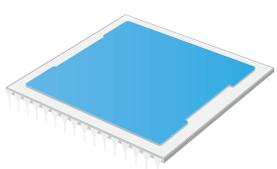
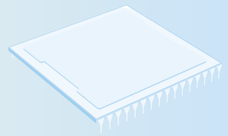
Denka



Thermal Interface Materials

Denka



Thermal Interface Materials

DENKA's Thermal Interface Materials are composed of

silicone matrix and ceramic filler,

and leverage highly developed organic and inorganic technologies

to deliver legendary radiation performance.

DENKA is constantly developing products that conform to dynamic

market requirements while further inspiring confidence from our customers.

DENKA

materials

for Thermal Solution

DENKA THERMALLY CONDUCTIVE SPACER

DENKA THERMALLY CONDUCTIVE SPACER is a "pad type" material. It has superior softness and is suitable for filling various gap sizes. It is recommended for portable base stations, digital gadgets, and other applications.

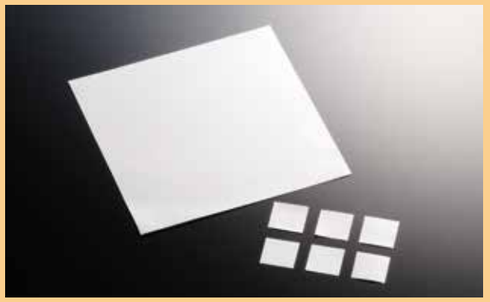
p.06
THERMALLY CONDUCTIVE SPACER

DENKA THERMALLY CONDUCTIVE GREASE

DENKA THERMALLY CONDUCTIVE GREASE can be applied flexibly. Customers can decrease thermal resistance by spreading our grease in a thin layer. Thermal Grease is highly prized in areas such as server systems and in automotive application.

p.14
THERMALLY CONDUCTIVE GREASE

DENKA THERMALLY CONDUCTIVE SHEET



DENKA THERMALLY CONDUCTIVE SHEET maintains its insulating properties throughout comprehensive testing, while also featuring ease in handling. It's suitable for automotive parts or electronic power supplies.

p.16
THERMALLY CONDUCTIVE SHEET

electronic materials

DENKA

THERMALLY CONDUCTIVE SPACER
grade lineup

Thermal conductivity 1-8 W/mK

Item	unit	FSL-BS	FSL-HR	FSL-HS (Under Development)	FSL-D	FSL-J	FSL-F3	Test method
color	—	Light Blue	Gray	Gray	Light Blue	Gray	Light Gray	—
Thickness	mm	0.5 0.75 1.0 1.5 2.0 2.5 3.0 3.5 4.0	1.0 1.5 2.0 2.5 3.0	1.0 1.5 2.0 2.5 3.0	0.3 0.5 1.0 1.5 2.0 2.5 3.0 4.0	0.1 0.15 0.2 0.25	0.3 0.5 1.0 1.5 2.0 2.5 3.0 4.0 5.0	Thickness gauge
Tolerance	%	± 10						—
Surface tack	—	One or both side	Both side	Both side	One or both side	One or both side	One or both side	—
Thermal conductivity	W/mK	3	8	5	3	1	2	ASTM D5470
Compressibility	%	30	15	30	15	5	25	0.1MPa
Hardness	—	8	40	8	30	60	15	Asker C
Specific gravity	—	2.8	3.3	3.1	2.7	2.5	1.7	25℃
Breaking strength	MPa	0.05	0.2	During measurement	0.23	1.2	0.25	JIS K6251
Elongation	%	324	40	During measurement	111	100	218	JIS K6251
Young's Modulus	MPa	0.011	0.2	During measurement	0.087	1.3	0.064	JIS K6251
Volume resistance	Ω・cm	1×10^{13}	1×10^{12}	During measurement	1×10^{13}	1×10^{14}	1×10^{13}	JIS K6911
Dielectric breakdown Voltage	kV/mm	10	10	During measurement	10	10	10	JIS C2110
Relative permittivity	—	7.2	8.3	During measurement	6.6	N.D.	4.5	JIS K6249@1MHz
Low molecule siloxane	ppm	450	250	500	50	200	650	ΣD5-10
Flame retardancy	—	V-0	V-1	More than 1.5mm: V-0Equivalence Less than 1.5mm: V-1Equivalence	V-0	V-0 Equivalence	More than 1.5mm: V-0 Less than 1.5mm: V-1	UL-94 File No. E49895

Item	unit	FSL-B	FSL-BH	FSL-H	FSL-HM (Under Development)	FSL-K4 (Under Development)	Test method
color	—	Light Blue	Light Blue	Gray	Gray	Light Blue	—
Thickness	mm	0.3 0.5 1.0 1.5 2.0 2.5 3.0 4.0 5.0	0.3 0.5 1.0 1.5 2.0 2.5 3.0 4.0 5.0	0.5 1.0 1.5 2.0	0.5 1.0 1.5 2.0 2.5 3.0	0.5 1.0 2.0 3.0	Thickness gauge
Tolerance	%	± 10					—
Surface tack	—	One or both side	One or both side	One or both side	Both side	One or both side	—
Thermal conductivity	W/mK	4	4	5	7	2	ASTM D5470
Compressibility	%	15	10	9	10	20	0.1MPa
Hardness	—	25	30	35	45	15	Asker C
Specific gravity	—	2.8	2.8	3.1	3.3	2.5	25℃
Breaking strength	MPa	0.15	0.18	0.27	0.25	0.2	JIS K6251
Elongation	%	149	100	82	30	200	JIS K6251
Young's Modulus	MPa	0.042	0.07	0.1	0.4	0.06	JIS K6251
Volume resistance	Ω・cm	1×10^{13}	1×10^{13}	1×10^{13}	1×10^{12}	1×10^{13}	JIS K6911
Dielectric breakdown Voltage	kV/mm	10					JIS C2110
Relative permittivity	—	7.1	6.9	7.9	8.2	N.D.	JIS K6249@1MHz
Low molecule siloxane	ppm	450	600	300	400	270	ΣD5-10
Flame retardancy	—	V-0	V-0	V-0	V-1 Equivalence	V-0 Equivalence	UL-94 File No. E49895

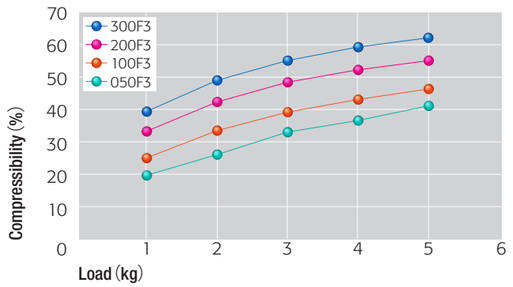
DENKA
THERMALLY CONDUCTIVE SPACER FSL-F3

Thermal conductivity of FSL-F3 is 2W/mK. It is utilized in gadgets such as tablet PC's.

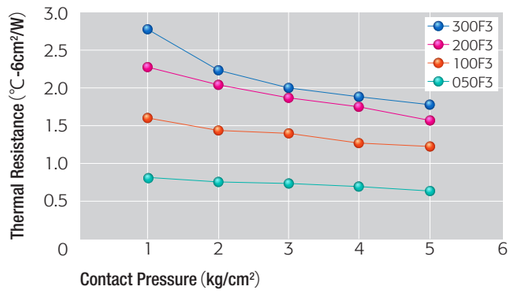
Product Characteristic

Product Data

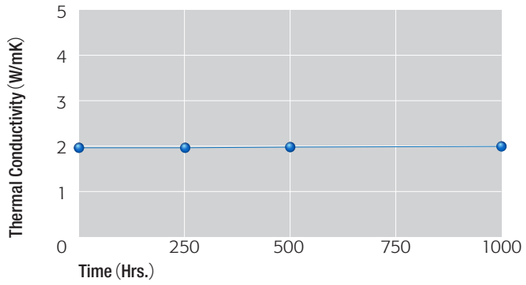
Load vs Compressibility

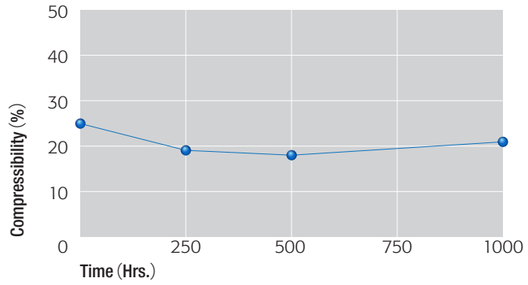


Contact Pressure vs Thermal Resistance

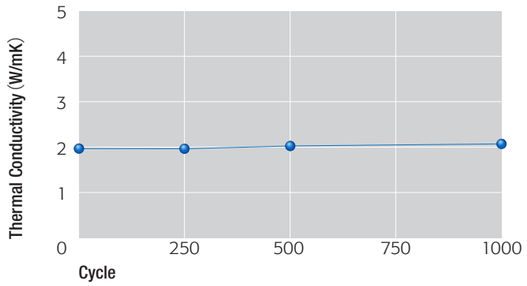


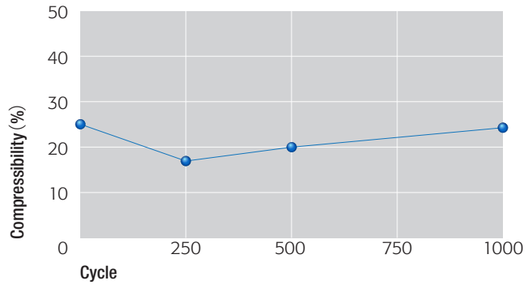
Heat-resistant reliability (150℃) *FSL100F3



