

THERMAL MANAGEMENT
INTERFACE
MATERIALS 2024

CREATING DIMENSIONS



The background is a deep blue gradient, overlaid with a complex network of thin, light blue lines and dots, resembling a circuit board or a data network. Some dots are larger and more prominent, while others are small specks. The lines are mostly horizontal and vertical, with some diagonal ones, creating a sense of connectivity and flow.

NEW DIMENSIONS IN THERMAL MANAGEMENT

CONTENT

THE HALA PRINCIPLE

| | |
|----|-----------------------|
| 06 | Services and products |
| 08 | Expertise |
| 10 | Your partner-team |
| 12 | IATF Certification |

A THERMAL MANAGEMENT

| | |
|----|--------------------------|
| 14 | Total-Thermal-Management |
| 16 | Heat Pipe Assemblies |

B THERMAL INTERFACE MATERIALS

| | Material | Product Code | Insulating | Conductivity W/mK | |
|----|---|---------------|------------|----------------------|----------------------------------|
| 19 | 1 GAP FILLER | | | | |
| | Silicone | | | | |
| 20 | Silicone Gap Filler Pad / soft | TGF-M-SI | ■ | 2.5 | ■ electrically insulating |
| 21 | Silicone Gap Filler Pad / soft | TGF-R-SI | ■ | 3.0 | |
| 22 | Silicone Gap Filler Pad / soft | TGF-U-SI | ■ | 4.5 | |
| 23 | Silicone Gap Filler Pad / soft | TGF-Z-SI | ■ | 11 | ■ electrically non-insulating |
| 24 | Silicone Gap Filler Pad / very soft | TGF-BXS-SI | ■ | 1.2 | |
| 25 | Silicone Gap Filler Pad / very soft | TGF-HUS-SI | ■ | 1.8 | ■ low dielectric |
| 26 | Silicone Gap Filler Pad / very soft | TGF-JUS-SI | ■ | 2.0 | |
| 27 | Silicone Gap Filler Pad / very soft / LV | TGF-JXS-SI | ■ | 2.0 | |
| 28 | Silicone Gap Filler Pad / very soft / optional fibreglass reinforced | TGF-MXS-SI | ■ | 2.4 | /LV = Low Volatile Siloxanes |
| 29 | Silicone Gap Filler Pad / very soft | TGF-LSS-SI | ■ | 2.5 | |
| 30 | Silicone Gap Filler Pad / very soft | TGF-MUS-SI | ■ | 3.0 | |
| 31 | Silicone Gap Filler Pad / very soft | TGF-RSS-SI | ■ | 3.0 | |
| 32 | Silicone Gap Filler Pad / very soft | TGF-TSS-SI | ■ | 3.2 | |
| 33 | Silicone Gap Filler Pad / very soft / LV | TGF-USS-SI | ■ | 3.3 | |
| 34 | Silicone Gap Filler Pad / very soft | TGF-WSS-SI | ■ | 5.5 | |
| 35 | Silicone Gap Filler Pad / very soft / fibreglass reinforced | TGF-AXS-SI-GF | ■ | 1.1 | |
| 36 | Silicone Gap Filler Pad / very soft / fibreglass reinforced | TGF-DXS-SI-GF | ■ | 1.3 | |
| 37 | Silicone Gap Filler Pad / very soft / fibreglass reinforced | TGF-EXS-SI-GF | ■ | 1.4 | |
| 38 | Silicone Gap Filler Pad / plastic / soft | TGF-UP-SI | ■ | 4.0 | |
| 39 | Silicone Gap Filler Pad / plastic / soft | TGF-WP-SI | ■ | 6.0 | |
| 40 | Silicone Gap Filler Pad / plastic / soft | TGF-YP-SI | ■ | 7.0 | |
| 41 | Silicone Gap Filler Pad / plastic / very soft | TGF-YSP-SI | ■ | 8.0 | |
| 42 | Silicone Gap Filler Pad / plastic / very soft | TGF-ZP-SI | ■ | 11 | |
| 43 | Silicone Gap Filler Pad / highly conductive / LV | TEL-R-SI | ■ | 15 | |
| 44 | Silicone Gap Filler Pad / highly conductive / LV | TEL-Z-SI | ■ | 50 | |
| 45 | Silicone Gap Filler Pad / highly conductive / LV | TEL-YSS-SI | ■ | 16 | |
| 46 | Silicone Gap Filler Pad / highly conductive / LV | TEL-ZS-SI | ■ | 20 | |
| 47 | 2-Part Gap Filler / dispensable / LV | TDG-L-SI-2C-Y | ■ | 2.0 | |
| 48 | 2-Part Gap Filler / dispensable / LV | TDG-T-SI-2C | ■ | 3.0 | |
| 49 | 2-Part Gap Filler / dispensable / LV | TDG-U-SI-2C | ■ | 3.6 | |
| 50 | 2-Part Gap Filler / dispensable / LV | TDG-W-SI-2C | ■ | 4.5 | |
| 51 | 2-Part Gap Filler / dispensable / LV | TDG-Y-SI-2C | ■ | 6.0 | |
| 52 | 1-Part Silicone Gap Filler / Putty / dispensable | TGL-W-SI | ■ | 5.5 | |
| 53 | 1-Part Silicone Gap Filler / Putty / dispensable | TGL-X-SI | ■ | 6.5 | |
| | Silicone-free | | | | |
| 54 | Silicone-free Gap Filler Pad / soft | TGF-R-NS | ■ | 3.0 | |
| 55 | Silicone-free Gap Filler Pad / soft | TGF-V-NS | ■ | 5.0 | |
| 56 | Silicone-free Gap Filler Pad / soft | TGF-W-NS | ■ | 6.0 | |
| 57 | Silicone-free Gap Filler Pad / soft | TGF-Y-NS | ■ | 8.0 | |
| 58 | Silicone-free Gap Filler Pad / very soft | TGF-GUS-NS | ■ | 1.5 | |
| 59 | Silicone-free Gap Filler Pad / very soft | TGF-IXS-NS | ■ | 2.0 | |
| 60 | Silicone-free Gap Filler Pad / very soft | TGF-NSS-NS | ■ | 2.5 | |
| 61 | 1-Part Silicone-free Gap Filler / Putty / dispensable | TGL-U-NS | ■ | 4.0 | |

