



Product Training Module: H48-2

Jan 2012

Introduction

- Purpose
 - This training module is used to give an introduction to t-Global Technology's H48-2 product range
- Objectives
 - To identify the key properties of H48-2
 - To identify the key design criteria for product selection
 - To identify common applications for the product
- Content
 - Introduction and background to H48-2
- Learning time
 - 30 mins



H48-2 - Series

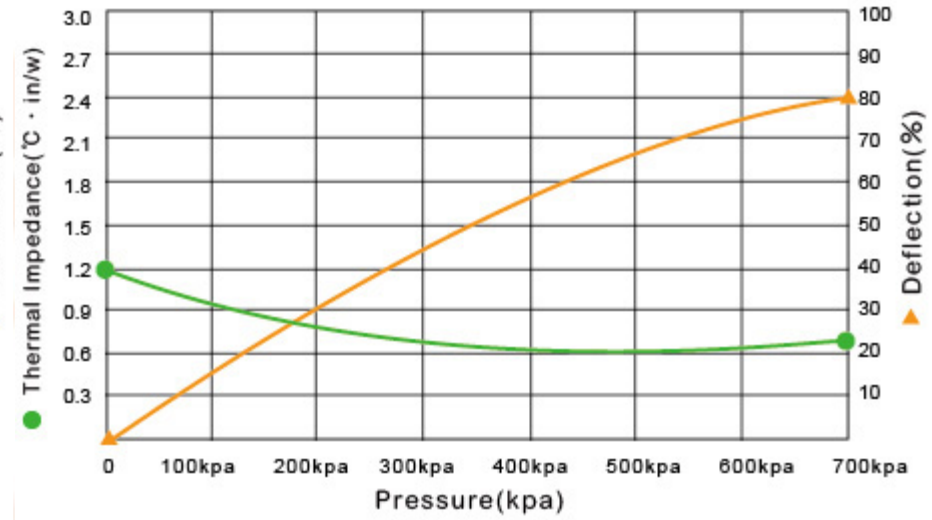
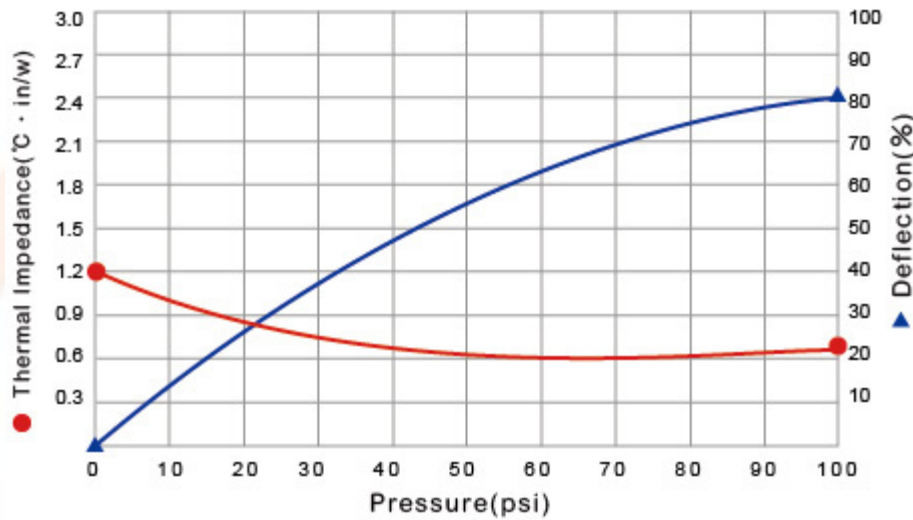
- The H48-2 series is t-Global Technology's core mid-performance silicone based thermal interface product
- Each member in the family has been developed to address specific industrial needs
- All products are available as standard sheets, custom-die cuts and on rolls
- All products can be supplied with a pressure sensitive adhesive applied to one or both sides

H48-2

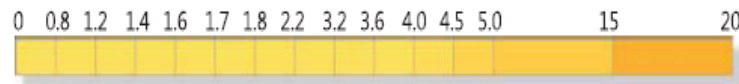
- H48-2 has a thermal conductivity of 2.2 W/m.k
- It offers
 - Good thermal conductivity
 - High compressibility
 - Natural surface tack
 - Excellent dielectric breakdown voltage
- Common applications include:
 - Consumer electronics
 - Automotive electronics
 - Handsets



