

Sil-Free™



Sil-Free™ 1020 is a metal-oxide-filled, silicone-free synthetic grease specially formulated to enhance heat transfer across the interface between the semiconductor case and the heat sink without the migration or contamination associated with silicone-based products.

Dry interface case-to-sink thermal resistance is typically reduced 50% to 75% with proper application of Sil-Free™ 1020.






This virtually "no-bleed", high-performance compound will not dry out, harden, melt, or run, even after long-term continuous exposure to temperatures up to 200°C. Even in a vacuum atmosphere (10⁻⁵ Torr, 24 hours@100°C), Sil-Free™ 1020 exhibits virtually "no bleed" or evaporation.

Color	White
Thermal Conductivity	0.79 W/(m-°C)
Operating Temperature Range	-40°C to 200°C
Volume Resistivity	2.3 x 10 ¹² Ohm-cm
Weight	47.5 grams
Dielectric Strength	225 Volts/mil
Consistency	Paste
Bleed	0.09 max
Specific Gravity	2.8
Shelf Life	Indefinite ¹ (unopened)

(1) It is recommended that the containers be turned over every 6 months to minimize settling for ease of mixing.

[MSDS Safety Sheet for Sil-Free in PDF format 104K](#)

Ordering Information

Part Number	RoHS	PCN	Package	Size
101700F00000G	RoHS ✓ Compliant		Syringe	43 grams (1.5 Oz.)
101800F00000G	RoHS ✓ Compliant		Tube	57 grams (2.0 Oz.)
101900F00000G	RoHS ✓ Compliant		Jar	57 grams (2.0 Oz.)
102000F00000G	RoHS ✓ Compliant		Tube	143 grams (5.0 Oz.)
102100F00000G	RoHS ✓ Compliant		Jar	457 grams (16.0 Oz.)

Ther-O-Link

Ther-O-Link is a silicone-based thermal compound that cost effectively enhances the heat transfer between a semiconductor case and a heat sink. Easy to apply, Ther-O-Link substantially reduces dry interface thermal resistance, while providing long life under a

Sil-Free™ Resistance Calculator

Enter the area of the device that will contact the heat sink:	<input type="text"/> mm ²
Enter the grease thickness:	<input type="text"/> mm
Interface Resistance = <input type="text"/>	

Formula

$$\text{interface resistance} = \frac{\text{interface thickness (mm)} * 1000}{\text{thermal conductivity (W/m-K)} * \text{contact area (mm}^2\text{)}}$$

variety of conditions.

Color	White
Thermal Conductivity	0.73 W/(m-K)
Operating Temperature Range	-40°C to 200°C
Volume Resistivity	1.0 x 10 ¹⁵ Ohm-cm
Dielectric Strength	250 Volts/mil
Consistency	Paste
Bleed	0.6 max
Specific Gravity	2.8
Shelf Life	Indefinite ¹ (unopened)

(1) It is recommended that the containers be turned over every 6 months to minimize settling for ease of mixing.

[MSDS Safety Sheet for Ther-O-Link in PDF format 104K](#)




Ther-O-Link Resistance Calculator

Enter the area of the device that will contact the heat sink:	<input type="text"/> mm ²
Enter the grease thickness:	<input type="text"/> mm
Interface Resistance = <input type="text"/>	

Formula

$$\text{interface resistance} = \frac{\text{interface thickness (mm)} * 1000}{\text{thermal conductivity (W/m-K)} * \text{contact area (mm}^2\text{)}}$$

Ordering Information

Part Number	RoHS	PCN	Package	Size
100000F00000G			Ampule	1g.
100100F00000G			Syringe	35.7 grams (1.25 Oz.)
100200F00000G			Tube	57 grams (2.0 Oz.)
100500F00000G			Tube	143 grams (5.0 Oz.)
100800F00000G			Can	228.6 grams (8.0Oz.)
101600F00000G			Can	.45 kg (1 lb)
108000F00000G			Can	2.27 kg (5 lb)
132000F00000G			Can	9.07 kg (20 lb)

Ultrastick

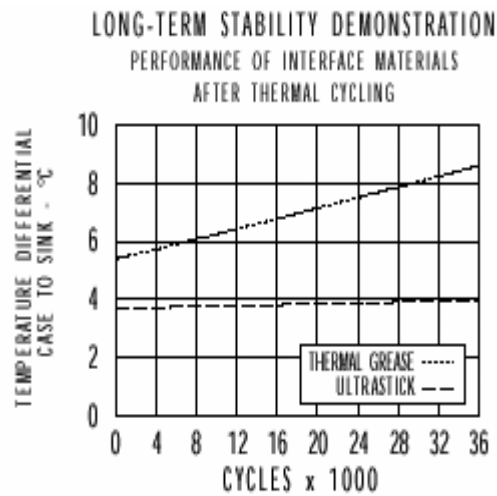
Part Number: 100300F00000G



[Download PDF Datasheet](#)



Aavid's Ultrastick is a unique phase-change thermal interface material that surpasses grease in thermal performance and long-term stability. This solid, silicone-free, paraffin-based thermal compound changes phase at 60°C, with a concurrent volumetric expansion that fills gaps between the mating surfaces. Ultrastick comes in a convenient applicator bar, allowing for neat, fast application to both heat sink and component surfaces. One cost-effective application leaves a thin, film-like deposit, providing excellent heat transfer and low interface thermal resistance.



