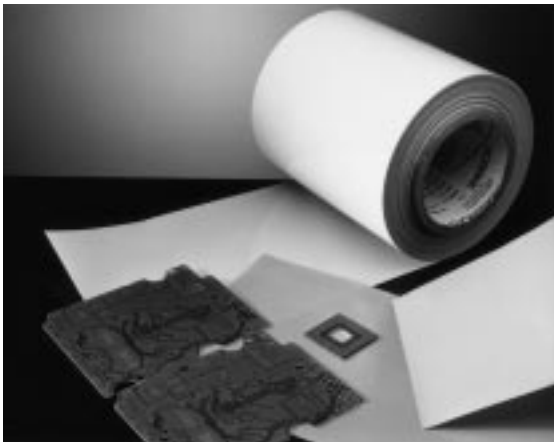


THERMATTACH® T413 and T414 Thermally Conductive Adhesive Tapes for Heat Spreader to Circuit Board Attachment



conformability and minimal air pockets. Extensive testing has shown that Chomerics' embossing system provides thermal and mechanical results superior to those of flat thermal tapes.

All THERMATTACH tapes meet stringent thermal, mechanical, environmental and chemical requirements. Vibration testing at 10 G shows no adverse effects. Unlike traditional acrylic pressure-sensitive tapes, after extended temperature/humidity aging and harsh conditions, THERMATTACH tapes meet or exceed initial properties for shear strength and thermal conductivity.

DESCRIPTION

Chomerics' patented* THERMATTACH® T413 and T414 double-sided adhesive tapes provide an effective thermal interface between components, ceramic hybrid circuits, printed circuit boards, flexible circuits and heat spreaders and sinks. Both are ionically clean tapes with good thermal conductivity and exceptional bonding properties – eliminating the need for thermal grease and mechanical fasteners.

THERMATTACH T413 thermal tape consists of a high bond strength, pressure-sensitive acrylic adhesive filled with aluminum oxide applied to a fiberglass carrier. The adhesive thickness and fiberglass allow for good conformability to irregular surfaces and good electrical isolation.

THERMATTACH T414 thermal tape consists of a high bond strength, pressure-sensitive acrylic adhesive, loaded with aluminum oxide particles and coated on 0.001 in. (0.025 mm) Kapton MT** thermally conductive polyimide film. The tape provides good thermal performance and excellent electrical isolation.

THERMATTACH tapes are embossed with a unique pattern for maximum

APPLICATIONS

For heat sink attachment to plastic encapsulated components, such as BGAs, THERMATTACH T410 and 411 tapes are recommended. Please see Chomerics Technical Bulletin No.79 for more information.

THERMATTACH T413 thermal tape bonds copper heat spreaders to the bottom of printed circuit boards to allow heat dissipation through the thermal vias under components. The tape also bonds heat spreaders/stiffeners to flex circuits in microprocessor TAB package constructions as well as ceramic hybrid circuits to metal chassis walls in place of clips, screws or other mechanical fasteners without thermal compounds.

THERMATTACH T413 tape has many advantages over traditional adhesives and mechanical fasteners. It can be consistently applied to meet design level thermal and mechanical requirements. Unlike rigid adhesives, THERMATTACH T413 is pliable and conformable, reducing concerns over CTE mismatch and the cracking or splitting of components or epoxy bond lines. At very comparable installed costs, THERMATTACH T413 offers advantages over mechanical fasteners or liquid adhesives which may require a large capital investment.

APPLICATION INSTRUCTIONS

Materials needed: Clean cotton cloth or rag, industrial solvent, rubber gloves. For optimal performance, Chomerics recommends interface flatness of 0.002 in/in (0.05 mm/mm) max. for T413 and 0.001 in/in (0.025 mm/mm) max. for T414.

Step 1: Ensure that bonding surfaces are free from oil, dust, etc. 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 clear liner or remove pre-cut tape from roll.

Step 3: Apply device and smooth over entire surface using moderate pressure.