| | | | | |
|-----|---|---------------------|---|------------------|
| 63 | 2 FOILS & FILMS | | | W/mK |
| 64 | Silicone foil / fibreglass reinforced | TF0-D-SI | ■ | 1.2 |
| 65 | Silicone foil / fibreglass reinforced | TF0-G-SI | ■ | 1.6 |
| 66 | Silicone foil / fibreglass reinforced | TF0-J-SI | ■ | 2.0 |
| 67 | Silicone foil / fibreglass reinforced | TF0-K-SI | ■ | 2.5 |
| 68 | Silicone foil / fibreglass reinforced | TF0-O-SI | ■ | 3.0 |
| 69 | Silicone foil / fibreglass reinforced | TF0-Q-SI | ■ | 6.0 |
| 70 | Silicone foil / fibreglass reinforced | TF0-R-SI | ■ | 3.5 |
| 71 | Silicone foil / fibreglass reinforced | TF0-T-SI | ■ | 4.1 |
| 72 | Silicone foil / fibreglass reinforced | TF0-X-SI | ■ | 5.0 |
| 73 | Silicone foil / fibreglass reinforced | TF0-ZS-SI | ■ | 8.0 |
| 74 | Insulating film / silicone coated | TF0-M-SI-PI | ■ | - |
| 75 | 3 SILICONE CAPS | | | |
| 76 | Silicone cap | TCP-C-SI | ■ | 0.8 |
| 77 | Silicone cap | TCP-J-SI | ■ | 1.5 |
| 78 | Silicone cap | TCP-L-SI | ■ | 2.0 |
| 79 | 4 PHASE CHANGE MATERIAL | | | |
| 80 | Polyimide film / phase change coated | TPC-N-PI | ■ | - |
| 81 | Polyimide film / phase change coated | TPC-P-KA | ■ | - |
| 82 | Phase change film | TPC-W-PC | ■ | 3.5 |
| 83 | Phase change film | TPC-Y-PC | ■ | 5.0 |
| 84 | Aluminum film / phase change coated | TPC-R-AL | ■ | - |
| 85 | Aluminum film / phase change coated | TPC-T-AL-CB | ■ | - |
| 86 | Graphite film / phase change coated | TPC-V-PG-CB | ■ | - |
| 87 | Phase change compound | TPC-W-PC-M/-E | ■ | 3.5 |
| 88 | Phase change compound | TPC-X-PC-NC-HT-M/-E | ■ | 3.0 |
| 89 | Phase change compound | TPC-Z-PC-HT-M/-E | ■ | 3.0 |
| 91 | 5 GRAPHITE FOILS | | | |
| 92 | Graphite foil / anisotropic | TF0-S-CB | ■ | z:8 / x-y:140 |
| 93 | Graphite foil / pyrolytic | TF0-V-PG | ■ | z:5 / x-y:1500 |
| 94 | Graphite foil / pyrolytic | TF0-Y-PG | ■ | z:>15 / x-y:>700 |
| 95 | Graphite foil / pyrolytic | TF0-ZS-PG | ■ | z:30 / x-y:500 |
| 97 | 6 PSA INSULATING TAPE | | | |
| 98 | PSA Insulating tape / acrylate with insulating film | TAT-J-PE | ■ | 0.7 |
| 99 | PSA Insulating tape / silicone | TAT-M-SI | ■ | 1.0 |
| 101 | 7 THERMAL GREASE | | | |
| 102 | Silicone-free grease / highly thermally conductive | TGR-J-NS | ■ | 2.0 |
| 103 | Silicone-free grease / highly thermally conductive | TGR-M-NS | ■ | 2.4 |
| 105 | 8 ADHESIVES | | | |
| 106 | Silicone adhesive / thermally conductive / 1K | TAD-G-SI-1C | ■ | 1.4 |
| 107 | Silicone adhesive / thermally conductive / 1K | TAD-O-SI-1C | ■ | 2.1 |
| 108 | Silicone adhesive / thermally conductive / 1K RTV | TAD-P-SI-1C | ■ | 2.3 |
| 109 | Silicone adhesive / thermally conductive / 1K | TAD-U-SI-1C | ■ | 3.3 |
| 110 | Polyurethane adhesive / thermally conductive / 2K | TAD-N-PU-2C | ■ | 2.0 |
| 111 | 9 POTTING GEL | | | |
| 112 | Silicone potting gel / 2 parts | TCR-D-SI-2C | ■ | 0.7 |
| 113 | Silicone potting gel / 2 parts | TCR-H-SI-2C | ■ | 1.2 |
| 114 | PU Potting gel / 2 parts | TCR-J-PU-2C-LV-AR | ■ | 1.5 |
| 115 | PU Potting gel / 2 parts | TCR-N-PU-2C-LV-AR | ■ | 2.6 |
| 116 | PU Potting gel / 2 parts | TCR-N-PU-2C-MV-AL | ■ | 2.6 |
| 117 | PU Potting gel / 2 parts | TCR-V-PU-2C-MV-AR | ■ | 3.5 |
| 118 | PU Potting gel / 2 parts | TCR-V-PU-2C-HV-AL | ■ | 3.5 |
| 119 | 10 HALA CLIPS | | | |
| 120 | Hala Clip for TO-220 | TO-220-1 | | |
| 121 | Hala Clip for TO-247 | TO-247-1 | | |

WHAT MAKES HALA UNIQUE

”

WITH COMPREHENSIVE
EXPERTISE, HALA
PARTNERS CLOSELY WITH
ITS CUSTOMERS TO
DEVELOP AND DELIVER
CUSTOM-TAILORED HEAT
MANAGEMENT SOLUTIONS
GLOBALLY THROUGH
A MANUFACTURER-
INDEPENDENT PROCESS.“

LEAVE THERMAL MANAGEMENT TO THE PROFES- SIONALS



WHAT HALA CAN DO FOR YOU

” HALA IS THE EXPERT-BRAND FOR OPTIMIZING HEAT MANAGEMENT AND THERMAL INTERFACES.

