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# Thermal Management Tapes

Thermal Transmission Acrylic Foam Tapes

Thermally Conductive Copper Tape  
Thermally Conductive Aluminium Tape

Natural Graphite Tapes  
Pyrolytic Synthetic Graphite Tapes



## Fothershield

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Heat dissipation is becoming increasingly important as electronics become smaller and more sophisticated. Using tapes as thermal interface materials and bonding medium reduces hot spots and protects sensitive components and circuitry. The tapes can be supplied in sheet or rolls, or can be die-cut into precise complex shapes to suit customer's applications.

Fothershield's Thermal Management Tapes are available in three different categories:-

- Acrylic Foams which are thermal transmission bonding tapes. Containing ceramic microspheres the foams are ideal for bonding applications such as LED lighting, fixing elements in back light displays, bonding cooling elements, and fixing components in the electronics industry
- Metal Foils with thermally conductive graphite adhesive give fast heat spread. Used in mobile phones, LED TV's, tablets, notebooks and thin electronic devices
- Natural and synthetic graphite laminated with thin adhesive coated films give excellent thermal conductivity and may be used in LED lighting, smart phones, tablets and PCs, telecommunication network systems, and advanced avionics and radar applications

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## THERMAL TRANSMISSION ACRYLIC FOAM TAPES

The thermal transmission acrylic foam tapes have been specially formulated to provide a strong structural bond on different substrates whilst still allowing for thermal transmission.

Having excellent heat transmission properties, the double-sided tapes are ideal for bonding applications in the electronics industry as they offer powerful mounting, bonding and fixing whilst allowing heat to dissipate.

As acrylic foams are viscoelastic this allows thermal expansion and contraction without loss of adhesion. The thermal transmission medium is achieved by using ceramic micro-spheres which also give the tape very good cohesive strength.

Acrylic foam tapes are an excellent method for fixing LED strip lighting and ideal for applications for fixing and bonding LED light engines. Precision die-cut parts to customer's specifications give a perfect bond to copper, aluminium and ceramic base plates, and can be used to fix components in light housings.

### Applications

- Ideal for bonding LED lights
- Fixing elements of back light displays
- Bonding thermal interface materials
- Fixing heat sinks
- Bonding cooling elements
- Fixing components in the electronics industry

### Features and Benefits

- Allows for thermal expansion and contraction of dissimilar materials
- No need to puncture the substrate the heat sink or thermal interface is fixed to
- Prevents vibration and rattle
- Acts as a complete seal for dust, air and moisture
- Replaces mechanical fixings such as screws and rivets
- Quick, clean and precise to use

## FS-7025W THERMAL TRANSMISSION ACRYLIC FOAM TAPE



### Product Description

- Foamed Acrylic Tape
- White in colour

### Technical Data

Item	Unit	Spec.	Test Method
Thickness	mm	0.25	-
Density	Kg/m <sup>3</sup>	1500	-
180° Peel Strength	gf/25m		ASTM D-3330
Stainless Steel	m	1200	(Stainless Steel, room temperature)
Aluminium		800	
Copper		1000	
Tensile Strength (T-Block Test)	gf/cm <sup>2</sup>	9000	ASTM D-897 (Aluminium, room temperature)
Dynamic Shear	gf/cm <sup>2</sup>		ASTM D-1002
Stainless Steel		8000	(after 24 hrs, room temperature)
Aluminium		5000	
Copper		5500	
Temperature Resistance (Short term)	°C	160	-
Temperature Resistance (Long term)	°C	100	-
Low Temperature Resistance	°C	-40	
UV Resistance	-	Good	-
Surface Resistance	Ω/cm	5.0 x 10 <sup>14</sup>	ASTM D-257
Volume Resistivity	Ω/cm	2.0 x 10 <sup>13</sup>	ASTM D-257
Dielectric Breakdown	kV	3.75	IEC-60243-1
Dielectric Strength	kV/mm	15	IEC-60243-1
Thermal Conductivity Z Axis	W/mK	1	TCi