EACH CYCLE 40°C TO 90°C - 7 MIN. RISE, 3 MIN. FALL

Temperature	200°
Volume Resistivity	1.0 X 1.0 ¹⁵ Ohm-cm
Dielectric Strength	250 volts/mil
Consistency	Paste
Bleed	0.6 max
Specific Gravity	0.28
Color	Opaque White
Operating Temperature Range	-40°C to 200°C
Thermal Resistance	0.03eC/W per square inch @ 20 psi 0.02eC/W per square inch @ 100 psi
Shelf Life	Indefinite

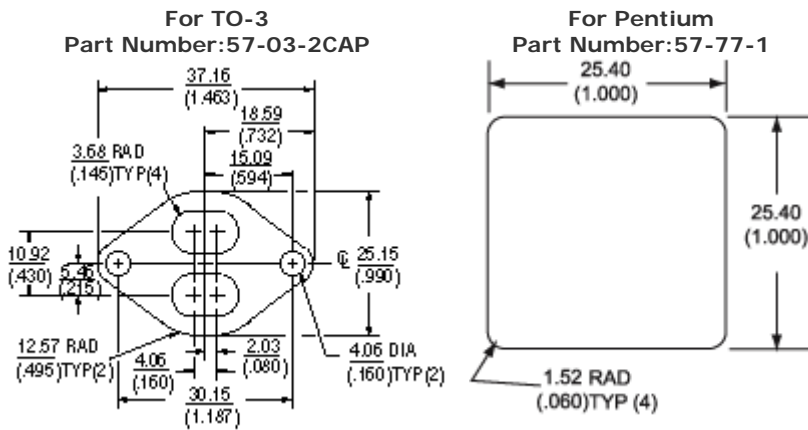
[Application Instructions for Ultrastick](#)

[MSDS Safety Sheet for Ultrastick in PDF format 684K](#)

Conducta-Cote™

Conducta-Cote™ is used where grease application is needed without an insulator. It performs like a greased bare joint application.

- Pre-coated thermal grease aluminum carrier.
- Save money by elimination of hand application of thermal grease.
- Provides uniform coating for maximum heat transfer (.025mm (.001") minimum).
- Eliminates contaminants.
- Aluminum carrier .10mm (.004") thick.



Thermalcote™

Thermalcote™ is a superior thermal joint compound of thermally-loaded silicone-based grease for use with all heat sinks. It improves the transfer of thermal energy across the metal-to-metal interfaces between the transistor or rectifier case and the heat sink. Thermalcote conducts heat approximately 15 times better than air and more than 4 times better than unloaded silicone grease. It is non-toxic, extremely stable, and neither cakes nor runs from -40° to 204°C (-40°F to 399°F).

Thermalcote Resistance Calculator

Enter the area of the device that will contact the heat sink:	<input type="text"/>	mm ²
Enter the grease thickness:	<input type="text"/>	mm
Interface Resistance =		<input type="text"/>

Formula

$$\text{interface resistance} = \frac{\text{interface thickness (mm)} * 1000}{\text{thermal conductivity (W/m-K)} * \text{contact area (mm}^2\text{)}}$$

Color	Opaque White
Operating Temperature Range	-40°C to 204°C (-40°F to 399°F).
Thermal Conductivity	0.765Wm ⁻¹ C ⁻¹ (0.442 Btu/hr ft °F)
Dialectic	11.8 x 10 ³ volts/mm (300volts/mil)

Cleaning solvent	Mineral Spirits or Turpentine
Specific gravity	1.6
Evaporation, 24 hours@200°C (392°F), wt%	1
Shelf Life	Indefinite ¹ (unopened)

(1) It is recommended that the containers be turned over every 6 months to minimize settling for ease of mixing.

Part No.	RoHS	PCN	Net Weight
249	RoHS Compliant	Product Change Notice	28 grams (1 oz) tube
250G	RoHS Compliant	Product Change Notice	57 grams (2 oz) tube
251G	RoHS Compliant	Product Change Notice	.45Kg. (1 lb) can
252G	RoHS Compliant	Product Change Notice	2.27Kg. (5 lbs) can
253G	RoHS Compliant	Product Change Notice	4.54Kg. (10 lbs) can

Thermalcote™ II

Thermalcote™ II was developed as the sensible alternative to silicone-based thermal greases. Thermalcote II employs a highly conductive synthetic base fluid that enables the finished product to exhibit the same thermal characteristics as the silicone-based products.

Thermalcote II contains no silicone. The high lubricity of the base oil permits efficient application to both semiconductor case or heat sink, and it will effectively fill the microscopic air gaps on the metal-to-metal mating surfaces. It is non-toxic, extremely stable, and neither cakes nor runs from -40° to 200°C (-40°F to 392°F).