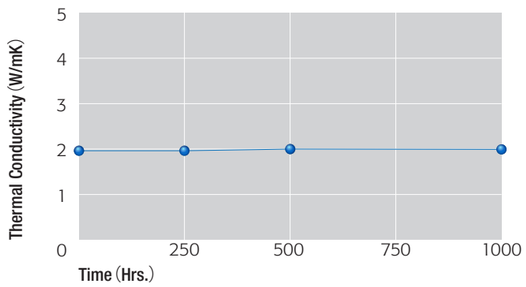


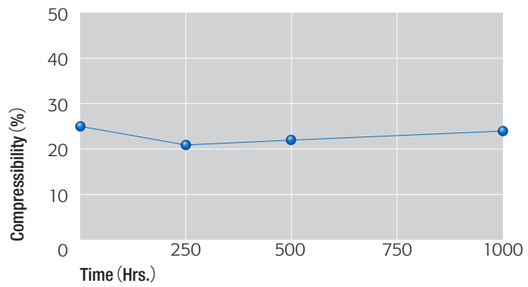
Heat-cycle resistant reliability (-40℃⇔+125℃) *FSL100F3





Humidity-resistant reliability (85℃/85%) *FSL100F3





THERMALLY CONDUCTIVE SPACER
FSL-BS

DENKA THERMALLY CONDUCTIVE SPACER FSL-BS

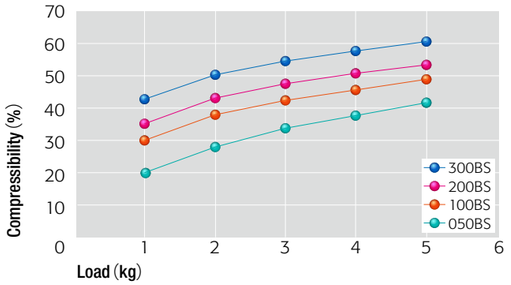
Thermal conductivity 3 W/mK

Product Characteristic

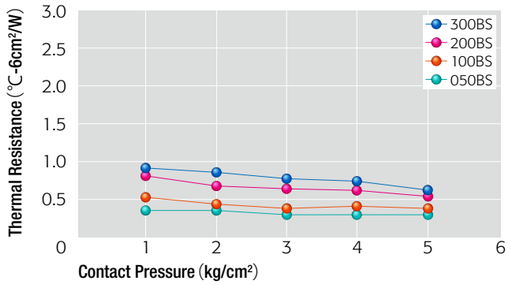
FSL-BS is the softest grade in our thermally conductive spacer lineup, with compressibility of 30%. It is recommended in applications which require both high thermal conductivity and compressibility, such as in portable base stations.

Product Data

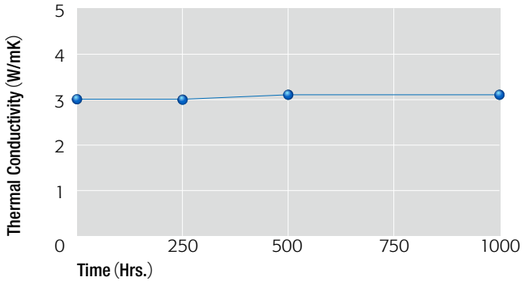
Load vs Compressibility

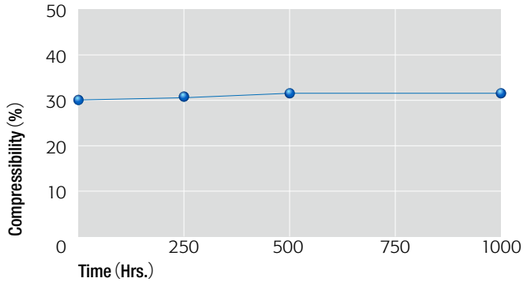


Contact Pressure vs Thermal Resistance

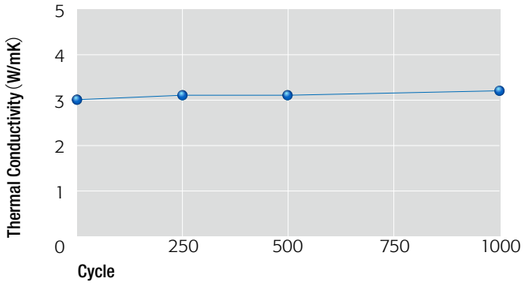


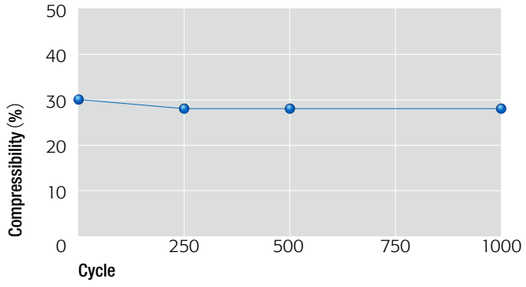
Heat-resistant reliability (150℃) *FSL100BS



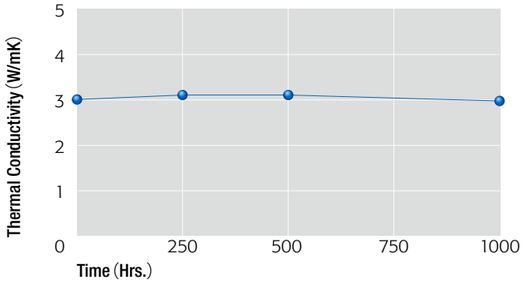


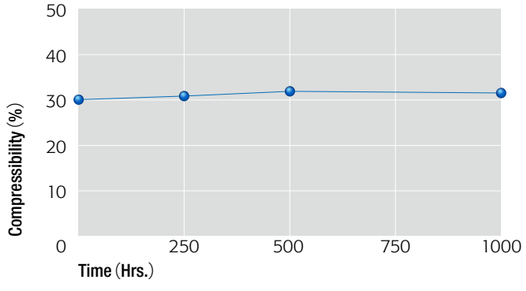
Heat-cycle resistant reliability (-40℃⇔+125℃) *FSL100BS





Humidity-resistant reliability (85℃/85%) *FSL100BS





Thermal conductivity 3 W/mK

THERMALLY CONDUCTIVE SPACER
FSL-D

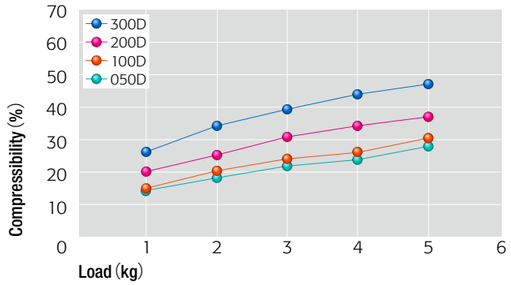
DENKA THERMALLY CONDUCTIVE SPACER FSL-D

FSL-D contains less Low molecule siloxane and has high reliability.

