

T69

Graphite Sheets



Features

- Highly oriented pyrolytic graphite sheet with high thermal conductivity
- It is flexible and has features of ultra-thin and high EMI shielding effect
- Excellent thermal conductivity: 1600 W/ mK (4x as high as copper, 7x as high as aluminium)
- Light weight: Specific gravity: 2.3 g/cm³
- Flexible and easy to be cut or trimmed
- Low thermal resistance
- Low moisture content: < 1%

Applications

- Electronic components: IC – CPU – MOS
- LED - M/B – P/S – Heat Sink
- LCD – TV – Notebook PC – PC Telecom Device – Wireless Hub... etc.
- DDR II Module – DVD Applications – Hand-set applications... etc.

Properties

- REACH Compliant
- ROSH Compliant

| Property | Test Methods |
|--|----------------|
| Thickness (µm) | Micrometer |
| Thermal conductivity (W/m.k) | XY axis |
| | Z axis |
| Thermal diffusivity (cm ² /S) | AC calorimeter |
| Density (g/cm ³) | Archimedes law |
| Electrical conductivity (S/cm) | JISK7194 |
| Flexibility | MIT |

| Property | | T69-17 | T69-25 | T69-40 | T69-50 | T69-70 | T69-100 |
|--|--------------|--|--|---|---|---|---|
| Thickness (mm) | | 17um | 25um | 40um | 50um | 70um | 100um |
| | | 0.017±0.005 | 0.025±0.010 | 0.040±0.012 | 0.050±0.015 | 0.070±0.017 | 0.100±0.019 |
| Available Size (mm) | | 305x305 | 305x305 | 295x295 | 295x295 | 295x295 | 295x295 |
| Thermal conductivity (W/m.k) | X-YDirection | 1750 | 1500 | 1350 | 1300 | 1000 | 700 |
| | Z Direction | 11 | 18 | 20 | 20 | 20 | 26 |
| Thermal diffusivity (cm ² /s) | | 10 - 11 (0.001-0.0011m ² /s) | 9 - 10 (0.0009-0.0010m ² /s) | 9 - 10 (0.0009-.0010m ² /s) | 8 - 10 (0.0008-.0010m ² /s) | 8 - 10 (0.0008-.0010m ² /s) | 8 - 10 (0.0008-.0010m ² /s) |
| Density (g/cm ³) | | 2.1 (2100 kg/m ³) | 1.95 (1095 kg/m ³) | 1.8 (1800 kg/m ³) | 1.7 (1700 kg/m ³) | 1.2 (1200 kg/m ³) | 0.85 (850 kg/m ³) |
| Specific heat (at 50°C) (J/gk) | | 0.85 (850J/kgk) | 0.85 (850J/kgk) | 0.85 (850J/kgk) | 0.85 (850J/kgk) | 0.85 (850J/kgk) | 0.85 (850J/kgk) |
| Heat resistance °C | | 400 | 400 | 400 | 400 | 400 | 400 |
| Extensional strength(Mpa) | X-YDirection | 40 | 30 | 25 | 20 | 20 | 20 |
| | Z Direction | 0.1 | 0.1 | 0.4 | 0.4 | 0.4 | 0.4 |
| Expansion coefficient (1/K) | X-YDirection | 9.3 x 10 ⁻⁷ | 9.3 x 10 ⁻⁷ | 9.3 x 10 ⁻⁷ | 9.3 x 10 ⁻⁷ | 9.3 x 10 ⁻⁷ | 9.3 x 10 ⁻⁷ |
| | Z Direction | 3.2 x 10 ⁻⁵ | 3.2 x 10 ⁻⁵ | 3.2 x 10 ⁻⁵ | 3.2 x 10 ⁻⁵ | 3.2 x 10 ⁻⁵ | 3.2 x 10 ⁻⁵ |
| Bending test (R5/180°C) (Times) | | 20000 or more | 20000 or more | 20000 or more | 20000 or more | 20000 or more | 20000 or more |
| Electric conductivity (S/cm) | | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| Operating Temperature | | -50 to 200 °C | -50 to 200 °C | -50 to 200 °C | -50 to 200 °C | -50 to 200 °C | -50 to 200 °C |