Thermalcote™ II Resistance Calculator

Enter the area of the device that will contact the heat sink:	<input type="text"/> mm ²
Enter the grease thickness:	<input type="text"/> mm
Interface Resistance =	<input type="text"/>

Formula

$$\text{interface resistance} = \frac{\text{interface thickness (mm)} * 1000}{\text{thermal conductivity (W/m-K)} * \text{contact area (mm}^2\text{)}}$$

Color	Blue
Operating Temperature Range	-40°C to 200°C (-40°F to 392°F).
Thermal	0.699Wm ⁻¹ C ⁻¹ (.204 Btu/hr ft °F)

Conductivity	
Dialectic strength 1.27 mm gap (.050" gap)	7.9 x 10 ³ volts/mm (200volts/mil)
Cleaning solvent	Mineral Spirits or Turpentine
Specific gravity	2.93@60°F(15.6°C)
Evaporation, 24 hours@200°C (392°F), wt%	0.6 max
Shelf Life	Indefinite ¹ (unopened)

(1) It is recommended that the containers be turned over every 6 months to minimize settling for ease of mixing.

[MSDS Safety Sheet for Thermalcote II in PDF format 41K](#)

Part No.	RoHS	PCN	Net Weight
349G	RoHS ✓ Compliant	Product Change Notice	28 grams (1 oz) tube
350G	RoHS ✓ Compliant	Product Change Notice	57 grams (2 oz) jar
351G	RoHS ✓ Compliant	Product Change Notice	.45Kg. (1 lb) can

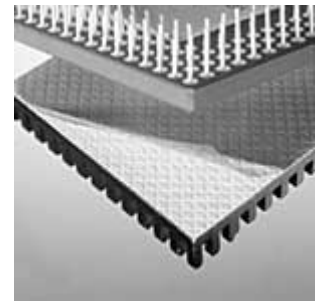
Double Sided Tapes

Double-sided thermal tapes adhere the heat sink to the device and offer good thermal characteristics. They are easy to apply, require no curing time, can be electrically conductive or isolating, and need no mechanical support to provide thermal or physical contact between the device and the heat sink. Aavid can apply one side to a heat sink.

Ther-A-Grip 1050 / T404

For ceramic or metal packages

Ther-A-Grip 1050 uses a 0.001 inch (0.03 mm) Kapton MT filled polyimide film coated on both sides with high-bond strength, pressure-sensitive acrylic adhesive that is loaded with aluminum oxide particles. This provides both good thermal performance and excellent electrical isolation.



Color	Beige
Electrical Function	Insulating

Thickness	0.005 inch (0.13 mm)
Carrier	Kapton
Thermal Impedance	0.58 °C-in ² /w
Thermal Resistance	0.37 w/m-k
Breakdown Voltage	5570 VAC
Volume Resistivity	3 x 10 ¹⁴ Ohm-cm
UL Flammability	94V-0
Rating	U.L.94
Lap Shear Adhesion	124 psi
Die Shear Adhesion	
Aluminum 25°C	130 psi
Aluminum 150°C	50 psi
Alum. Oxide 25°C	170 psi
Alum. Oxide 150°C	50 psi
Creep Adhesion	
25°C @ 12psi	>50 days
150°C @ 12psi	>10 days

Ther-A-Grip 1070 / T405R

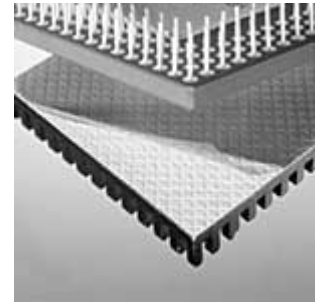
For ceramic or metal packages

Ther-A-Grip™ 1070 uses a 0.002 inch (0.05 mm) aluminum foil core coated on both sides with high-bond strength, pressure-sensitive acrylic adhesive that is loaded with aluminum oxide particles. The aluminum foil provides added thermal conductivity for applications where electrical isolation is not required. The combination of filter, expanded metal and embossed surface enhances both tape conformability and thermal performance.

Ther-A-Grip 1090 / T412

For ceramic or metal packages

Ther-A-Grip™ 1090 uses an expanded foil carrier coated on both sides with high-bond strength, pressure sensitive acrylic that is loaded with titanium diboride particles. The combination of filter, expanded metal and embossed surface enhances both tape conformability and thermal performance.



Color	1070 / White	1090 / Grey
Electrical Function	Conductive	Conductive
Thickness	0.006 inch (0.15 mm)	0.009 inch (0.23 mm)
Carrier	Aluminum	Expanded Aluminum
Thermal Impedance	0.54 °C-in ² /w	0.25 °C-in ² /w
Thermal Conductivity	0.50 w/m-k	1.40 w/m-k
Breakdown Voltage	N/A	N/A
Volume Resistivity	3 x 10 ⁻² Ohm-cm	N/A
UL Flammability	94V-0	N/A
Rating	U.L.94	
Lap Shear Adhesion	134 psi	70 psi
Die Shear Adhesion		
Aluminum 25°C	125 psi	135 psi
Aluminum 150°C	55 psi	25 psi
Alum.Oxide 25°C	145 psi	125 psi
Alum.Oxide 150°C	60 psi	40 psi
Creep Adhesion		
25°C @ 12 psi	>50 days	>50 days

150°C @ 12 psi	>10 days	>10 days
----------------	----------	----------

T410R / T411
For plastic packages

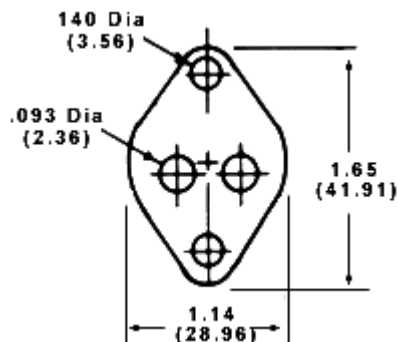
T410R thermally conductive tape consists of a high bond strength, pressure sensitive acrylic adhesive loaded with aluminum oxide and coated onto a 0.002 inch (0.05mm) aluminum foil carrier. The other side of the foil carrier has a silicone pressure sensitive adhesive which provides excellent adhesion to silicone-contaminated plastics and other low energy surfaces.