OUR MOTIVATION:
TO MAKE OUR CUSTOMERS’
PRODUCTS MORE EFFICIENT
AND SUSTAINABLE.“

/ INDIVIDUAL CONSULTING
THROUGHOUT THE ENTIRE
SUPPLY CHAIN

/ WE ARE YOUR DEVELOPMENT
PARTNER AND SUPPLIER, AND WE
THINK THROUGH YOUR REQUIRE-
MENTS FROM START TO FINISH

/ WE OFFER FAST AND FLEXIBLE
PROCESSING

/ OVER 100 YEARS OF EXPERIENCE

THERMAL MANAGEMENT REQUIRES EXPERIENCE



WHAT HALA IS: ONE TEAM

”YOU BRING US YOUR
JOBS AND IDEAS.
WE EXECUTE THEM.
FLEXIBLE. GLOBAL.
AND AROUND THE CLOCK,
IF NECESSARY.“

WWW.HALA-TEC.DE
CONTEC@HALA-TEC.DE





WE ARE QUALITY

HALA IS
IATF 16949:2016
CERTIFIED



”FROM PROJECT
CONCEPT TO SERIES
PRODUCTION,
DEFINITION AND
CONTROL ARE
ESSENTIAL.“

/ WE REGULARLY AUDIT OUR
PARTNERS

/ WE IMPROVE OUR OWN
PROCESSES CONTINUOUSLY
AND PROACTIVELY





THERMAL MANAGEMENT

/ TOTAL THERMAL MANAGEMENT
/ HEAT PIPE ASSEMBLIES
/ CFD SIMULATION

TOTAL THERMAL MANAGEMENT

FOR HEAT DISTRIBUTION & HEAT TRANSFER

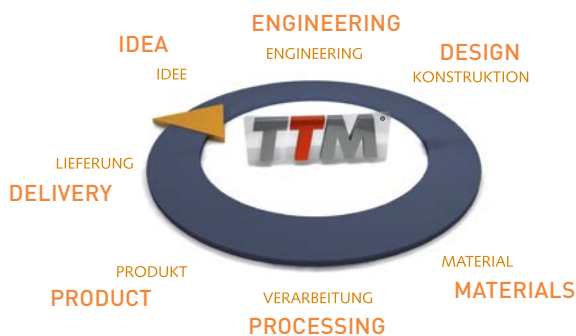
PROJECT MANAGEMENT

As project managers, we develop and optimize system solutions for thermal management. We can work with you from initial idea to end product.

How we work: Our approach is to consider all components, taking into account mechanical, thermal, electronic and manufacturing interactions.

We always keep your technical requirements in mind to deliver the best quality and most economical solution.

We serve as a development partner and supplier, in your country and in your language.



TTM stands for solution expertise, project management, purchasing and delivery.

TTM works globally and internationally, from initial idea to series production.

THERMAL SYSTEMS

We create integrated, high-performance thermal solutions for next generation products in a wide range of markets, including power semi-conductors, automotive, energy conversion, medical and test equipment, transportation, defense, aerospace, computers, communications and many other industries.

In doing so, we integrate engineering, CAD, CFD simulation, prototyping, series manufacturing and operations as well as testing and analysis.

HEAT PIPE ASSEMBLIES

Heat distribution



Heat transfer



FLUID COOLING



”CONSULT WITH US SO WE CAN WORK TOGETHER TO DEVELOP THE BEST SOLUTION FOR YOUR REQUIREMENTS“



Dr. Wilhelm Pohl

Managing Director

+49 89 665 477-84

wilhelm.pohl@hala-tec.de

TOTAL THERMAL MANAGEMENT



HEAT PIPE ASSEMBLIES

TUBULAR- AND VAPOR CHAMBER PLANAR PIPES<>

HALA supplies 2 Phase Modules of two basic configurations: Tubular Heat Pipes and Vapor Chamber Planar Heat Pipes

HEAT PIPES

- ❑ Outer diameter: From 2.0 mm up to and over 50 mm
- ❑ Internal structures: sintered, mesh, groove or hybrid (sintered-groove)
- ❑ Cross section geometry: round, rectangular, flattened
- ❑ Flatnesses down to 0.4 mm
- ❑ Length: up to 70 cm
- ❑ Geometry: straight or multiple bends
- ❑ Bonding of heat pipes to the assembly: soldering, press fit, epoxy
- ❑ Heat pipe surface coating: nickel or tin plated

All copper/water heat pipes are designed to survive numerous freeze/thaw cycles without any degradation.

Copper/water heat pipes are made of copper, use water as a working fluid and typically operate in the temperature range of 20 up to 150°C (and over).

The planar heat pipes are called Vapor Chambers (VC) which are used as heat spreaders.

Copper/water 2 phase systems can be combined with other components to form heat transfer modules:

- ❑ Extruded heat sinks
- ❑ Die cast heat sinks
- ❑ Fin Stack heat sinks
- ❑ Skived heat sinks

Connected by:

- ❑ Thermal Interface Materials

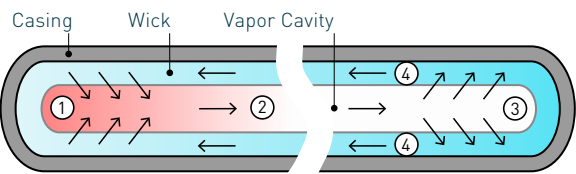
Tubular Heat Pipes



Vapor Chamber



Heat Pipe Thermal cycle



High - Environment - Low-Temperature

Heat pipe thermal cycle

- ① Working fluid evaporates to vapor absorbing thermal energy.
- ② Vapor migrates along cavity to lower temperature end.
- ③ Vapor condenses back to fluid and is absorbed by the wick, releasing thermal energy.
- ④ Working fluid flows back to the higher temperature end.