H48-2 – Performance

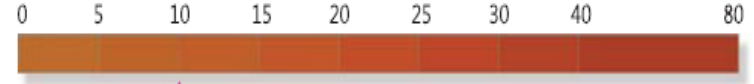


Thermal Conductivity: 2.2 W/m.k
(W / m.k - Z Axis)



Testing sample thickness : 1.0 mm

Hardness: 10 (Shore A)
(Shore A)



H48-2 - Datasheet

Property	H48-2	Unit	Tolerance	Test Method
Colour	Dark Red	-	-	Visual
Thickness	0.2 - 2.0	mm	-	ASTM D374
	0.0078 - 0.7874	inch	-	ASTM D374
Thermal Conductivity	2.2	W/m.k	-	ASTM D5470
Flame Rating	V-0	-	-	UL94
Dielectric Breakdown Voltage	>5	kV/mm	-	ASTM D149
Weight Loss	<1	%	-	ASTM E595
Specific Gravity	2.43	g/cm ³	±0.2	ASTM D792
Working Temperature	-40 to 200	°C	-	-
Volume Resistance	>10 ¹¹	Ohm-cm	-	ASTM D257
Elongation	282	%	±0.28	ASTM D412
Tensile Strength	7	Kgf/cm ²	±2	ASTM D412
Standard Shape	-	Sheet ones	-	-
Hardness	10	Shore A	±2	ASTM D2240

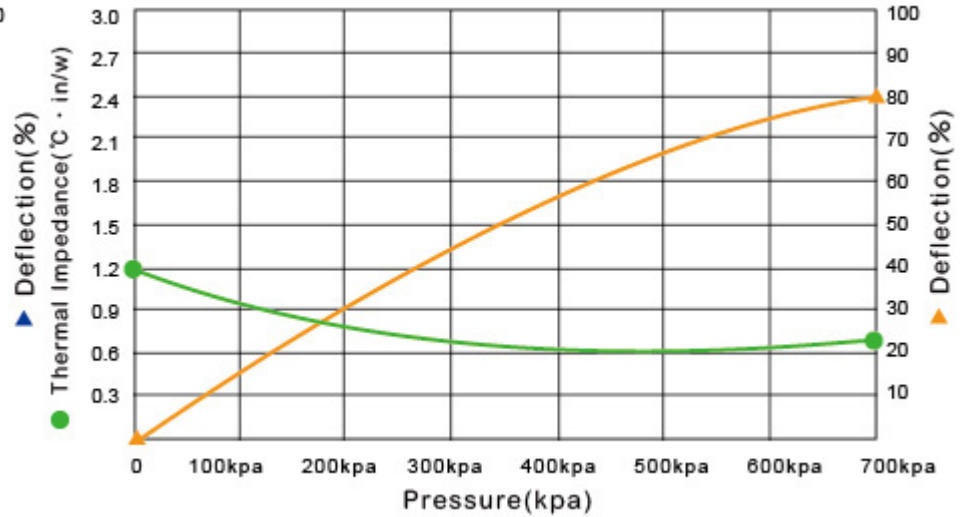
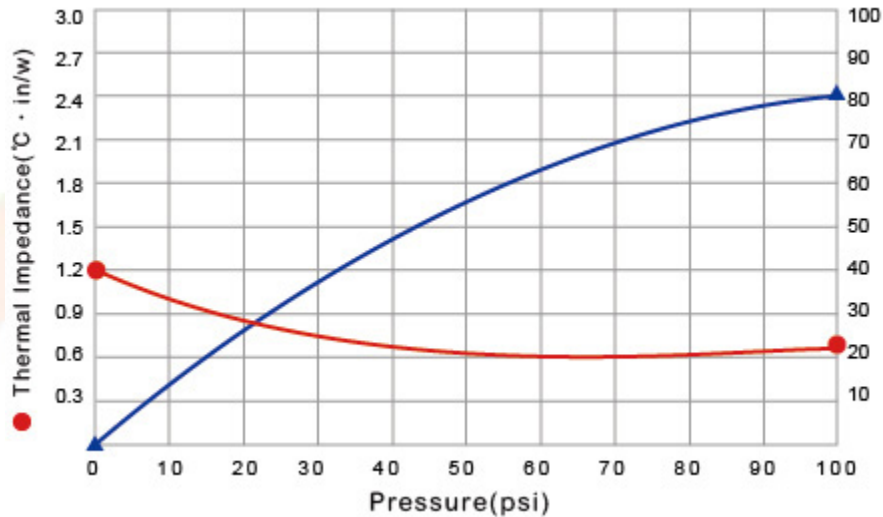
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H48-2K