T411 thermally conductive tape consists of a high bond strength, pressure sensitive adhesive with an aluminum mesh carrier layer. The mesh carrier allows the tape to conform to curved surfaces of plastic molded IC packages, providing a high adhesive strength attachment for heat sinks. The high performance silicone-contaminated plastics and other low energy surfaces.

Typical Properties	T410R	T411
Construction		
Adhesive (to heat sink side)	Acrylic	Silicone
Color	0.006 inch White	0.009 inch Clear (Silver)
Carrier	Aluminum Foil	Aluminum Mesh
Adhesive (onto component side)	Silicone	Silicone
Color (to component side)	Clear (Silver)	Clear (Silver)
Thickness, mm (inch)	0.18 (0.007)	0.28 (0.011)
Thermal		
Thermal Impedance @<1 psi °C-cm ² /w (°C-in ² /w)	7.1 (1.1)	6.5 (1.0)
Operating Temperature Range, °C	-50 to + 150	-50 to + 150
Mechanical		
Lap shear Adhesion, psi (MPa)	60 (0.414)	14 (0.094)
Die shear Adhesion, psi (MPa) Steel/FR4 25°C 125 °C	170 (1.172) 40 (0.276)	80 (0.552) 20 (0.138)

Kon Dux
Standard Device Types

Kon-Dux interface pads are a cost-effective alternative to thermally conductive grease compounds. Aavid pre-applies Kon-Dux to your heat sink to enhance heat conductance from the semiconductor case and speed your manufacturing process. Kon-Dux pads are the equivalent of Softface™ for low-volume applications. This material is ideal for use with small, discrete semiconductors.



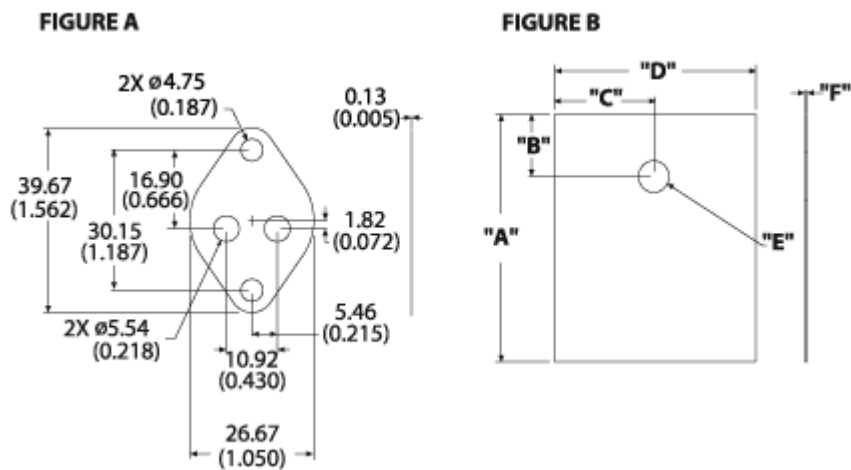
Color	Black (Metallic)
Thickness	0.005 inch

	(0.13 mm)
Thermal Impedance	0.08 °C-in ² /W
Electrical Resistivity	15 x 10 ⁻⁶ Ohms
Compression Strength: for 10% reduction in thickness	580 psi
Tensile Strength	650 psi
Ultimate Compression Strength	12500 psi
Service Temperature	-240°C to +300°C
Liner	None

Grafoil™ Conducta-Pad

RoHS Compliant!

Grafoil™ is a non-insulating material which reduces interface thermal resistance in a bare joint application. A dry material, basically a graphite compound, Grafoil™ was originally developed for high temperature gasketing applications and is covered by U.S. Patent 3,404,061 granted to Union Carbide. Basic shapes in stock are designed to accommodate TO-3, TO-218, TO-220, and Multiwatt case styles. Grafoil™ is factory applied to the heat sink and is available on all stamped and extruded models.



