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With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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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/cm<sup>3</sup>
- 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	AC calorimeter
	Z axis	Laser flash
Thermal diffusivity (cm <sup>2</sup> /S)	AC calorimeter	
Density (g/cm <sup>3</sup> )	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 <sup>2</sup> /s)		10 - 11 (0.001-0.0011m <sup>2</sup> /s)	9 - 10 (0.0009-0.0010m <sup>2</sup> /s)	9 - 10 (0.0009-.0010m <sup>2</sup> /s)	8 - 10 (0.0008-.0010m <sup>2</sup> /s)	8 - 10 (0.0008-.0010m <sup>2</sup> /s)	8 - 10 (0.0008-.0010m <sup>2</sup> /s)
Density (g/cm <sup>3</sup> )		2.1 (2100 kg/m <sup>3</sup> )	1.95 (1095 kg/m <sup>3</sup> )	1.8 (1800 kg/m <sup>3</sup> )	1.7 (1700 kg/m <sup>3</sup> )	1.2 (1200 kg/m <sup>3</sup> )	0.85 (850 kg/m <sup>3</sup> )
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 <sup>-7</sup>	9.3 x 10 <sup>-7</sup>	9.3 x 10 <sup>-7</sup>	9.3 x 10 <sup>-7</sup>	9.3 x 10 <sup>-7</sup>	9.3 x 10 <sup>-7</sup>
	Z Direction	3.2 x 10 <sup>-5</sup>	3.2 x 10 <sup>-5</sup>	3.2 x 10 <sup>-5</sup>	3.2 x 10 <sup>-5</sup>	3.2 x 10 <sup>-5</sup>	3.2 x 10 <sup>-5</sup>
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

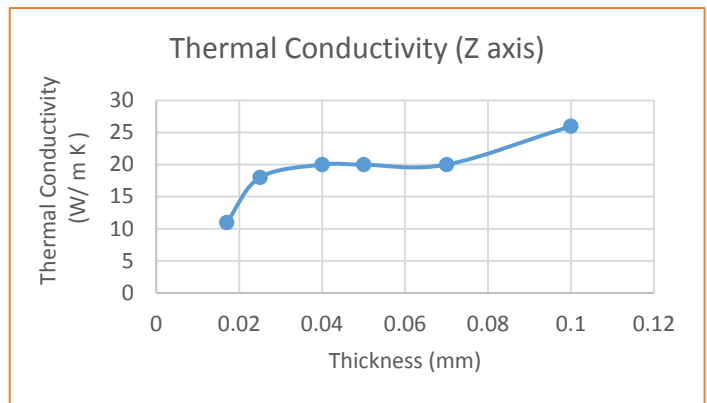
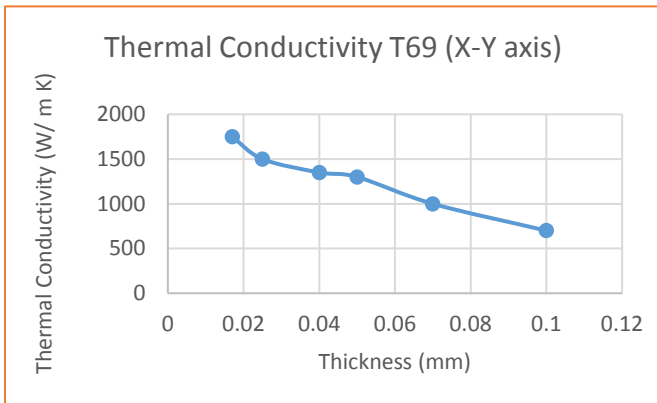
## Part Number

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

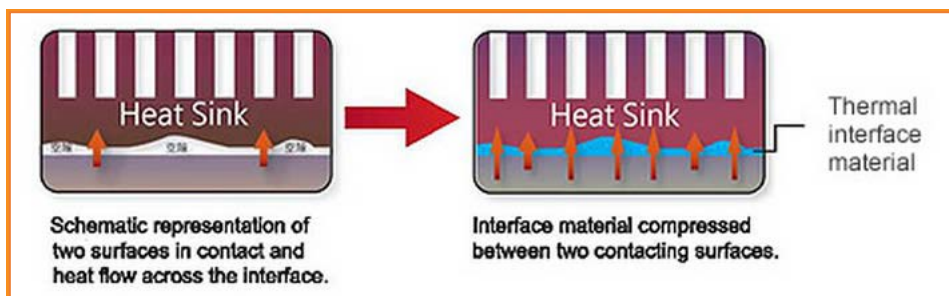
\*All measurements in mm

## 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 goes through the 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 goes 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 0.002 in/in (0.050 mm/25 mm) 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

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