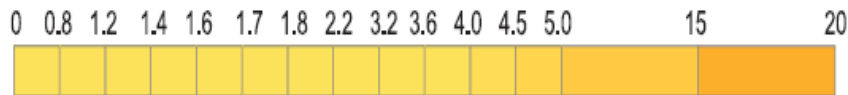
- H48-2K has a thermal conductivity of 1.8 W/m.k
- Available in thickness of 0.1, 0.2 and 0.3mm
- Formulated for exceptionally low silicone bleed
- Exceptional dielectric breakdown voltage
- Applications include:
 - Automotive electronics
 - Hard drives
 - Optical systems
 - Consumer electronics



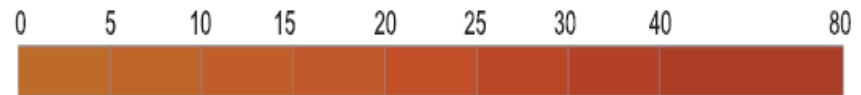
H48-2K - Performance



Thermal Conductivity: 1.8 W/m.k
(W / m.k - Z Axis)



Hardness: 60 (Shore A)
(Shore A)



H48-2K - Datasheet

Property	H48-2K	Unit	Test Method
Colour	Dark Red	-	Visual
Thickness (+ / -10%)	0.1/ 0.2/ 0.3	mm	-
Construction	Silicone Base With Ceramic Fillers (non-silicone oil)	-	-
Op. Temp. Range	-45 to 200	°C	-
Density	2.1	g/cm ³	ASTM D792
Thermal Conductivity	1.8	W/m.k	ASTM D5470
Hardness	40	Shore A	ASTM D2240
Thermal Impedance	-	-	ASTM D5470
10psi	0.21/ 0.37/ 0.57/ 0.73	K- in ² /W	-
50psi	0.20/ 0.33/ 0.51/ 0.64	K- in ² /W	-
100psi	0.17/ 0.31/ 0.46/ 0.59	K- in ² /W	-
Percent Deflection	-	-	ASTM D575
10psi	2	%	-
50psi	5	%	-
100psi	11	%	-
Breakdown Voltage	1.2 / 2.5 / 3.5	KV	ASTM D149
TML	<0.5 %	%	ASTM E595
Tensile Strength	200	psi	ASTM D412
Elongation	50	%	ASTM D412
UL Flammability	V-0	-	UL 94