Ordering Information

6109 - - -
Finish Suffix

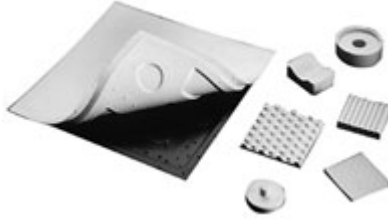
Suffix	Device	Figure	"A" Dim	"B" Dim	"C" Dim	"D" Dim	"E" Dim	"F" Dim
G1	TO-3	A						
G4	TO-218	B	19.30 (0.760)	4.83 (0.190)	7.87 (0.310)	15.75 (0.620)	3.81 (0.150)	0.13 (0.005)
G5	TO-220	B	16.51 (0.650)	3.43 (0.135)	5.33 (0.210)	10.67 (0.420)	3.43 (0.135)	0.13 (0.005)
G7	Multiwatt	B	17.53 (0.690)	2.92 (0.115)	10.03 (0.395)	20.07 (0.790)	3.81 (0.150)	0.13 (0.005)

Note: Tolerances +/- .25mm (.010") unless otherwise specified.
Material is nylon 6/6 rated 94 V-O

Gap Fillers

A-PIi™

A-PIi™ is a "super-soft" low durometer material designed to fill gaps between hot components and their heat sinks or enclosure (plastic or metal). The flexible, elastic nature of this product allows it to blanket uneven surfaces, either individually or as a group. Heat is conducted away from the individual components, or an entire PCB, into metal covers, frames, or spreader plates.



A-PIi is available in various cut sizes.

Please contact your [local representative](#) for more information.

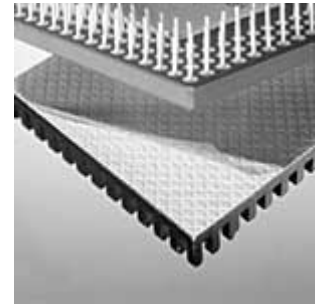
Physical Properties	Units	A-PIi 210	A-PIi 220	A-PIi 230	A-PIi 240	A-PIi 260	A-PIi 2120	A-PIi 2200
Filler		BN	BN	BN	BN	BN	BN	BN
Color		Pink	Blue	Grey	Yellow	Grey	Grey	Grey
Thermal Impedance (@<1 psi)	°C/in ² /W	0.10	0.18	0.24	0.32	0.44	0.80	1.3
Thermal Conductivity	W/m-K	6	6	6	6	6	6	6
Thickness	inch (mm)	0.010 (.25)	0.020 (.51)	0.030 (.76)	0.040 (1.02)	0.060 (1.52)	0.120 (3.05)	0.200 (5.08)
tolerance +/- inch (mm)		0.001 (0.03)	0.002 (0.05)	0.004 (0.10)	0.006 (0.15)	0.010 (0.25)	0.010 (0.25)	0.010 (0.25)
Dielectric Strength	Volts/mil	300	300	300	300	300	300	300
Density	g/cc	1.28	1.28	1.28	1.28	1.28	1.28	1.28
Hardness	Shore A	12	10	8	7	6	5	3

Double Sided Tapes

Double-sided thermal tapes adhere the heat sink to the device and offer good thermal characteristics. They are easy to apply, require no curing time, can be electrically conductive or isolating, and need no mechanical support to provide thermal or physical contact between the device and the heat sink. Aavid can apply one side to a heat sink.

Ther-A-Grip 1050 / T404 For ceramic or metal packages

Ther-A-Grip 1050 uses a 0.001 inch (0.03 mm) Kapton MT filled polyimide film coated on both sides with high-bond strength, pressure-sensitive acrylic adhesive that is loaded with aluminum oxide particles. This provides both good thermal performance and excellent electrical isolation.



Color	Beige
Electrical Function	Insulating
Thickness	0.005 inch (0.13 mm)
Carrier	Kapton
Thermal Impedance	0.58 °C-in ² /w
Thermal Resistance	0.37 w/m-k
Breakdown Voltage	5570 VAC
Volume Resistivity	3 x 10 ¹⁴ Ohm-cm
UL Flammability	94V-O
Rating	U.L.94
Lap Shear Adhesion	124 psi
Die Shear Adhesion	
Aluminum 25°C	130 psi
Aluminum 150°C	50 psi
Alum. Oxide 25°C	170 psi
Alum. Oxide 150°C	50 psi
Creep Adhesion	
25°C @ 12psi	>50 days
150°C @ 12psi	>10 days

Ther-A-Grip 1070 / T405R

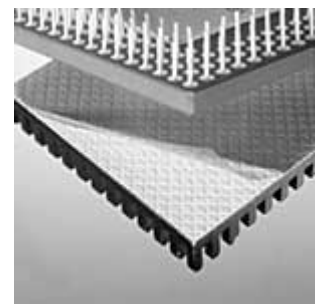
For ceramic or metal packages

Ther-A-Grip™ 1070 uses a 0.002 inch (0.05 mm) aluminum foil core coated on both sides with high-bond strength, pressure-sensitive acrylic adhesive that is loaded with aluminum oxide particles. The aluminum foil provides added thermal conductivity for applications where electrical isolation is not required. The combination of filter, expanded metal and embossed surface enhances both tape conformability and thermal performance.

Ther-A-Grip 1090 / T412

For ceramic or metal packages

Ther-A-Grip™ 1090 uses an expanded foil carrier coated on both sides with high-bond strength, pressure sensitive acrylic that is loaded with titanium diboride particles. The combination of filter, expanded metal and embossed surface enhances both tape conformability and thermal performance.