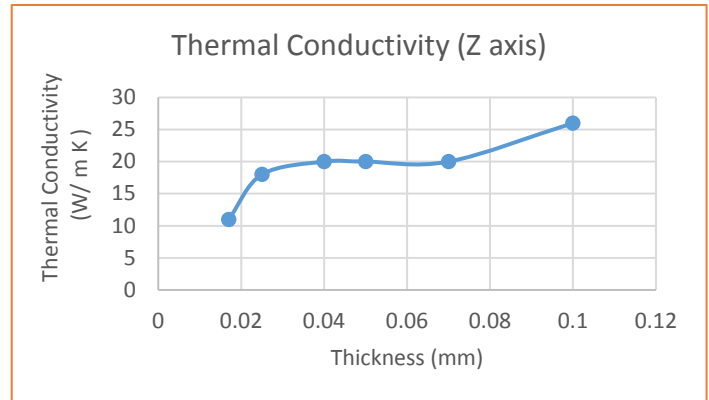
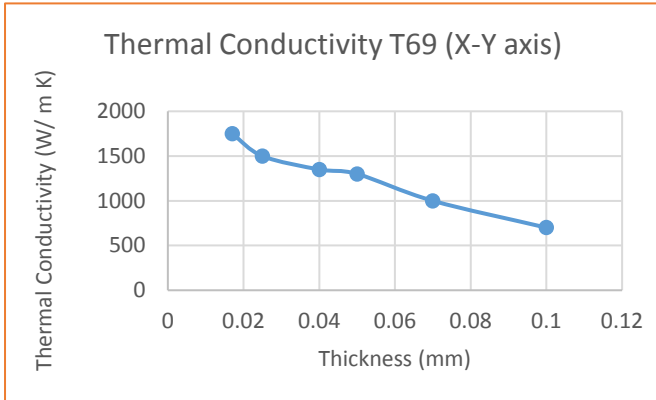
Part Number

| T69-120-120-0.017-1A | | | | |
|----------------------|------------------|-----------------|-----------------------|-----------------|
| Product | Length | Width | Thickness | Adhesive |
| T69 | 120 | 120 | 0.017 | 1A |
| T69 product | Length of 120 mm | Width of 120 mm | Thickness of 0.017 mm | 1 side adhesive |

| T69-120-120-0.017 | | | | |
|-------------------|------------------|-----------------|-----------------------|-------------|
| Product | Length | Width | Thickness | Adhesive |
| T69 | 120 | 120 | 0.017 | - |
| T69 product | Length of 120 mm | Width of 120 mm | Thickness of 0.017 mm | No adhesive |

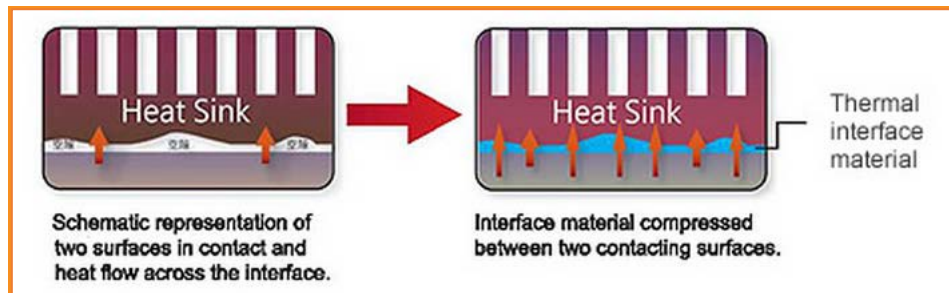
*All measurements in mm

Data



***Data for design engineer guidance only.** Observed performance varies in application. Engineers are reminded to test the material in application.

Application Guide



Without thermal interface material, the heat flow go through joint face slowly, and the thermal conductive performance is bad (Thermal conductivity of air is 0.026 W/m K). Using **T-Global Thermal Interface Material** to link two joint faces, the heat flow go through equally, and the thermal conductive performance is good.