DIMENSION AND PERFORMANCE Range (mm)

| Diameter | Recommended Overall Length Range | Recommended Bending Radius | Recommended Flattened Thickness | Qmax (W) Flattened Thickness | Pipe Diameter ø 3 mm | Pipe Diameter ø 4 mm | Pipe Diameter ø 5 mm | Pipe Diameter ø 6 mm | Pipe Diameter ø 8 mm |
|-------------|----------------------------------|----------------------------|---------------------------------|------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 3 | 70 – 750 | ≥9 | ≥2.0 | T = 2.0 mm | 10 W | 15 W | 21 W | N/A | N/A |
| 4 | 70 – 750 | ≥12 | ≥2 (e.g. 2.4) | T = 2.5 mm | 14 W | 17 W | 32 W | 46 W | 65 W |
| 5 | 70 – 750 | ≥15 | ≥2 (e.g. 3.0) | T = 3.0 mm | 15 W | 19 W | 42 W | 56 W | 75 W |
| 6 | 70 – 750 | ≥18 | ≥2.5 (e.g. 3.6) | Rounded | 16 W | 20 W | 46 W | 60 W | 85 W |
| 6.35 (¼") | 70 – 750 | ≥19 | ≥2.5 (e.g. 3.5) | | | | | | |
| 8 | 70 – 750 | ≥24 | ≥3 (e.g. 4.0) | | | | | | |
| 9.52 (⅜") | 70 – 750 | ≥28.6 | ≥3 (e.g. 4.5) | | | | | | |
| 10 | 70 – 750 | ≥30 | ≥3 (e.g. 5.0) | | | | | | |
| 12 | 70 – 750 | ≥36 | ≥3 (e.g. 6.0) | | | | | | |
| 12.7 (½") | 70 – 750 | ≥38 | ≥3 (e.g. 6.3) | | | | | | |
| 15.875 (⅝") | 70 – 750 | ≥47 | ≥3 (e.g. 8.0) | | | | | | |
| 19.05 (¾") | 70 – 750 | ≥57 | ≥3 (e.g. 9.5) | | | | | | |
| 25.4 (1") | 70 – 750 | ≥76 | ≥3 (e.g. 12.0) | | | | | | |

Diameter: 3 / 4 / 5 / 6 / 6.35 (¼") / 8 / 9.52 (⅜") / 10 / 12 / 12.7 (½")

Tube Wall Thickness 0.9 mm / 0.5 mm / 0.3 mm / 0.2 mm

Diameter Tolerance ±0.05 mm

Length Tolerance ±0.5 to ±1.0 mm

Thickness Tolerance ±0.05 mm

Width Tolerance ±0.10 to ±0.15 mm

FLATTENED HEAT PIPES

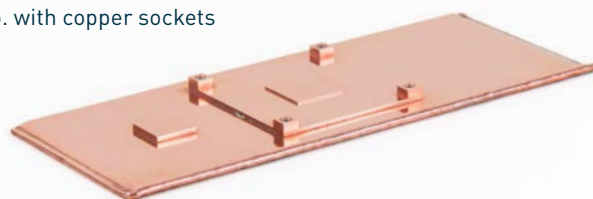


VAPOR CHAMBERS

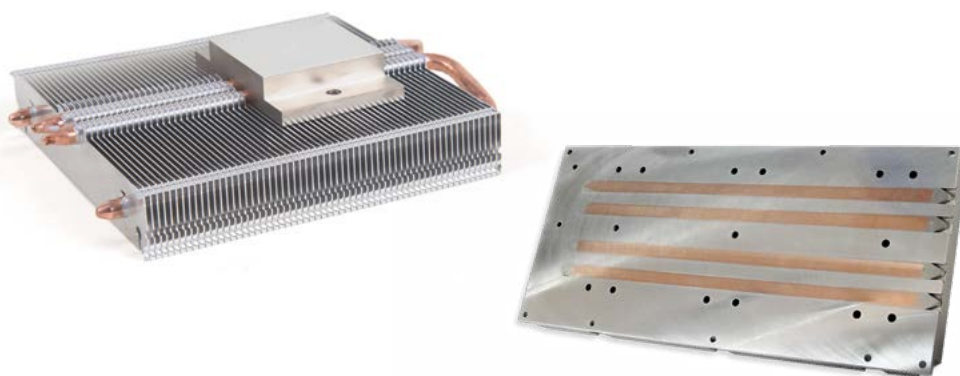
a. interior structure and sealing



b. with copper sockets



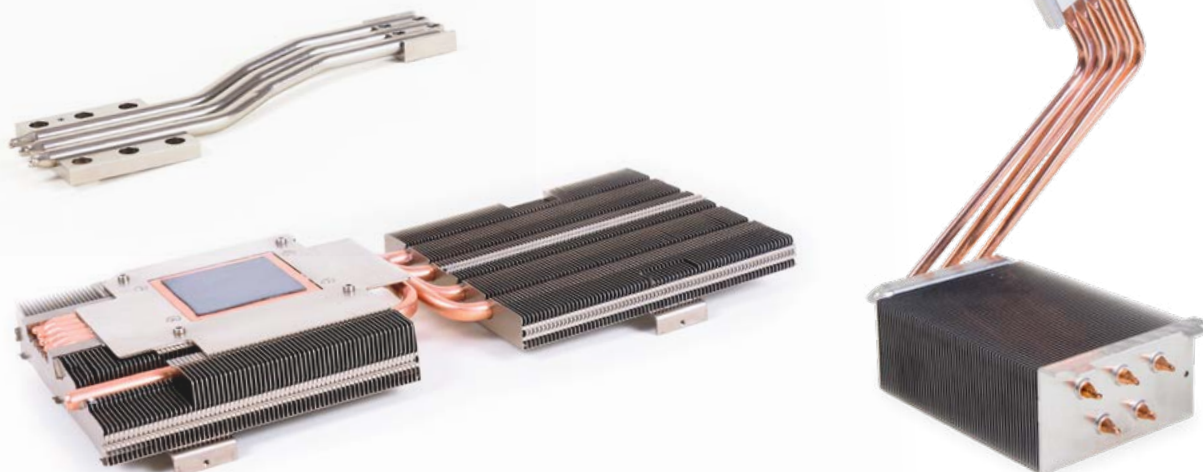
HEAT SPREADER



HEAT COLUMN



HEAT TRANSFER



B THERMAL INTERFACE MATERIALS

/ GAP FILLER / FOILS & FILMS /
SILICONE CAPS / PHASE CHANGE
MATERIAL / GRAPHITE FOILS /
PSA INSULATING TAPE /
THERMAL GREASE / ADHESIVES /
POTTING GEL / HALA CLIPS