Color	1070 / White	1090 / Grey
Electrical Function	Conductive	Conductive

Thickness	0.006 inch (0.15 mm)	0.009 inch (0.23 mm)
Carrier	Aluminum	Expanded Aluminum
Thermal Impedance	0.54 °C-in ² /w	0.25 °C-in ² /w
Thermal Conductivity	0.50 w/m-k	1.40 w/m-k
Breakdown Voltage	N/A	N/A
Volume Resistivity	3 x 10 ⁻² Ohm-cm	N/A
UL Flammability	94V-0	N/A
Rating	U.L.94	
Lap Shear Adhesion	134 psi	70 psi
Die Shear Adhesion		
Aluminum 25°C	125 psi	135 psi
Aluminum 150°C	55 psi	25 psi
Alum.Oxide 25°C	145 psi	125 psi
Alum.Oxide 150°C	60 psi	40 psi
Creep Adhesion		
25°C @ 12 psi	>50 days	>50 days
150°C @ 12 psi	>10 days	>10 days

T410R / T411

For plastic packages

T410R thermally conductive tape consists of a high bond strength, pressure sensitive acrylic adhesive loaded with aluminum oxide and coated onto a 0.002 inch (0.05mm) aluminum foil carrier. The other side of the foil carrier has a silicone pressure sensitive adhesive which provides excellent adhesion to silicone-contaminated plastics and other low energy surfaces.

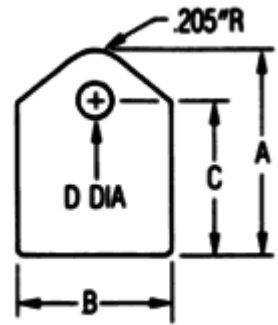
T411 thermally conductive tape consists of a high bond strength, pressure sensitive adhesive with an aluminum mesh carrier layer. The mesh carrier allows the tape to conform to curved surfaces of plastic molded IC packages, providing a high adhesive strength attachment for heat sinks. The high performance silicone-contaminated plastics and other low energy surfaces.

Typical Properties	T410R	T411
Construction		
Adhesive (to heat sink side)	Acrylic	Silicone
Color	0.006 inch White	0.009 inch Clear (Silver)
Carrier	Aluminum Foil	Aluminum Mesh
Adhesive (onto component side)	Silicone	Silicone
Color (to component side)	Clear (Silver)	Clear (Silver)
Thickness, mm (inch)	0.18 (0.007)	0.28 (0.011)
Thermal		
Thermal Impedance @ <1 psi °C-cm ² /w (°C-in ² /w)	7.1 (1.1)	6.5 (1.0)
Operating Temperature Range, °C	-50 to + 150	-50 to + 150
Mechanical		
Lap shear Adhesion, psi (MPa)	60 (0.414)	14 (0.094)
Die shear Adhesion, psi (MPa) Steel/FR4		
25°C	170 (1.172)	80 (0.552)
125 °C	40 (0.276)	20 (0.138)

In-Sil-8

Standard Pads

When you need thermal conductance and electrical isolation in one package, In-Sil-8 Pads offer you the best of both. These silicone-based insulators come with thermally conductive fillers to isolate up to 6000 volts AC. In-Sil-8 pads withstand the rigors of assembly, harsh environments, and aging under continuous use. You'll save time with these cost-effective pads too: installation is 4 times faster than mica and grease, and they won't contaminate solder baths. Order In-Sil-8 Pads with or without pressure-sensitive adhesive, and in standard or custom shapes.



Ordering Information

In-Sil-8 pads have 12 digit ordering numbers. The 1st - 4th digits are listed in this chart, the 5th & 6th digits indicate standard configurations, and the last 6 digits are F00000. The 5th and 6th digit ordering codes along with the part dimensions are listed in the code column on the [standard pads page](#).

Part Numbers (With adhesive factory applied to one side)	1886 (1896)	1887 (1897)	1888 (1898)	1889 (1899)
Color	Grey	Rust	Grey	Grey
Thickness (inch)	0.006	0.009	0.007	0.009
Thickness (mm)	0.15	0.23	0.18	0.23
Thermal Res. (°C/W)				
TO-3	0.40	0.21	0.33	0.50
TO-220	1.40	0.63	1.25	1.50
TO-218	0.93	0.49	0.77	1.16
Breakdown Voltage	6000	5000	4000	5000
Dielectric Constant	5.5	4.5	5.5	5.5

A Dux

A-dux is not recommended for new designs

Please [contact your local sales rep](#) or Aavid Technical Support for new custom opportunities where Pre-applied interface is needed.

Property	Units	A-Dux without Adhesive	A-Dux with Adhesive
Product#	-	1885	1895
Color	-	White	White
Thermal Impedance	°C/in ² /W	0.16	0.23
Thickness	inch (mm)	0.004 (0.10)	0.0045 (0.11)
Electrical Resistivity	Ohm-cm	1 x 10 ⁻¹⁴	1 x 10 ⁻¹⁴
Tensile Strength	psi	700	700
Service Temperature	°C	-50 to +200	-50 to +200
Coefficient of Thermal Expansion	10 ⁻⁶ in/in/°C	5	5

Ordering Information

Part Number	Size
D037202316B	2.00 x 2.00

Thermalfilm™ Polyimide Plastic Films
 RoHS Compliant

Thermalfilm™ and Thermalfilm™MT are low cost polyimide plastic insulating films designed to be an improved replacement for mica. These insulators have a distinctive amber color and can be easily recognised and assembled on a production line

Thermalfilm™MT, made from high performance Kapton™MT material, provides thermal conductivity nearly 2-5 times greater than standard Thermalfilm™.

