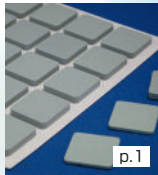


Thermal Management Solutions

The background features a large, abstract graphic design. It consists of several thick, parallel lines that create a sense of depth and perspective. A central vertical line is orange, flanked by grey lines that appear to recede into the distance. The overall effect is clean, modern, and industrial.

Product Lines

Heat spreader: heat dissipation parts

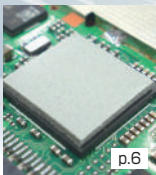


CERACOLD /CECD
p.1



HEAT SPREADER SHEET /HSD
p.2

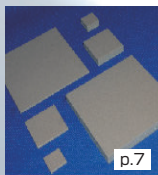
Thermal conductive material - Silicone type



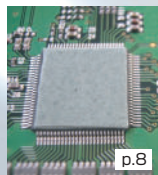
COOLPROVIDE™ /SPVS, SPV
p.6

KGS
First Solution
Proposer

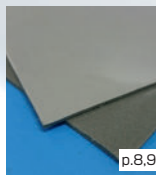
Thermal conductive material - silicone-free type



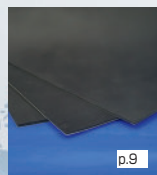
COOLPROVIDE™ /CPVH, CPVH
p.7



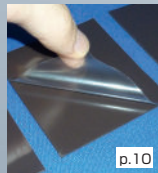
COOLPROVIDE™ /CPVT
p.8



COOLPROVIDE™ /CPVP, CPSS
p.8,9



THERMAL DAMPER /CPAG
p.9



COOLPROVIDE™ /EMPV4, EMPV5
p.10



COOLPROVIDE™ /CPVG-30 /-50
p.11



COOLPROVIDE™ /CPVP-30-F
p.12

Icons



Thermal & EMC Dual Functions
EMC absorption and thermal transfer management



High Thermal Conductivity(3W/m·K or higher)
High heat dissipation from ICs



Soft(ASKER C 15 or less)
For devices containing modules affected by pressure and compression

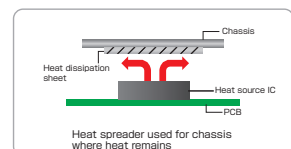
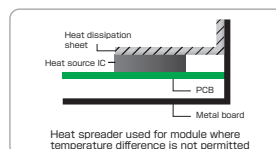
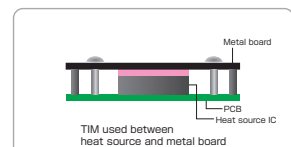
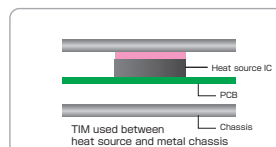
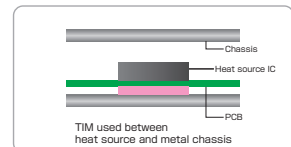
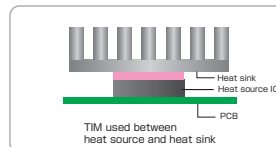


Phase-Change
Upon application high-viscosity gel-like material works as a gap-filler



Vibration damping type
Vibration damping is performed simultaneously with high loss factor.

Applications



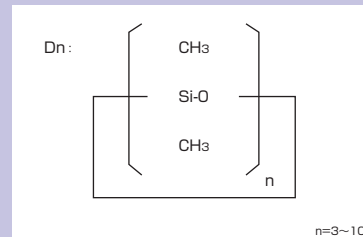
Low-molecular-weight siloxane

The number of dimethyl siloxane molecules in the sequence is often referred to as D3 (trimer), D4 (tetramer), or D5 (pentamer), and so on. The molecules up to D20 are called "low molecular weight cyclic siloxane". In particular, the total volume of D3 through D10 is used as a reference for the silicone's quality.

<Disadvantages>

The low-molecular-weight siloxane is highly volatile. It readily evaporates at room temperature, which results in the following problems.

- Electric contact failure: Electrically insulative silica is deposited on metal, resulting in contact failures.
- Adverse effect on optical equipment: Siloxane gas adversely affects optical instruments and devices



Thermal conductivity and thermal resistance

heat equation

Fourier's equation: $Q = \lambda \times ((\Delta T \cdot S) / d)$

Q: heat flow (W), λ : thermal conductivity (W / m · K), ΔT : temperature difference, S: cross sectional area of heat transfer area, d: distance

<Thermal Conductivity>

A measure of a material's ability to transfer heat

- The value of thermal conductivity does not change regardless of material size.
 - Decreasing the thickness of an object will decrease its temperature difference.
- λ (thermal conductivity) = $(Q \cdot d) / (\Delta T \cdot S)$ Where: $d / \Delta T = \text{constant}$

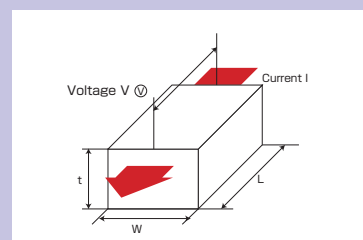
<Thermal Resistance>

Ability to resist flow of heat

- Depending on distance of the heat source, area, and surface conformity, the resistance value of the same pad varies.
 - The resistance will be decreased when the area is wider; a higher thermal conductivity material is used; and the distance/ thickness to heat source is reduced.
- R1 (thermal resistance): $^{\circ}\text{C} / \text{W} = d / (\lambda \cdot S)$

Volume resistivity (JIS K 6911 compliant)

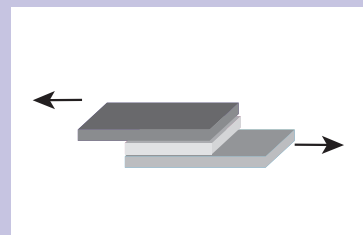
Electrical resistance is generally used as a measure of conductivity (ease of electric conductance) of an object or material. Resistance of a certain material per cubic unit (1 cm³) is referred as volume resistivity, which is a material property and is measured in [$\Omega \cdot \text{cm}$]. As shown in right diagram, the volume resistivity is calculated by measuring a voltage difference V(V) between two contacts across the cross section (t·W) generated by a constant current I (A) flow.



Tensile lap-shear strength (JIS K 6850: ISO 4587 and ISO 1995 equivalent)

The shear strength testing determines the shear strength of adhesives by applying tensile force to the specimen to pull it apart along the plane of adhesion until the breakdown of the adhesive layer occurs.

It is calculated by dividing the force required to shear the specimen by the area of the sheared area.



Safety Guidelines

Please read before using this product.

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2. The data described in this catalog is not a guaranteed value
3. When exporting a product listed in this catalog, please check whether the cargo is subject to the regulation of "Foreign Exchange and Foreign Trade Law". In that case, the applicable export license is required. In addition, there are some countries and regions where a product is restricted for sale.
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6. The products described in this catalog might not be for sale by country or region.
7. The product listed in this catalog is meant to be used in general-purpose standard applications commonly found in general electronic devices/equipment (related to AV, office-use, computer-peripheral, communication, home appliance, industrial robot, entertainment, personal-use, measuring/test, etc.). It is intended to be used in a normal operation/method in such general electronic devices/equipment.

The scope of this catalog shall not be considered to guarantee the product's performance or quality, especially if it is planned to be used as a requirement in a high degree safety and reliability, or for an application where the device failure, malfunction, or misconduct may cause risk/harm to human life and body, or damages to a property, or may cause enormous impact to social conformance, as to such in the following applications (defined as specific applications). Please consult us before use in such cases whenever you require anything more than the product's normal performance range and conditions specified in the catalog, or if you have specific applications.

- ① aerospace equipment, ② transportation equipment (automobiles, trains, ships, etc.),
- ③ nuclear power related equipment, ④ medical equipment, ⑤ military equipment,
- ⑥ undersea/submarine equipment, ⑦ power generation control equipment,
- ⑧ highly public information processing equipment, ⑨ transportation control equipment,
- ⑩ electric heating equipment, combustion equipment, ⑪ disaster prevention, crime prevention equipment,
- ⑫ various safety devices, ⑬ other usage deemed to be specific applications,

While designing the equipment to use the product in this catalog, please secure a protection or a backup in accordance with the intended use of the device.

8. We have taken all possible measures to improve the quality and reliability of the product, however, the wrong usage may cause personal injuries, fire accidents or social losses. Please consult us if you have any questions/concerns about the proper usage of our products.