## FS-7064W THERMAL TRANSMISSION ACRYLIC FOAM TAPE



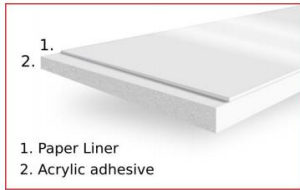
### Product Description

- Foamed Acrylic Tape
- White in colour

### Technical Data

Item	Unit	Spec.	Test Method
Thickness	mm	0.64	-
Density	Kg/m <sup>3</sup>	1500	-
180° Peel Strength	gf/25m		ASTM D-3330
Stainless Steel	m	2100	(Stainless Steel, room temperature)
Aluminium		800	
Copper		1200	
Tensile Strength (T-Block Test)	gf/cm <sup>2</sup>	8400	ASTM D-897 (Aluminium, room temperature)
Dynamic Shear	gf/cm <sup>2</sup>		ASTM D-1002
Stainless Steel		5000	(after 24 hrs, room temperature)
Aluminium		4000	
Copper		4500	
Temperature Resistance (Short term)	°C	160	-
Temperature Resistance (Long term)	°C	100	-
Low Temperature Resistance	°C	-40	
UV Resistance	-	Good	-
Surface Resistance	Ω/cm	5.0 x 10 <sup>14</sup>	ASTM D-257
Volume Resistivity	Ω/cm	2.0 x 10 <sup>13</sup>	ASTM D-257
Dielectric Breakdown	kV	9.6	IEC-60243-1
Dielectric Strength	kV/mm	15	IEC-60243-1
Thermal Conductivity Z Axis	W/mK	1	TCi

## FS-7120W THERMAL TRANSMISSION ACRYLIC FOAM TAPE



### Product Description

- Foamed Acrylic Tape
- White in colour

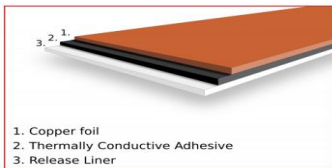
### Technical Data

Item	Unit	Spec.	Test Method
Thickness	mm	1.2	-
Density	Kg/m <sup>3</sup>	1500	-
180° Peel Strength	gf/25m		ASTM D-3330
Stainless Steel	m	1600	(Stainless Steel, room temperature)
Aluminium		800	
Copper		1200	
Tensile Strength (T-Block Test)	gf/cm <sup>2</sup>	8400	ASTM D-897 (Aluminium, room temperature)
Dynamic Shear	gf/cm <sup>2</sup>		ASTM D-1002
Stainless Steel		4500	(after 24 hrs, room temperature)
Aluminium		3000	
Copper		3500	
Temperature Resistance (Short term)	°C	160	-
Temperature Resistance (Long term)	°C	100	-
Low Temperature Resistance	°C	-40	
UV Resistance	-	Good	-
Surface Resistance	Ω/cm	5.0 x 10 <sup>14</sup>	ASTM D-257
Volume Resistivity	Ω/cm	2.0 x 10 <sup>13</sup>	ASTM D-257
Dielectric Breakdown	kV	18	IEC-60243-1
Dielectric Strength	kV/mm	15	IEC-60243-1
Thermal Conductivity Z Axis	W/mK	1	TCi

## THERMALLY CONDUCTIVE COPPER AND ALUMINIUM TAPES

Fothershield’s thermally conductive foil tapes are high grade copper and aluminium foils. The tapes are available in four thicknesses, and are designed to give excellent dissipation in the X-Y plane, giving high interface performance and minimising heat conduction in the Z axis.

