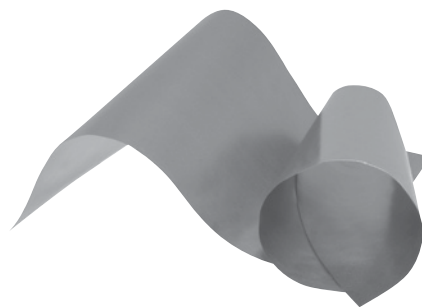


"PGS" Graphite Sheets

Type: **EYG**

"PGS (Pyrolytic Graphite Sheet)" is a thermal interface material which is very thin, synthetically made, has high thermal conductivity, and is made from a highly oriented graphite polymer film. It is ideal for providing thermal management/heat-sinking in limited spaces or to provide supplemental heat-sinking in addition to conventional means. This material is flexible and can be cut into customizable shapes.

"SSM(Semi-Sealing Material)" is the product which is compounding PGS Graphite sheet and High thermal conductive Elastomer resin. It has a function to absorb heat by resin and release the heat by utilizing high thermal conductivity of PGS Graphite sheet. It also enables taking better attachment to the component which has different height on the electronic board, reducing stress to the electronic board.



Features

- Excellent thermal conductivity : 700 to 1950 W/(m·K)
(2 to 5 times as high as copper, 3 to 8 times as high as aluminum)
- Lightweight: Specific gravity : 0.85 to 2.13 g/cm³
(1/4 to 1/10 of copper, 1/1.3 to 1/3 of aluminum in density)
- Flexible and easy to be cut or trimmed. (withstands repeated bending)
- Low thermal resistance
- Low heat resistance with flexible Graphite sheet (SSM)
- Low repulsion and easy to keep the product's shape after attaching (SSM)
- Siloxane Free(SSM)
- High dielectric voltage : 17 kVac/mm (SSM)
- RoHS compliant

Recommended applications

- Smart phones, Mobile phones, DSC, DVC, Tablet PCs, PCs and peripherals, LED Devices
- Semiconductor manufacturing equipment (Sputtering, Dry etching, Steppers)
- Optical communications equipment

Explanation of Part Numbers

● PGS only (EYGS*****)

1	2	3	4	5	6	7	8	9	10
E	Y	G	S	0	9	1	2	1	0
Product Code			Style		Dimension			PGS thickness*	
			S	PGS only	0912	90 mm × 115 mm			10 100 μm
					1218	115 mm × 180 mm			07 70 μm
					1823	180 mm × 230 mm			05 50 μm
								04 40 μm	03 25 μm

* PGS thickness of 17 μm, 10 μm does not support as single item.

● Taping (EYGA*****)

1	2	3	4	5	6	7	8	9	10	11	12
E	Y	G	A	0	9	1	2	1	0	D	M
Product Code			Style		Dimension**			PGS thickness		Suffix	
			A	Taping	0912	90 mm × 115 mm		10	100 μm	A	Lamination type *Please refer to Composition example.
					1218	115 mm × 180 mm		07	70 μm	M	
								05	50 μm	F	
								04	40 μm	PA	
								03	25 μm	PM	
								02	17 μm	DM	
								01	10 μm	DF	
										V	
										RV	

** Please contact us for other dimensions other than those above.

** Please contact us for other dimensions other than those above.

● Thermally conductive elastomer processing (EYGE*****)

1	2	3	4	5	6	7	8	9	10	11	12
E	Y	G	E	0	9	1	2	X	B	6	D
Product Code			Style		Dimension**			PGS thickness		Elastomer thickness	
			E	Elastomer processing	0912	90 mm × 115 mm			A 100 μm	5 0.5 mm	Q PET tape 8 μm
								B 70 μm	6 1.0 mm	D PET tape 10 μm	
								C 50 μm	7 1.5 mm	P PET tape 30 μm	
								G 40 μm	8 2.0 mm	F Acrylic adhesive tape 6 μm	
								D 25 μm	9 3.0 mm	M Acrylic adhesive tape 10 μm	
								E 17 μm		A Acrylic adhesive tape 30 μm	
								F 10 μm			