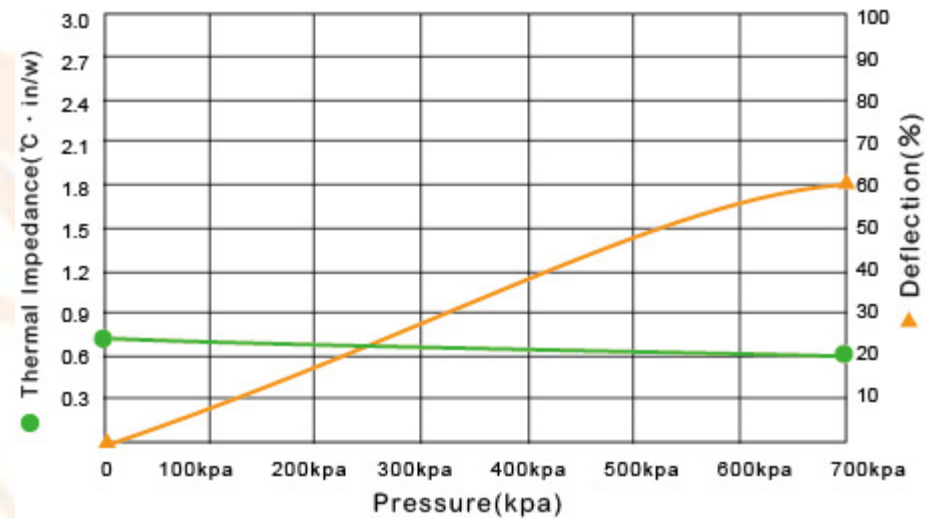
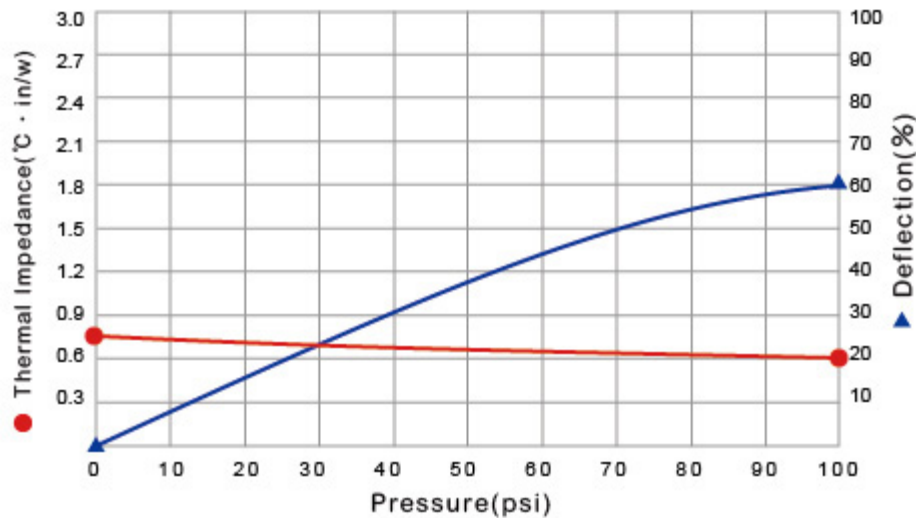
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H48-6

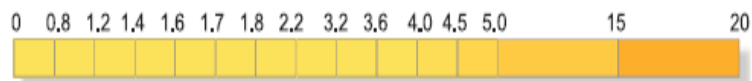
- H48-6 has a thermal conductivity of 3.2 W/m.k
- H48-6 is an excellent insulator and exceptionally soft
- H48-6 is available in thicknesses from 0.3 – 2mm
- H48-6 is commonly used for:
 - Wireless applications
 - Telecom networks
 - Consumer electronics
 - Military electronics



H48-6 - Performance

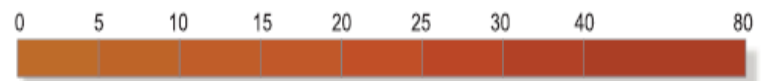


Thermal Conductivity: 3.2 W/m.k
(W / m.k - Z Axis)



Testing sample thickness : 1.0 mm

Hardness: 20 (Shore A)
(Shore A)



H48-6 - Datasheet

Property	H48-6	Unit	Tolerance	Test Method
Colour	Dark Red	-	-	Visual
Thickness	0.3 - 2.0	mm	-	ASTM D374
	0.0118 - 0.7874	inch	-	ASTM D374
Thermal Conductivity	3.2	W/m.k	-	ASTM D5470
Flame Rating	V-0	-	-	UL94
Dielectric Breakdown Voltage	>5	kV/mm	-	ASTM D149
Weight Loss	<1	%	-	ASTM E595
Specific Gravity	2.42	g/cm ³	±0.2	ASTM D792
Working Temperature	-40 to 200	°C	-	-
Volume Resistance	>10 ¹¹	Ohm-cm	-	ASTM D257
Elongation	130	%	±13	ASTM D412
Tensile Strength	8	Kgf/cm ²	±2	ASTM D412
Standard Shape	-	Sheet ones	-	-
Hardness	20	Shore A	±5	ASTM D2240