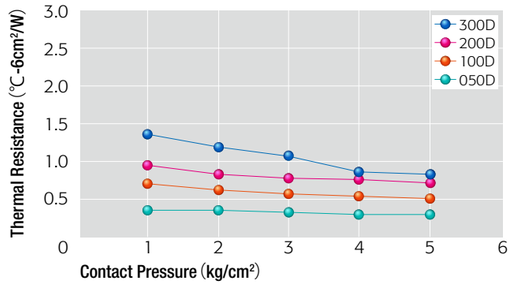
Product Characteristic

Product Data

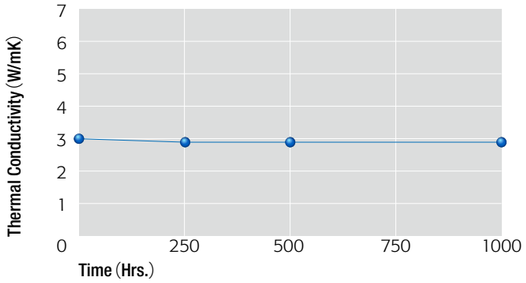
Load vs Compressibility

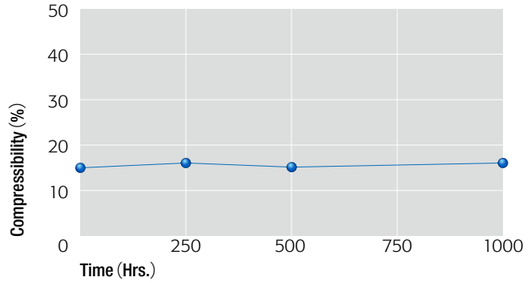


Contact Pressure vs Thermal Resistance

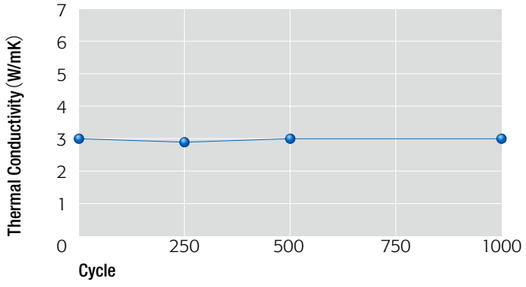


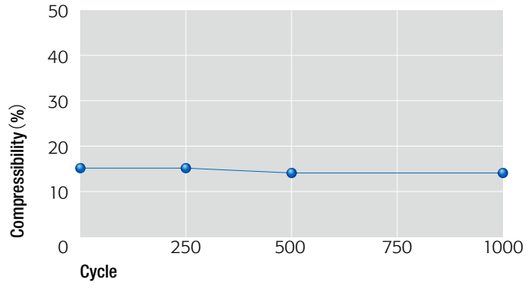
Heat-resistant reliability (150℃) *FSL100D



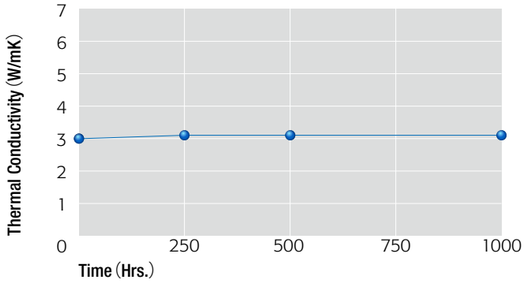


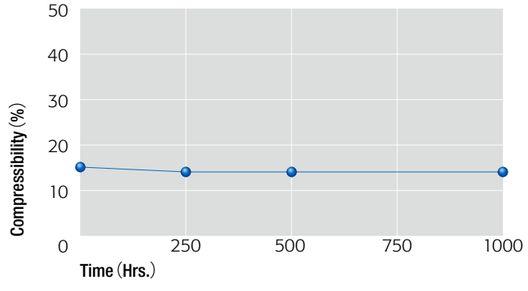
Heat-cycle resistant reliability (-40℃⇔+125℃) *FSL100D





Humidity-resistant reliability (85℃/85%) *FSL100D





THERMALLY CONDUCTIVE SPACER
FSL-B

DENKA THERMALLY CONDUCTIVE SPACER FSL-B

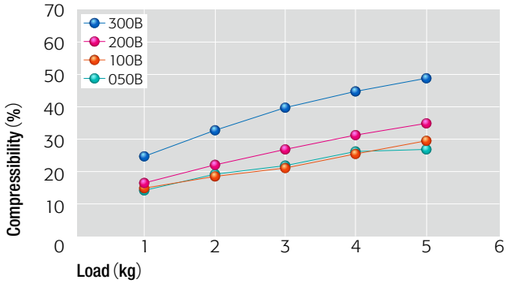
Thermal conductivity 4 W/mK

Product Characteristic

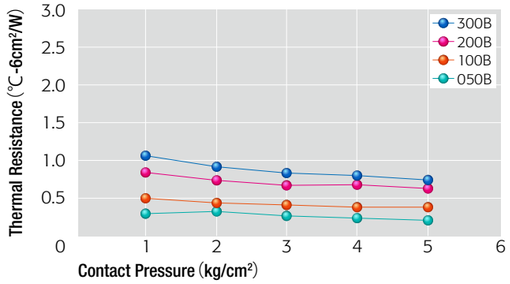
FSL-B is Denka's economy grade, featuring excellent balance between thermal conductivity and computability.

Product Data

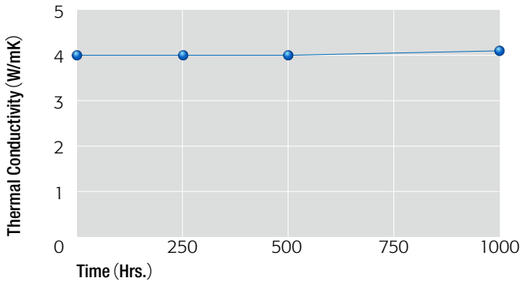
Load vs Compressibility

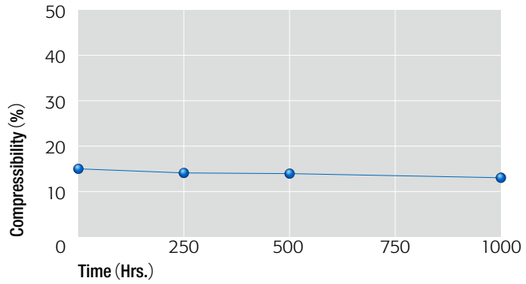


Contact Pressure vs Thermal Resistance

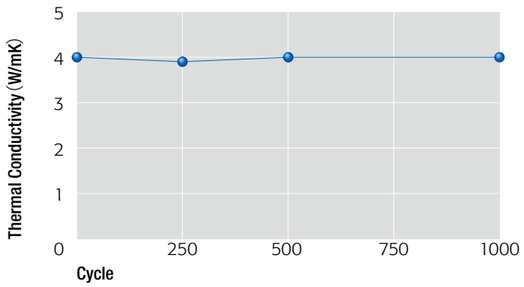


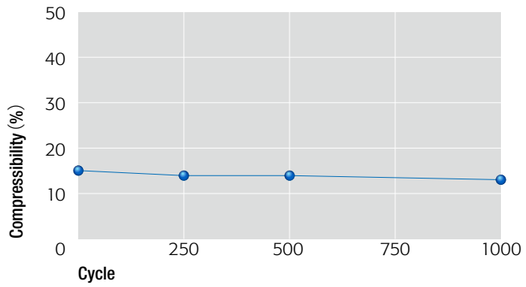
Heat-resistant reliability (150℃) *FSL100B



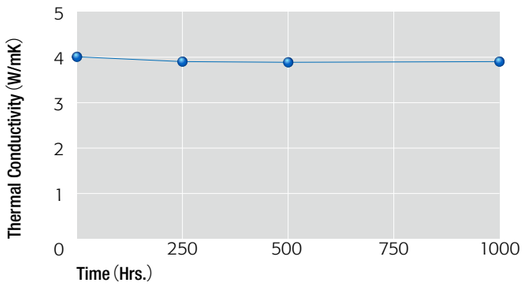


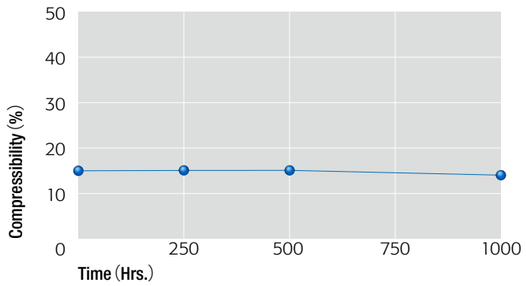
Heat-cycle resistant reliability (-40℃⇔+125℃) *FSL100B





Humidity-resistant reliability (85℃/85%) *FSL100B





4 W/mK Thermal conductivity

THERMALLY CONDUCTIVE SPACER DENKA FSL-BH

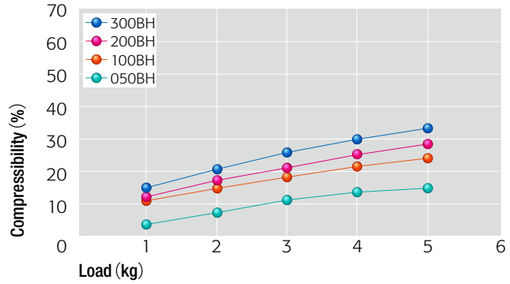
THERMALLY CONDUCTIVE SPACER
FSL-BH

Product Characteristic

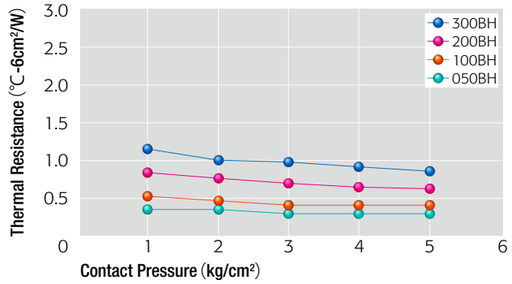
FSL-BH is harder than standard FSL-B grade, making it suitable for producing thicker pads.