** Please contact us for other dimensions other than those above.

Characteristics of PGS Graphite Sheets

Thickness		100 μm	70 μm	50 μm	40 μm
		0.10±0.03 mm	0.07±0.015 mm	0.050±0.015 mm	0.040±0.012 mm
Density		0.85 g/cm ³	1.21 g/cm ³	1.70 g/cm ³	1.80 g/cm ³
Thermal conductivity	a-b plane	700 W/(m·K)	1000 W/(m·K)	1300 W/(m·K)	1350 W/(m·K)
Electrical conductivity		10000 S/cm	10000 S/cm	10000 S/cm	10000 S/cm
Extensional strength		20.0 MPa	20.0 MPa	20.0 MPa	25.0 MPa
Expansion coefficient	a-b plane	9.3×10^{-7} 1/K	9.3×10^{-7} 1/K	9.3×10^{-7} 1/K	9.3×10^{-7} 1/K
	c axis	3.2×10^{-5} 1/K	3.2×10^{-5} 1/K	3.2×10^{-5} 1/K	3.2×10^{-5} 1/K
Heat resistance*		400 °C			
Bending(angle 180,R5)		10000 cycles			

Thickness		25 μm	17 μm	10 μm
		0.025±0.010 mm	0.017±0.005 mm	0.010±0.002 mm
Density		1.90 g/cm ³	2.10 g/cm ³	2.13 g/cm ³
Thermal conductivity	a-b plane	1600 W/(m·K)	1850 W/(m·K)	1950 W/(m·K)
Electrical conductivity		20000 S/cm	20000 S/cm	20000 S/cm
Extensional strength		30.0 MPa	40.0 MPa	40.0 MPa
Expansion coefficient	a-b plane	9.3×10^{-7} 1/K	9.3×10^{-7} 1/K	9.3×10^{-7} 1/K
	c axis	3.2×10^{-5} 1/K	3.2×10^{-5} 1/K	3.2×10^{-5} 1/K
Heat resistance*		400 °C		
Bending(angle 180,R5)		10000 cycles		

* Withstand temperature refers to PGS only.
(Lamination material such as PET tape etc. is not included)

** Values are for reference, not guaranteed.

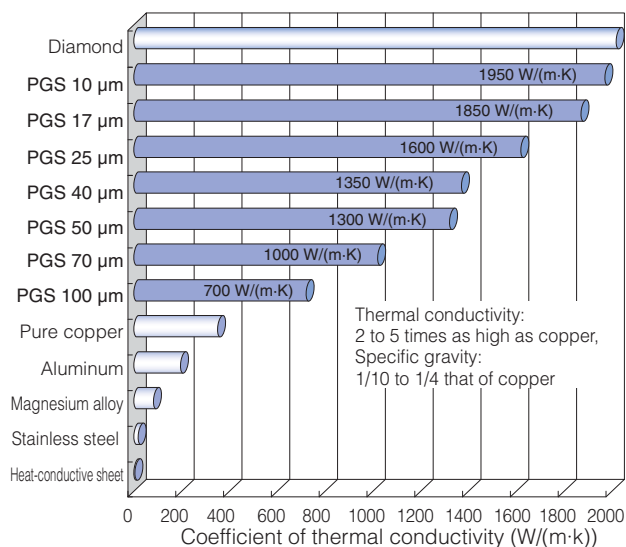
Characteristics of SSM (Elastomer)

Thickness		1 mm	2 mm	3 mm
Specific heat		1.4 J/(g·C)		
Density		1.88 g/cm ³		
Thermal conductivity		1.6 W/(m·K)**		
Thermal resistance	100 kPa	7.53 (C·cm ²)/W	14.82 (C·cm ²)/W	19.48 (C·cm ²)/W
	200 kPa	6.71 (C·cm ²)/W	13.17 (C·cm ²)/W	16.01 (C·cm ²)/W
	300 kPa	5.90 (C·cm ²)/W	10.73 (C·cm ²)/W	11.38 (C·cm ²)/W
Compressibility	100 kPa	4.93 %	4.05 %	4.43 %
	200 kPa	9.58 %	8.66 %	14.04 %
	300 kPa	18.41 %	22.13 %	40.49 %
Resistivity		$> 10 \times 10^{14} \Omega \cdot \text{cm}$		
Dielectric voltage		$> 17 \text{ kVac/mm}$		
Hardness (Type E)		39		
Adhesive force	SUS	39 mN/cm		
	Aluminum	31 mN/cm		
	Glass	38 mN/cm		