1 GAP-FILLER

/ PAD / PUTTY / 2-PART DISPENSABLE



SILICONE GAP FILLER PAD TGF-M-SI

soft, flexible

TGF-M-SI is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a very high thermal conductivity. Through its high softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- ☐ Soft and compliant
- ☐ Thermal conductivity: 2.5 W/mK
- ☐ Operates at low pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One or two-side self-tacky

AVAILABILITY

- ☐ Sheet 480 x 460 mm (Thickness 0.5 / 1.0 mm)
- ☐ Sheet 460 x 460 mm (Thickness 2.0 mm)
- ☐ Sheet 450 x 460 mm (Thickness ≥ 2.5 mm)
- ☐ Tacky on both sides (TGF-MXXXX-SI)
- ☐ Tacky on one side (TGF-MXXXX-SI-A1)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

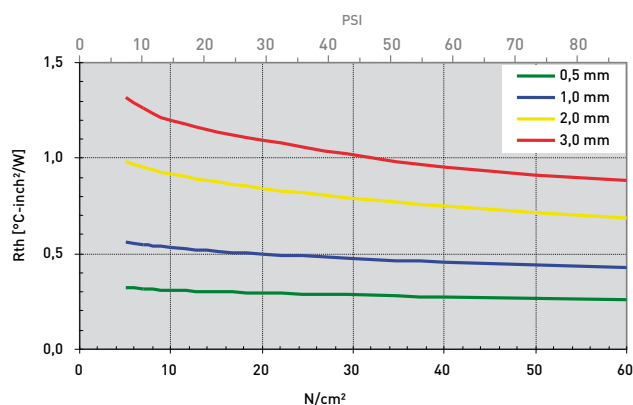
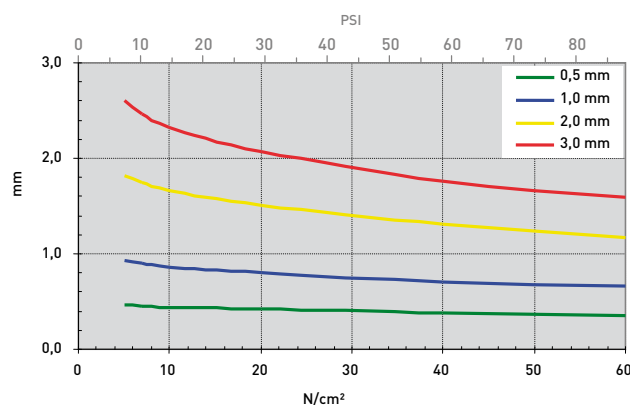
- Thermal link of:
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ Capacitors
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering/ Industrial PCs

| PROPERTY | UNIT | TGF-M0500-SI | TGF-M1000-SI | TGF-M2000-SI | TGF-M3000-SI |
|--|------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | | | | |
| Material | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Light blue | Light blue | Light blue | Light blue |
| Thickness | mm | 0.5 ± 0.05 | 1.0 ± 0.10 | 2.0 ± 0.20 | 3.0 ± 0.30 |
| Hardness | Shore 00 | 50 | 50 | 50 | 50 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.27 (0.38) | 0.45 (0.71) | 0.75 (1.31) | 0.96 (1.76) |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.29 (0.42) | 0.50 (0.80) | 0.84 (1.50) | 1.09 (2.07) |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.32 (0.45) | 0.55 (0.90) | 0.95 (1.75) | 1.26 (2.46) |
| Thermal Conductivity ¹ | W/mK | 2.5 | 2.5 | 2.5 | 2.5 |
| Operating Temperature Range | °C | - 60 to + 180 | - 60 to + 180 | - 60 to + 180 | - 60 to + 180 |
| ELECTRICALLY | | | | | |
| Dielectric Strength | kV / mm | 10 | 10 | 10 | 10 |
| Volume Resistivity | Ohm - cm | 1.0×10^{11} | 1.0×10^{11} | 1.0×10^{11} | 1.0×10^{11} |
| Dielectric Constant | @ 1 kHz | 5.2 | 5.2 | 5.2 | 5.2 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-R-SI

soft, flexible

TGF-R-SI is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a very high thermal conductivity. Through its high softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



GAP FILLER

PROPERTIES

- ☐ Soft and compliant
- ☐ Thermal conductivity: 3.0 W/mK
- ☐ Operates at low pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One or two-side self-tacky

AVAILABILITY

- ☐ Sheet 480 x 460 mm (Thickness 0.5 / 1.0 mm)
- ☐ Sheet 460 x 460 mm (Thickness 2.0 mm)
- ☐ Sheet 460 x 450 mm (Thickness 3.0 / 4.0 / 5.0 mm)
- ☐ Tacky on both sides (TGF-RXXXX-SI)
- ☐ Tacky on one side (TGF-RXXXX-SI-A1)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