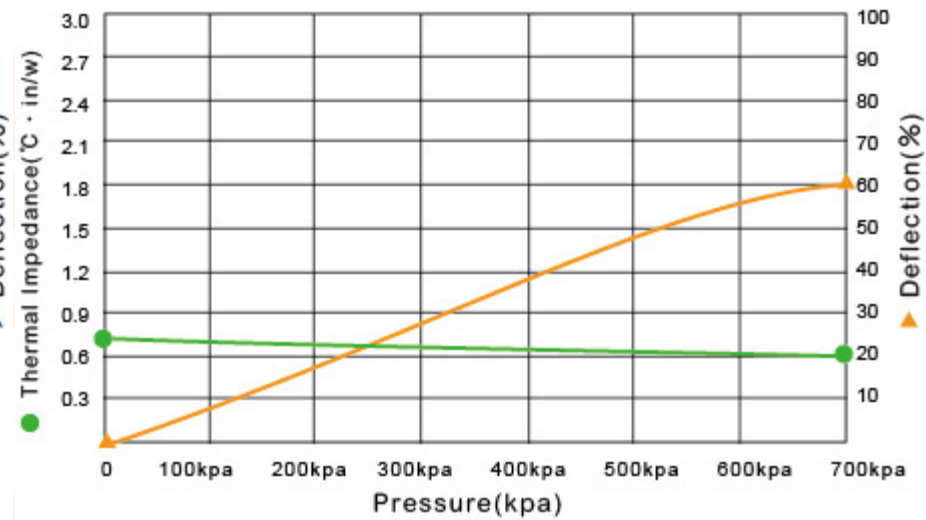
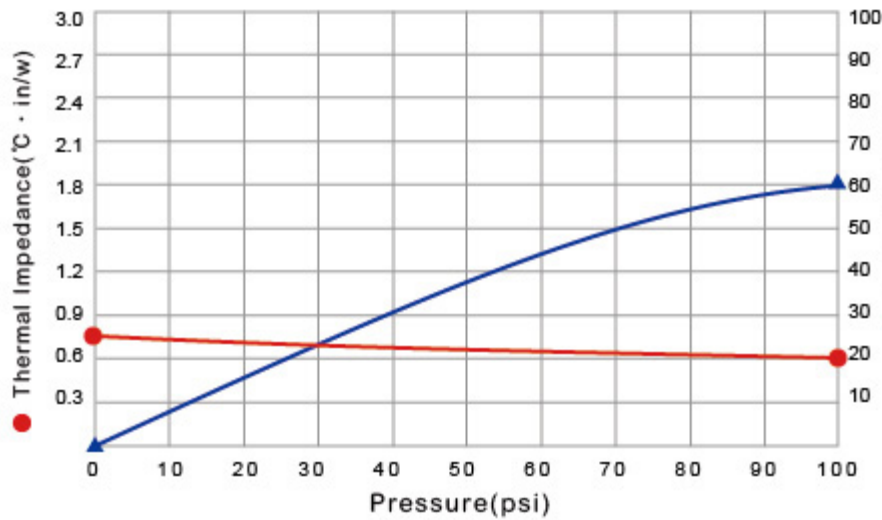
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H48-6A

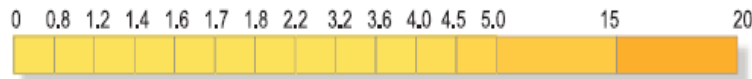
- H48-6A has a thermal conductivity of 4 W/m.k
- It is available in thickness up to 2mm
- It is highly compressible and exhibits natural tack
- It is commonly used for applications where better thermal conductivity is needed
- Common applications include:
 - Power electronics
 - Cellular communication devices
 - LED applications



H48-6A - Performance

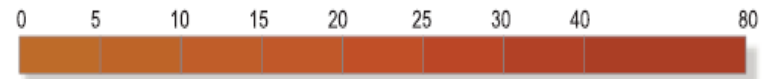


Thermal Conductivity: 4 W/m.k
(W / m.k - Z Axis)



Testing sample thickness : 1.0 mm

Hardness: 25 (Shore A)
(Shore A)



