

### “GraphiteTIM(Compressible Type)” PGS with low thermal resistance

Type: **EYGS**



GraphiteTIM(Compressible Type) is a graphite sheet that is dedicated for use as a thermal interface material.

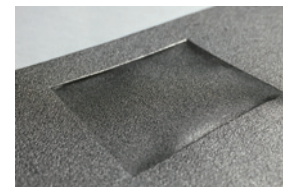
The GraphiteTIM(Compressible Type) has very high compressibility compared to standard PGS, which enables reducing the thermal resistance by following gap, warpage, and distortion of targets/substrates. Excellent heat resistance and reliability of the GraphiteTIM help obtaining longer service life and higher performance of various components, such as power modules.

The GraphiteTIM(Compressible Type) is cost-saving, because it may allow you to reduce your existing processes. Unlike grease, there is no necessity for printing process, since it is a sheet-type product.

There are no problems that are found in grease and phase change materials in the GraphiteTIM, which makes it excellent TIM.

#### Features

- Thermal resistance : 0.2K·cm<sup>2</sup>/W (600 kPa)  
To draw a good thermal resistance from sheet, pressure the GraphiteTIM. A close adherence would make the product fit into the uneven part and enhance the performance.
- Thermal conductivity : X-Y direction 400W/m·K, Z direction (28W/m·K)
- Compressibility : 40 % (600k Pa)
- High and long term reliability : operating temperature range -55 to 400 °C
- RoHs compliant



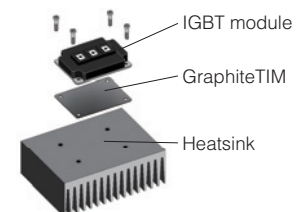
After pressure

#### Recommended applications

For cooling/heat transfer of electronic devices that generates heat, such as power modules.

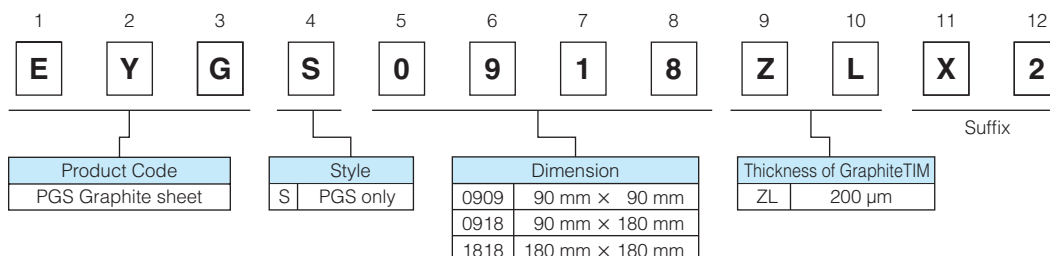
- Inverters and converters
- Car-mounted camera, motor control unit, automotive LED, luminous source of laser HUD, medical equipment
- Base station, Server

Install in IGBT module



#### Explanation of Part Numbers

- GraphiteTIM(EYGS\*\*\*\*ZL\*\*)



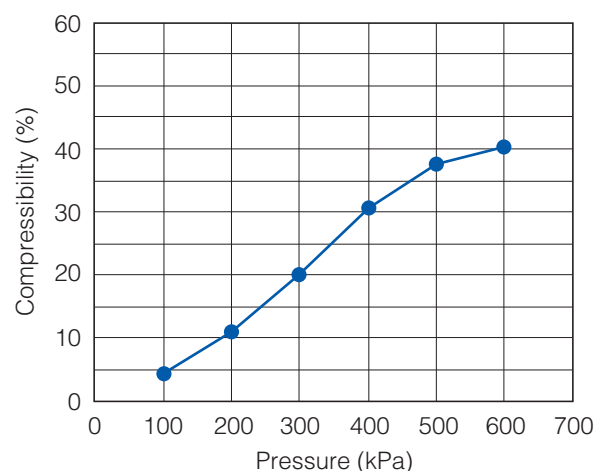
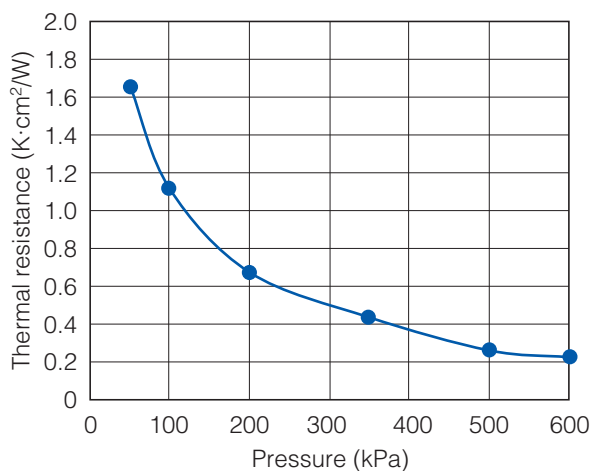
\* Please contact us for custom-made products.