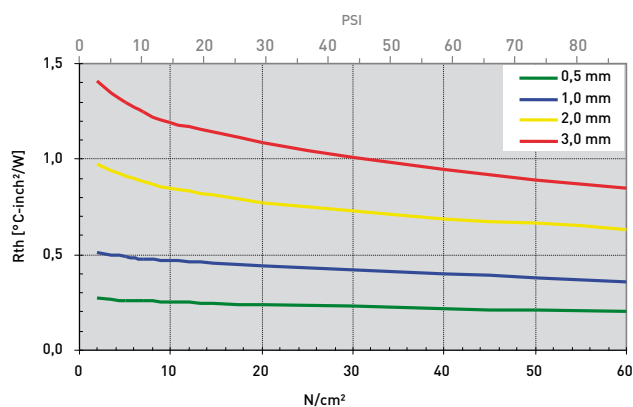
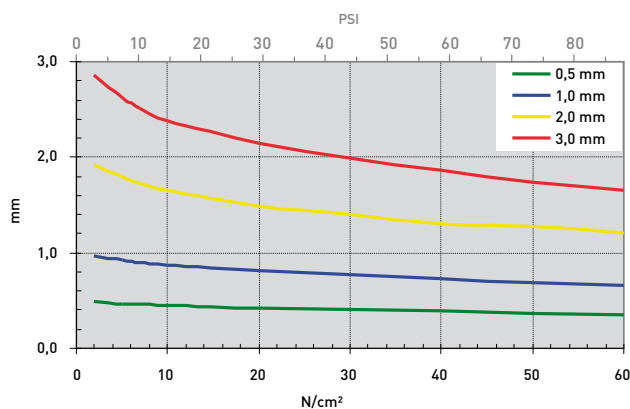
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ Capacitors
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications/ Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-R0500-SI | TGF-R1000-SI | TGF-R2000-SI | TGF-R3000-SI |
|--|------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Light blue | Light blue | Light blue | Light blue |
| Thickness | mm | 0.5 ±0.05 | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 |
| Hardness | Shore 00 | 55 | 55 | 55 | 55 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.22 (0.39) | 0.40 (0.73) | 0.68 (1.31) | 0.95 (1.86) |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.24 (0.42) | 0.44 (0.81) | 0.77 (1.49) | 1.09 (2.15) |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.26 (0.46) | 0.48 (0.90) | 0.88 (1.72) | 1.25 (2.50) |
| Thermal Conductivity ¹ | W/mK | 3.0 | 3.0 | 3.0 | 3.0 |
| Operating Temperature Range | °C | - 60 to + 180 | - 60 to + 180 | - 60 to + 180 | - 60 to + 180 |
| ELECTRICALLY | | | | | |
| Dielectric Strength | kV / mm | 10 | 10 | 10 | 10 |
| Volume Resistivity | Ohm - cm | 1.0 x 10 ¹¹ | 1.0 x 10 ¹¹ | 1.0 x 10 ¹¹ | 1.0 x 10 ¹¹ |
| Dielectric Constant | @ 1 kHz | 5.2 | 5.2 | 5.2 | 5.2 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 4.0 mm / 5.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-U-SI

soft, flexible

TGF-U-SI is an electrically insulating thermally conductive high performance silicone gap filler. It is ideal for use in applications where a very good thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has an extremely high thermal conductivity. Through its softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- ☐ Soft and compliant
- ☐ Thermal conductivity: 4.5 W/mK
- ☐ Operates at low pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness

AVAILABILITY

- ☐ Sheet 300 x 400 mm
- ☐ Tacky on both sides (TGF-UXXXX-SI)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

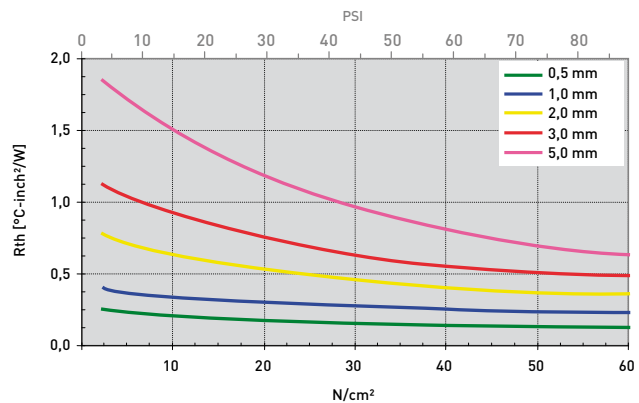
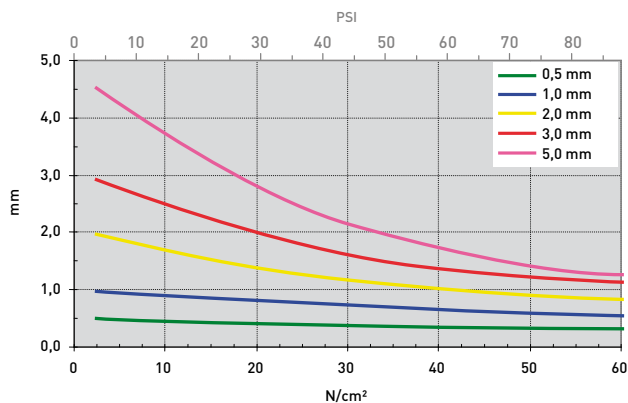
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs Smemory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications / Laptops / Medicine engineering / Embedded boards

| PROPERTY | UNIT | TGF-U0500-SI | TGF-U1000-SI | TGF-U2000-SI | TGF-U3000-SI | TGF-U5000-SI |
|--|------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Grey | Grey | Grey | Grey | Grey |
| Thickness | mm | 0.5 ±0.10 | 1.0 ±0.15 | 2.0 ±0.20 | 3.0 ±0.25 | 5.0 ±0.30 |
| Hardness | Shore 00 | 60 | 60 | 60 | 60 | 60 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.15 (0.35) | 0.27 (0.65) | 0.42 (1.03) | 0.57 (1.40) | 0.84 (1.75) |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.17 (0.40) | 0.32 (0.81) | 0.55 (1.40) | 0.78 (1.98) | 1.20 (2.75) |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.22 (0.45) | 0.36 (0.91) | 0.68 (1.77) | 0.99 (2.63) | 1.62 (3.95) |
| Thermal Conductivity ¹ | W/mK | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Operating Temperature Range | °C | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 |
| ELECTRICALLY | | | | | | |
| Dielectric Strength | kV / mm | 15 | 15 | 15 | 15 | 15 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 4.0 mm / 5.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-Z-SI

soft, flexible

TGF-Z-SI is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has an extremely high thermal conductivity. Through its softness and plasticity the material perfectly mates to irregular surfaces thus optimizing the thermal contact at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



GAP FILLER

PROPERTIES

- ☐ Soft and compliant
- ☐ Thermal conductivity: 11 W/mK
- ☐ Operates at low pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One or two-side self-tacky

AVAILABILITY

- ☐ Sheet 200 x 300 mm
- ☐ Tacky on both sides (TGF-ZXXXX-SI)
- ☐ Tacky on one side by talcum coating (TGF-ZXXXX-SI-A1)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