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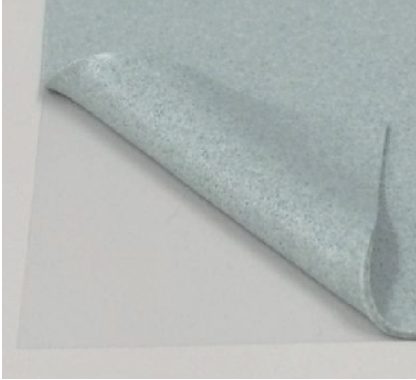
[Handling Instructions]

- Avoid touching heat element while installing — danger of burning when in contact.
- Ensure that the surface is free of dirt, dust, oil, or moisture before mounting.
- Do not remove protection film (Release liner, Release paper) until the time of use. It prevents debris and dust contamination.
- Product thickness shown on specification does not include protection film (Release liner, Release paper).
- Store in a cool and low-humidity place and avoid direct sunlight.
The phase-change gel must be stored below 35°C (Recommended temperature is 25°C).
- The product with self-tackiness may be difficult to peel after heating and compressing.

COOLPROVIDE™ / CPSH



P.7



Conductivity 5 W/m·K, Flexible thermally conductive sheet

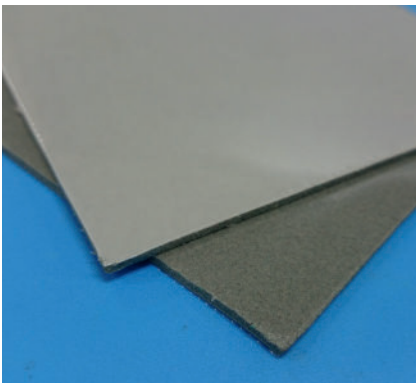
Features

- The sheet provides both high-thermal conductivity and flexibility. (Thermal conductivity: 5 W/m·K, Hardness: ASKER C 32)
- Flexible and excellent adhesion sheet lowers contact resistance.
- Silicone-free, no siloxane outgassing.
- Oil bleeding is reduced compared to silicone-based thermal materials.

COOLPROVIDE™ / CPVP



P.8



Ultra soft (ASKER C 0) Thermal Pad

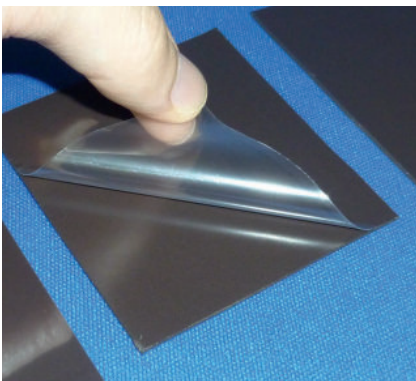
Features

- Super compliant (ASKER C 0) material minimizes thermal resistance.
- Compliant thermal pad with excellent compressive stress relaxation that reduces the load to heat element and PCB.
- Layered design for easy handling.
- Silicone-free, no siloxane outgassing.
- Oil bleeding is reduced compared to silicone-based thermal materials.

COOLPROVIDE™ / EMPV4



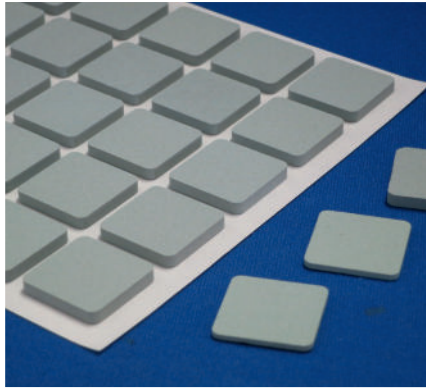
P.10



Thermal Interface Material with High Permeability ($\mu' = 13$)

Features

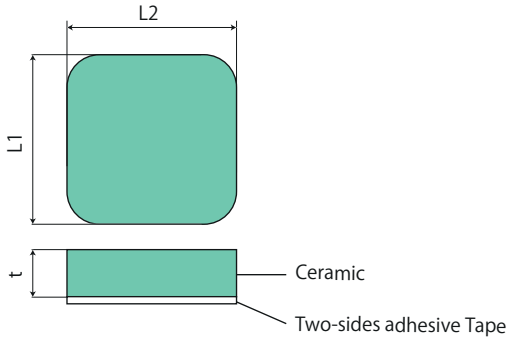
- Excellent EMI absorber performance ($\mu' = 13$) and compliant thermal material.(ASKER C 40)
- Designed for excellent conformity, thermal conduction and EMC control in MHz ~ GHz range.
- Silicone-free, no siloxane outgassing.
- Oil bleeding is reduced compared to silicone-based thermal materials.



Porous ceramic-based heat sink for excellent insulation

Features

- Have better thermal emissivity and heat dissipation is enhanced by a larger surface area of porous ceramic material compared to aluminum material.
- Lighter than aluminum heat sinks by approx.. 30%
- No electromagnetic radiation emitted from the heat sink unlike metal heat sinks.



(Unit: mm)

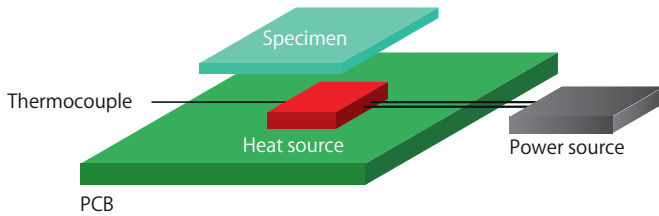
Part Number	Thickness:t	L1	L2
CECD-1.5-020020T	1.5	20	20
CECD-3.0-020020T	3.0	20	20
CECD-3.0-040040T	3.0	40	40

(The values below are not guaranteed.)

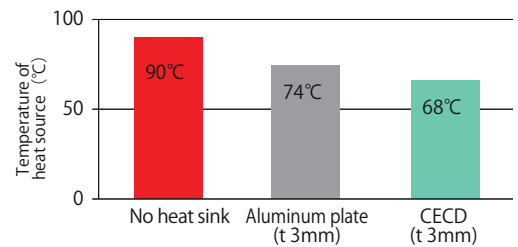
Test type	Unit	Standard	C E C D
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	11.5
Color	—	—	Green
Specific Gravity	—	JIS Z 8807	1.95
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	$\geq 10^8$
Operating temp	$^{\circ}\text{C}$	—	-40~125

Heat dissipation efficiency

Heat conductive characteristics



Comparison of Heat Sink Efficiency



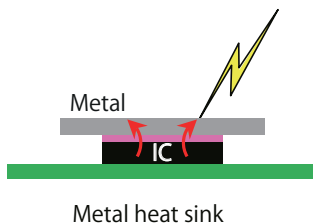
〈Test conditions〉

Heat source : □10mm(1.6W)

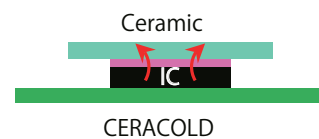
Specimen dimensions: □20mm(t3mm)

EMI noise issues with metal heat sink

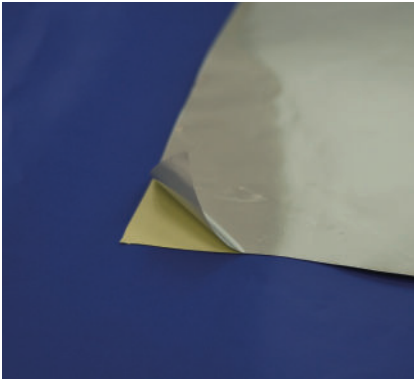
Stray capacitance occurs between the IC chip (noise source) and the heat sink (not grounded), which becomes an antenna and emits radiated noise.



Since ceramic is an insulator, it is not affected by electrostatic coupling and does not act as an antenna to radiate noise.



Heat spreader sheet / HSD

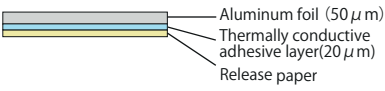


Thin and flexible heat spreading sheet for superior thermal management

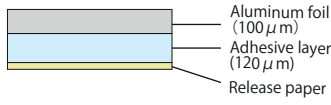
Features

- HSD has 221W/m·K in thermal conductivity property which transfer heat in the X-Y axes.
- Flexible material suitable for uneven surfaces with various thicknesses available.
- Electrically insulating bonded layer (PET film, thermal conductive sheet) is available upon request.
- Ideal thermal solutions for hot spots on space conscious applications, such as mobile devices, tablet, and routers.