Product Data

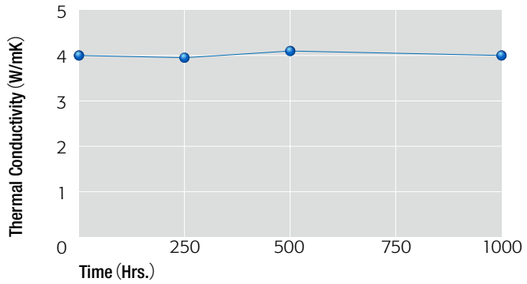
Load vs Compressibility

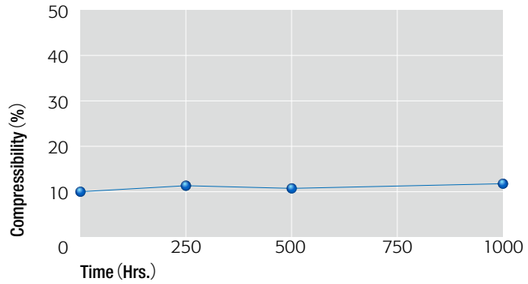


Contact Pressure vs Thermal Resistance

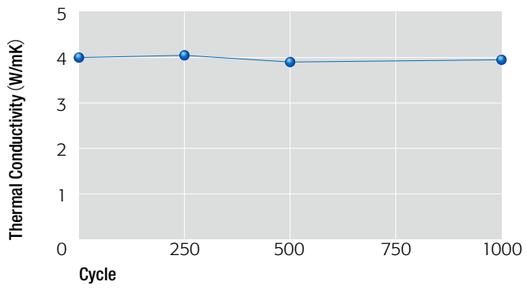


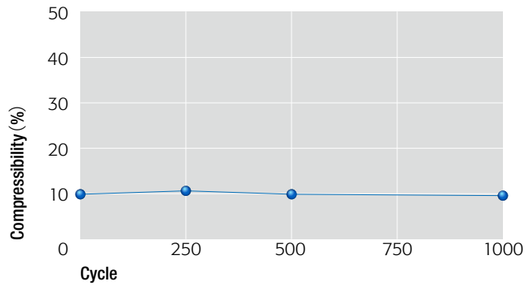
Heat-resistant reliability (150℃) *FSL100BH



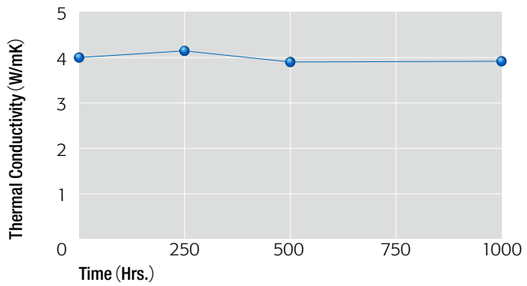


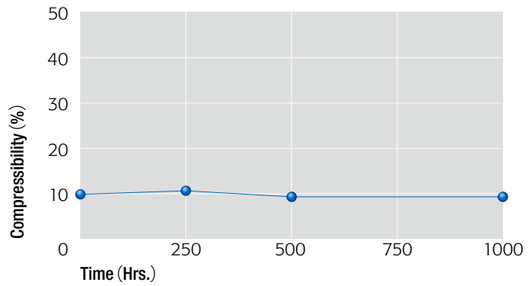
Heat-cycle resistant reliability (-40℃⇔+125℃) *FSL100BH





Humidity-resistant reliability (85℃/85%) *FSL100BH





THERMALLY CONDUCTIVE SPACER
FSL-H

DENKA THERMALLY CONDUCTIVE SPACER FSL-H

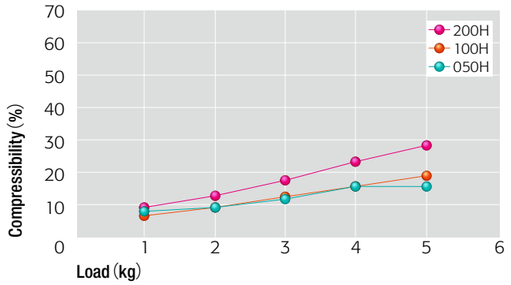
Thermal conductivity 5 W/mK

Product Characteristic

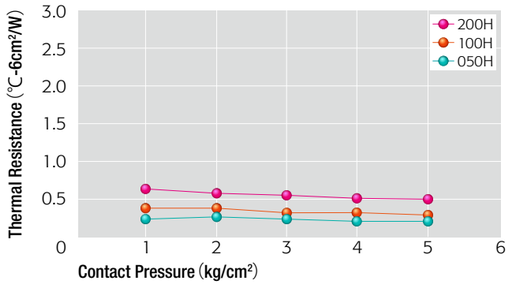
FSL-H features high thermal conductivity at 5W/mk, and also reverts to its original state after unloading.

Product Data

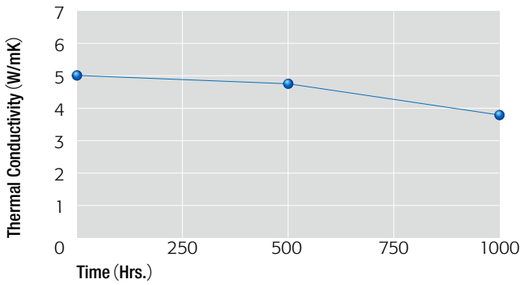
Load vs Compressibility

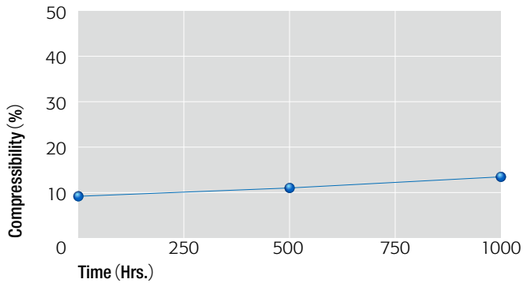


Contact Pressure vs Thermal Resistance

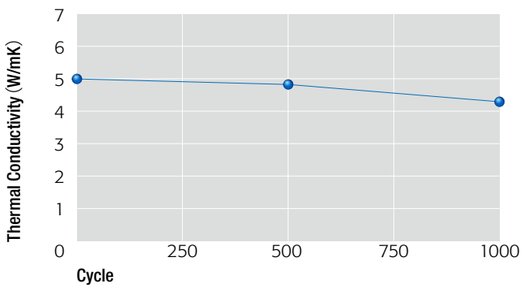


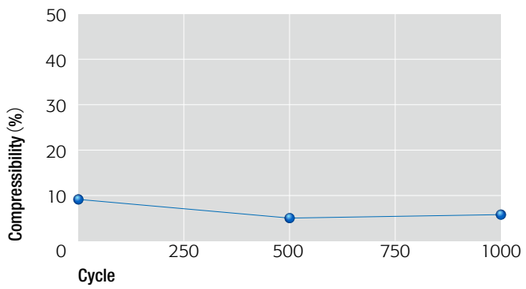
Heat-resistant reliability (150℃) *FSL100H



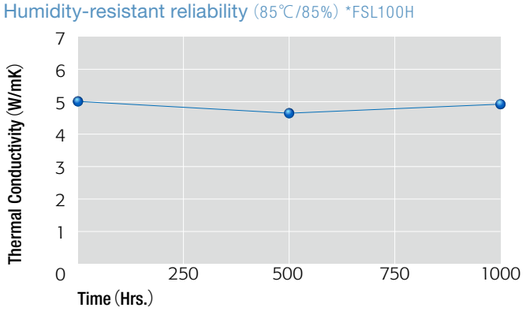


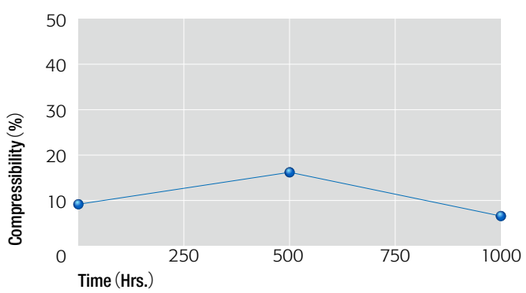
Heat-cycle resistant reliability (-40℃⇔+125℃) *FSL100H





Humidity-resistant reliability (85℃/85%) *FSL100H





8 W/mK Thermal conductivity

DENKA THERMALLY CONDUCTIVE SPACER FSL-HR

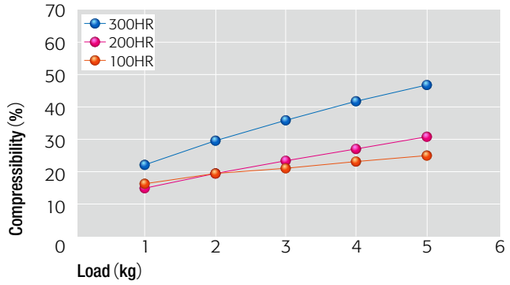
THERMALLY CONDUCTIVE SPACER
FSL-HR

Product Characteristic

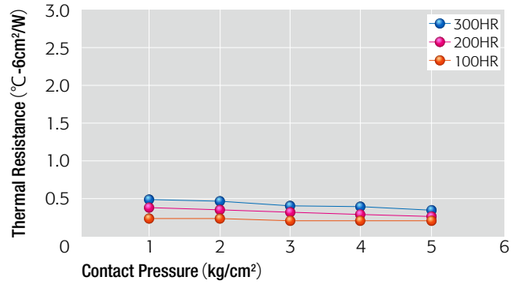
FSL-HR has highest thermal conductivity in our lineup, at 8W/mK.

