

“Graphite-PAD” high thermal conductivity in z-direction

EYGT type

Graphite-PAD is a thermal interface material (TIM) that compatibly obtained excellent thermal conductivity in thickness direction (Z-axis direction) and high flexibility (deformable with a low load). The properties are greater than that of existing TIMs. The product is created by filling PGS Graphite Sheet into silicon resin.

Features

- High thermal conductivity : 13 W/m·K
- Excellent compressibility : 50 % (t=2 mm, Pressure 300 kPa)
- Thermal resistance : fit into uneven parts and provide excellent thermal resistance with a low load
- High reliability : correspond to -40 to 150 °C and maintains long-term reliability
- Thickness range : 0.5, 1.0, 1.5, 2.0, 2.5, 3.0 mm
- RoHS compliant

Recommended applications

Cooling of heat generating components, such as electronic devices, semiconductor memory device, etc.

- General-purpose inverter, medical equipment, and DSC
- Car-mounted camera, motor control unit, automotive lighting (LED), car navigation, luminous source of laser HUD
- Base station, IGBT module

Explanation of part numbers

- Graphite-PAD (EYGT*****A)

1	2	3	4	5	6	7	8	9	10	11	12
E	Y	G	T	3	5	3	5	A	2	0	A
Product code				Dimension		Type		Thickness of PAD*		Ex. Code	
Graphite-PAD				3535	35 mm × 35 mm	A	Material code	30	3.0 mm		
				7070	70 mm × 70 mm			25	2.5 mm		
				E0E0	140 mm × 140 mm			20	2.0 mm		
				F0F0	150 mm × 150 mm			15	1.5 mm		
								10	1.0 mm		
								05	0.5 mm		

* E0E0 : 2.0 mm, 2.5 mm, 3.0 mm

F0F0 : 0.5 mm, 1.0 mm, 1.5 mm

** Please confirm other condition separately.

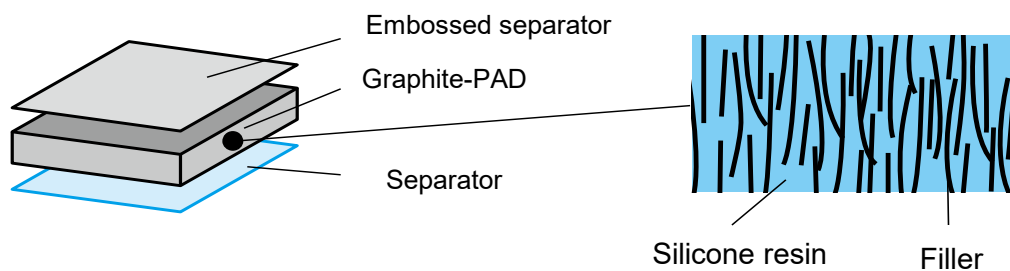
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Typical characteristics