H48-6A - Datasheet

Property	H48-6A	Unit	Tolerance	Test Method
Colour	Dark Red	-	-	Visual
Thickness (The thickness can be ordered)	0.3 - 2.0	mm	-	ASTM D374
	0.0118 - 0.7874	inch	-	ASTM D374
Thermal Conductivity	4.0	W/m.k	-	ASTM D5470
Flame Rating	V-0	-	-	UL94
Dielectric Breakdown Voltage	>5	kV/mm	-	ASTM D149
Weight Loss	<1	%	-	ASTM E595
Specific Gravity	2.48	g/cm ³	±0.2	ASTM D792
Working Temperature	-40 to 200	°C	-	-
Volume Resistance	>10 ¹¹	Ohm-cm	-	ASTM D257
Elongation	120	%	±13	ASTM D412
Tensile Strength	8	Kgf/cm ²	±2	ASTM D412
Standard Shape	-	Sheet ones	-	-
Hardness	25	Shore A	±5	ASTM D2240

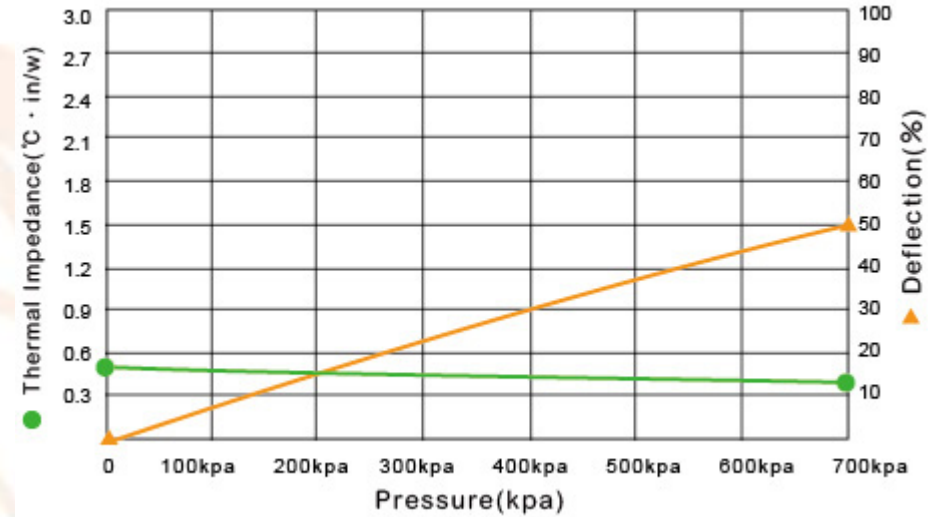
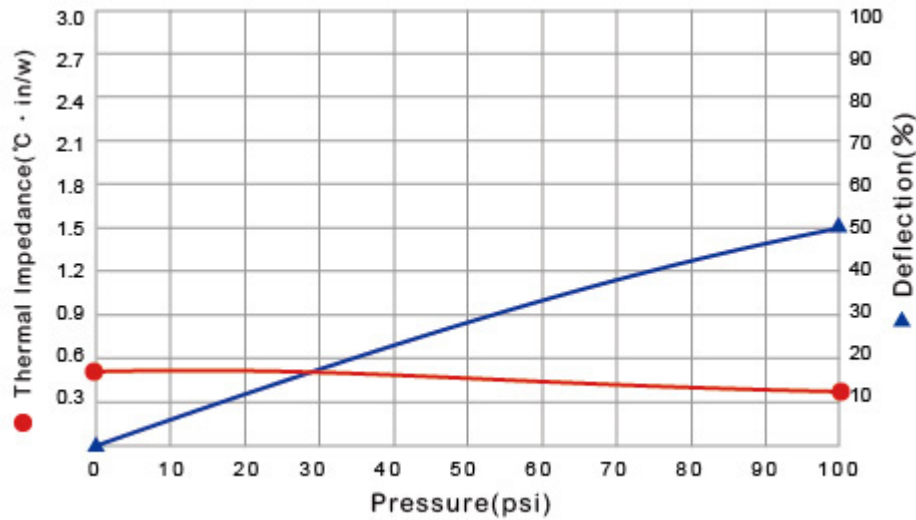
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H48-6G

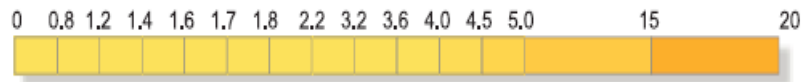
- L37-3L has a thermal conductivity of 6 W/m.k
- It is available in thickness from 0.3 to 5 mm
- It is commonly used for applications where better thermal conductivity is needed combined with good compression characteristics
- Common applications include:
 - Military electronics
 - Network communications devices
 - Automotive electronics