Step 4: Remove blue embossed liner from the tape. Center device using any one of the recommended temperature/pressure options shown below:

| Pressure | Temperature | Time |
|-----------------------|-------------|---------|
| 10 psi (0.069 MPa) | 22°C | 15 sec. |
| 30 psi (0.207 MPa) | 22°C | 5 sec. |
| 10 psi (0.069 MPa) | 50-65°C | 5 sec. |
| 30 psi (0.207 MPa) | 50-65°C | 3 sec. |

Contact Chomerics' Applications Department for additional information.

Note: Increasing any of the application variables (pressure, temperature and time) can improve results due to the relationship of the variables. Elevated temperature can be achieved by exposing heat sinks to a conventional hot air/heat gun prior to application. Approximately 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 occur immediately following the initial application.

continued

* U.S. Patent #5,298,791

** Trademark of DuPont

REMOVAL INSTRUCTIONS

Materials needed: Single-edged razor blade or a small, thin-bladed pocket knife; 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 device and the bonding surface. 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 device is separated, the tape can be removed and discarded. If adhesive remains on the surfaces, it must be removed. Adhesive is best removed by wiping with a rag dabbed with isopropyl alcohol, MEK or toluene. Use sufficient solvent to remove all adhesive.

Step 5: Let solvent cleaned components air dry for 15 minutes before reapplying THERMATTACH tape.

| TYPICAL PROPERTIES | | T413 | T414 | TEST METHOD |
|--------------------|---|--------------------------|--------------------------|---------------------------------|
| CONSTR. | Carrier | Fiberglass | Kapton MT** | — |
| | Color | White | Beige | Visual |
| | Thickness, inch | 0.007 (0.178) | 0.005 (0.127) | ASTM D374 |
| THERMAL | Thermal Impedance @ <1 psi, °C-in ² /W (°C-cm ² /W) | 0.65 (4.0) | 0.6 (3.7) | ASTM D5470 |
| | Thermal Conductivity, W/m-K | 0.35 | 0.37 | ASTM D5470 |
| ELEC. | Voltage Breakdown, Vac | 3700 | 5000 | ASTM D149 |
| | Volume Resistivity, ohm-cm | 1.3 x 10 ¹⁶ | 5 x 10 ¹⁵ | ASTM D257 |
| MECHANICAL | Lap Shear Adhesion, psi (MPa) | 100 (0.69) | 100 (0.69) | ASTM D1002 |
| | Die Shear Adhesion, psi (MPa) Aluminum 25°C 150°C | 180 (1.24) 20 (0.138) | 150 (1.04) 15 (0.104) | Chomerics Test Procedure No. 54 |
| | Creep Adhesion, days 25°C, 12 psi (0.083 MPa) 150°C, 12 psi (0.083 MPa) | >50 >10 | >50 >10 | PSTC-7*** |
| | Adhesive CTE, ppm/°C, -40 to +150°C | 147 | 147 | ASTM D3386 |

** Trademark of DuPont *** Pressure Sensitive Tape Council

ORDERING INFORMATION

Standard Rolls

THERMATTACH T413 and T414 thermal tapes are available in standard 100 ft. (30.5m) rolls of various widths. Use the part number system below when ordering rolls of THERMATTACH tapes.

Pre-cut parts are available in kiss-cut, rectangular shapes on rolls of 1000 parts per roll. For availability of THERMATTACH parts for other components or package sizes, please contact Chomerics' Inside Sales Department.

67 - 10 - YYYY - ZZZZ

| Roll Width |
|---------------------------|
| 0050 = 0.50 in. (1.27 cm) |
| 0075 = 0.75 in. (1.91 cm) |
| 0100 = 1.00 in. (2.54 cm) |
| 0125 = 1.25 in. (3.18 cm) |
| 0150 = 1.50 in. (3.81 cm) |
| 0175 = 1.75 in. (4.45 cm) |
| 0200 = 2.00 in. (5.08 cm) |

| Material |
|------------------------|
| T413 = THERMATTACH 413 |
| T414 = THERMATTACH 414 |



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