



SPREADERSHIELD™ Graphite Heat Spreaders



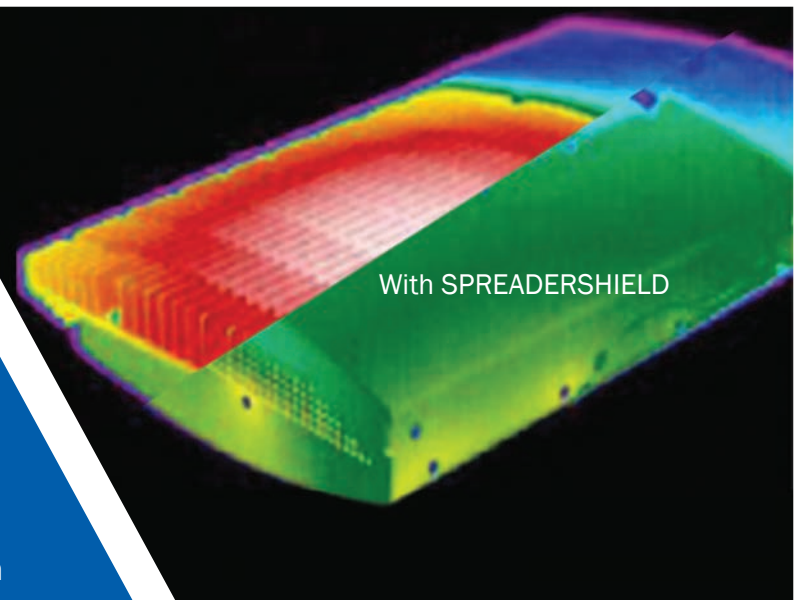
Thermal Management

RAPID
RIGHT
RELIABLE

SPREADERSHIELD solutions eliminates hot-spots and protects sensitive areas. Compared to aluminum and copper, SPREADERSHIELD provides superior heat spreading and thermal management for a wide range of electronics applications, from the thinnest and lightest weight to high power devices. SPREADERSHIELD products function as both a passive heat spreader and heat shield.

This unique, patented solution takes advantage of graphite's anisotropic thermal properties to both shield heat from sensitive areas and distribute heat evenly to eliminate hot spots in LED lighting and more.

- In-plane conductivity 300-1500 W/mK
- Spreads heat up to 4x Cu and 7x Al
- Saves weight vs alternatives; 30% lighter vs Al, 80% vs Cu
- Thicknesses as low as 25 μm
- Anisotropic ratio up to 300:1





Product Grade Characteristics^[1]

	SS300 300 W/mK	SS400 400 W/mK	SS500 500 W/mK	SS600 600 W/mK	SS1500 1500 W/mK
Typical Thermal Conductivity ^[2] In-Plane • Through-Plane (W/mK)	300 • 4.5	400 • 3.7	500 • 2.8	600 • 3.5	1500 • 3.4
Available Thickness Range (mm)	0.51 – 0.94	0.040 – 0.94	0.076 – 0.76	0.102 – 0.127	0.017 – 0.025
Thermal Contact Impedance Per Side (°C cm ² /W) @ specified thickness (mm)	0.30 @ 0.51	0.38 @ 0.51	0.90 @ 0.102	0.44 @ 0.102	0.10 @ 0.25
Tensile Strength (MPa)	–	9.7	7.7	9.7	37
Electrical Resistivity In-Plane (uNM)	6.5	5.2	4.2	3.4	0.5
Electrical Conductivity In-Plane • Through-Plane (S/cm)	1,600 • 28	1,900 • 18	2,400 • 15	2,900 • 10	19,000 • 5
CTE (Coefficient of Thermal Expansion) In-Plane • Through-Plane (ppm/°C)			-0.4 • 27.0		
Flammability Rating			UL 94V-0		
Operating Temperature (°C)			-40 TO +400		
Specific Heat @ 25 °C (J/kg-°C)			710		
RoHS Compliant			Yes		

Coatings and Adhesives

SPREADERSHIELD solutions are available with or without coatings (dielectric or metal) and adhesives. The table below contains typical coating and adhesive options and their properties.

	Coating Options					Adhesive Options		
	C1	P1	P22	P7	M3	A1	P1A1	P8A8
Description	Acrylic Coating	PET Film Coating	PET Film Coating	Temporary Liner ^[4]	Aluminum Foil Coating	Acrylic Adhesive ^[5]	PET Film Adhesive ^[5]	PET Film Adhesive ^[5]
Coating Thickness ^[3] (mm)	0.025	0.010	0.005 – 0.008	N/A	0.013	0.030 – 0.038	0.010 – 0.012	0.005 – 0.006
Release Liner Thickness (mm)	-	-	-	0.05 PET	-	0.08 Paper	0.08 Paper	0.010 Paper
Dielectric Strength ^[6]	-	2,800	600	-	0	-	2,800	900
Operating Temperature (°C)			-40 to +150					-40 to 100
Thermal Contact Impedance ^[7] (°C • cm ² /W) per side	-	1.6	0.95	-	-	0.16	-	0.42
Thermal Contact Impedance ^[7] Through-Thickness (W/mK)	-	0.16	0.16	-	210	-	0.16	0.16

Die-Cut Edge Options^[8]

Die-Cut edge options are dependent on the selected coating. The table below contains typical coating and adhesive options and their properties.

Description	EN	
	Flush Edge Cut	Envelope Seal
Diagram		



Notes:
[1] Properties listed are typical and cannot be used as acceptance or rejection criteria. Product characteristics exclude coatings and adhesives.
[2] In-plane conductivity at ambient temperature determined using Angstrom's method; through-plane determined using ASTM D5470 Modified method.
[3] Coating thickness specified includes adhesive thickness used to bond coatings to graphite.
[4] P7 is a temporary liner used exclusively to package sheets of SS1500 into a continuous roll and must be defined as a bottom coating type ("GP7") for SS1500 if no other coating is specified.
[5] Adhesive strength of "A1" and "P1A1" are 700 g/cm² respectively based upon lap shear test ASTM D3163 on a glass plate. Adhesive strength for "P8A8" = 2.64 N/cm per 90o based upon peel adhesion test ASTM D3330 on a glass plate.
[6] ASTM D149-09 Method A
[7] ASTM D5470 Modified (at 11kPa/16 psi/1.1 bar). Total thermal impedance = impedance of graphite + impedance of coating.
[8] Overlay seal (-OV) is no longer an available sealing option.
[9] Availability and specified thickness "d" will vary depending upon graphite thickness and coating selected. Please contact Sur-Seal for additional information.
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