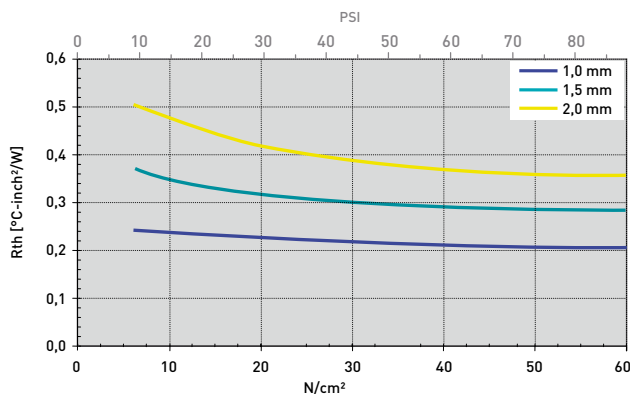
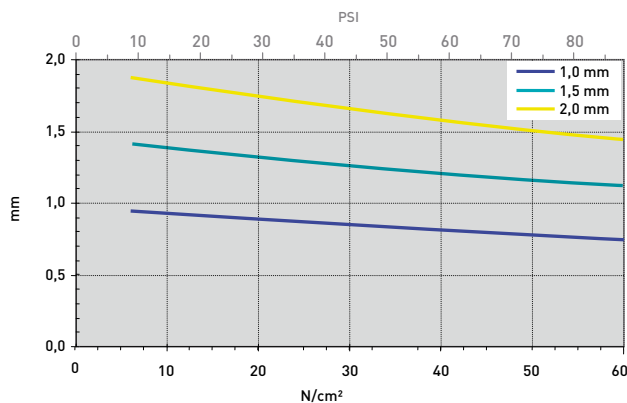
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Capacitors
- For use in Automotive applications / Laptops / Medicine engineering / Embedded-boards

| PROPERTY | UNIT | TGF-Z1000-SI | TGF-Z1500-SI | TGF-Z2000-SI |
|--|------------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | | | |
| Colour | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Density | g/cm ³ | Light grey | Light grey | Light grey |
| Thickness | mm | 3.4 | 3.4 | 3.4 |
| Hardness | Shore 00 | 1.0 ±0.2 | 1.5 ±0.2 | 2.0 ±0.3 |
| UL Flammability (Equivalent) | UL 94 | 72 | 72 | 72 |
| RoHS Conformity | 2015 / 863 / EU | V0 | V0 | V0 |
| | | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.21 (0.82 mm) | 0.30 (1.21 mm) | 0.37 (1.59 mm) |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.23 (0.89 mm) | 0.32 (1.33 mm) | 0.42 (1.76 mm) |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.24 (0.95 mm) | 0.37 (1.41 mm) | 0.50 (1.88 mm) |
| Thermal Conductivity | W/mK | 11.0 | 11.0 | 11.0 |
| Operating Temperature Range | °C | - 50 to + 150 | - 50 to + 150 | - 50 to + 150 |
| ELECTRICALLY | | | | |
| Dielectric Strength | kV / mm | >14 | >14 | >14 |
| Dielectric Constant | Ohm - cm | 1.0 x 10 ¹¹ | 1.0 x 10 ¹¹ | 1.0 x 10 ¹¹ |
| Volume Resistivity | 1 MHz | ca. 7.2 | ca. 7.2 | ca. 7.2 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 1.0 mm / 1.5 mm / 2.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-BXS-SI

ultra soft, flexible

TGF-BXS-SI is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a good thermal conductivity. Through its ultra softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at minimum pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The optional PSA on one side provides for a strong adhesiveness.



PROPERTIES

- Ultra soft and compliant
- Thermal conductivity: 1.2 W/mK
- Operates at minimum pressure
- Extraordinary chemical resistance and longterm stability
- Shock-absorbing
- Easy mounting through self tackiness
- Two-side tacky or one-side adhesive

AVAILABILITY

- Sheet 200 x 400 mm
- Tacky on both sides (TGF-BXSXXX-SI)
- PSA adhesive on one side (TGF-BXSXXX-SI-A1)
- Die cut parts
- Kiss cut parts on sheet

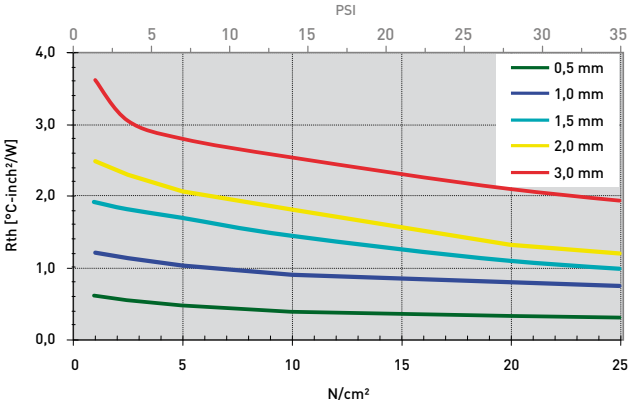
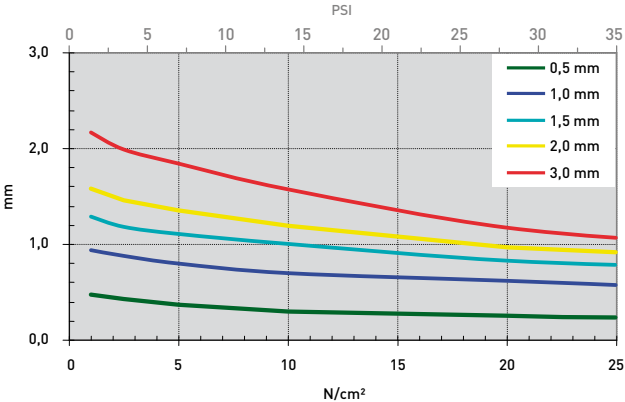
APPLICATION EXAMPLES