### FS-60TC THERMALLY CONDUCTIVE COPPER TAPE



#### Product Description

- Thermal diffusivity tape
- Demonstrating high interface performance
- Low cost

#### Construction

- Copper foil with graphite adhesive giving fast heat spread
- 60 micron thickness
- Easy release liner

#### Application

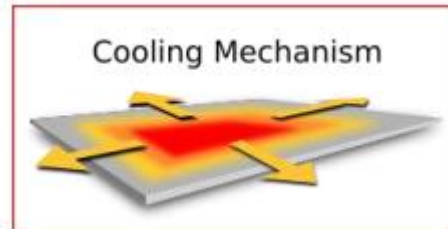
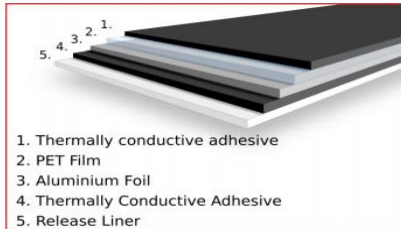
- Mobile phones – battery cover, dual core CPU
- LED TV, Tablet PC, Notebooks, and thin electronic devices with high efficiency
- Heat spreader for a variety of applications
- Ideal for shielding with very good conductivity

#### Technical Data

Item	Unit	Specification	Remarks
Total Thickness	µm	60 (-5, +10)	Thickness Gauge
Adhesive Strength	Gf/inch	>800	180° Peel/PET 25µm/SUS 304
Contact resistance - Top	Ω/inch	Conductivity	1 inch surface resistance
Contact resistance - Bottom	Ω/inch	<10 <sup>6</sup> Ω	1 inch surface resistance
Thermal conductivity (X-Y axis)	W/mK	320	Copper’s property
Thermal conductivity (X-Y axis)*	W/mK	227 ↑	NETZSCH LFA (Aju Univ.)
Operating Temperature	°C	-10~90	-

\*Under the same conditions (LFA) measured. Film-coated graphite and FS-60TC has similar performance 100~200W/mK

## FS-160TC THERMALLY CONDUCTIVE ALUMINIUM TAPE



### Product Description

Thermal spread with interface double sided tape, the tape has excellent heat spread/diffusion properties and very good dielectric and absorption characteristics. Stabilising the function of the device it is applied to, the tape reduces malfunction caused by high temperatures emitted from specific components.

- Excellent electrical conductivity
- Excellent adhesion and stability
- Superior thermal conductivity in the plane
- Quick heat spread and good adhesion with graphite adhesive

### Construction

- Backing type – head radiation coating plus aluminium foil
- Adhesive – thermally conductive adhesive (graphite filler)
- Easy release liner

### Application

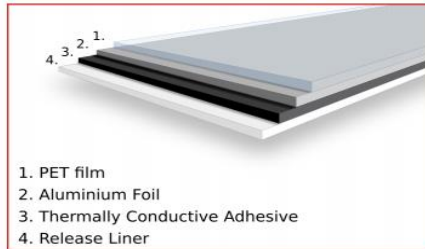
- Camera module for mobile phones – battery cover, dual core CPU
- LED Lighting, LED TV, Tablet PC, Notebooks, and thin electronic devices with high efficiency
- Heat spreader for a variety of applications

### Technical Data

Item	Unit	Specification	Remarks
Total Thickness	mm	0.160 +/-1 10%	Thickness Gauge
Adhesive Strength	Gram/mm	>700	KS T1028 (SUS 304)
Top-Bottom Resistance (Z Axis)	$\Omega$	Non-conductive	MIL-DTL-83528C
Surface Resistance, Adhesive (XY axis)	$\Omega$	Non-conductive	MIL-DTL-83528C
Thermal conductivity (Vertical)	W/mK	4	ASTM D 5470
Thermal conductivity (In-plane)	W/mK	180	ASTM D 5470
Operating Temperature	$^{\circ}\text{C}$	-10~90	-



## FS-150TC THERMALLY CONDUCTIVE ALUMINIUM TAPE



### Product Description

Thermal spread with interface single sided tape, the tape has excellent heat spread/diffusion properties and very good dielectric and absorption characteristics. Stabilising the function of the device it is applied to, the tape reduces malfunction caused by high temperatures emitted from specific components. Thermal diffusivity tape.