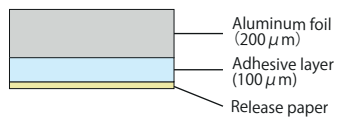
HSD-0.07



HSD-0.22



HSD-0.30

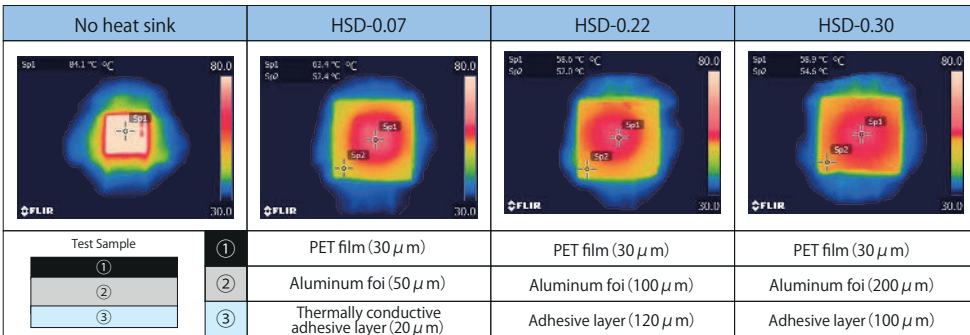


(The values below are not guaranteed.)

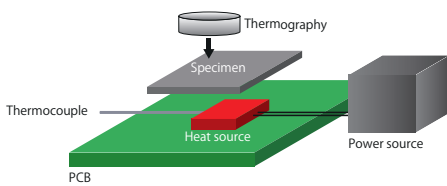
Test type	Unit	Standard	HSD-0.07	HSD-0.22	HSD-0.30
Surface Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)		221(aluminum)	
Thickness	mm	—	0.07	0.22	0.30
Adhesion	N/25mm	ISZ0237:2009	>6	>16	>11
Flammability	—	UL94	UL510 FR equivalent	—	—
Operating temp	°C	—		-20~100	

Heat Dissipation Effect

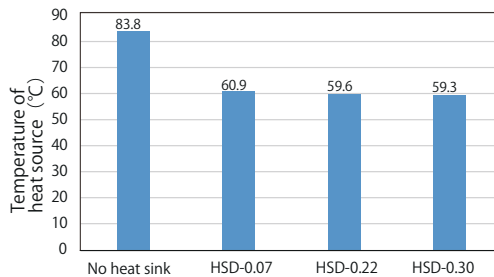
heat distribution



Testing method



HSD Series Heat Dissipation Effect



<Test conditions>
 Heat source : □25mm(1.5W)
 Specimen dimensions : □50mm

High Thermal Conductivity Characteristics (Non-silicone)

(The values below are not guaranteed.)

Test type	Unit	Standard	CPSH-F	CPSH	CPVH-F	CPVH
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	5.0	5.0	3.0	3.0
		ISO22007-2 (Hot Disc method)	3.7	3.7	2.2	2.2
Color	—	—	Light green	Light green	Brown	Brown
Thickness	mm	—	0.5/1.0/1.5/2.0	1.0/1.5/2.0	0.5/1.0/1.5/2.0	2.0/3.0/4.0
			2.5/3.0/3.5/4.0	2.5/3.0/3.5/4.0	2.5/3.0/3.5/4.0	
Specific Gravity	—	JIS Z 8807	2.89	2.89	2.33	2.33
Hardness	ASKER C	JIS K 7312	32※2	32	15	15
	Shore OO	ASTM D 2240	64	64	47	47
Tensile strength	MPa	JIS K 6251	0.37	0.21	0.25	0.15
Elongation rate	%	JIS K 6251	28	55	11	200
Volume Resistivity	Ω·cm	JIS K 6911 compliant	1.0×10 ¹¹	1.0×10 ¹¹	1.0×10 ¹¹	1.0×10 ¹¹
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	2.2	2.0	2.7	3.1
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	1.4	1.2	2.1	1.9
Dielectric constant	1MHz	Company standard	18.2	18.8	18.2	19.6
Loss tangent	1MHz	Company standard	0.01	0.01	0.08	0.08
Flammability	—	UL94	V-0	V-0 equivalent	V-0	V-0
Operating temp	°C	—	-40~125	-40~125	-40~125	-40~125
Available max. dimension※1	mm	—	210×510	210×510	210×510	210×510

(The values below are not guaranteed.)

Test type	Unit	Standard	CPS S-F	CPS S	CPVT-F	CPVP-F
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	2.0	2.0	2.0	2.0
		ISO22007-2 (Hot Disc method)	1.5	1.5	—	1.4
Color	—	—	Dark green	Dark green	Green	Dark green/White
Thickness	mm	—	1.0/1.5/2.0	4.0	0.10/0.15	1.0/2.0/3.0
			2.5/3.0/4.0		0.20/0.25	
Specific Gravity	—	JIS Z 8807	1.92	1.92	1.94	—
Hardness	ASKER C	JIS K 7312	8	8	28	0 (Super low hardness layer)
	Shore OO	ASTM D 2240	33	33	—	—
Tensile strength	MPa	JIS K 6251	0.28	—	4.38	—
Elongation rate	%	JIS K 6251	25	—	14	—
Volume Resistivity	Ω·cm	JIS K 6911 compliant	1.0×10 ¹²	1.0×10 ¹²	1.0×10 ¹³	1.0×10 ¹¹
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	3.5	—	11.1	—
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	2.8	—	5.0	—
Dielectric constant	1MHz	Company standard	14.6	—	6.69	—
Loss tangent	1MHz	Company standard	0.09	—	0.08	—
Flammability	—	UL94	V-2(t1.0-3.0mm) / V-0(t4.0mm)	—	—	V-0
Operating temp	°C	—	-40~100	-40~100	-20~100	-40~125
Available max. dimension※1	mm	—	210×510	210×510	210×510	210×510

(The values below are not guaranteed.)

Test type	Unit	Standard	EMPV4-F	EMPV5-F	CPAG-T	CPAG
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	1.5	—	0.8	0.8
		ISO22007-2 (Hot Disc method)	1.4	0.8	—	—
Color	—	—	Black	Black	Black	Black
Thickness	mm	—	1.0/1.5/2.0	1.0/1.5/2.0	0.5/1.0/2.0	0.5/1.0/2.0
			2.5/3.0/3.5	2.5/3.0/3.5	3.0/4.0/5.0	3.0/4.0/5.0
Specific Gravity	—	JIS Z 8807	3.55	—	—	—
Hardness	ASKER C	JIS K 7312	40	30	70	70
	Shore OO	ASTM D 2240	70	60	Durometer type A 64※4	Durometer type A 64※4
Tensile strength	MPa	JIS K 6251	0.51	—	—	—
Elongation rate	%	JIS K 6251	44	—	—	—
Volume Resistivity	Ω·cm	JIS K 6911 compliant	1.0×10 ¹²	1.0×10 ¹¹	5.54×10 ¹¹	5.54×10 ¹¹
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	6.0	8.8	—	—
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	4.2	5.0	—	—
Dielectric constant	1MHz	Company standard	12.7	—	—	—
Loss tangent	1MHz	Company standard	0.13	—	—	—
Flammability	—	UL94	V-0 equivalent	V-0 equivalent	—	V-1 equivalent(t2.0mm) V-0 equivalent(t3.0-5.0mm)
Operating temp	°C	—	-40~110	-40~110	-10~100	-10~100
Available max. dimension※1	mm	—	210×510	210×510	340×340	350×350

※1) Please contact us for available pcs/sheet. ※2) 0.5F : ASKER C 55 ※3) t 0.5-2.0mm ※4) JIS K 6253compliant

High Thermal Conductivity Characteristics (Non-silicone)

(The values below are not guaranteed.)

Test type	Unit	Standard	CPVG-30	CPVG-50 (Under development)
Thermal Conductivity	W/m · K	ISO22007-2 (Hot Disc method)	3.0	5.0
Thermal resistance	t1.0mm	ASTM D5470	0.33	0.19
	t0.3mm		0.08	0.05
	t0.1mm		0.01	0.00
Color	—	—	Gray	Blue
Specific Gravity	—	JIS Z 8807	2.9	3.2
Viscosity	0.5[1/s]	ASTM D1824 compliant	3,300	6,500
	1.0[1/s]		2,500	4,000
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	1.0×10^9	1.0×10^9
Breakdown voltage	kV/mm	JIS K 6911 compliant	8	12
Relative permittivity	500MHz	Company standard	8.98	13.47
	1GHz	Company standard	8.88	13.58
Flammability	—	UL94	Equivalent to V-0	Equivalent to V-0
Operating temp	$^{\circ}\text{C}$	—	-40 ~ 125	-40 ~ 125
Product form when supplied	—	—	Cartridge: 330 ml	

(The values below are not guaranteed.)