Both insulators have an extremely high resistance to flow or thin out under high compressive stresses, particularly at elevated temperatures.

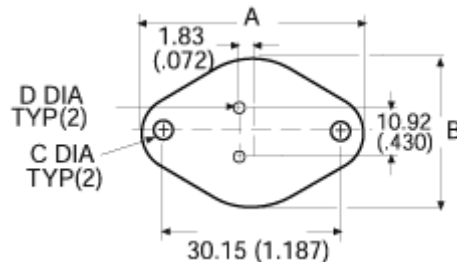
Excellent physical, mechanical and electrical properties remain nearly constant over a wide range of temperatures and frequencies. They are radiation resistant, have no melting points, and have no known organic solvents.

The polyimide plastic film is UL listed as a component in UL's publication "Component - Plastic Material" dated September 18, 1969. The UL card number is E39505R, Guide QMFZ2 filed by E.I. du Pont de Nemours & Co., Inc. Thermalfilm is rated 94 V-O.

Notes:

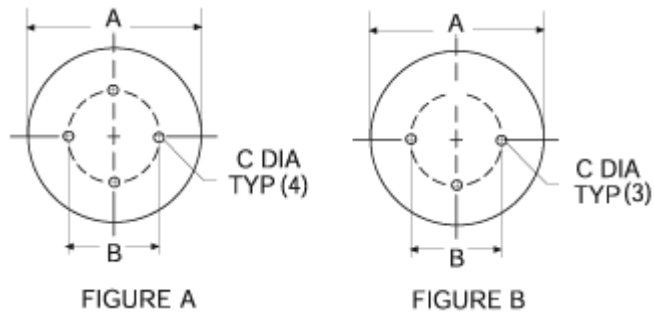
- Thermalfilm™ MT part numbers begin with "46".
- Insulator thickness is .05mm +/- 0.006mm (0.002" +/- 0.00025") unless otherwise specified.
- Dimensional tolerances are +/- .38mm(0.015"), hole diameters are +/- .25mm (0.010") and angularity is +/- 1 1/2° unless otherwise specified.

For TO-3



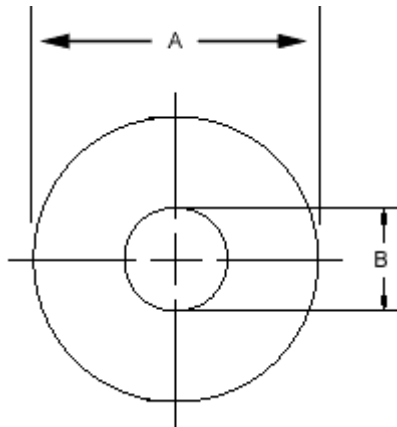
Model	RoHS	PCN	A	B	C	D
43-03-1G	RoHS Compliant	N/A	43.94 (1.730)	31.75 (1.250)	3.56 (0.140)	1.57 (0.062)
43-03-2G	RoHS Compliant	Product Change Notice	42.04 (1.655)	27.00 (1.063)	3.96 (0.156)	1.57 (0.062)
43-03-3G	RoHS Compliant	N/A	42.04 (1.655)	27.00 (1.063)	3.96 (0.156)	4.22 (0.166)
43-03-4G	RoHS Compliant	Product Change Notice	39.70 (1.563)	26.67 (1.050)	3.56 (0.140)	1.57 (0.062)
43-03-6G	RoHS Compliant	N/A	42.04 (1.655)	28.58 (1.125)	3.96 (0.156)	1.57 (0.062)

For TO-5 and TO-18



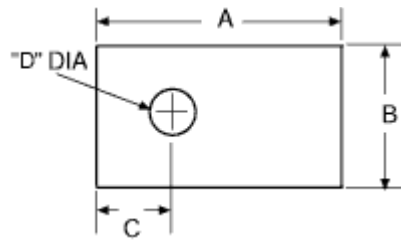
Part Number	RoHS	PCN	FIG.	A	B	C
43-05-1G (TO-5)	RoHS Compliant	Product Change Notice	N/A	A	9.91 (0.390)	5.08 (0.200) .91 (0.036)
43-05-2G (TO-5)	RoHS Compliant	Product Change Notice	N/A	B	9.91 (0.390)	5.08 (0.200) .91 (0.036)
43-18-1G (TO-18)	RoHS Compliant	Product Change Notice	N/A	A	6.35 (0.250)	2.54 (0.100) .91 (0.036)

Washer



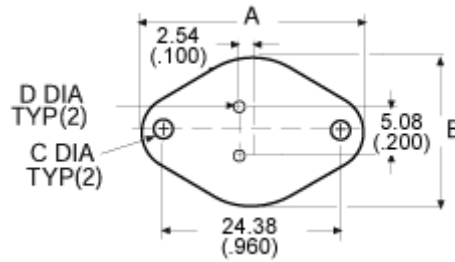
Part Number	RoHS	PCN	Thread	A	B
43-02-4G	RoHS Compliant	Product Change Notice	#4	6.35 (0.250)	3.05 (0.120)
43-02-10G	RoHS Compliant	Product Change Notice	#10	14.27 (0.562)	5.16 (0.203)
43-02-25G	RoHS Compliant	Product Change Notice	1/4"	20.62 (0.812)	6.73 (0.265)