### Typical characteristics

Items	Test method	Condition	Data
Thickness (μm)			200
Thermal resistance (K·cm <sup>2</sup> /W)	TIM Tester	600 kPa	0.2
Compressibility (%)	TIM Tester	600 kPa	40
Thermal conductivity (W/m·K)	Laser PIT	X-Y	400 (300 to 600)
		Z	(28)
Flame resistance	UL-94V		V-0
Operating temperature range (°C)			-55 to 400

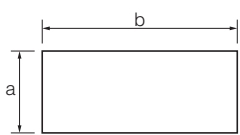
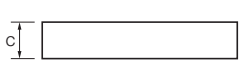
Typical values, not guaranteed.

### Thermal resistance and compressibility



### Lamination type/Composition example

- GraphiteTIM(Compressible Type) standard form

Type		Sheet only
		S Type
Process for IGBT mounting		—
Structure	Front	
	Side	
Operating Temperature Range		-55 to 400 °C
Thickness: c		200 μm
Standard Part No.	90 × 90 mm	EYGS0909ZLX2
	90 × 180 mm	EYGS0918ZLX2
	180 × 180 mm	EYGS1818ZLX2

\* Part numbers listed above are all standard samples for your consideration.

\*\* Contact us for custom-made samples.

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

● PGS in IGBT forms

Type		Sheet only
		S Type
Process for IGBT mounting		Lamination
Structure	Front	<p>* This shape is an example, please contact us for detailed shape of each part no.</p>
	Side	
Operating Temperature Range		-55 to 400 °C
Thickness: c		200 μm

No.	Standard Part No.	a : Lateral size (mm)	b : Longitudinal size (mm)	Hole number	Hole diameter (φmm)	d : Lateral hole pitch (mm)	e : Longitudinal hole pitch (mm)
1	EYGS1431ZLAA	140	308	12	6	126	290
2	EYGS0925ZLWA	85	246	14	6	73	234
3	EYGS1419ZLWB	136	186	8	7.5	124	171
4	EYGS0917ZLWC	85	168	10	6	73	156
5	EYGS1316ZLAC	125	163	8	6.1	110	150
6	EYGS1216ZLWD	120	160	8	6	110	150
7	EYGS1116ZLMA	108.8	158	8	6	92.75	144
8	EYGS1315ZLGA	129.5	150	8	7	118.5	137.5
9	EYGS1314ZLWE	126	136	6	7.5	114	124
10	EYGS1014ZLAD	97.8	138	4	6.8	86	127
11	EYGS0714ZLAE	70	138	4	5.7	57	128
12	EYGS0714ZLAF	69	136	4	7.2	57	124
13	EYGS1113ZLMB	106	132	4	5.7	95	121
14	EYGS1313ZLGB	128	128	4	6.7	110	110
15	EYGS0713ZLAG	66	126	4	5.7	50	116
16	EYGS0813ZLMD	71	123	2	4.7	Center	116
17	EYGS1212ZLGC	120	120	4	5.7	110	110
18	EYGS0912ZLGD	88	120	4	5.7	78	110
19	EYGS0612ZLWF	60	120	4	5.7	50	110
20	EYGS0512ZLGE	53	118	2	5.7	Center	106
21	EYGS0811ZLGH	80	113	4	5.7	70	103
22	EYGS0811ZLWG	78	108	4	6.7	62	93
23	EYGS0611ZLWH	60	106	4	6.7	48	93
24	EYGS0411ZLWJ	43	105.5	2	5.7	Center	93
25	EYGS0610ZLAH	59.4	104.4	4	6.7	48	93
26	EYGS0410ZLAJ	43	102.8	2	5.7	Center	93
27	EYGS1010ZLME	98	98	4	6.7	87	87