Item	Unit	Compliance standard	CPVP-30
Thickness	mm	—	1.0/1.5/2.0 ^{※1} , 3.0/4.0
Thermal conductivity	W/m · K	ISO 22007-2 (Hot Disc method)	3.0 (Low-hardness layer)
Hardness	ASKER C	JIS K 7312	7 (Low-hardness layer)
Volume resistivity	$\Omega \cdot \text{cm}$	JIS K 6911	1.0×10^{11}
Flammability	—	UL94	Equivalent to V-0
Color	—	—	Green/White
Recommended operating temperature	$^{\circ}\text{C}$	—	-40 ~ 125

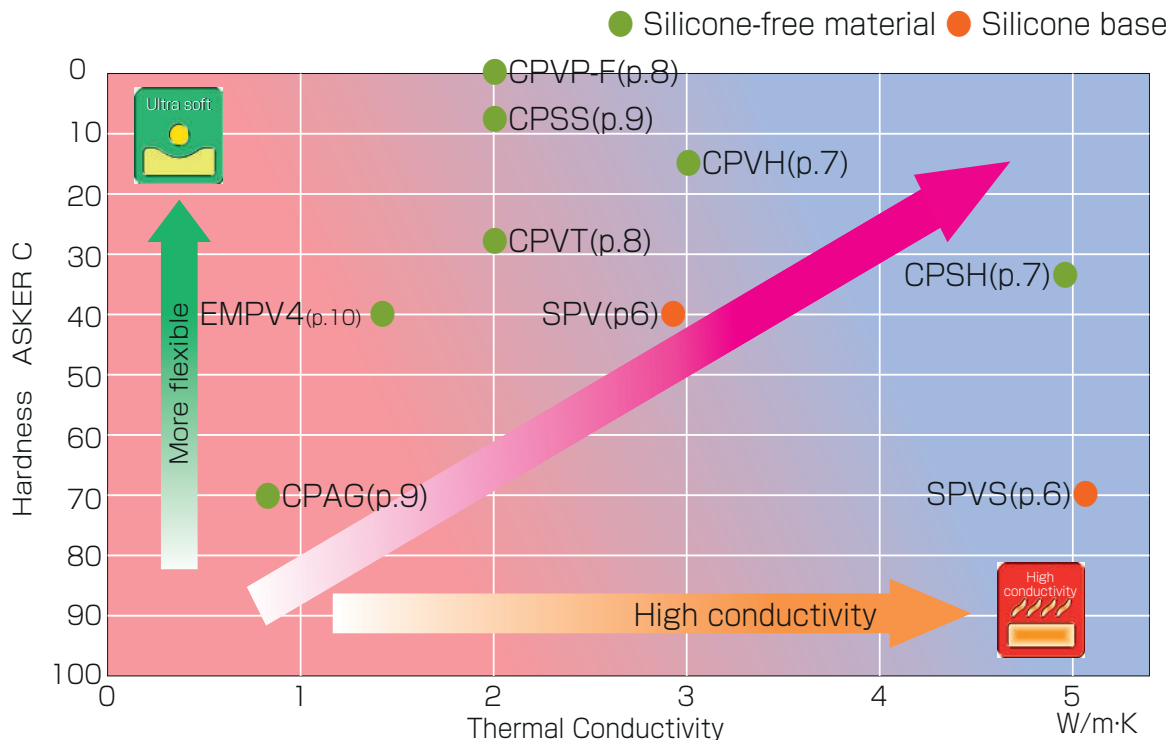
※ 1.0, 1.5 and 2.0mm thick products are under development.

(The values below are not guaranteed.)

Test type	Unit	Standard	SPVS	SPV
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	5.0	3.0
		ISO22007-2 (Hot Disc method)	3.4	2.3
Color	—	—	Green	Green
Thickness	mm	—	0.5/1.0/1.5	0.5/1.0
Specific Gravity	—	JIS Z 8807	2.75	2.2
Hardness	ASKER C	JIS K 7312	70	40
	Shore OO	ASTM D 2240	86	69
Tensile strength	MPa	JIS K 6251	0.78	0.49
Elongation rate	%	JIS K 6251	46	160
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	3.0×10^{11}	2.0×10^{11}
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	3.2	0.69
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	1.8	0.3
Dielectric constant	1MHz	Company standard	13.7	35.1
Loss tangent	1MHz	Company standard	0.06	0.07
Flammability	—	UL94	V-0	V-1(t 0.5mm)
Operating temp	°C	—	-20~125	-20~125
Available max. dimension*1	mm	—	210×510	210×510

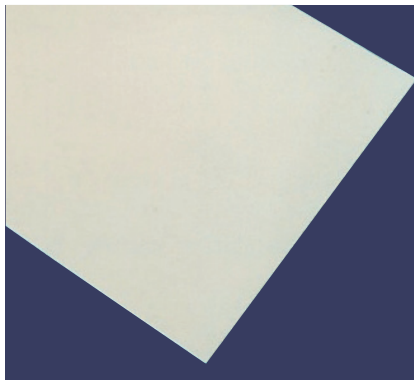
※1) Please contact us for available pcs/sheet.

Characteristics comparison



※ CPVP is shown for super low hardness layer only

COOLPROVIDE™ / SPVS



5W/m·K silicone thermal pad for high operating temperature applications

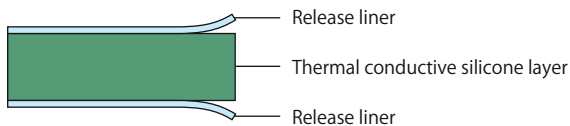
Features

- Volatilization of low-molecular-weight siloxane gas is minimal, which should minimize PCB contact failure in long-term use.

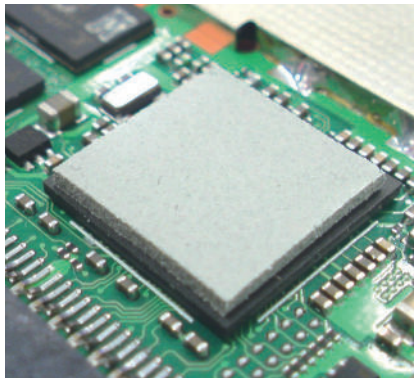
(The values below are not guaranteed.)

Test type	Unit	Standard	SPVS
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	5.0
		ISO22007-2 (Hot Disc method)	3.4
Color	—	—	Green
Thickness	mm	—	0.5/1.0/1.5
Specific Gravity	—	JIS Z 8807	2.75
		ASCER C	70
Hardness	Shore OO	JIS K 7312	70
		ASTM D 2240	86
Tensile strength	MPa	JIS K 6251	0.78
Elongation rate	%	JIS K 6251	46
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	3.0×10^{11}
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	3.2
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	1.8
Dielectric constant	1MHz	Company standard	13.7
Loss tangent	1MHz	Company standard	0.06
Flammability	—	UL94	V-0
Operating temp	°C	—	-20~125
Available max. dimension ^{※1)}	mm	—	210×510

※1) Please contact us for available pcs/sheet.



COOLPROVIDE™ / SPV



3W/m·K silicone thermal pad for high operating temperature applications

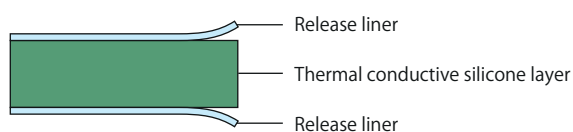
Features

- Soft, high thermal conductive sheet.
- Volatilization of low-molecular-weight siloxane gas is minimal, which should minimize PCB contact failure in long-term use.

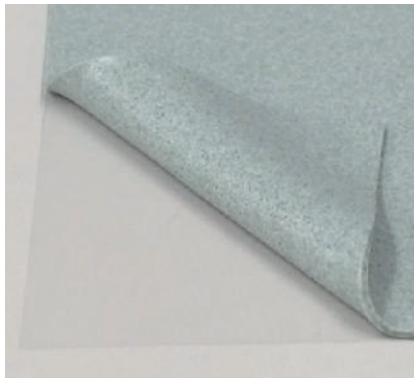
(The values below are not guaranteed.)

Test type	Unit	Standard	SPV
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	3.0
		ISO22007-2 (Hot Disc method)	2.3
Color	—	—	Green
Thickness	mm	—	0.5/1.0
Specific Gravity	—	JIS Z 8807	2.2
		ASCER C	40
Hardness	Shore OO	JIS K 7312	40
		ASTM D 2240	69
Tensile strength	MPa	JIS K 6251	0.49
Elongation rate	%	JIS K 6251	160
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	2.0×10^{11}
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	0.69
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	0.3
Dielectric constant	1MHz	Company standard	35.1
Loss tangent	1MHz	Company standard	0.07
Flammability	—	UL94	V-1(t 0.5mm)
Operating temp	°C	—	-20~125
Available max. dimension ^{※1)}	mm	—	210×510

※1) Please contact us for available pcs/sheet.