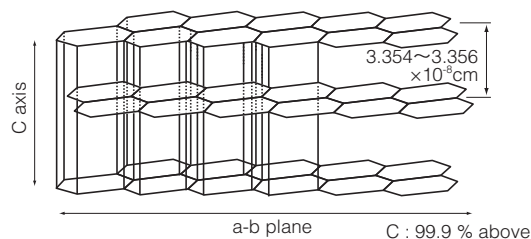
* Characteristics refer to Elastomer resin only.

** Typical values, not guaranteed.

Comparison of thermal conductivity (a-b plane)

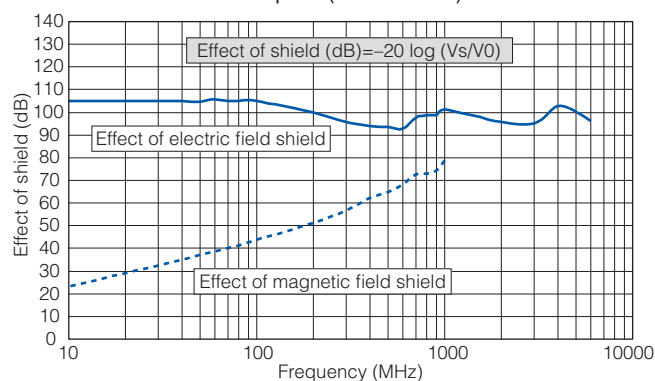


Layered structure of PGS



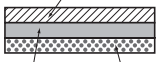
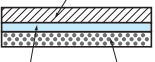
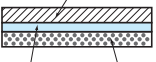
Electric field shield performance

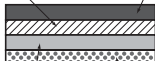
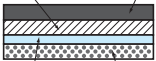
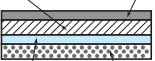
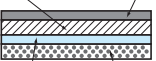
a-b plane(KEC method)



Lamination type/Composition example

- Standard series (PGS 100, 70, 50, 40, 25, 17, 10 μm)

Type		PGS Only	Adhesive Type		
		S type	A-A type	A -M type	A -F type
Front face		—	—	—	—
Rear face		—	Insulative adhesion type 30 μm	Insulative thin adhesion type 10 μm	Insulative thin adhesion type 6 μm
Structure					
Features		· High Thermal Conductivity · High Flexibility · Low Thermal Resistance · Available up to 400 °C · Conductive Material	· With insulation material on one side · With strong adhesive tape for putting chassis · Withstanding Voltage : 2 kV	· With insulation material on one side · Low thermal resistance comparison with A-A type · Withstanding Voltage : 1 kV	· With insulation material on one side · Low thermal resistance comparison with A-A type
Withstand temperature		400 °C	100 °C	100 °C	100 °C
Standard size		115 × 180 mm	90 × 115 mm	90 × 115 mm	90 × 115 mm
Maximum size		180 × 230 mm (25 μm to)	115 × 180 mm	115 × 180 mm	115 × 180 mm
100 μm	Part No.	EYGS121810	EYGA091210A	EYGA091210M	EYGA091210F
	Thickness	100 μm	130 μm	110 μm	106 μm
70 μm	Part No.	EYGS121807	EYGA091207A	EYGA091207M	EYGA091207F
	Thickness	70 μm	100 μm	80 μm	76 μm
50 μm	Part No.	EYGS121805	EYGA091205A	EYGA091205M	EYGA091205F
	Thickness	50 μm	80 μm	60 μm	56 μm
40 μm	Part No.	EYGS121804	EYGA091204A	EYGA091204M	EYGA091204F
	Thickness	40 μm	70 μm	50 μm	46 μm
25 μm	Part No.	EYGS121803	EYGA091203A	EYGA091203M	EYGA091203F
	Thickness	25 μm	55 μm	35 μm	31 μm
17 μm	Part No.	—	EYGA091202A	EYGA091202M	EYGA091202F
	Thickness	—	47 μm	27 μm	23 μm
10 μm	Part No.	—	EYGA091201A	EYGA091201M	EYGA091201F
	Thickness	—	40 μm	20 μm	16 μm