No.	Standard Part No.	a : Lateral size (mm)	b : Longitudinal size (mm)	Hole number	Hole diameter (φmm)	d : Lateral hole pitch (mm)	e : Longitudinal hole pitch (mm)
28	EYGS0409ZLGJ	44	93	2	6.7	Center	80
29	EYGS0509ZLGK	46	92	2	6.7	Center	80
30	EYGS0309ZLMF	32	92	2	6.7	Center	80
31	EYGS0409ZLMG	41	88	2	5.7	Center	80
32	EYGS0309ZLAK	29.5	89.5	2	6.6	Center	80
33	EYGS0509ZLMH	51	86	2	4.7	–	80
34	EYGS0508ZLMJ	46.2	83	2	4.7	–	77
35	EYGS0608ZLMK	55	78	2	4.5	Center	40
36	EYGS0607ZLGL	58	69.7	4	5.7	50	62
37	EYGS0507ZLML	45.3	66	2	4.7	–	60
38	EYGS0407ZLAL	40	65.5	1	7.7	Center	Center
39	EYGS0506ZLMM	48	55	1	4.5	Center	Center
40	EYGS0404ZLMP	36	38	1	4.5	Center	Center
41	EYGS1018ZLSA	104.5	182.5	8	7	93	171
42	EYGS1516ZLSB	148	158	8	5	137	150
43	EYGS1116ZLSC	112	158	8	5	101	150
44	EYGS0715ZLSD	67	153	4	5.6	57	143
45	EYGS0613ZLSE	61	127.5	4	5.6	50	116
46	EYGS0612ZLSF	63.3	124	4	5.6	50	110
47	EYGS0612ZLSG	61.5	124	4	5.6	50	110
48	EYGS1012ZLSH	104.5	121	4	6.7	93	109.5
49	EYGS0410ZLSJ	43	103	2	5.7	Center	93
50	EYGS0609ZLSK	61.5	91	4	5.6	50	77
51	EYGS0606ZLSL	58	61.5	2	5.6	44	50
52	EYGS0305ZLSM	27	51	1	4.6	Center	Center
53	EYGS0204ZLSN	24	36.5	1	4.6	Center	Center
54	EYGS0303ZLSP	29	32	1	4.5	Center	Center
55	EYGS0911ZLDA	92	109	4	6	78	93
56	EYGS1014ZLDB	98	138	4	6.7	86	127

## Guidelines and precautions regarding the technical information and use of our products described in this online catalog.

- If you want to use our products described in this online catalog for applications requiring special qualities or reliability, or for applications where the failure or malfunction of the products may directly jeopardize human life or potentially cause personal injury (e.g. aircraft and aerospace equipment, traffic and transportation equipment, combustion equipment, medical equipment, accident prevention, anti-crime equipment, and/or safety equipment), it is necessary to verify whether the specifications of our products fit to such applications. Please ensure that you will ask and check with our inquiry desk as to whether the specifications of our products fit to such applications use before you use our products.
- The quality and performance of our products as described in this online catalog only apply to our products when used in isolation. Therefore, please ensure you evaluate and verify our products under the specific circumstances in which our products are assembled in your own products and in which our products will actually be used.
- If you use our products in equipment that requires a high degree of reliability, regardless of the application, it is recommended that you set up protection circuits and redundancy circuits in order to ensure safety of your equipment.
- The products and product specifications described in this online catalog are subject to change for improvement without prior notice. Therefore, please be sure to request and confirm the latest product specifications which explain the specifications of our products in detail, before you finalize the design of your applications, purchase, or use our products.
- The technical information in this online catalog provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.
- If any of our products, product specifications and/or technical information in this online catalog is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially with regard to security and export control, shall be observed.

## <Regarding the Certificate of Compliance with the EU RoHS Directive/REACH Regulations>

- The switchover date for compliance with the RoHS Directive/REACH Regulations varies depending on the part number or series of our products.
- When you use the inventory of our products for which it is unclear whether those products are compliant with the RoHS Directive/REACH Regulation, please select "Sales Inquiry" in the website inquiry form and contact us.