COOLPROVIDE™ / CPSH



Conductivity 5 W/m·K, Flexible thermally conductive sheet

Features

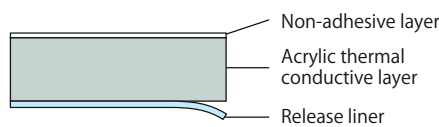
- The sheet provides both high-thermal conductivity and flexibility. (Thermal conductivity: 5 W/m·K, Hardness: ASKER C 32)
- Flexible and excellent adhesion sheet lowers contact resistance.
- Silicone-free, no siloxane outgassing.
- Oil bleeding is reduced compared to e-based thermal materials.

(The values below are not guaranteed.)

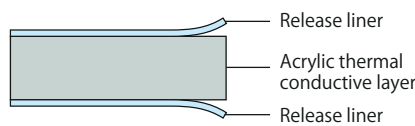
Test type	Unit	Standard	CPSH-F	CPSH
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	5.0	5.0
		ISO22007-2 (Hot Disc method)	3.7	3.7
Color	—	—	Light green	Light green
Thickness	mm	—	0.5/1.0/1.5/2.0	1.0/1.5/2.0
			2.5/3.0/3.5/4.0	2.5/3.0/3.5/4.0
Specific Gravity	—	JIS Z 8807	2.89	2.89
Hardness	ASKER C	JIS K 7312	32	32
	Shore OO	ASTM D 2240	64	64
Tensile strength	MPa	JIS K 6251	0.37	0.21
Elongation rate	%	JIS K 6251	28	55
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	1.0×10^{11}	1.0×10^{11}
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	2.2	2.0
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	1.4	1.2
Dielectric constant	1MHz	Company standard	18.2	18.8
Loss tangent	1MHz	Company standard	0.01	0.01
Flammability	—	UL94	V-0	V-0 equivalent
Operating temp	°C	—	-40~125	-40~125
Available max. dimension. ^{※1)}	mm	—	210×510	210×510

※1) Please contact us for available pcs/sheet.

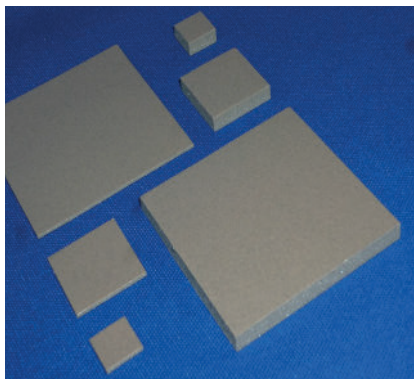
One-side tacky type / CPSH-F



Both-side tacky type / CPSH



COOLPROVIDE™ / CPVH



3W/m·K thermal pad (ASKER C 15) for high operating temperature applications

Features

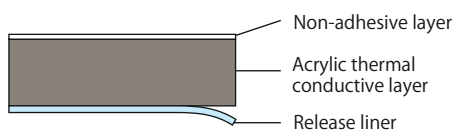
- Super compliant (ASKER C 15) material minimizes thermal resistance.
- Compliant thermal pad with excellent compressive stress relaxation that reduces the load to heat element and PCB.
- Silicone-free, no siloxane outgassing.
- Oil bleeding is reduced compared to silicone-based thermal materials.

(The values below are not guaranteed.)

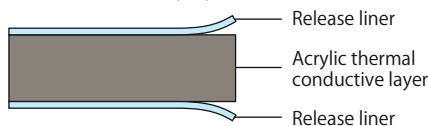
Test type	Unit	Standard	CPVH-F	CPVH
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	3.0	3.0
		ISO22007-2 (Hot Disc method)	2.2	2.2
Color	—	—	Brown	Brown
Thickness	mm	—	0.5/1.0/1.5/2.0	2.0/3.0/4.0
			2.5/3.0/3.5/4.0	
Specific Gravity	—	JIS Z 8807	2.33	2.33
Hardness	ASKER C	JIS K 7312	15	15
	Shore OO	ASTM D 2240	47	47
Tensile strength	MPa	JIS K 6251	0.25	0.15
Elongation rate	%	JIS K 6251	11	200
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	1.0×10^{11}	1.0×10^{11}
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	2.7	3.1
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	2.1	1.9
Dielectric constant	1MHz	Company standard	18.2	19.6
Loss tangent	1MHz	Company standard	0.08	0.08
Flammability	—	UL94	V-0	V-0
Operating temp	°C	—	-40~125	-40~125
Available max. dimension. ^{※1)}	mm	—	210×510	210×510

※1) Please contact us for available pcs/sheet.

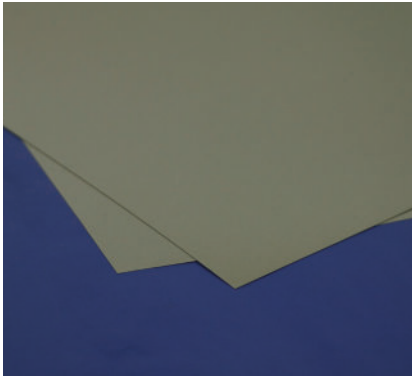
One-side tacky type / CPVH-F



Both-side tacky type / CPVH



COOLPROVIDE™ / CPVT



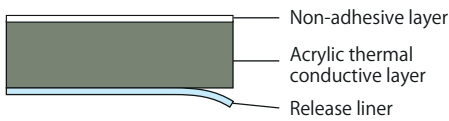
Ultra thin thermal sheet is suitable for limited gap space such as in mobile applications.

Features

- Thickness ranging from 0.1mm~0.25mm at 0.05mm pitch minimizes PCB load.
- Self-tacky sheet provides easy workability compared to grease application.
- Super compliant (ASKER C 28) material minimizes thermal resistance.
- Silicone-free, no siloxane outgassing.
- Oil bleeding is reduced compared to silicone-based thermal materials.

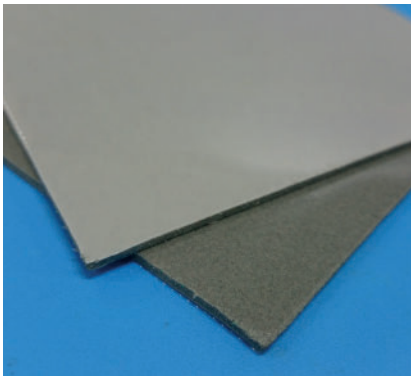
(The values below are not guaranteed.)

Test type	Unit	Standard	CPVT-F
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	2.0
		ISO22007-2 (Hot Disc method)	—
Color	—	—	Green
Thickness	mm	—	0.10/0.15
			0.20/0.25
Specific Gravity	—	JIS Z 8807	1.94
Hardness	ASKER C	JIS K 7312	28
	Shore OO	ASTM D 2240	—
Tensile strength	MPa	JIS K 6251	4.38
	%	JIS K 6251	14
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	1.0×10^{13}
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	11.1
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	5.0
Dielectric constant	1MHz	Company standard	6.69
Loss tangent	1MHz	Company standard	0.08
Flammability	—	UL94	—
Operating temp	°C	—	-20~100
Available max. dimension ^{※1)}	mm	—	210×510



※1) Please contact us for available pcs/sheet.

COOLPROVIDE™ / CPVP



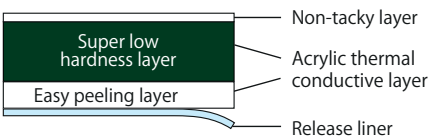
Ultra soft (ASKER C 0) Thermal Pad

Features

- Super compliant (ASKER C 0) material minimizes thermal resistance.
- Compliant thermal pad with excellent compressive stress relaxation that reduces the load to heat element and PCB.
- Layered design for easy handling.
- Silicone-free, no siloxane outgassing.
- Oil bleeding is reduced compared to silicone-based thermal materials.

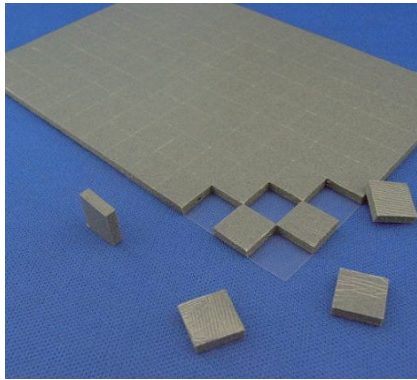
(The values below are not guaranteed.)