For TO-220, TO-126, Case 77, Case 199, Case 90, TO-218, TO-3P



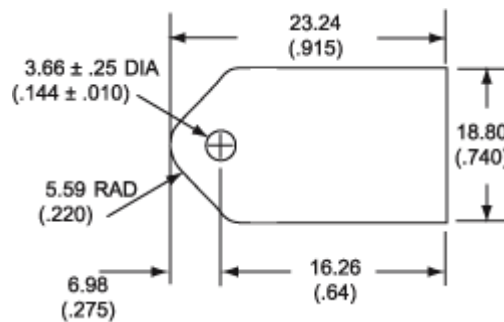
Part Number	RoHS	PCN	A	B	C	D
43-77-1G (TO-126,case 77)	RoHS Compliant	Product Change Notice	11.10 (0.437)	7.92 (0.312)	3.56 (0.140)	2.36 (0.093)
43-77-2G (case 90,case 199)	RoHS Compliant	Product Change Notice	17.45 (0.687)	14.27 (0.562)	5.54 (0.218)	3.18 (0.125)
43-77-6G (case 90,case 199)	RoHS Compliant	Product Change Notice	20.62 (0.812)	14.27 (0.562)	7.14 (0.281)	3.96 (0.156)
43-77-8G (case 90,case 199)	RoHS Compliant	Product Change Notice	18.92 (0.745)	13.84 (0.545)	5.38 (0.212)	3.81 (0.150)
43-77-9G (TO-220)	RoHS Compliant	Product Change Notice	18.42 (0.725)	13.21 (0.520)	4.32 (0.170)	2.92 (0.115)
46-77-9G (TO-220)	RoHS Compliant	Product Change Notice	18.42 (0.725)	13.21 (0.520)	4.32 (0.170)	2.92 (0.115)
43-77-20G (TO-220,TO-218,TO-3P)	RoHS Compliant	Product Change Notice	23.24 (0.915)	18.80 (0.740)	6.98 (0.2.75)	3.66 (0.144)

For TO-66





Model	A	B	C	D	Thickness
43-66-2	33.32 (1.312)	19.35 (0.762)	3.56 (0.140)	1.57 (0.062)	.05 (0.002)

For TO-218



Bulk Thermalfilm™

Part Number	RoHS	PCN	Thickness
4300G 2 MIL			0.051 (0.002)
4500 5 MIL	N/A	N/A	0.127 (0.005)

Thermalfilm™ / Thermalfilm™MT

Property	Electrical -Typical Value @ 25°C		Test Method
	Thermalfilm™	Thermalfilm™MT	
Dielectric Strength	03mm (1 -mil) 275.6 x 10 ³ volts/mm (7,000 volts/mil)	177.2 x 10 ³ volts/mm (4500 volts/mm)	ASTM D149-64
Dielectric Constant	3.5	4.3	ASTM D150-64T
Dissipation Factor	0.002	0.002	ASTM D150-64T
Volume Resistivity	10 ¹⁷ ohm-cm	10 ¹⁷ ohm-cm	ASTM D257-61
Surface Resistivity	10 ¹⁶ ohms	10 ¹⁶ ohms	ASTM D257-61
Corona Start Voltage .025mm (1 -mil)	465 volts	465 volts	ASTM D1868-61T
Insulation Resistance	100.00 megohm mfd.	100.00 megohm mfd.	Based on 0.05 mfd wound capacitor using 0.25mm (1 -mil) Film
PHYSICAL			
Ultimate Tensile Strength (MD)	1.72 x 10 ⁸ Pa (25,000 psi)	103 MPa (1500 psi)	ASTM D882-64T
Bursting Strength Test (Mullen)	3.10 x 10 ⁵ Pa (45 psi)	0.31 MPa (45 psi)	ASTM 0774-63
Tear Strength - Initial	27,559 gm/mm (700 gm/mil)	35,433 gm/mm (900 gm/mil)	ASTM D1004-61
Density	1.42 gm/cm ³ (88.7 lb/ft ³)	1.78 gm/cm ³ (111.1 lb/ft ³)	ASTM D1505-63T
Folding Endurance(MIT)	>10,000 cycles	>10,000 cycles	ASTM D2176-63T
THERMAL			
Melting Point	None	None	
Zero Strength Temperature	815°C (1499°F)	815°C (1499°F)	Hot Bar (Du Pont Test)
Cut Through Temperature	435°C (815°F) 525°C (977°F)	435°C (815°F) 525°C (977°F)	Weighted Probe on Heated Film (Du Pont Test)
Service Temperature	-260°C to 240°C) (-464°F to 464°F)	-260°C to 240°C) (-464°F to 464°F)	
Thermal Conductivity	0.156Wm/K (0.09 BTU/hr-ft-°F)	0.379Wm/K (0.219 BTU/hr-ft-°F)	Model TC-1000 Twin Heatmeter Comparitive Tester
Flammability	V-0, UL "E" card E39505	V-0, UL "E" card E39505	UL 94