**We do not take any responsibility for the use of our products outside the scope of the specifications, descriptions, guidelines and precautions described in this online catalog.**

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## Precautions on the whole

- Do not use the products beyond the descriptions in this catalog.
- This catalog guarantees the quality of the products as individual components.  
Before you use the products, please make sure to check and evaluate the products in the circumstance where they are installed in your product.
- This product was designed and manufactured for standard applications such as general electronics devices, office equipment, information and communications equipment, measuring instruments, household appliances and audio-video equipment.

For applications in which special quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or cause threat of personal injury (such as for aircraft and aerospace equipment, traffic and transport equipment, combustion equipment, medical equipment, accident prevention and anti-theft devices, and safety equipment), please be sure to consult with our sales representative in advance and to exchange product catalog which conform to such applications.

## Safety and Design considerations

- We are trying to improve the quality and the reliability, but the durability differs depending on the use environment and the use conditions. On use, be sure to confirm the actual product under the actual use conditions.
- Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other significant damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, and disaster/crime prevention equipment.
  - The system is equipped with a protection circuit and protection device.
  - The system is equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault.
  - The system is equipped with an arresting the spread of fire or preventing glitch.
- When a dogma shall be occurred about safety for this product, be sure to inform us rapidly, operate your technical examination.
- The temperature of this product at the time of use changes depending on mounting conditions and usage conditions, therefore, please confirm that the temperature of this product is the specified temperature after mounting it
- This product does not take the use under the following special environments into consideration. Accordingly, the use in the following special environments, and such environmental conditions may affect the performance of the product; prior to use, verify the performance, reliability, etc. thoroughly.
  - 1) Use in liquids such as water, oil, chemical, and organic solvent.

- 2) Use under direct sunlight, in outdoor or in dusty atmospheres.
- 3) Use in places full of corrosive gases such as sea breeze, Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, and NO<sub>x</sub>.
- 4) Use the product in a contaminated state.
- 5) Use in acid.
- 6) Use outside the range defined by the operating temperature range.
- 7) Use under reduced pressure or vacuum.

## Precaution of installation

- Do not reuse this product after removal from the mounting board.
- Do not drop this product on the floor. If this product is dropped, it can be damaged mechanically. Avoid using the dropped product.
- This product is soft, do not rub or touch it with rough materials to avoid scratching it.
- Lines or folds in this product may affect thermal conductivity.
- Never touch a this product during use because it may be extremely hot.
- Use protective materials when handling and/or applying this product, do not use items with sharp edges as they might tear or puncture this product.
- Do not handle with bare hands as there is a concern about performance degradation.

## Precaution on storage conditions

- Storage period is less than one year after our shipping inspection is completed. Please use within the period.
- If the product is stored in the following environments and conditions, the performance may be badly affected, avoid the storage in the following environments.
  - (1) Storage in places full of corrosive gases such as sea breeze, Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, and NO<sub>x</sub>.
  - (2) Storage in places exposed to ultraviolet light.
    - \*Recommended storage in the dark.
  - (3) Store at a temperature outside the storage temperature range specified by this catalog.
- In the case of a product configuration that assumes bonding, please use after checking the adhesiveness of the product when the storage period is over.

## Precaution specific to this product

- This product has conductivity. If required, This product should be provided insulation.
- This product can not guarantee the insulation because there is a concern for powder falling off of conductive materials.
- Thermal conductivity is dependent on the way it is used. Test the adaptability of the product to your application before use.

## Applicable laws and regulations, others

- No ODCs or other ozone-depleting substances which are subject to regulation under the Montreal Protocol are used in our manufacturing processes, including in the manufacture of this product.
- This product complies with the RoHS Directive (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (DIRECTIVE 2011/65/EU and (EU)2015/863) .
- All the materials used in this part are registered material under the Law Concerning the Examination and Regulation of Manufactures etc. of Chemical substances.
- If you need the notice by letter of "A preliminary judgment on the Laws of Japan foreign exchange and Foreign Trade control", be sure to let us know.
- These products are not dangerous goods on the transportation as identified by UN(United Nations) numbers or UN classification.
- As to the disposal of the module, check the method of disposal in each country or region where the modules are incorporated in your products to be used.
- The technical information in this catalog provides examples of our products typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.