Test type	Unit	Standard	CPVP-F
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	2.0
		ISO22007-2 (Hot Disc method)	1.4
Color	—	—	DarkGreen/White
Thickness	mm	—	1.0/2.0/3.0
			4.0/5.0/6.0
Hardness	ASKER C	JIS K 7312	0 (Super low hardness layer)
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	1.0×10^{11}
Flammability	—	UL94	V-0
Operating temp	°C	—	-40~125
Available max. dimension ^{※1)}	mm	—	210×510



※1) Please contact us for available pcs/sheet.

COOLPROVIDE™ / CPSS



Ultra soft (ASKER C 8) Thermal Pad

Features

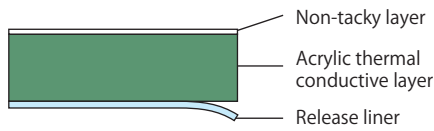
- Super compliant (ASKER C 8) material minimizes thermal resistance. Compliant thermal pad with excellent compressive stress relaxation, that reduces the load to heat element and PCB.
- Silicone-free, no siloxane outgassing.
- Oil bleeding is reduced compared to silicone-based thermal materials.

(The values below are not guaranteed.)

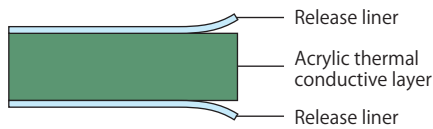
Test type	Unit	Standard	CPS S-F	CPS S
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	2.0	2.0
		ISO22007-2 (Hot Disc method)	1.5	1.5
Color	—	—	DarkGreen	DarkGreen
Thickness	mm	—	1.0/1.5/2.0	4.0
			2.5/3.0/4.0	
Specific Gravity	—	JIS Z 8807	1.92	1.92
Hardness	ASKER C	JIS K 7312	8	8
	Shore OO	ASTM D 2240	33	33
Tensile strength	MPa	JIS K 6251	0.28	—
Elongation rate	%	JIS K 6251	25	—
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	1.0×10^{12}	1.0×10^{12}
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	3.5	—
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	2.8	—
Dielectric constant	1MHz	Company standard	14.6	—
Loss tangent	1MHz	Company standard	0.09	—
Flammability	—	UL94	V-2(t1.0 - 3.0mm)	—
			V-0(t4.0mm)	
Operating temp	°C	—	-40~100	-40~100
Available max. dimension ^{※1}	mm	—	210×510	210×510

※ 1) Please contact us for available pcs/sheet.

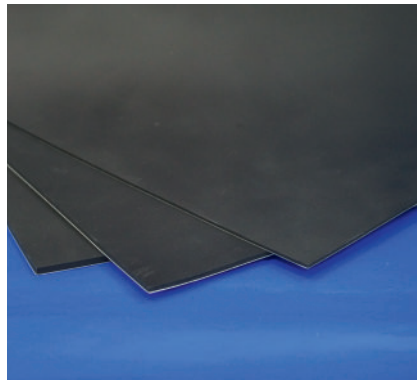
One-side tacky type / CPSS-F



Both-side tacky type / CPSS



THERMAL DAMPER/ CPAG



Thermal conductive and vibration damping material (loss factor of 0.9)

Features

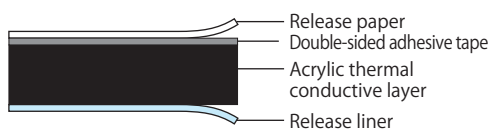
- Dual function thermal conductive and vibration damping.
- Excellent vibration control. (loss factor 0.9)
- Custom profiles can be provided upon request.
- Silicone-free, no siloxane outgassing.

(The values below are not guaranteed.)

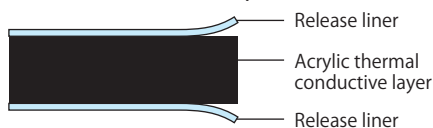
Test type	Unit	Standard	CPAG-T	CPAG
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	0.8	0.8
Color	—	—	Black	Black
Thickness	mm	—	0.5/1.0/2.0	0.5/1.0/2.0
			3.0/4.0/5.0	3.0/4.0/5.0
Hardness	ASKER C	JIS K 7312	70	70
	Durometer typeA	JIS K 6253	A 64	A 64
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	5.54×10^{11}	5.54×10^{11}
Flammability	—	UL94	—	V-1 equivalent (t2.0mm) V-0 equivalent (t3.0 - 5.0mm)
Loss Factor	—	—	0.9	0.9
Operating temp	°C	—	-10~100	-10~100
Available max. dimension ^{※1}	mm	—	340×340	350×350

※ 1) Please contact us for available pcs/sheet.

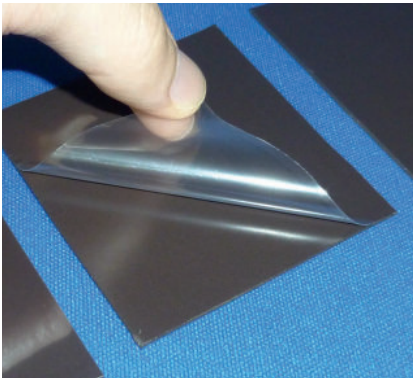
With adhesive tape / CPAG-T



With no adhesive tape / CPAG



COOLPROVIDE™ / EMPV4



Thermal Interface Material with High Permeability ($\mu' = 13$)

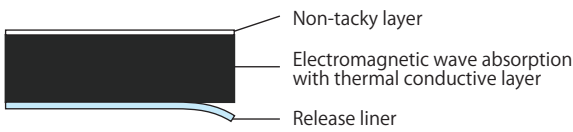
Features

- Excellent EMI absorber performance ($\mu' = 13$) and compliant thermal material (ASKER C 40).
- Have excellent adhesion, performs heat conduction and MHz~GHz range electromagnetic wave attenuation simultaneously.
- Silicone-free, no siloxane outgassing.
- Oil bleeding is reduced compared to silicone-based thermal materials.

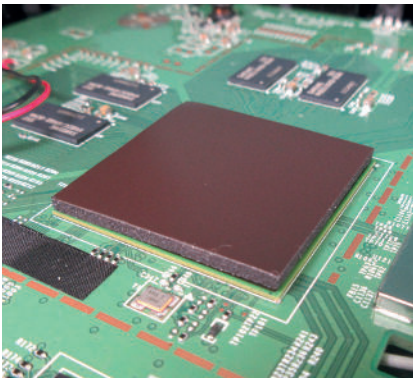
(The values below are not guaranteed.)

Test type	Unit	Standard	EMPV4-F
Thermal Conductivity	W/m·K	JIS R 2616 (Hot-wire method)	1.5
		ISO22007-2 (Hot Disc method)	1.4
Color	—	—	Black
Thickness	mm	—	1.0 / 1.5 / 2.0
			2.5 / 3.0 / 3.5
Specific Gravity	—	JIS Z 8807	3.55
Hardness	ASKER C	JIS K 7312	40
	Shore OO	ASTM D 2240	70
Tensile strength	MPa	JIS K 6251	0.51
Elongation rate	%	JIS K 6251	44
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	1.0×10^{12}
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	6.0
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	4.2
Dielectric constant	1MHz	Company standard	12.7
Loss tangent	1MHz	Company standard	0.13
Flammability	—	UL94	V-0 equivalent
Permeability (at 10MHz)	—	—	13
Operating temp	°C	—	-40~110
Available max. dimension. ^{※1}	mm	—	210×510

※1) Please contact us for available pcs/sheet.



COOLPROVIDE™ / EMPV5



Thermal conductive sheet available for EMC noise suppression in broad frequency band from 500MHz to 3GHz.

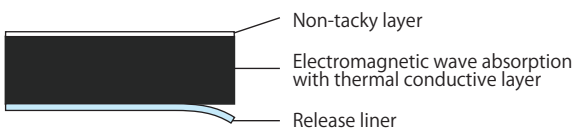
Features

- Original composition is realized EMC noise suppression in broad band from 500MHz to 3GHz.
- Because of a non-silicon material, siloxane is not contained.
- Oil bleed is less, compared with silicone type.

(The values below are not guaranteed.)

Test type	Unit	Standard	EMPV5-F
Thermal Conductivity	W/m·K	ISO22007-2 (Hot Disc method)	0.8
Color	—	—	Black
Thickness	mm	—	1.0 / 1.5 / 2.0
			2.5 / 3.0 / 3.5
Hardness	ASCER C	JIS K 7312	30
	Shore OO	ASTM D 2240	60
Volume Resistivity	$\Omega \cdot \text{cm}$	JIS K 6911 compliant	1.0×10^{11}
Breakdown voltage	kV/mm	JIS C 2110-1 compliant	8.8
Withstanding voltage	kV/mm	JIS C 2110-1 compliant	5.0
Flammability	—	UL94	V-0 equivalent
Permeability (at 10MHz)	—	—	7
Operating temp	°C	—	-40~110
Available max. dimension. ^{※1}	mm	—	210×510

※1) Please contact us for available pcs/sheet.