H48-6G - Performance

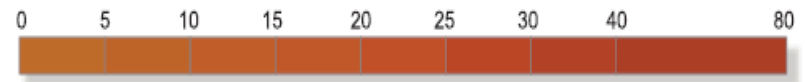


Thermal Conductivity: 6 W/m.k
(W / m.k - Z Axis)



Testing sample thickness : 1 0 mm

Hardness: 14 (Shore A)
(Shore A)



H48-6G - Datasheet

Property	H48-6G	Unit	Tolerance	Test Method
Colour	Grey	-	-	Visual
Thickness (The thickness can be ordered)	0.3 - 5.0	mm	-	ASTM D374
	0.0118 - 0.1969	inch	-	ASTM D374
Thermal Conductivity	6.0	W/m.k	-	ASTM D5470
Flame Rating	V-0	-	-	UL94
Dielectric Breakdown Voltage	>13	kV/mm	-	ASTM D149
Weight Loss	<1	%	-	ASTM E595
Specific Gravity	3.09	g/cm ³	±0.2	ASTM D792
Working Temperature	-40 to 200	°C	-	-
Volume Resistance	>10 ²	Ohm-cm	-	ASTM D257
Elongation	60	%	±13	ASTM D412
Tensile Strength	6	Kgf/cm ²	±2	ASTM D412
Standard Shape	-	Sheet ones	-	-
Hardness	25	Shore A	±5	ASTM D2240

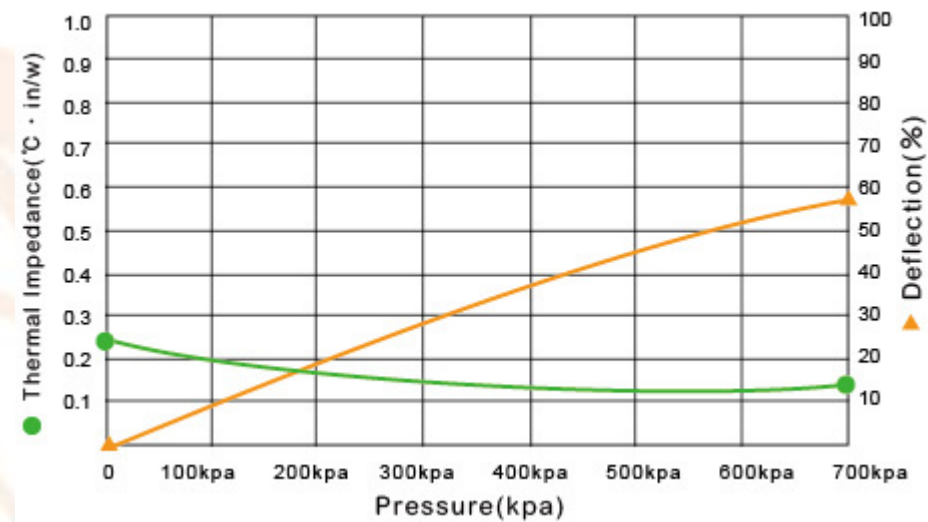
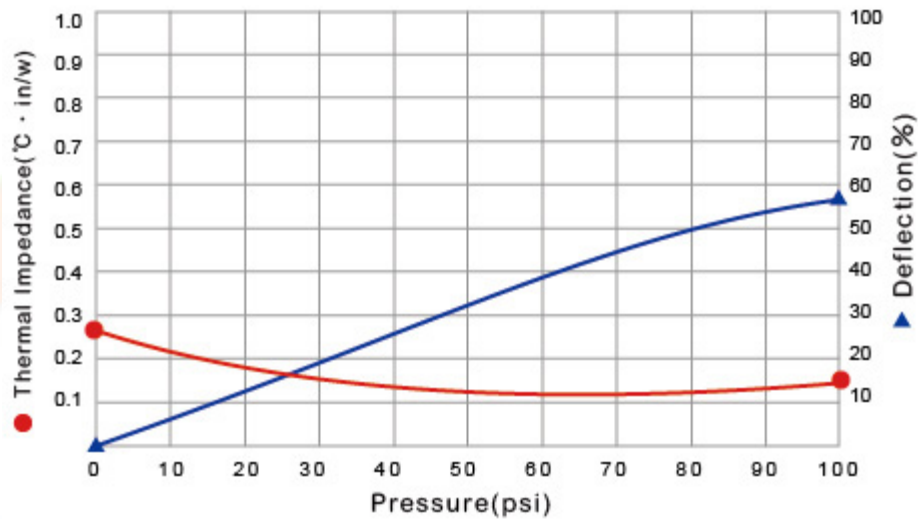
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H48-6S