Product Data

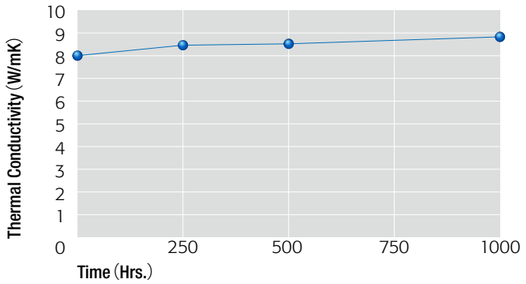
Load vs Compressibility

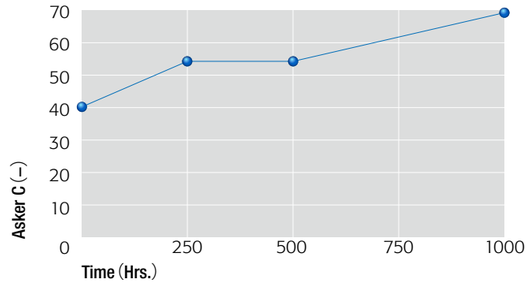


Contact Pressure vs Thermal Resistance

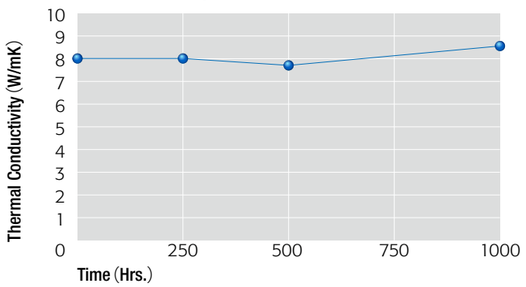


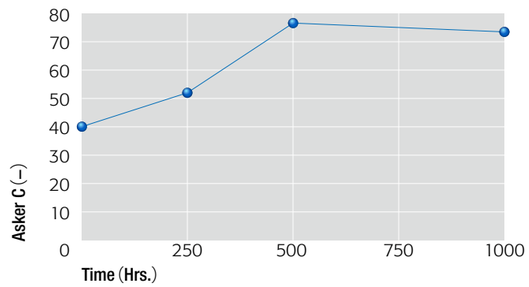
Heat-resistant reliability (100℃) *FSL100HR



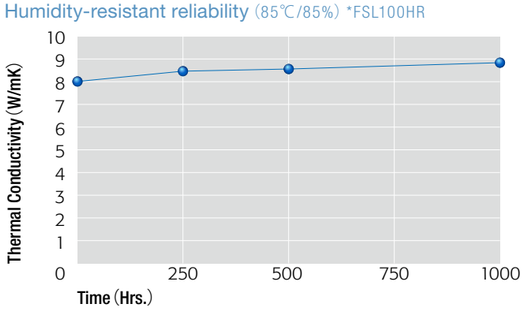


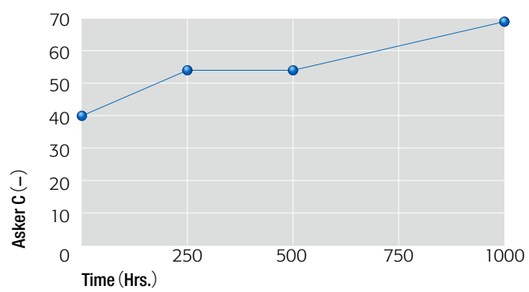
Heat-resistant reliability (125℃) *FSL100HR





Humidity-resistant reliability (85℃/85%) *FSL100HR





electronic materials

DENKA

THERMALLY CONDUCTIVE GREASE

grade lineup

Thermal conductivity 1.2-6.2 W/mK

Item	unit	GFC-V2 (Under Development)	GFC-WX (Under Development)	GFC-P4 (Under Development)	GFC-PF3	GFC-N8	Test method
color	—	Gray	White	Gray	White	Gray	Visual
Thermal Resistance	℃・cm^2/W	0.12	0.21	0.23	0.29	0.07	ASTM D5470
Thermal Resistance (0.1mm)	℃・cm^2/W	0.21	0.56	0.34	0.53	0.8	ASTM D5470
Thermal conductivity	W/mK	6.2	2.5	3.5	3	1.5	ASTM D5470
Bond Line thickness	μm	72	28	72	52	7	—
Dielectric breakdown voltage	kV/mm	—	＞10	＞10	＞10	7	JIS 2101
Volume resistivity	Ω・cm	—	1×10^{14}	1×10^{14}	1×10^{14}	1×10^{13}	JIS K6911
Oil Separation	%	0	During measurement	0	0	0	JIS K2220 130℃, 100Hrs.
Weight loss	wt%	During measurement	0	0.15	0.05	0.05	150℃-24Hrs.
Specific gravity	—	2.7	3.0	3.2	3.1	2.9	Calculation
Viscosity	Pa・s	280	100	300	22	450	Share rate 10 (s^{-1}) @25℃
Low molecule siloxane	ppm	Less than 100	-	Less than 100	Less than 100	Less than 200	ΣD5-D10
Useful temperature range	℃	-40～125	−40～175	-40～125	−40～150	-40～125	—

Item	unit	GFC-Z1	FCR-H	GFC-L1 (Under Development)	GFC-Q1 (Under Development)	Test method
color	—	Gray	Gray	White	White	Visual
Thermal Resistance	℃・cm^2/W	0.07	0.30	0.11	0.07	ASTM D5470
Thermal Resistance (0.1mm)	℃・cm^2/W	0.65	0.50	1.7	During measurement	ASTM D5470
Thermal conductivity	W/mK	2.0	3.3	0.6	1.2	ASTM D5470
Bond Line thickness	μm	7	72	3	During measurement	—
Dielectric breakdown voltage	kV/mm	—	7	8	3	JIS 2101
Volume resistivity	Ω・cm	—	1.1×10^{14}	1×10^{8}	1×10^{13}	JIS K6911
Oil Separation	%	0.1	0	During measurement	0.1	JIS K2220 130℃, 100Hrs.
Weight loss	wt%	0.3	0.03	0.4	0.3	150℃-24Hrs.
Specific gravity	—	2.6	3.1	2.5	3.3	Calculation
Viscosity	Pa・s	240	500	60	320	Share rate 10 (s^{-1}) @25℃
Low molecule siloxane	ppm	Less than 100	N.D.	During measurement	Less than 300	ΣD5-D10
Useful temperature range	℃	-40～100	-40～130	-40～125	-40～125	—

※ Thermal conductivity isn't including contact resistance.

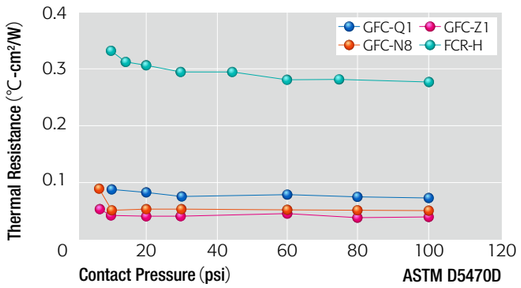
DENKA THERMALLY CONDUCTIVE GREASE

DENKA THERMALLY CONDUCTIVE GREASE is a liquid-type TIM, and features high heat radiation properties together with high reliability. GFC-N8 is our premium grade with high resistance properties for pump-out and bleed-out.