※The values are measured data for reference, not guaranteed.

Silicone-free

COOLPROVIDE™ / CPVG (Putty TIM)



Putty TIM can be applied thickly with a dispenser

Features

- Putty TIM does not drip even when coated thickly. Useful to fill gaps between heat spreaders and ICs of various heights.
- CPVG-30: GAP 1 mm or less the load to heat element and PCB.
- CPVG-50 (Under development): GAP 2 mm or less
- Putty type TIM has low repulsive force (after compression), load on ICs and PCBs is lowered to 10 % or less of the sheet type.
- Single liquid type, cross-linked material does not easily drip. Auto coating is possible with a dispenser.
- Silicone-free type generates no siloxane gas and oil bleeding is reduced.

Applications

【For both CPVG-30 and -50】

- Consumer equipment heat-dissipation management (PCs-including semiconductor devices, TVs, home appliances etc.)
- Communication equipment heat-dissipation management (5G antennas)

【For CPVG-50】

- On-Vehicle equipment heat-dissipation management (Engine rooms, others)

(The values below are not guaranteed.)

● Results of drip off test

Other company's grease	CPVG-30	CPVG-50
Dripped off	No-drip off	No-drip off

【Test conditions】

Temperature: 125°C

Time: 1000 h

Coating thickness: t=1mm

Materials: Glass + Aluminum plate

Test type	Unit	Standard	CPVG-30	CPVG-50 (Under development)
Thermal Conductivity	W/m · K	ISO22007-2 (Hot Disc method)	3.0	5.0
Thermal resistance	t1.0mm	ASTM D5470	0.33	0.19
	t0.3mm		0.08	0.05
	t0.1mm		0.01	0.00
Color	—	—	Gray	Blue
Specific Gravity	—	JIS Z 8807	2.9	3.2
Viscosity	0.5[1/s]	ASTM D1824 compliant	3,300	6,500
	1.0[1/s]		2,500	4,000
Volume Resistivity	Ω · cm	JIS K 6911 compliant	1.0×10 ⁹	1.0×10 ⁹
Breakdown voltage	kV/mm	JIS K 6911 compliant	8	12
Relative permittivity	500MHz	Company standard	8.98	13.47
	1GHz	Company standard	8.88	13.58
Flammability	—	UL94	Equivalent to V-0	Equivalent to V-0
Operating temp	°C	—	-40 ~ 125	-40 ~ 125
Product form when supplied	—	—	Cartridge: 330 ml	

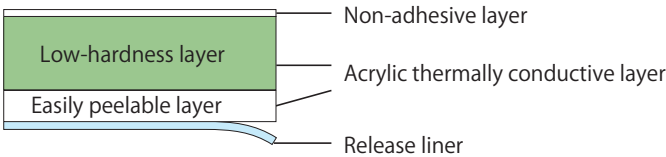
COOLPROVIDE™ / CPVP-30-F



Silicone free, low-hardness, high-thermally conductive pad (3W/m·K)

Features

- the two-layer structured putty can be handled in the same way as a pad. has a thermal conductivity of 3.0W/m·K, which is 2.1 times higher than the existing product.
- Silicon free COOLPROVIDE contains no siloxane.
- With excellent flexibility and stress relaxation, the assembled pad can lower the load on heating elements and PCBs.
- Recommended operating temperature: -40~125°C bleeds less oil compared with the silicone type.



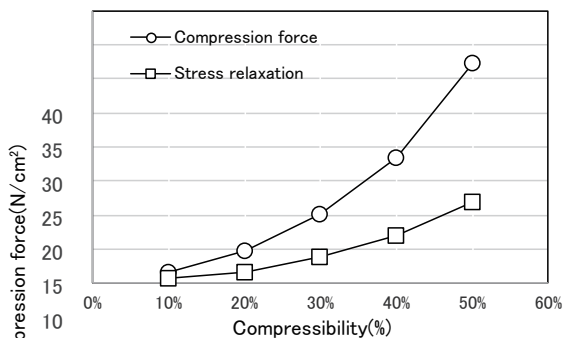
Properties

(The values below are not guaranteed.)

Item	Unit	Compliance standard	CPVP-30
Thickness	mm	—	1.0/1.5/2.0※1, 3.0/4.0
Thermal conductivity	W/m · K	ISO 22007-2 (Hot Disc method)	3.0 (Low-hardness layer)
Hardness	ASKER C	JIS K 7312	7 (Low-hardness layer)
Volume resistivity	Ω · cm	JIS K 6911	1.0 × 10 ¹¹
Flammability	—	UL94	Equivalent to V-0
Color	—	—	Green / White
Recommended operating temperature	°C	—	-40~125

※ 1.0, 1.5 and 2.0mm thick products are under development.

● Compressive stress relaxation properties



Sample dimensions : □10mm(t=4.0mm)

Cross-head speed : 1mm/min

Compression plate materials

Upper : Stainless steel Φ28mm

Lower : Gold plated copper Φ106mm

※ Compressive force is the largest load value immediately after compression.

※ The values are measured data for reference, not guaranteed.

1. Scope

1.1 The following General Terms of Delivery and Payment shall be applicable – provided nothing to the contrary is stipulated in writing – to all of the deliveries and other performance effected by us.

1.2 Deviating General Terms of Business of the Purchaser shall not bind us.

1.3 Amendments and/or supplements to the following terms and to the additionally stipulated agreements upon the conclusion of the contract must be made in writing.

2. Conclusion of the Contract

2.1 The offers of Kitagawa GmbH are made without obligation.

2.2 A contract between Kitagawa GmbH and the Purchaser shall only come into effect in accordance with the contents of the written confirmation of order on the part of Kitagawa GmbH or through the delivery of the goods or the rendering of the agreed performance by Kitagawa GmbH.

2.3 The Purchaser shall be bound to its order for three weeks. Kitagawa GmbH reserves the right to deviate from the order specifications in the acceptance of the order if this is necessary for the fulfillment of the order and is acceptable for the Purchaser.

2.4 Kitagawa GmbH shall be entitled to effect an alteration to the goods at any time without prior notification insofar as this does not result in any shortfall of the contractually stipulated characteristics of the goods and the alteration is reasonable for the Purchaser. The alteration of already delivered contract cannot be subsequently demanded.

3. Delivery Terms

3.1 The delivery period of the goods shall be determined in accordance with the written confirmation of order of Kitagawa GmbH.

3.2 Indicated delivery periods shall run from the dispatch of the written confirmation or order. If the Purchaser is obliged to effect advance performance, then the delivery period shall commence with the receipt of the contractual advance performance of the Purchaser at Kitagawa GmbH.

3.3 If the Purchaser demands alterations to the contractually stipulated performance after a written confirmation of order has been effected, then Kitagawa GmbH shall be entitled to effect a reasonable extension to the delivery period if necessary.

3.4 In cases of force majeure, interventions by sovereign powers, natural disasters, war, revolts, strikes at its own company, at supply companies or at carriers, Kitagawa GmbH shall be entitled to make up the delivery after the cessation of the cause of the impediment and the delivery period shall be extended accordingly. The same applies if Kitagawa GmbH does not receive its own supplies in due time or in due form. There shall be no claims due to non-delivery or late delivery. This shall also be applicable if above indicated circumstances arise once the stipulated delivery period was already exceeded.

3.5 If a promised delivery date is not met by Kitagawa GmbH for reasons attributable to Kitagawa GmbH's fault, then the Purchaser shall be entitled to set Kitagawa GmbH a two-week subsequent period after the expiry of the stipulated delivery period by means of registered letter. The Purchaser shall be entitled to withdraw from the agreement after the fruitless expiry of the period. Claims for damages, insofar as is legally permissible, as well as more extensive rights shall be excluded, provided the delay in delivery is neither due to intent nor gross negligence on the part of Kitagawa GmbH. This limitation of claims shall not apply in cases due to loss of life, bodily injury or damage of health. The burden of proof that intent or gross negligence is not applicable shall be borne by Kitagawa GmbH.

3.6 Kitagawa GmbH shall be entitled to effect part deliveries unless they should be unreasonable to be accepted by the Purchaser.

4. Shipment and passing of risk

4.1 Kitagawa GmbH shall undertake the shipments of the goods at the Purchaser's expense. Kitagawa GmbH shall select the forwarder/carrier to the best of its knowledge, without, however, assuming corresponding liability. Kitagawa GmbH shall award the shipping order on the customary terms in the sector in each case. Transport insurance shall only be taken out at the Purchaser's request and expense.