Materials Needed

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

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

Step 1: Ensure that the surface is 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 sheet to size and remove a liner or remove pre-cut sheet from roll.



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 T69 sheet and heat sink.

Step 4: Center heat sink onto component and apply using any one of the recommended temperature and pressure. (**Minimum:** 10 psi at room temperature for 15 seconds. **Preferred:** 30 psi at room temperature for 5 seconds) More pressure equals better wetting out of the adhesive to the 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.



| Digi-Key Part Number | Manufacturer Part Number | Description | Material | Adhesive | Backing, Carrier | Color | Thermal Conductivity |
|-------------------------|--------------------------|---------------------------------|----------|---------------------|------------------|-------|----------------------|
| 1168-2112-ND | T69-305-305-0.070 | GRAPHITE 305X305X0.070MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| 1168-2107-ND | T69-305-305-0.025 | GRAPHITE 305X305X0.025MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| 1168-2109-ND | T69-305-305-0.040 | GRAPHITE 305X305X0.040MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| 1168-2110-ND | T69-305-305-0.040-1A | GRAPHITE 305X305X0.040MM W/ADH | Graphite | Adhesive - One Side | - | Grey | 1600 W/m-K |
| 1168-2106-ND | T69-305-305-0.017-1A | GRAPHITE 305X305X0.017MM W/ADH | Graphite | Adhesive - One Side | - | Grey | 1600 W/m-K |
| 1168-2113-ND | T69-305-305-0.10 | GRAPHITE 305X305X0.10MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| 1168-2108-ND | T69-305-305-0.025-1A | GRAPHITE 305X305X0.025MM W/ADH | Graphite | Adhesive - One Side | - | Grey | 1600 W/m-K |
| 1168-2111-ND | T69-305-305-0.050 | GRAPHITE 305X305X0.050MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| 1168-2105-ND | T69-305-305-0.017 | GRAPHITE 305X305X0.017MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| T69-225-225-0.025-ND | T69-225-225-0.025 | GRAPHITE 225X225X0.025MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| T69-225-225-0.040-ND | T69-225-225-0.040 | GRAPHITE 225X225X0.040MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| T69-225-225-0.025-1A-ND | T69-225-225-0.025-1A | GRAPHITE 225X225X0.025MM W/ADH | Graphite | Adhesive - One Side | - | Grey | 1600 W/m-K |
| T69-225-225-0.040-1A-ND | T69-225-225-0.040-1A | GRAPHITE 225X225X0.040MM W/ADH | Graphite | Adhesive - One Side | - | Grey | 1600 W/m-K |
| T69-225-225-0.050-ND | T69-225-225-0.050 | GRAPHITE 225X225X0.050MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| T69-225-225-0.017-ND | T69-225-225-0.017 | GRAPHITE 225X225X0.017MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| T69-225-225-0.070-ND | T69-225-225-0.070 | GRAPHITE 225X225X0.070MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| T69-225-225-0.10-ND | T69-225-225-0.10 | GRAPHITE 225X225X0.10MM WO/ADH | Graphite | - | - | Grey | 1600 W/m-K |
| T69-225-225-0.017-1A-ND | T69-225-225-0.017-1A | GRAPHITE 225X225X0.017MM W/ADH | Graphite | Adhesive - One Side | - | Grey | 1600 W/m-K |

NOTICE: The information contained herein is to the best of our knowledge true and accurate. However, since the varied conditions of potential use are beyond our control, all recommendations or suggestions are presented without guarantee or responsibility on our part and users should make their own test to determine the suitability of our products in any specific situation. This product is sold without warranty either expressed or implied, of fitness for a particular purpose or otherwise, except that this product shall be of standard quality, and except to the extent otherwise stated T-Global Technology Europe and North America's invoice, quotation, or order acknowledgment. We disclaim any and liability incurred in connection with the use of information contained herein, or otherwise. All risks of such are assumed by the user. Furthermore, nothing contained herein shall be construed as a recommendation to use any process or to manufacture or to use any product in conflict with existing future patents covering any product or material or its use.