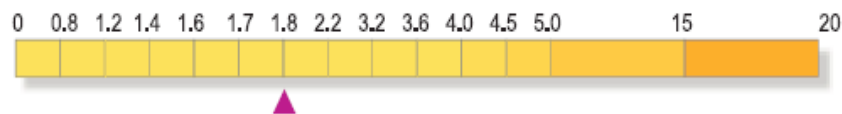
- H48-6S has a thermal conductivity of 1.8 W/m.k
- It is available in a thickness of 0.23mm
- It is commonly used for applications where thermal conductivity is required with high break-down voltage
- Common applications include:
 - Power devices
 - Lighting Applications
 - Consumer electronics



H48-6S - Performance

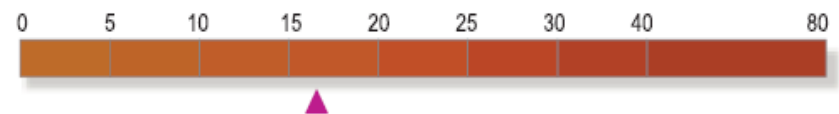


Thermal Conductivity: 1.8 W/m.k
(W / m.k - Z Axis)



Testing sample thickness : 1.0 mm

Hardness: 16 (Shore A)
(Shore A)



H48-6S - Datasheet

Property	H48-6S	Unit	Tolerance	Test Method
Colour	Dark Red	-	-	Visual
Thickness (The thickness can be ordered)	0.23	mm	-	ASTM D374
	0.0091	inch	-	ASTM D374
Thermal Conductivity	1.8	W/m.k	-	ASTM D5470
Flame Rating	V-0	-	-	UL94
Dielectric Breakdown Voltage	>7	kV/mm	-	ASTM D149
Weight Loss	<1	%	-	ASTM E595
Specific Gravity	1.95	g/cm ³	±0.2	ASTM D792
Working Temperature	-40 to 200	°C	-	-
Volume Resistance	>10 ¹²	Ohm-cm	-	ASTM D257
Elongation	0.2	%	-	ASTM D412
Tensile Strength	66.5	Kgf/cm ²	±2	ASTM D412
Standard Shape	-	Sheet ones	-	-
Hardness	16	Shore A	±2	ASTM D2240

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Design Guide Lines

- For effective thermal management H48-2 should be used under a compression of 20 – 45% based on the original thickness
- H48-2 should only be used within the temperature range of – 40 + 200C. For applications outside of this range please contact t-global

Frequently Asked Questions

- **Can H48-2 Series be reworked?**
 - With care the product can be removed and repositioned without an appreciable loss in thermal performance
- **What is the shelf-life of the product?**
 - Shelf-life for most gap-pads is one year. For gap-pads with an adhesive the shelf life is six months from the date of manufacture. After these dates adhesive strength and inherent tack must be re-characterised
- **Will the pads soften with temperature?**
 - Up to the maximum working temperature, as specified on the individual product datasheet, the materials will not suffer with temperature

Frequently Asked Questions

- Can the H48-2 series be supplied in different formats?
 - H48-2 can be supplied in sheet form, die-cuts, moulded parts and with adhesive applied to one or both sides
- How does H48-2 respond to ageing and thermal cycling tests?
 - H48-2 does not exhibit any measurable changes in property when tested using all common industry standard environmental test regimes



Summary

- H48-2 Series is a silicone based gap filler from t-Global technology
- The product family offers the design engineer a number of solutions to specific thermal problems
- Thermal conductivity for the series varies from 1.8 – 6 W/m.k
- The series is available as standard sheets, custom die cuts and rolls