Type		Laminated type (Insulation & Adhesive)			
		A-PA type	A-PM type	A-DM type	A-DF type
Front face		Polyester tape standard type 30 μm	Polyester tape standard type 30 μm	Polyester tape thin type 10 μm	Polyester tape thin type 10 μm
Rear face		Insulative adhesion type 30 μm	Insulative thin adhesion type 10 μm	Insulative thin adhesion type 10 μm	Insulative thin adhesion type 6 μm
Structure					
Features		· With insulation material on both side · Withstanding Voltage PET tape : 4 kV · Adhesive Tape : 2 kV	· With insulation material on both side · Withstanding Voltage PET tape : 4 kV · Adhesive Tape : 1 kV	· With insulation material on both side · Withstanding Voltage PET tape : 1 kV · Adhesive Tape : 1 kV	· With insulation material on both side · Withstanding Voltage PET tape : 1 kV
Withstand temperature		100 °C	100 °C	100 °C	100 °C
Standard size		90 × 115 mm	90 × 115 mm	90 × 115 mm	90 × 115 mm
Maximum size		115 × 180 mm	115 × 180 mm	115 × 180 mm	115 × 180 mm
100 μm	Part No.	EYGA091210PA	EYGA091210PM	EYGA091210DM	EYGA091210DF
	Thickness	160 μm	140 μm	120 μm	116 μm
70 μm	Part No.	EYGA091207PA	EYGA091207PM	EYGA091207DM	EYGA091207DF
	Thickness	130 μm	110 μm	90 μm	86 μm
50 μm	Part No.	EYGA091205PA	EYGA091205PM	EYGA091205DM	EYGA091205DF
	Thickness	110 μm	90 μm	70 μm	66 μm
40 μm	Part No.	EYGA091204PA	EYGA091204PM	EYGA091204DM	EYGA091204DF
	Thickness	100 μm	80 μm	60 μm	56 μm
25 μm	Part No.	EYGA091203PA	EYGA091203PM	EYGA091203DM	EYGA091203DF
	Thickness	85 μm	65 μm	45 μm	41 μm
17 μm	Part No.	EYGA091202PA	EYGA091202PM	EYGA091202DM	EYGA091202DF
	Thickness	77 μm	57 μm	37 μm	33 μm
10 μm	Part No.	EYGA091201PA	EYGA091201PM	EYGA091201DM	EYGA091201DF
	Thickness	70 μm	50 μm	30 μm	26 μm

* Please contact us for other lamination type product.

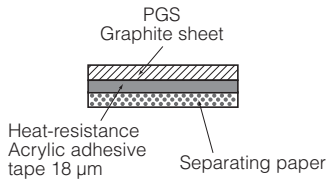
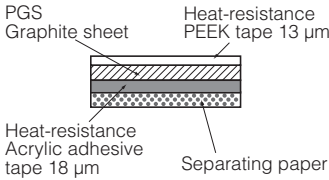
** Withstanding Voltages are for reference, not guaranteed.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.

Should a safety concern arise regarding this product, please be sure to contact us immediately.