- Excellent electrical conductivity
- Excellent adhesion and stability
- Superior thermal conductivity in the plane
- Quick heat spread and good adhesion with graphite adhesive

### Construction

- PET – good electrical isolation and die cutting
- Aluminium – heat diffusion and conduction
- Adhesive – high thermal conductivity and diffusion (graphite adhesive)
- Easy release liner

### Application

- Mobile phones – dual core CPU/battery cover
- LED Lighting, LED TV, Tablet PC, Notebooks, and thin electronic devices with high efficiency
- Heat spreader for a variety of applications

### Technical Data

Item	Unit	Specification	Remarks
Total Thickness	µm	150 (-5, +10)	Thickness Gauge
Adhesive Strength	Gf/inch	1000↑	180° Peel/PET 25µ/SUS 304)
Contact Resistance Top	Ω/inch	Non-conductive	1 inch surface resistance
Contact Resistance Bottom	Ω/inch	10 <sup>3</sup> Ω↑	1 inch surface resistance
Thermal conductivity (X-Y axis) HB150TC	W/mK	100	NETZSCH LFA 447 (KAIST)
Thermal conductivity (IX-Y axis) Graphite	W/mK	108	NETZSCH LFA 447 (KAIST)
Operating Temperature	°C	-10~90	-

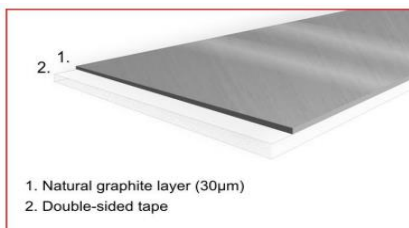
## NATURAL GRAPHITE TAPES

Natural graphite is a soft crystalline material which has anisotropic characteristics due to its layered structure. Graphite has excellent electrical conductivity and thermal properties and as such is a good choice material for producing thermal interface materials. The thermal properties in the XY plane are much greater than in the Z axis, giving excellent conductivity and heat spread.

Graphite is 75% lighter than copper, and 25% lighter than aluminium, and the thermal conductive values are much greater than copper or aluminium. Due to the light nature of the material, graphite is a good choice for applications such as smart phones and tablets.

Graphite is also flexible and conformable and makes a good choice material when used for heat sinks, heat spreaders and as thermal interface materials. Formed into thin sheets which can be laminated with adhesives, the natural graphite can be die-cut into customer's specific applications. Thickness ranges from 30 micron to 940 micron thick.

## FS-030N THERMALLY CONDUCTIVE NATURAL GRAPHITE TAPE



### Product Description

- Excellent electromagnetic shielding properties
- Eliminates hot spots and reduces surface temperature
- Double sided tape on the back
- Flexible and conformable
- Excellent thermal conductivity in the horizontal direction (X-Y plane)
- Can be die-cut
- Eliminates the need for both fans and heat pipes
- RoHS compliant, halogen free, UL certified

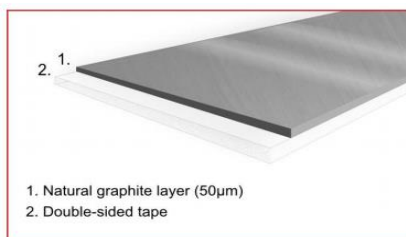
### Construction

- Natural graphite (30µm)
- Double sided tape

## Technical Data

Item	Unit	Specification
Thickness	μm	30 +/- 10
Density	Kg/m <sup>3</sup>	>1700
Thermal conductivity	W/mK	1100~1300 (XY Plane)/≥5 (Z axis)
Tensile strength	MPa	3.5~4.0
Heat resistance	°C	-200~600
Carbon content	%	>99%