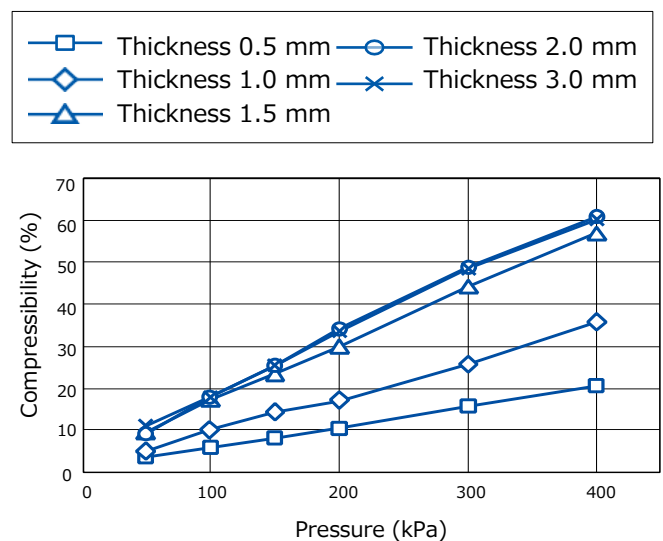
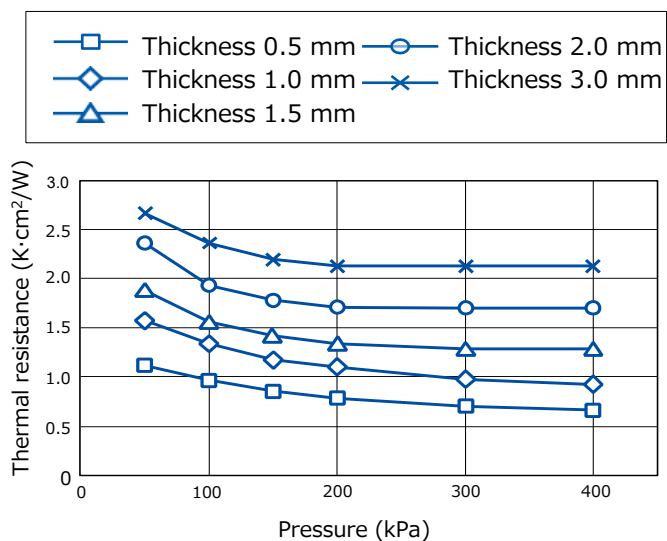
Items	Test equipment/ method	Condition	Data					
Thickness (mm)			0.5	1.0	1.5	2.0	2.5	3.0
Thermal resistance (K·cm ² /W)	TIM Tester	100 kPa	0.96	1.34	1.56	1.93	2.10	2.36
Compressibility (%)	TIM Tester	100 kPa (50 °C)	5.78	10.29	17.46	17.8	17.6	17.9
Thermal conductivity of Graphite-PAD with a unit (W/m·K) (including contact resistance)	TIM Tester	100 kPa	5.08	7.02	7.80	8.60	9.66	10.10
Thermal conductivity of the Graphite-PAD (W/m·K)	(ASTM D5470)	50 kPa	13					
Hardness	(ASTM D2240)	TYPE E	25					
Adhesive			Adhesive on both faces					
Volume resistivity (Ω·cm)	(ASTM D257)		4×10 ⁵					
Operating temperature range (°C)			-40 to 150					
Siloxane		Σ (D4-D10)	≤ 70 ppm					

Typical values, not guaranteed.

Structure

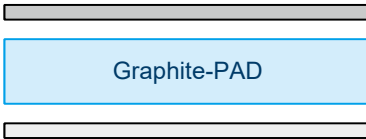


Thermal resistance and compressibility



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Composition example

Structure		Embossed separator  Separator			
		Operating temperature range			
Standard dimension		-40 °C to 150 °C			
		35 × 35 mm	70 × 70 mm	140 × 140 mm	150 × 150 mm
0.5 mm	Standard Part No.	EYGT3535A05A	EYGT7070A05A	–	EYGTF0F0A05A
	Thickness	0.5 mm	0.5 mm	–	0.5 mm
1.0 mm	Standard Part No.	EYGT3535A10A	EYGT7070A10A	–	EYGTF0F0A10A
	Thickness	1.0 mm	1.0 mm	–	1.0 mm
1.5 mm	Standard Part No.	EYGT3535A15A	EYGT7070A15A	–	EYGTF0F0A15A
	Thickness	1.5 mm	1.5 mm	–	1.5 mm
2.0 mm	Standard Part No.	EYGT3535A20A	EYGT7070A20A	EYGTE0E0A20A	–
	Thickness	2.0 mm	2.0 mm	2.0 mm	–
2.5 mm	Standard Part No.	EYGT3535A25A	EYGT7070A25A	EYGTE0E0A25A	–
	Thickness	2.5 mm	2.5 mm	2.5 mm	–
3.0 mm	Standard Part No.	EYGT3535A30A	EYGT7070A30A	EYGTE0E0A30A	–
	Thickness	3.0 mm	3.0 mm	3.0 mm	–

* Above listed Part No. are examples for evaluation and selection, not for mass production.

Customized service available for mass production spec..

** Contact us for custom-made samples.

We can make samples in various forms and/or dimensions other than standard samples.

Safety and Legal Matters to Be Observed

Product specifications and applications

- Please be advised that this product and product specifications are subject to change without notice for improvement purposes. Therefore, please request and confirm the latest delivery specifications that explain the specifications in detail before the final design, or purchase or use of the product, regardless of the application. In addition, do not use this product in any way that deviates from the contents of the company's delivery specifications.
- Unless otherwise specified in this catalog or the product specifications, this product is intended for use in general electronic equipment (AV products, home appliances, commercial equipment, office equipment, information and communication equipment, etc.).
When this product is used for the following special cases, the specification document suited to each application shall be signed/sealed (with Panasonic and the user) in advance..These include applications requiring special quality and reliability, wherein their failures or malfunctions may directly threaten human life or cause harm to the human body (e.g.: space/aircraft equipment, transportation/traffic equipment, combustion equipment, medical equipment, disaster prevention/crime prevention equipment, safety equipment, etc.).