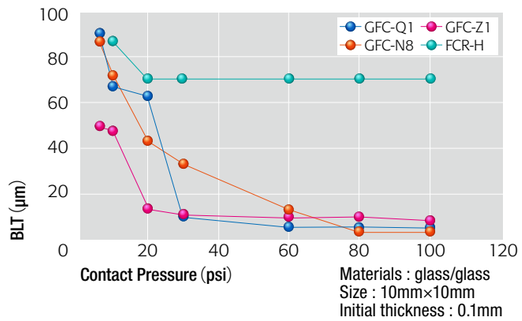
Product Characteristic

Product Data

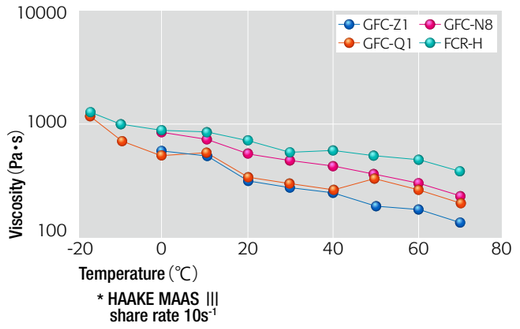
Contact pressure vs Thermal Resistance



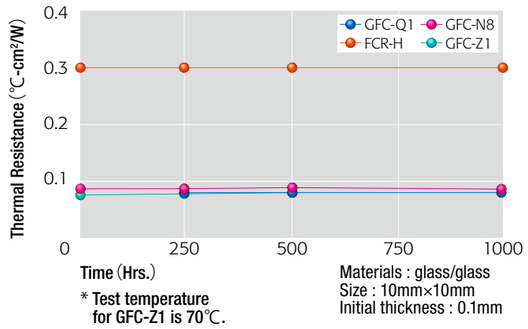
Contact pressure vs BLT



Temperature vs Viscosity



Resistance heat test (@130℃)



THERMALLY CONDUCTIVE SHEET

DENKA

THERMALLY CONDUCTIVE SHEET
grade lineup

Thermal conductivity 1.4-5.0 W/mK

THERMALLY CONDUCTIVE SHEET

Item	unit	BFG20	BFG30	BFG45	BFG80	Test method
color	—	Light Green	White	White	White	—
Thickness	mm	0.20±0.05	0.30±0.05	0.45±0.05	0.80+0.20/-0.05	—
Reinforced layer	—	Reinforced with glass fiber				—
Thermal resistance TO-3	℃/W	0.18	0.20	0.25	0.36	Denka method
Thermal resistance TO-3P	℃/W	0.37	0.42	0.51	0.77	Denka method
Thermal conductivity TO-3	W/mK	4.1				Denka method
Withstand voltage	AC kV	1.0	3.0	4.0	5.0	JEM 1021
Dielectric breakdown voltage	AC kV	3.0	6.5	9.0	>10	JIS C2110
Volume resistivity	Ω・cm	1.9×10^{15}	2.4×10^{15}	3.3×10^{15}	4.1×10^{15}	JIS K6271
Dielectric constant	—	3.6				1MHz
Flammability	UL94	V-0				FileNo.E49895
Specific gravity	g/cm^3	1.7				—
Tensile strength	MPA kgf/cm^2	25 260	20 200	14 140	9 90	JIS K6251
Tear strength	kN/m kgf/cm	117 120	88 90	59 60	39 40	JIS K6252
Hardness	Durometer A	88				JIS K6253
Foldamability	ϕ mm	1.2	1.2	3.1	>5	—

Item	unit	BFG20A	BFG30A	BFG45A	BFG80A	Test method
color	—	White				—
Thickness	mm	0.20±0.05	0.30±0.05	0.45±0.05	0.80+0.20/-0.05	—
Reinforced layer	—	Reinforced with glass fiber				—
Thermal resistance TO-3	℃/W	0.12	0.15	0.19	0.30	Denka method
Thermal resistance TO-3P	℃/W	0.28	0.29	0.32	0.66	Denka method
Thermal conductivity TO-3	W/mK	5.0				Denka method
Withstand voltage	AC kV	1.0	3.0	4.0	5.0	JEM 1021
Dielectric breakdown voltage	AC kV	3.0	6.0	9.0	>10	JIS C2110
Volume resistivity	Ω・cm	1.7×10^{15}	7.9×10^{15}	9.2×10^{15}	8.9×10^{15}	JIS K6271
Dielectric constant	—	3.3				1MHz
Flammability	UL94	V-0				FileNo.E49895
Specific gravity	g/cm^3	1.7				—
Tensile strength	MPA kgf/cm^2	9 96	8 84	5 69	4 41	JIS K6251
Tear strength	kN/m kgf/cm	41 42	37 38	36 29	28 19	JIS K6252
Hardness	Durometer A	90	90	89	88	JIS K6253
Foldamability	ϕ mm	1.0	1.2	1.2	3.1	—

※The values of thermal condutivity are the estimates including contact resistance at 1mm thick.
※Thermal resistance TO-3
Clipped thermally conductive sheet between a model heater (TO-3 shape) and heatsink (Cu plate).
After tightened a torque and applied voltage as prescribed, thermal resistance is calculated from temperature difference between a model heater and a heatsink.
※Thermal resistance TO-3P
Clipped thermally conductive sheet between a transistor package (TO-3P, TO-3PL, TO-220 shape) and heatsink (Radiator fin).
After tightened a torque and applied electric pressure as prescribed, thermal resistance is calculated from temperature difference between a model heater and a heatsink.

Item	unit	BS20	BS30	BS45	BS80	Test method
color	—	Light Green	Green	Green	Green	—
Thickness	mm	0.20±0.05	0.30±0.05	0.45±0.05	0.80+0.20/−0.05	—
Reinforced layer	—	Reinforced with glass fiber				—
Thermal resistance TO-3	℃/W	0.19	0.21	0.26	0.37	Denka method
Thermal resistance TO-3P	℃/W	0.40	0.45	0.54	0.79	Denka method
Thermal conductivity TO-3	W/mK	3.9				Denka method
Withstand voltage	AC kV	1.0	3.0	4.0	5.0	JEM 1021
Dielectric breakdown voltage	AC kV	3.0	5.1	7.8	>10	JIS C2110
Volume resistivity	Ω・cm	1.8×10^{15}	2.6×10^{15}	2.5×10^{15}	1.8×10^{15}	JIS K6271
Dielectric constant	—	3.5				1MHz
Flammability	UL94	V-0				FileNo.E49895
Specific gravity	g/cm^3	1.7	1.6	1.6	1.6	—
Tensile strength	MPA kgf/cm^2	25 260	18 180	13 130	9 90	JIS K6251
Tear strength	kN/m kgf/cm	117 120	88 90	59 60	39 40	JIS K6252
Hardness	Durometer A	88	89	89	88	JIS K6253
Foldamability	ϕ mm	Completely foldable	Completely foldable	Completely foldable	0.1	—

Item	unit	M20	M30	M45	M80	Test method
color	—	Yellow				—
Thickness	mm	0.20±0.05	0.30±0.05	0.45±0.05	0.80+0.20/−0.05	—
Reinforced layer	—	Reinforced with glass fiber				—
Thermal resistance TO-3	℃/W	0.43	0.64	0.8	1.07	Denka method
Thermal resistance TO-3P	℃/W	0.86	1.27	1.59	2.10	Denka method
Thermal conductivity TO-3	W/mK	1.4				Denka method
Withstand voltage	AC kV	1.0	3.0	4.0	5.0	JEM 1021
Dielectric breakdown voltage	AC kV	2.4	5.5	8.5	>10	JIS C2110
Volume resistivity	Ω・cm	1.7×10^{15}	1.7×10^{15}	2.8×10^{15}	2.6×10^{15}	JIS K6271
Dielectric constant	—	4.0				1MHz
Flammability	UL94	V-0				FileNo.E49895
Specific gravity	g/cm^3	1.9	1.9	2.0	2.0	—
Tensile strength	MPA kgf/cm^2	28 290	24 240	26 270	20 200	JIS K6251
Tear strength	kN/m kgf/cm	127 130	98 100	107 110	68 70	JIS K6252
Hardness	Durometer A	91	91	90	90	JIS K6253
Foldamability	ϕ mm	0.8	1.2	2.5	1.5	—

DENKA
THERMALLY CONDUCTIVE SHEET BFG-A

Thermal conductivity 5 W/mK

BFG Series

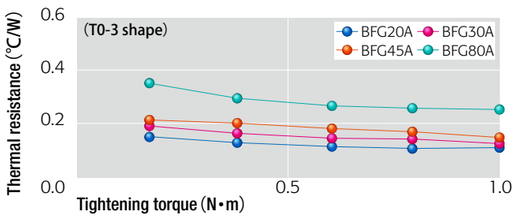
BFG-A

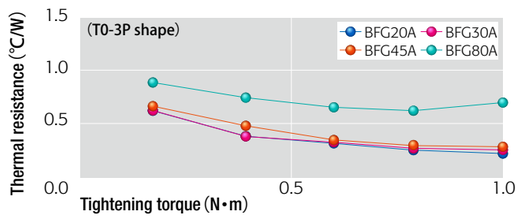
Product Characteristic

BFG-A is insulating heat conductive sheet with highest thermal conductivity in our lineup, 5W/mK.