## FS-050N THERMALLY CONDUCTIVE NATURAL GRAPHITE TAPE



### Product Description

- Excellent electromagnetic shielding properties
- Eliminates hot spots and reduces surface temperature
- Double sided tape on the back
- Flexible and conformable
- Excellent thermal conductivity in the horizontal direction (X-Y plane)
- Can be die-cut
- Eliminates the need for both fans and heat pipes
- RoHS compliant, halogen free, UL certified

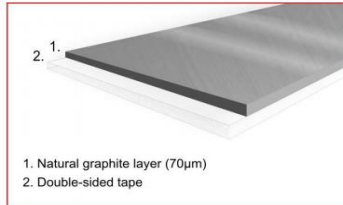
### Construction

- Natural graphite (50μm)
- Double sided tape

## Technical Data

Item	Unit	Specification	Test Method
Thickness	μm	50 +/- 10	-
Density	Kg/m <sup>3</sup>	>1500	-
Thermal conductivity	W/mK	1000~1200 (XY Plane)/≥5 (Z axis)	-
Tensile strength	MPa	4.0~8.0	-
Heat resistance	°C	-200~600	-
Carbon content	%	>99%	-

## FS-070N THERMALLY CONDUCTIVE NATURAL GRAPHITE TAPE



### Product Description

- Excellent electromagnetic shielding properties
- Eliminates hot spots and reduces surface temperature
- Double sided tape on the back
- Flexible and conformable
- Excellent thermal conductivity in the horizontal direction (X-Y plane)
- Can be die-cut
- Eliminates the need for both fans and heat pipes
- RoHS compliant, halogen free, UL certified

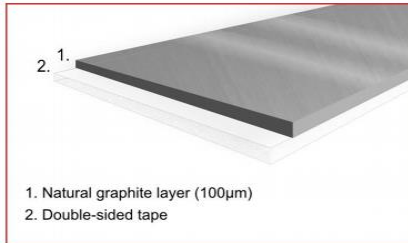
### Construction

- Natural graphite (70µm)
- Double sided tape

### Technical Data

Item	Unit	Specification
Thickness	µm	70 +- 10
Density	Kg/m <sup>3</sup>	>1500
Thermal conductivity	W/mK	1000~1200 (XY Plane)/≥5 (Z axis)
Tensile strength	MPa	4.0~8.0
Heat resistance	°C	-200~600
Carbon content	%	>99%

## FS-100N THERMALLY CONDUCTIVE NATURAL GRAPHITE TAPE



### Product Description

- Excellent electromagnetic shielding properties
- Eliminates hot spots and reduces surface temperature
- Double sided tape on the back
- Flexible and conformable
- Excellent thermal conductivity in the horizontal direction (X-Y plane)
- Can be die-cut
- Eliminates the need for both fans and heat pipes
- RoHS compliant, halogen free, UL certified

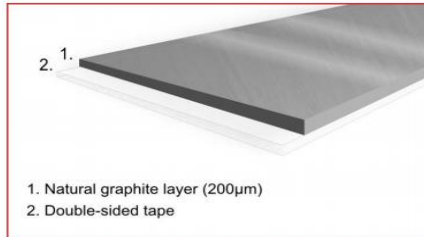
### Construction

- Natural graphite (100µm)
- Double sided tape

### Technical Data

Item	Unit	Specification
Thickness	µm	100 +- 15
Density	Kg/m <sup>3</sup>	>1200
Thermal conductivity	W/mK	400~500 (XY Plane)/≥5 (Z axis)
Tensile strength	MPa	4.0~8.0
Heat resistance	°C	-200~600
Carbon content	%	>99%

## FS-200N THERMALLY CONDUCTIVE NATURAL GRAPHITE TAPE



### Product Description

- Excellent electromagnetic shielding properties
- Eliminates hot spots and reduces surface temperature
- Double sided tape on the back
- Flexible and conformable
- Excellent thermal conductivity in the horizontal direction (X-Y plane)
- Can be die-cut
- Eliminates the need for both fans and heat pipes
- RoHS compliant, halogen free, UL certified