Lamination type/Composition example

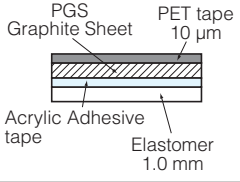
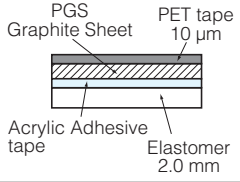
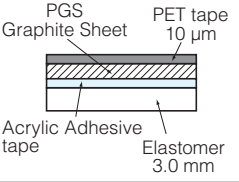
● High heat resistance series (PGS 100, 70, 50, 40, 25, 17, 10 μm)

Type		High heat resistance type	
		A-V type	A-RV type
Front face		—	High heat resistance and insulation type 13 μm
Rear face		High heat resistance and insulation adhesion type 18 μm	High heat resistance and insulation adhesion type 18 μm
Structure			
Features		· With high heat resistance and insulation tape on one side · Withstanding Voltage Adhesive tape : 2 kV	· With high heat resistance and insulation tape on both side · Withstanding Voltage PEEK tape : 2 kV · Adhesive tape : 2 kV
Withstand temperature		150 °C	150 °C
Standard Size		90 × 115 mm	90 × 115 mm
Maximum size		115 × 180 mm	115 × 180 mm
100 μm	Part No.	EYGA091210V	EYGA091210RV
	Thickness	118 μm	131 μm
70 μm	Part No.	EYGA091207V	EYGA091207RV
	Thickness	88 μm	101 μm
50 μm	Part No.	EYGA091205V	EYGA091205RV
	Thickness	68 μm	81 μm
40 μm	Part No.	EYGA091204V	EYGA091204RV
	Thickness	58 μm	71 μm
25 μm	Part No.	EYGA091203V	EYGA091203RV
	Thickness	43 μm	56 μm
17 μm	Part No.	EYGA091202V	EYGA091202RV
	Thickness	35 μm	48 μm
10 μm	Part No.	EYGA091201V	EYGA091201RV
	Thickness	28 μm	41 μm

* Please contact us for other lamination type product.

** Withstanding Voltages are for reference, not guaranteed.

● Standard series (SSM)

Type		E-6 type	E-8 type	E-9 type
Elastomer thickness		1.0 mm	2.0 mm	3.0 mm
Structure				
Features		· Soft and low thermal resistance (Elastomer) · Low repulsion · Withstanding Voltage : 1.7 kV	· Soft and low thermal resistance (Elastomer) · Low repulsion · Withstanding Voltage : 1.7 kV	· Soft and low thermal resistance (Elastomer) · Low repulsion · Withstanding Voltage : 1.7 kV
Withstand temperature		100 °C	100 °C	100 °C
Standard Size		90 × 115 mm	90 × 115 mm	90 × 115 mm
70 μm	Part No.	EYGE0912XB6D	EYGE0912XB8D	EYGE0912XB9D
	Thickness	1.09 mm	2.09 mm	3.09 mm
25 μm	Part No.	EYGE0912XD6D	EYGE0912XD8D	EYGE0912XD9D
	Thickness	1.05 mm	2.05 mm	3.05 mm