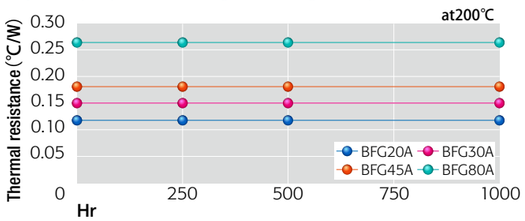
Product Data

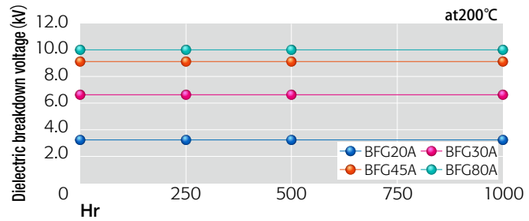
Relation between tightening torque and thermal resistance



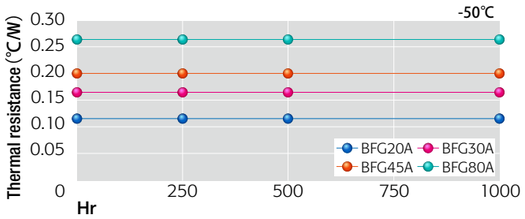


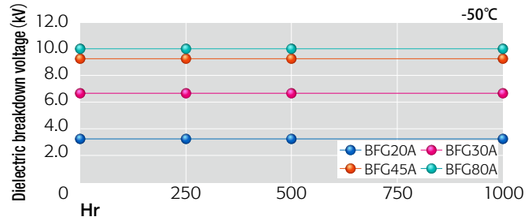
Physical properties change after high temperature treatment (200℃)



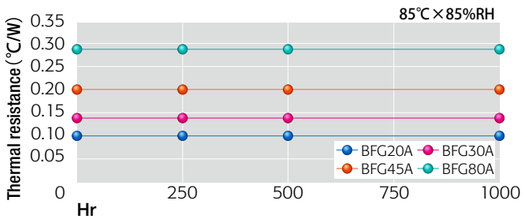


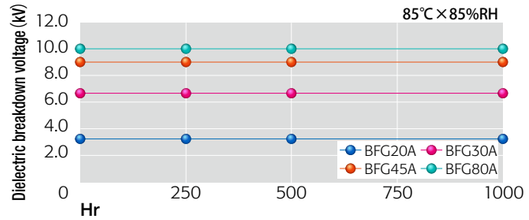
Physical properties change after low temperature treatment (-50℃)



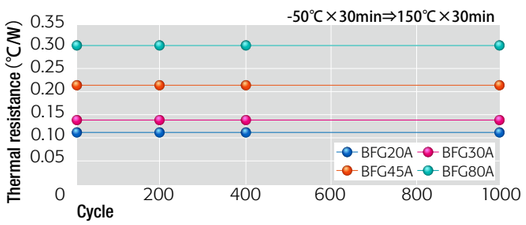


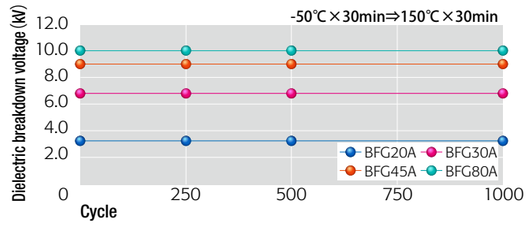
Physical properties change after 85℃×85%RH treatment





Physical properties change after heat cycle treatment (-50℃⇄150℃)





4.1 W/mK Thermal conductivity

DENKA
THERMALLY CONDUCTIVE SHEET BFG

BFG Series

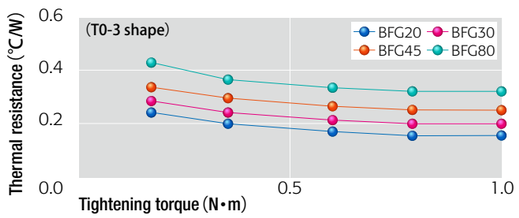
BFG

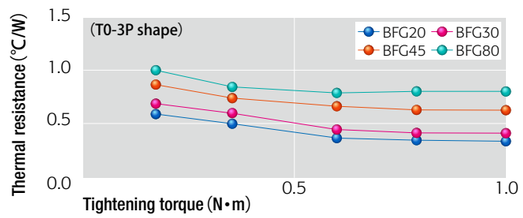
Product Characteristic

BFG grade is a sheet that has superior insulation & thermal conduction with a reinfocement layer (fiber glass). It is designed to support a number of applications.

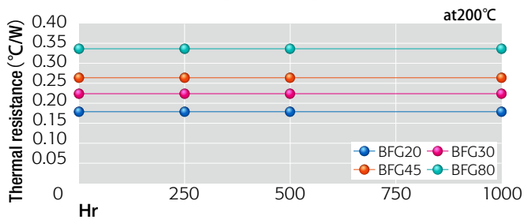
Product Data

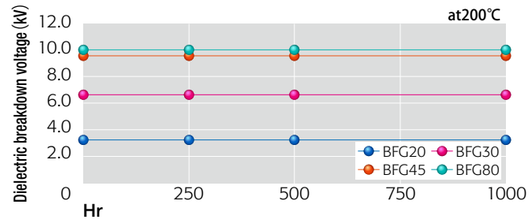
Relation between tightening torque and thermal resistance



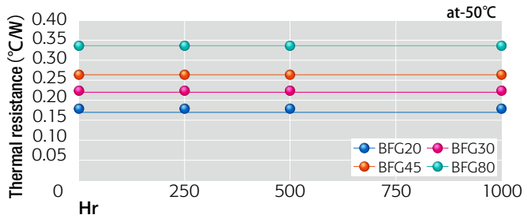


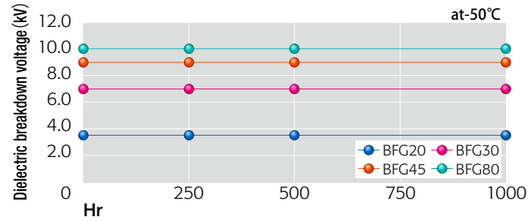
Physical properties change after high temperature treatment (200℃)



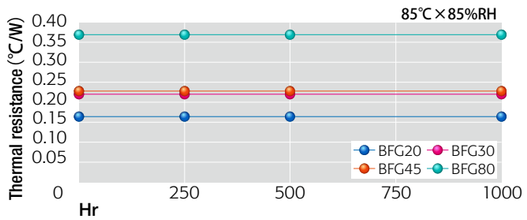


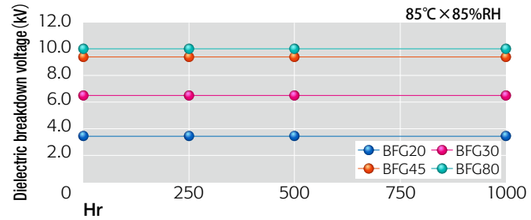
Physical properties change after low temperature treatment (-50℃)



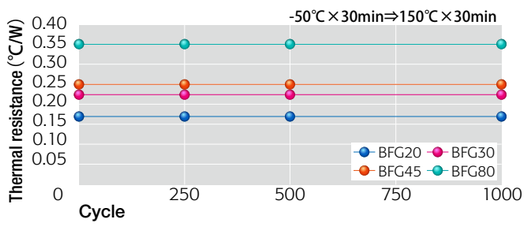


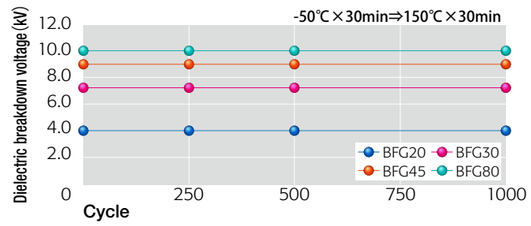
Physical properties change after 85℃×85%RH treatment



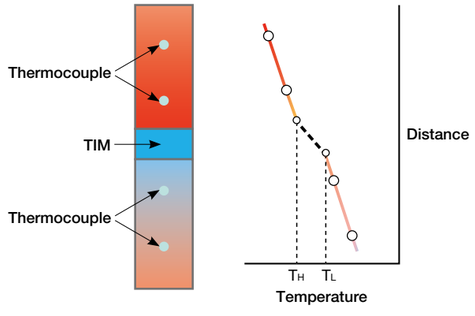


Physical properties change after heat cycle treatment (-50℃⇄150℃)