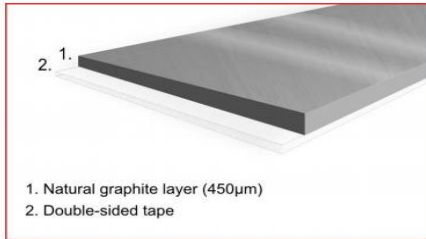
### Construction

- Natural graphite (200µm)
- Double sided tape

### Technical Data

Item	Unit	Specification
Thickness	µm	200 +- 25
Density	Kg/m <sup>3</sup>	>1200
Thermal conductivity	W/mK	400~500 (XY Plane)/≥5 (Z axis)
Tensile strength	MPa	4.0~8.0
Heat resistance	°C	-200~600
Carbon content	%	>99%

## FS-450N THERMALLY CONDUCTIVE NATURAL GRAPHITE TAPE



### Product Description

- Excellent electromagnetic shielding properties
- Eliminates hot spots and reduces surface temperature
- Double sided tape on the back
- Flexible and conformable
- Excellent thermal conductivity in the horizontal direction (X-Y plane)
- Can be die-cut
- Eliminates the need for both fans and heat pipes
- RoHS compliant, halogen free, UL certified

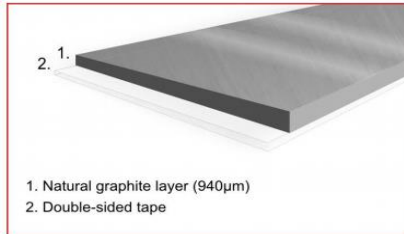
### Construction

- Natural graphite (450µm)
- Double sided tape

### Technical Data

Item	Unit	Specification
Thickness	µm	450 +- 25
Density	Kg/m <sup>3</sup>	>1200
Thermal conductivity	W/mK	400~500 (XY Plane)/≥5 (Z axis)
Tensile strength	MPa	4.0~8.0
Heat resistance	°C	-200~600
Carbon content	%	>99%

## FS-940N THERMALLY CONDUCTIVE NATURAL GRAPHITE TAPE



### Product Description

- Excellent electromagnetic shielding properties
- Eliminates hot spots and reduces surface temperature
- Double sided tape on the back
- Flexible and conformable
- Excellent thermal conductivity in the horizontal direction (X-Y plane)
- Can be die-cut
- Eliminates the need for both fans and heat pipes
- RoHS compliant, halogen free, UL certified

### Construction

- Natural graphite (940µm)
- Double sided tape

### Technical Data

Item	Unit	Specification
Thickness	µm	940 +- 25
Density	Kg/m <sup>3</sup>	>1200
Thermal conductivity	W/mK	400~500 (XY Plane)/≥5 (Z axis)
Tensile strength	MPa	4.0~8.0
Heat resistance	°C	-200~600
Carbon content	%	>99%



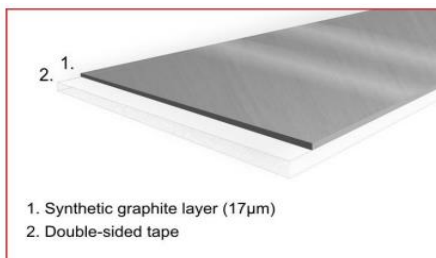
## PYROLYTIC SYNTHETIC GRAPHITE TAPES

Using an annealing process, synthetic graphite is produced by converting film material at extremely high temperatures in excess of 3000°C. Under pressure, a graphite layer is formed which is highly crystalline. The film produced is multi-layered, uniform and oriented, unlike natural graphite. The product gives excellent thermal properties and characteristics, and is available in 17, 24 and 40 micron thicknesses.

