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Insulating Films

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.

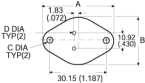
Excellent physical, mechanical and electrical properties remain nearly constant over a wide range of temperatures and frequencies. They are radiation resistant, have no melting points, and have no known organic solvents.

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 QMF22 filed by E.I. du Pont de Nemours & Co., Inc. Thermalfilm is rated 94 V-O.

Notes:

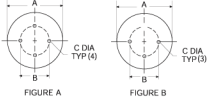
- Thermalfilm™ MT part numbers begin with "46".
- Insulator thickness is .05mm +/- 0.006mm (0.002" +/- 0.00025") unless otherwise specified.
- Dimensional tolerances are +/- 0.38mm (0.015"), hole diameters are +/- 0.25mm (0.010") and angularity is +/- 1.1/2" unless otherwise specified.

For TO-3



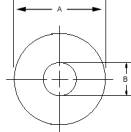
Part Number	RoHS	PCN	A	B	C	D
43-03-1G	RoHS ✓ Compliant	N/A	43.94 (1.730)	31.75 (1.250)	3.56 (0.140)	1.57 (0.062)
43-03-2G	RoHS ✓ Compliant	Protect Change Notice [H]	42.04 (1.655)	27.00 (1.063)	3.96 (0.156)	1.57 (0.062)
43-03-3G	RoHS ✓ Compliant	N/A	42.04 (1.655)	27.00 (1.063)	3.96 (0.156)	4.22 (0.166)
43-03-4G	RoHS ✓ Compliant	Protect Change Notice [H]	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



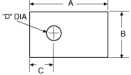
Part Number	RoHS	PCN	FIG.	A	B	C
43-05-1G (TO-5)	RoHS ✓ Compliant	Protect Change Notice [H]	A	9.91 (0.390)	5.08 (0.200)	0.91 (0.036)
43-05-2G (TO-5)	RoHS ✓ Compliant	Protect Change Notice [H]	B	9.91 (0.390)	5.08 (0.200)	0.91 (0.036)
43-18-1G (TO-18)	RoHS ✓ Compliant	Protect Change Notice [H]	A	6.35 (0.250)	2.54 (0.100)	0.91 (0.036)

Washer



Part Number	RoHS	PCN	Thread	A	B
43-02-4G	RoHS ✓ Compliant	Protect Change Notice [H]	#4	6.35 (0.250)	3.05 (0.120)
43-02-10G	RoHS ✓ Compliant	Protect Change Notice [H]	#10	14.27 (0.562)	5.16 (0.203)
43-02-25G	RoHS ✓ Compliant	Protect Change Notice [H]	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	Protect Change Notice [H]	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	Protect Change Notice [H]	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	Protect Change Notice [H]	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	Protect Change Notice [H]	18.92 (0.745)	13.84 (0.545)	5.38 (0.212)	3.81 (0.150)

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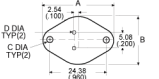
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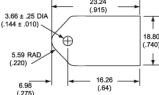
43-77-20G (TO-220,TO-218,TO-3P)	RoHS ✓ Compliant	Product Status New	23.24 (0.915)	18.80 (0.740)	6.98 (0.2.75)	3.66 (0.144)
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For TO-66



Part Number	A	B	C	D	Thickness
43-66-2	33.32 (1.312)	19.35 (0.762)	3.56 (0.140)	1.57 (0.062)	0.05 (0.002)

For TO-218



Part Number	RoHS	PCN	Thickness
43-02-95	N/A	N/A	0.05 (0.002)

Bulk Thermalfilm™

Part Number	RoHS	PCN	Thickness
4300G 2 MIL	RoHS ✓ Compliant	Product Status New	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 mlds.	100.00 megohm mlds.	Based on 0.05 mld 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	0.156W/mK (0.09 BTU/hr-ft-°F)	0.379W/mK (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

Note: One mil equals .001 inch

Thermalfilm Resistance Calculator

Enter the area of the device that will contact the heat sink:	mm ²
Interface Resistance =	

Formula

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

Thermalfilm MT Resistance Calculator

Enter the area of the device that will contact the heat sink:	mm ²
Interface Resistance =	

Formula

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

Aavid will lead the electronics thermal management industry worldwide. We will be the first company customers call to enable their thermal designs anywhere in the world. We will respond with extraordinary speed and will provide them with timely and cost-effective solutions because we understand their needs, their industry, and their culture. 2012 Aavid Thermalloy, LLC