Method of determination for Thermal resistance (ASTM D5470)



After clipping TIM by Copper jig, heating up from upper side.
The relation between distance from lower copper and temperature is described as chart.
Thermal resistance can be calculated by TH and TL.

$$\text{Thermal resistance} = \frac{T_H - T_L}{\text{Heat flow ratio}} \qquad \text{Thermal conductivity} = \frac{\text{Thickness of TIM}}{\text{Thermal resistance} \times \text{dimension of TIM}}$$

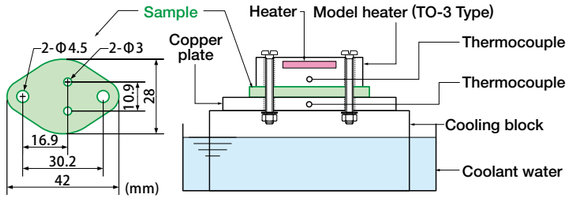
Method of determination for Thermal resistance

Thermal resistance of TO-3 Type (Product No. : B-1)

◆Test method (Denka method)

Clipped thermally conductive sheet between a model heater (TO-3 shape) and heatsink (Cu plate).
After tightened a torque and applied voltage as prescribed, thermal resistance is calculated from temperature difference between a model heater and a heatsink.

〈Outline dimensions of sample〉



[Test conditions]
Tightening torque : 0.5N·m (5.1kgf·m)
Applied voltage : 15W

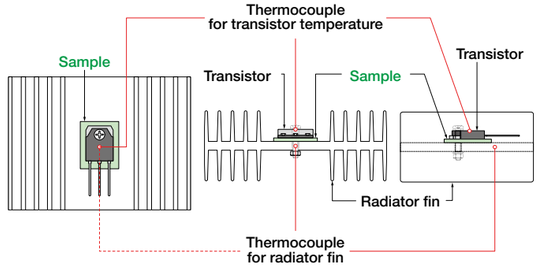
$$\text{Thermal resistance}\ (℃/W) = \frac{\text{Temperature of heater T1} - \text{Temperature of cooling block T2}}{\text{Applied voltage}\ (W)} + \text{Interface resistance}$$

$$\text{Thermal conductivity}\ (W/m\cdot k) = \frac{\text{Thickness}\ (m)}{\text{dimension}\ (m^2) \times \text{Thermal resistance}\ (℃/W)}$$

Thermal resistance after mounted (Product No. : D-1, D-3, D-6 etc.)

◆Test method (Denka method)

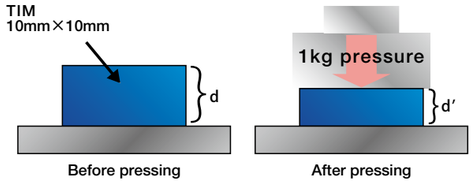
Clipped thermally conductive sheet between a transistor package (TO-3P, TO-3PL, TO-220 shape) and heatsink (Radiator fin).
After tightened a torque and applied electric pressure as prescribed, thermal resistance is calculated from temperature difference between a model heater and a heatsink.



$$\text{Thermal resistance}\ (℃/W) = \frac{\text{Temperature of transistor} - \text{Temperature of heatsink}}{\text{Applied voltage}\ (W)} + \text{Interface resistance}$$

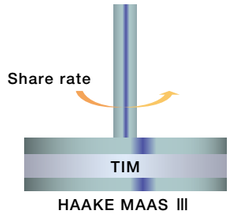
Though we used heatsink applied for ordinal electric power supply, we can change it and do remeasurement as customers' requirement.

Method of Compressibility

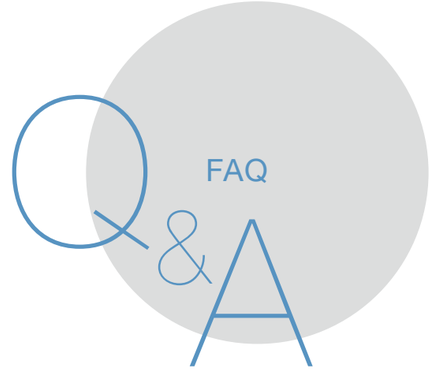


$$\text{Compressibility}(\%) = \frac{d-d'}{d} \times 100$$

Method of Viscosity



Measuring Viscosity when the rate of rotation is "d γ /dt=10" and the thickness of TIM is 0.3mm by using HAAKE MAASIII.



Q What kind of filler is Denka using?

A Denka utilizes inorganic fillers, such as BN and Al2O3, that we produce in-house.

Q What is the range of usage temperature of DENKA TIM?

A We recommend to use around 125℃. Please contact us when you'd like to use them over 125℃ .

Q What is the expiration date for DENKA TIM?

A 6 months after ETD date.

Q What are the points to remember when storing?

A Please keep away from direct daylight and preserve under room temperature.

Q Do DENKA TIM products contain environmentally hazardous substances?

A Denka does not intentionally utilize or include environmentally hazardous substances in TIM products.

Q What is the most suitable compressibility for DENKA THERMALLY CONDUCTIVE SPACER?

A We recommend 10%, but you can use by compressing over 10%.

Q Is there Non-adhesive type of DENKA THERMALLY CONDUCTIVE SPECER?

A Non-adhesive process can be applied only one side.

Q What is the thinnest thickness for expanding DENKA THERMALLY CONDUCTIVE GREASE?

A Please refer to the value of "BLT" in this catalog.

Q Is it possible to supply grease by syringe-type?

A Yes. Denka also supplies grease in syringe packaging.

Q What is the most recommended torque pressure of DENKA THERMALLY CONDUCTIVE SHEET?

A 5kg-cm.

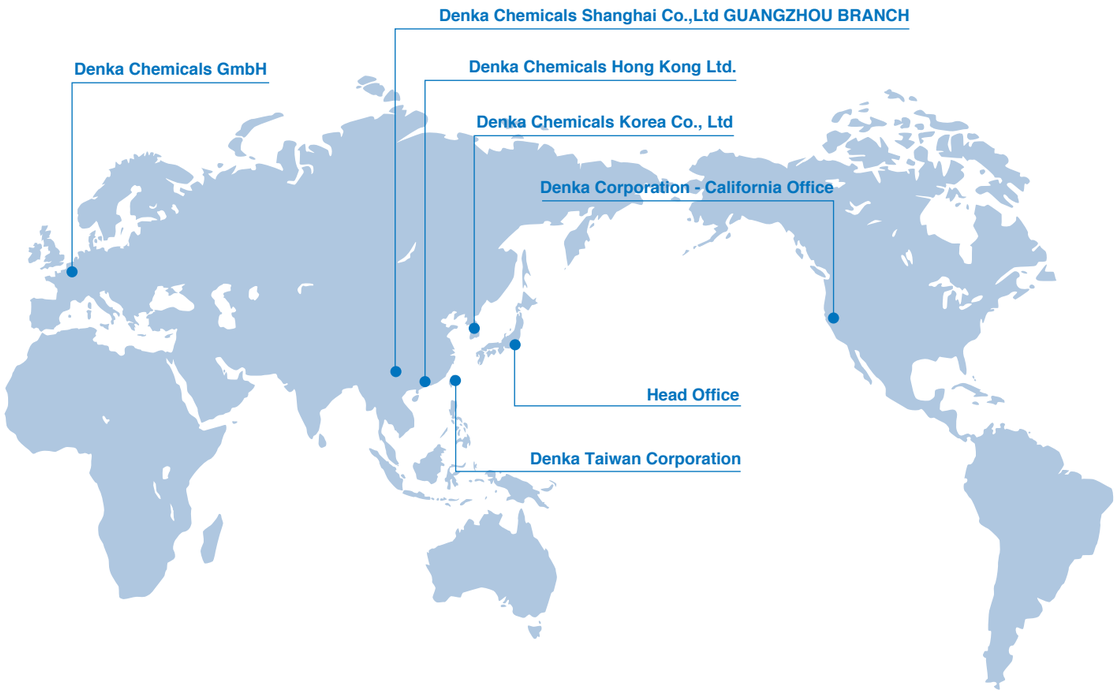
Q What is the way to decrease thermal resistance of DENKA THERMALLY CONDUCTIVE SHEET?

A We recommend to increase contact between sheet and other materials, or by using grease.

Q What is the difference between "Dielectric breakdown voltage" and " Dielectric withstanding voltage"?

A Dielectric breakdown voltage:The voltage value when breakdown happens
Dielectric withstanding voltage : The maximum voltage value DENKA assures insulating property

Sales office



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All properties in this catalog are typical values and
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Denka