### Applications

- LED lighting
- Semiconductor manufacturing equipment
- Advanced avionics and radar
- Smart phones/tablets/PC's
- Telecommunication network equipment
- Television and display panels

## FS-017S THERMALLY CONDUCTIVE SYNTHETIC GRAPHITE TAPE



### Product Description

- Excellent electromagnetic shielding properties
- Eliminates hot spots and reduces surface temperature
- Double sided tape on the back
- Flexible and conformable
- Excellent thermal conductivity in the horizontal direction (X-Y plane)
- Can be die-cut
- Eliminates the need for both fans and heat pipes
- RoHS compliant, halogen free, UL certified

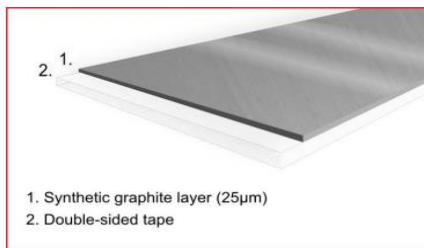
### Construction

- Synthetic graphite (17µm)
- Double sided tape

### Technical Data

Item	Unit	Specification
Thickness	µm	17 +- 5
Density	Kg/m <sup>3</sup>	>2000
Thermal conductivity	W/mK	1600~1800 (XY Plane)/≥10 (Z axis)
Thermal diffusivity	cm <sup>2</sup> /s	8.7~9.7
Tensile strength	MPa	40
Heat resistance	°C	500
Bending	Time	≥10000
Carbon content	%	>99%

## FS-025S THERMALLY CONDUCTIVE SYNTHETIC GRAPHITE TAPE



### Product Description

- Excellent electromagnetic shielding properties
- Eliminates hot spots and reduces surface temperature
- Double sided tape on the back
- Flexible and conformable
- Excellent thermal conductivity in the horizontal direction (X-Y plane)
- Can be die-cut
- Eliminates the need for both fans and heat pipes
- RoHS compliant, halogen free, UL certified

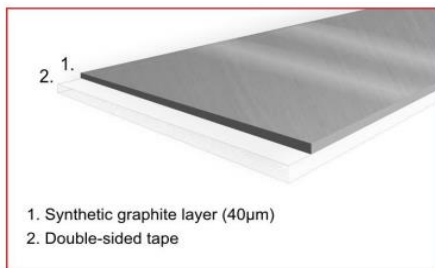
### Construction

- Synthetic graphite (25µm)
- Double sided tape

## Technical Data

Item	Unit	Specification
Thickness	$\mu\text{m}$	25 +/- 5
Density	$\text{Kg}/\text{m}^3$	>1800
Thermal conductivity	$\text{W}/\text{mK}$	1400~1600 (XY Plane)/ $\geq 10$ (Z axis)
Thermal diffusivity	$\text{cm}^2/\text{s}$	8~9
Tensile strength	MPa	40
Heat resistance	$^{\circ}\text{C}$	500
Bending	Time	$\geq 10000$
Carbon content	%	>99%

## FS-040S THERMALLY CONDUCTIVE SYNTHETIC GRAPHITE TAPE



### Product Description

- Excellent electromagnetic shielding properties
- Eliminates hot spots and reduces surface temperature
- Double sided tape on the back
- Flexible and conformable
- Excellent thermal conductivity in the horizontal direction (X-Y plane)
- Can be die-cut
- Eliminates the need for both fans and heat pipes
- RoHS compliant, halogen free, UL certified

### Construction

- Synthetic graphite (40 $\mu\text{m}$ )
- Double sided tape



## Technical Data

Item	Unit	Specification
Thickness	µm	40 +- 5
Density	Kg/m <sup>3</sup>	>1600
Thermal conductivity	W/mK	1200 (XY Plane)/≥10 (Z axis)
Thermal diffusivity	cm <sup>2</sup> /s	7.8~8.3
Tensile strength	MPa	40
Heat resistance	°C	500
Bending	Time	≥10000
Carbon content	%	>99%

*All technical data herein is accurate to the best of our knowledge based on our most up to date testing information and material specifications. This information is not presented as a warranty or guarantee and is not intended to be all inclusive as to conditions of use. The data herein represents typical properties and is not to be used as a basis for a specification.*