4.2 Risk shall pass when the goods leave the warehouse or upon the surrender of the goods to the forwarder/carrier. The risk shall also pass to the Purchaser, if the goods are ready for shipment and delivery is delayed or fails for other reasons attributable to the Purchaser.

4.3 Any transport damage which occurs must be asserted by the Purchaser in due time to the forwarder/carrier or its insurance company.

5. Prices

The prices are indicated in the respective confirmation of order or Kitagawa GmbH and are expressed net in EURO plus the statutory rate of V.A.T. exclusive of packing, freight, postage, delivery charges etc.

6. Payment Terms

6.1 Insofar as no other payment terms are indicated in the confirmation of order of Kitagawa GmbH, the invoices are payable after the invoice date within 30 days net without any discount. Decisive for effecting payment on time is the receipt of the payment at Kitagawa GmbH. Cheques shall only be accepted on account of performance.

6.2 If the Purchaser is a businessman, then it shall be in default upon the exceeding of the due date without a separate warning. Kitagawa GmbH shall be entitled to assert default interest to the amount of 8 percentage points above the basic rate of interest. The assertion of a more extensive loss caused by default remains reserved.

6.3 In the event that the Purchaser should be in default with payment, Kitagawa GmbH may upon its discretion request advance payment before

delivery of the goods. The same shall apply if the Purchaser's economic conditions give reason to concern regarding the due fulfillment of payment obligations.

6.4 The Purchaser shall only be entitled to set off the claims of Kitagawa GmbH against those claims which are undisputed or legally binding.

7. Warranty

7.1 Kitagawa warrants for the duration of 12 months that the goods contained not material or fabrication defects at the time the risks passes. This warranty ("Gewährleistung") commences upon delivery of the goods.

7.2 Warranty shall not be effected in the case of improper utilization, faulty installation, incorrect operation etc. No warranty shall similarly be effected for losses which arise through the operation of the goods together with such appliances whose compatibility has not been expressly confirmed in writing by Kitagawa GmbH.

7.3 The Purchaser shall notify Kitagawa GmbH of any defects of the delivery in writing as soon as such defects are detected under conditions of normal business operations. Section 377 German Trade Code applies.

7.4 In the case of defects the warranty shall be effected at the option of Kitagawa GmbH by subsequent rectification or substitute delivery free of charge. If the subsequent rectification also fails on the second attempt or in if the second substitute delivery also contains defects or if Kitagawa GmbH does not meet its subsequent delivery or substitute delivery obligation within a reasonable period, then the Purchaser shall be entitled to a reduction of the purchase price or rescission of the contract.

7.5 Claims for damages caused by defects shall be excluded. This exclusion shall not apply in case a defect has been fraudulently concealed, in the event that life, body or health is injured and acts of Kitagawa GmbH with intention or gross negligence. In the case a guaranteed characteristic of the goods should be lacking, liability shall be restricted to the loss which is to be expected in accordance with the customary course of events. More extensive claims on account of the faulty nature of the goods shall be excluded. This shall also be applicable to the repair of consequential losses and to the violation of ancillary contractual obligations.

7.6 The afore mentioned exclusion of liability shall also be applicable to claims in tort and in connection with the initiation, conclusion and processing of a contract, not, however, in the case of claims in accordance with the Product Liability Act.

8. Retention of Title

8.1 Kitagawa GmbH shall retain title to all goods until the payment in full of all receivables resulting from the business relations with Kitagawa GmbH. If the value of the collateral which is in existence in favour of Kitagawa GmbH should exceed the claims against the contract partner by more than 10 per cent in total, then Kitagawa GmbH shall be obliged to release collateral at the request of the Purchaser

GENERAL TERMS OF DELIVERY AND PAYMENT

8.2 The Purchaser shall be entitled to resell the goods subject to retention of title in customary business transactions. For this case, the Purchaser hereby assigns all claims arising out of such resale, whether the goods have been processed or not, to Kitagawa. Herewith, Kitagawa accepts this assignment.

Notwithstanding Kitagawa's right to claim direct payment, the Purchaser shall be entitled to receive the payment on the assigned claims. To this end, Kitagawa agrees to not demand payment on the assigned claims to the extent the Purchaser complies with all its obligations for payment and does not become subject to an application for insolvency or similar proceedings or to any delay of payments. Moreover, the Purchaser shall not be entitled to pledge the goods subject to retention of title or to assign all claims to which it is entitled from a future sale of the goods subject to retention of title against its purchasers to Kitagawa GmbH by way of security.

8.3 In the case of the processing or reconstruction of the goods subject to retention of title by the Purchaser, this shall always be effected for Kitagawa GmbH. If the goods subject to retention of title are processed with other articles which do not belong to Kitagawa GmbH, then Kitagawa shall acquire co-ownership to the new article in proportion to the value of the goods subject to retention of title to the other processed articles at the time of processing. If the Purchaser sells the goods subject to retention of title together with other goods which do not belong to Kitagawa GmbH, or after joining or processing, then the assignment shall only be effected to the amount of the outstanding invoices sum of the respective goods subject to retention of title.

8.4 The Purchaser shall be entitled to collect the assigned receivable in its own name. Kitagawa GmbH shall, however, be entitled to revoke this collection authority at any time, especially in the case of default in payment by the Purchaser. In the case of revocation the Purchaser shall be obliged to provide Kitagawa GmbH with or to surrender to it all necessary information and documentation for the assertion of the assigned receivables and to disclose the assignments to its purchasers. In the case of default in payment by the Purchaser Kitagawa GmbH shall be entitled to notify its purchasers of the assignment.

8.5 The Purchaser shall be obliged to provide Kitagawa GmbH with information at any time on the where-abouts of the goods subject to retention of title and on the receivables arising from their resale. The Purchaser shall be obliged to inform Kitagawa GmbH in writing of a seizure by a third party of the goods subject to retention of title or of the receivables assigned to Kitagawa GmbH and it shall be obliged to draw the third party's attention to the rights of Kitagawa GmbH. The Purchaser shall furthermore be obliged to support Kitagawa GmbH upon the assertion and enforcement of its rights against this third party, especially at its expense to lodge the necessary immediate remedies/appeals in order to safeguard the rights of Kitagawa GmbH.

8.6 In case of default in payment on the part of the Purchaser Kitagawa GmbH shall be entitled to take back the goods subject to retention of title. The Purchaser shall accordingly be obliged to surrender these goods. The taking back of the goods subject to retention of title does not constitute a withdrawal from the contract, unless Kitagawa GmbH expressly states such a withdrawal in writing.

8.7 The Purchaser shall be obliged to treat the delivered goods subject to retention of title with care. It shall especially be obliged to take out adequate insurance cover for the goods subject to retention of title at its own expense against loss or damage through fire, water, burglary or theft. The Purchaser hereby assigns its corresponding insurance claim to Kitagawa GmbH. Kitagawa GmbH hereby accepts this assignment and states the reassignment to the Purchaser with the proviso that this shall become effective if and as soon as the retention of title has expired.

9. Final Provisions

9.1 The Purchaser shall not be entitled to assign rights and obligations to third parties arising from the contract concluded with Kitagawa GmbH without the prior approval of Kitagawa GmbH.

9.2 The contractual relations between the contracting parties shall be subject to the Law of the Federal Republic of Germany. The provisions of the Convention on Contracts of the International Sale of Goods (CISG, Vienna Convention) shall not apply to the contract concluded with the Purchaser.

9.3 Venue for all disputes and types of proceedings arising from or in connection with the contractual relations between the parties shall be Darmstadt, Federal Republic of Germany, provided the Purchaser is a businessman.

9.4 Kitagawa GmbH shall be entitled to store and to use the personal data to which it has obtained access from the business relations with the Purchaser under the terms of the German Data Protection Act for its own business purposes.

9.5 If a provision of these General Terms of Business or of the contract concluded with the Purchaser should be or become ineffective, then this shall not affect the effectiveness of the remaining provisions of these General Terms of Business or of the concluded contract.

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Notice:

The specifications provided in this catalogue are believed to be accurate and reliable. Kitagawa GmbH reserves the right to make changes to specifications to improve manufacturing process performance and reliability.

This catalogue is intended for representation only and is not to form any part of any order. Engineering specifications are available upon request.

Any information/specification supplied by Kitagawa GmbH is based upon Kitagawa Industries laboratory test data and is believed to be reliable. It is recommended that our products are tested by the customer to ensure suitability for the intended application.

If any Kitagawa product is to be used in a life threatening application (such areas as Medical Automotive and Aerospace etc) the application must be discussed with Kitagawa GmbH and its written approval must be obtained.

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