XX = 10 (100 foot roll)<br>XX = 40 (400 foot roll) | YYYY = 0750 for 7.5" wide<br>YYYY = 1150 for 11.5" wide<br>YYYY = 2400 for 24" wide<br>For T404/T414 Only:<br>YYYY= 0600 for 6"wide<br>YYYY= 0900 for 9" wide<br>YYYY= 1900 for 19" wide* |   |
| W = 9 (Custom part)      | XX = 13 for PSA two sides                          | YYYYY = Custom Part Number.<br>Contact Chomerics  |   |

\* for T404/T414 only

### Handling Information

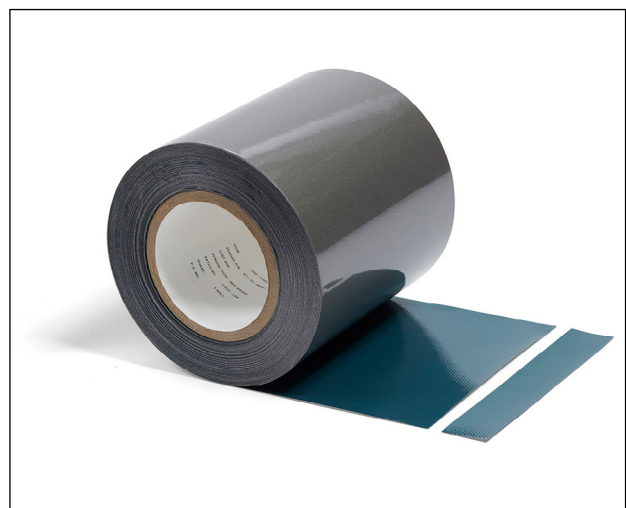
These products are defined by Chomerics as "articles" according to the following generally recognized regulatory definition for articles:

An article is a manufactured item "formed to a specific shape or design during manufacturing," which has "end use functions" dependent upon its size and shape during end use and which has generally "no change of chemical composition during its end use."

In addition:

- There is no known or anticipated exposure to hazardous materials/substances during routine and anticipated use of the product.
- The product's shape, surface, and design is more relevant than its chemical composition.

These materials are not deemed by Chomerics to require an MSDS. For further questions, please contact Chomerics at 781-935-4850.



**THERMATTACH® Thermally Conductive Attachment Tapes**  
 Tape Application Instructions: T404, T405, T405-R, T411, T412, T413, T414, T418

**Materials Needed**

- Clean lint-free cloth rag
- Industrial solvent
- Rubber gloves

For optimal performance, Chomerics recommends interface flatness of 0.001 in/in (0.025 mm/25 mm) to 0.002 in/in (0.050 mm/25 mm) maximum.

Step 1: Ensure that bonding surfaces are free from oil, dust, or any contamination that may affect bonding. Using rubber gloves, wipe surfaces with a cloth dampened with industrial solvents such as MEK, toluene, acetone or isopropyl alcohol.

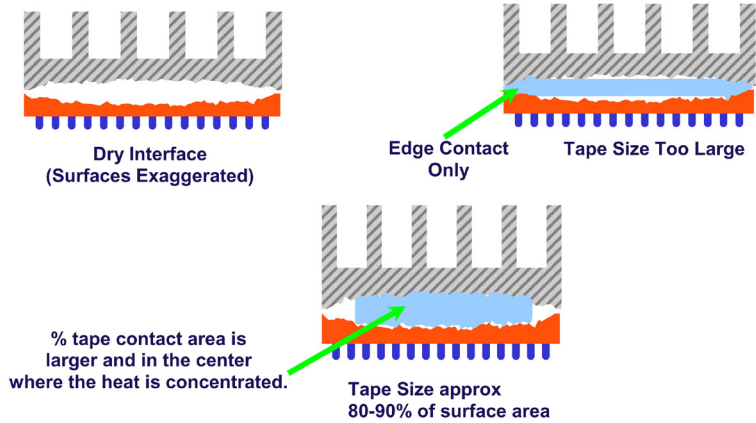
Step 2: Cut tape to size\* and remove a liner or remove pre-cut tape from roll.

\*Note: Due to variations in heat sink surfaces, Chomerics' data indicates that it sometimes is beneficial to be cut slightly smaller than the area of the heat sink. See illustration.

Step 3: Apply to center of heat sink bonding area and smooth over entire surface using moderate hand pressure / rubbing motion. A roller may be useful to help smooth the part to the surface by rolling from the center out to beyond the edges of the part. This ensures optimal contact between tape and heat sink.

Step 4: Center heat sink onto component and apply using any one of the recommended temperature/pressure options:

More pressure equals better wetting out of the adhesive to the



Minimum: 10 psi at room temperature for 15 seconds  
 PREFERRED: 30 psi at room temperature for 5 seconds

contact surfaces. A twisting motion during assembly of the substrates will typically improve wetting. Note that typically 70% of the ultimate adhesive bond strength is achieved with initial application, and 80-90% is reached within 15 minutes. Ultimate adhesive strength is achieved within 36 hours; however the next manufacturing step can typically occur immediately following the initial application.

**Removal Instructions**  
 Materials needed: Single-edged razor blade or a small, thin-bladed pocketknife; soft, thin metal spatula. Use safety precautions when handling sharp instruments and organic solvents.

Step 1: Carefully insert the blade edge into the bond line at a corner

between the heat sink and the component. The penetration need not be very deep.

Step 2: Remove the blade and insert the spatula into the wedge. Slowly twist the spatula blade so that it exerts a slight upward pressure.

Step 3: As the two surfaces start to separate, move the spatula blade deeper into the bond line and continue the twisting motion and upward force.

Step 4: After the two components are separated, the tape can be removed and discarded. If adhesive remains on the component surfaces, it must be removed. Wipe with a clean rag (lint-free) dabbed with MEK, toluene, or isopropyl alcohol. Use sufficient solvent to remove all adhesive.

Step 5: Solvent cleaned components must be verified 100% free of cleaning solvent prior to reattachment of adhesive.

**Relative Thermal Performance**

| Thermally Conductive Attachment Tapes |                        |              |              |              |               |              |
|---------------------------------------|------------------------|--------------|--------------|--------------|---------------|--------------|
| Typical Properties                    |                        | T418         | T412         | T404 / T414  | T405 / T405-R | T411         |
| Performance*                          | Ceramic Attachment     | ██████████   | ██████████ 3 | ██████████ 4 | ██████████ 4  | ██████████ 4 |
|                                       | Metal Attachment       | ██████████   | ██████████ 3 | ██████████ 4 | ██████████ 4  | ██████████ 4 |
|                                       | Plastic Attachment     | N/R          | N/R          | N/R          | N/R           | ██████████   |
|                                       | Dielectric Performance | ██████████ 3 | N/R          | ██████████   | N/R           | N/R          |
|                                       | Thermal Performance    | ██████████ 2 | ██████████ 5 | ██████████ 3 | ██████████ 4  | ██████████ 2 |

\* Performance rated on a scale of 1-5, 5 being the best. N/R = Not Recommended.