Safety design and product evaluation

- Please ensure safety through protection circuits, redundant circuits, etc., in the customer's system design so that a defect in our company's product will not endanger human life or cause other serious damage.
- This catalog shows the quality and performance of individual parts. The durability of parts varies depending on the usage environment and conditions. Therefore, please ensure to evaluate and confirm the state of each part after it has been mounted in your product in the actual operating environment before use.
If you have any doubts about the safety of this product, then please notify us immediately, and be sure to conduct a technical review including the above protection circuits and redundant circuits at your company.

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- The transportation of dangerous goods as designated by UN numbers, UN classifications, etc., does not apply to this product. In addition, when exporting products, product specifications, and technical information described in this catalog, please comply with the laws and regulations of the countries to which the products are exported, especially those concerning security export control.
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Further, if you are using product models in stock and are not sure whether or not they comply with the RoHS Directive or REACH Regulation, please contact us by selecting "Sales Inquiry" from the inquiry form.
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Matters to Be Observed When Using This Product

(PGS graphite sheet)

Use environments

- This product (graphite sheet) is not designed for use in specific environments. Using the product in specific environments or service conditions described below, therefore, may affect the performance of the product. Please check the performance and reliability of the product first and then use the product.
 - (1) Used in liquid, such as water, oil, chemicals, and organic solvents.
 - (2) Used in a place exposed to direct sunlight, an outdoor place with no shielding, or a dusty place.
 - (3) Used in a place where the product is heavily exposed to sea breeze or a corrosive gas, such as Cl_2 , H_2S , NH_3 , SO_2 , or NO_x .
 - (4) Used in a contaminated state.
 - (5) Used in a place where acid is present nearby.
 - (6) Used in a temperature condition outside a specified working temperature range.
 - (7) Used in a depressurized or vacuum atmosphere.
- Temperatures of the graphite sheet in use vary depending on mounting conditions, service conditions, etc. Make sure to confirm that the temperature of the graphite sheet mounted on your board matches the specified temperature.

Handling conditions

- The product is likely to suffer mechanical damage when dropped on the floor. Avoid using such a product. The graphite sheet is soft and is therefore easily scratched or damaged. Do not rub or hit the graphite sheet against a hard object. A stripe, folding line, etc., formed on the graphite sheet may affect its heat conductivity.
- Do not reuse a graphite sheet having been used on a printed board and removed therefrom. A tearing load applied to the graphite sheet or a pointed object coming in contact with the sheet may tear the sheet or leave a hole thereon. Use the sheet with a protective material.
- The graphite sheet may get hotter during its use. Do not touch the graphite sheet in use. Touching the graphite sheet with a bare hand may degrade the graphite sheet in performance. Do not do it.
- Because the graphite sheet is conductive, you have to perform an insulation treatment on the graphite sheet if you want it to be insulative. Still, there is a concern that a conductive material in powder form may fall from the graphite sheet. Making the graphite sheet completely insulative, therefore, cannot be guaranteed.
- The heat conductivity of the graphite sheet changes depending on how it is used. Conduct a heat conductivity test of the graphite sheet before using it to see if its heat conductivity meets the use purpose.

Storage conditions

- Do not keep the graphite sheet in the following environments that may affect the performance of the graphite sheet.
 - (1) Stored in a place where the product is heavily exposed to sea breeze or a corrosive gas, such as Cl_2 , H_2S , NH_3 , SO_2 , or NO_x .
 - (2) Stored in a place where the graphite sheet is exposed to UV-rays (storing the graphite sheet in a dark place is recommendable).
 - (3) Stored at a temperature different from the specified storage temperature.
- The storage period of the graphite sheet is one year or less from completion of a shipment inspection. Use the graphite sheet before this storage period expires.
- When the graphite sheet is incorporated in a circuit structure on the assumption that the graphite sheet is bonded, confirm the bonding performance of the graphite sheet before using it.