Minimum order

Item	Type	Part No.	Size	Minimum order
PGS Graphite Sheet Only	S type 100 μm	EYGS091210	90×115 mm	20
		EYGS121810	115×180 mm	10
		EYGS182310	180×230 mm	10
	S type 70 μm	EYGS091207	90×115 mm	20
		EYGS121807	115×180 mm	10
		EYGS182307	180×230 mm	10
	S type 50 μm	EYGS091205	90×115 mm	20
		EYGS121805	115×180 mm	10
		EYGS182305	180×230 mm	10
	S type 40 μm	EYGS091204	90×115 mm	20
		EYGS121804	115×180 mm	10
		EYGS182304	180×230 mm	10
	S type 25 μm	EYGS091203	90×115 mm	20
		EYGS121803	115×180 mm	10
		EYGS182303	180×230 mm	10
PGS 70, 25, 17 μm Adhesive Type [Standard series]	A-A type 70 μm	EYGA091207A	90×115 mm	20
		EYGA121807A	115×180 mm	10
	A-A type 25 μm	EYGA091203A	90×115 mm	20
		EYGA121803A	115×180 mm	10
	A-A type 17 μm	EYGA091202A	90×115 mm	20
		EYGA121802A	115×180 mm	10
	A-M type 70 μm	EYGA091207M	90×115 mm	20
		EYGA121807M	115×180 mm	10
	A-M type 25 μm	EYGA091203M	90×115 mm	20
		EYGA121803M	115×180 mm	10
	A-M type 17 μm	EYGA091202M	90×115 mm	20
		EYGA121802M	115×180 mm	10
PGS 70, 25, 17 μm Laminated Type (Insulation & Adhesive) [Standard series]	A-PA type 70 μm	EYGA091207PA	90×115 mm	20
		EYGA121807PA	115×180 mm	10
	A-PA type 25 μm	EYGA091203PA	90×115 mm	20
		EYGA121803PA	115×180 mm	10
	A-PA type 17 μm	EYGA091202PA	90×115 mm	20
		EYGA121802PA	115×180 mm	10
	A-PM type 70 μm	EYGA091207PM	90×115 mm	20
		EYGA121807PM	115×180 mm	10
	A-PM type 25 μm	EYGA091203PM	90×115 mm	20
		EYGA121803PM	115×180 mm	10
	A-PM type 17 μm	EYGA091202PM	90×115 mm	20
		EYGA121802PM	115×180 mm	10
	A-DM type 70 μm	EYGA091207DM	90×115 mm	20
		EYGA121807DM	115×180 mm	10
	A-DM type 25 μm	EYGA091203DM	90×115 mm	20
		EYGA121803DM	115×180 mm	10
	A-DM type 17 μm	EYGA091202DM	90×115 mm	20
		EYGA121802DM	115×180 mm	10

* Only S type supports 180×230 mm size.

(PGS thickness of 17 μm, 10μm does not support as single item)

** PGS of 10 μm, 40 μm, 50 μm type is also possible to be made as lamination type.

*** The above-listed part number is sample part number for testing.

**** Please contact us about your request of custom part number which will be arranged separately.

***** Please contact us if quantity is below Minimum Order Quantity.

Minimum order

Item	Type	Part No.	Size	Minimum order
PGS 70, 25, 17 μ m [High heat resistance type]	A-V type 70 μ m	EYGA091207V	90×115 mm	20
		EYGA121807V	115×180 mm	10
	A-V type 25 μ m	EYGA091203V	90×115 mm	20
		EYGA121803V	115×180 mm	10
	A-V type 17 μ m	EYGA091202V	90×115 mm	20
		EYGA121802V	115×180 mm	10
	A-RV type 70 μ m	EYGA091207RV	90×115 mm	20
		EYGA121807RV	115×180 mm	10
	A-RV type 25 μ m	EYGA091203RV	90×115 mm	20
		EYGA121803RV	115×180 mm	10
	A-RV type 17 μ m	EYGA091202RV	90×115 mm	20
		EYGA121802RV	115×180 mm	10
SSM Elastomer 3.0, 2.0, 1.0 mm PGS 70, 25, 17 μ m	E-9 type Elastomer 3.0 mm, PGS 70 μ m	EYGE0912XD9D	90×115 mm	5
	E-9 type Elastomer 3.0 mm, PGS 25 μ m	EYGE0912XB9D	90×115 mm	5
	E-8 type Elastomer 2.0 mm, PGS 70 μ m	EYGE0912XD8D	90×115 mm	5
	E-8 type Elastomer 2.0 mm, PGS 25 μ m	EYGE0912XB8D	90×115 mm	5
	E-6 type Elastomer 1.0 mm, PGS 70 μ m	EYGE0912XD6D	90×115 mm	5
	E-6 type Elastomer 1.0 mm, PGS 25 μ m	EYGE0912XB6D	90×115 mm	5

* Only S type supports 180×230 mm size.

(PGS thickness of 17 μ m, 10 μ m does not support as single item)

** PGS of 10 μ m, 40 μ m, 50 μ m type is also possible to be made as lamination type.

*** The above-listed part number is sample part number for testing.

**** Please contact us about your request of custom part number which will be arranged separately.

***** Please contact us if quantity is below Minimum Order Quantity.