- Thermal link of:
- SMD packages
 - Through-hole vias
 - Capacitors
 - Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-BXS0500-SI | TGF-BXS1000-SI | TGF-BXS1500-SI | TGF-BXS2000-SI | TGF-BXS3000-SI |
|----------------------------------|-----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Pink | Pink | Pink | Pink | Pink |
| Thickness | mm | 0.5 ±0.10 | 1.0 ±0.10 | 1.5 ±0.15 | 2.0 ±0.20 | 3.0 ±0.30 |
| Hardness | Shore 00 | 30 | 30 | 30 | 30 | 30 |
| Density | g/cm³ | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 |
| UL Flammability | UL 94 | VO | VO | VO | VO | VO |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance¹ @ 35 PSI @ Thickness | °C-inch²/W (mm) | 0.31 (0.24) | 0.75 (0.58) | 1.00 (0.80) | 1.20 (0.92) | 1.95 (1.09) |
| Resistance¹ @ 15 PSI @ Thickness | °C-inch²/W (mm) | 0.39 (0.30) | 0.90 (0.70) | 1.45 (1.01) | 1.81 (1.19) | 2.54 (1.57) |
| Resistance¹ @ 7 PSI @ Thickness | °C-inch²/W (mm) | 0.48 (0.37) | 1.03 (0.80) | 1.70 (1.11) | 2.07 (1.35) | 2.80 (1.84) |
| Thermal Conductivity¹ | W/mK | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| Operating Temperature Range | °C | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 | -40 to + 150 |
| ELECTRIC | | | | | | |
| Dielectric Strength | kV / mm | > 6.5 | > 6.5 | > 6.5 | > 6.5 | > 6.5 |
| Volume Resistivity | Ohm - cm | 3.5 x 10¹² | 3.5 x 10¹² | 3.5 x 10¹² | 3.5 x 10¹² | 3.5 x 10¹² |
| Dielectric Constant | @ 1 MHz | 3.87 | 3.87 | 3.87 | 3.87 | 3.87 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 3.5 mm / 4.0 mm / 4.5 mm / 5.0 mm / .. 12.0 mm
mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-HUS-SI

extremely soft, flexible

TGF-HUS-SI is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a good thermal conductivity. Through its extreme softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at very low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



GAP FILLER

PROPERTIES

- ☐ Extremely soft and compliant
- ☐ Thermal conductivity: 1.8 W/mK
- ☐ Operates at very low pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ Two-side self-tacky

AVAILABILITY

- ☐ Sheet 300 x 400 mm
- ☐ Tacky on both sides [TGF-HUSXXX-SI]
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

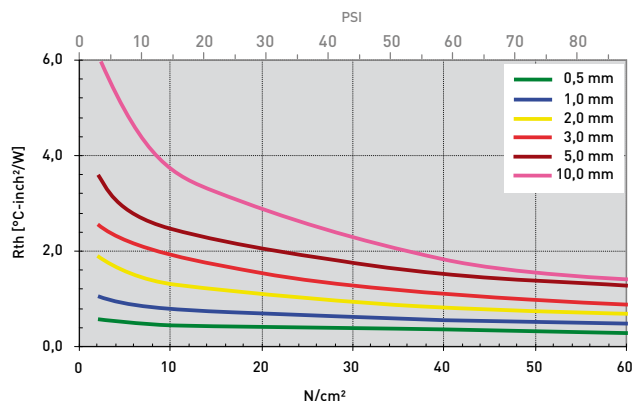
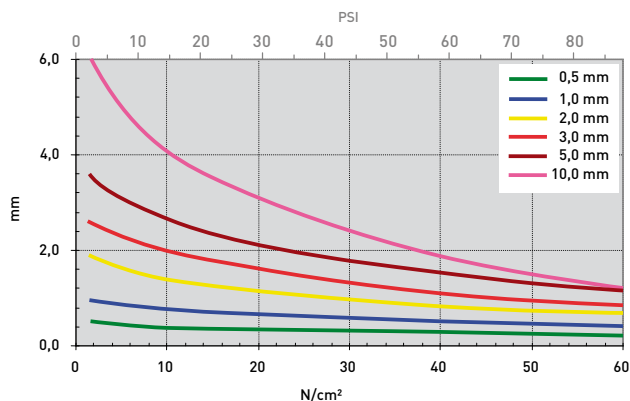
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ Capacitors
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-HUS0500-SI | TGF-HUS1000-SI | TGF-HUS2000-SI | TGF-HUS3000-SI | TGF-HUS5000-SI |
|--|------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| MATERIAL | | | | | | |
| Colour | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Thickness | mm | Dark grey | Dark grey | Dark grey | Dark grey | Dark grey |
| Hardness | Shore 00 | 0.5 ±0.10 | 1.0 ±0.15 | 2.0 ±0.20 | 3.0 ±0.25 | 5.0 ±0.30 |
| UL Flammability | UL 94 | 30 | 30 | 30 | 30 | 30 |
| RoHS Conformity | 2015 / 863 / EU | V0 | V0 | V0 | V0 | V0 |
| Yes | | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance ¹ @ 60 PSI @ thickness | °C-inch ² /W (mm) | 0.34 (0.31) | 0.56 (0.54) | 0.82 (0.85) | 1.10 (1.09) | 1.52 (1.54) |
| Resistance ¹ @ 30 PSI @ thickness | °C-inch ² /W (mm) | 0.40 (0.36) | 0.69 (0.68) | 1.12 (1.16) | 1.53 (1.63) | 2.06 (2.13) |
| Resistance ¹ @ 10 PSI @ thickness | °C-inch ² /W (mm) | 0.50 (0.46) | 0.85 (0.85) | 1.48 (1.57) | 2.10 (2.18) | 2.71 (2.92) |
| Thermal Conductivity ¹ | W/mK | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Operating Temperature Range | °C | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 |
| ELECTRICALLY | | | | | | |
| Dielectric Strength | kV / mm | > 10 | > 10 | > 10 | > 10 | > 10 |
| Volume Resistivity | Ohm - cm | 8.056 x 10 ¹² | 8.056 x 10 ¹² | 8.056 x 10 ¹² | 8.056 x 10 ¹² | 8.056 x 10 ¹² |
| Dielectric Constant | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 4.0 mm / 5.0 mm / 10.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-JUS-SI

extremely soft, flexible

TGF-JUS-SI is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a good thermal conductivity. Through its extreme softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at very low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- Extremely soft and compliant
- Thermal conductivity: 2.0 W/mK
- Operates at very low pressure
- Extraordinary chemical resistance and longterm stability
- Shock absorbing
- Easy mounting through self tackiness
- One or two-side self-tacky

AVAILABILITY

- Sheet 480 x 460 mm (Thickness 1.0 mm)
- Sheet 460 x 460 mm (Thickness 2.0 mm)
- Sheet 450 x 460 mm (Thickness ≥2.5 mm)
- Tacky on both sides (TGF-JUSXXX-SI)
- Tacky on one side (TGF-JUSXXX-SI-A1)
- Die cut parts
- Kiss cut parts on sheet

APPLICATION EXAMPLES

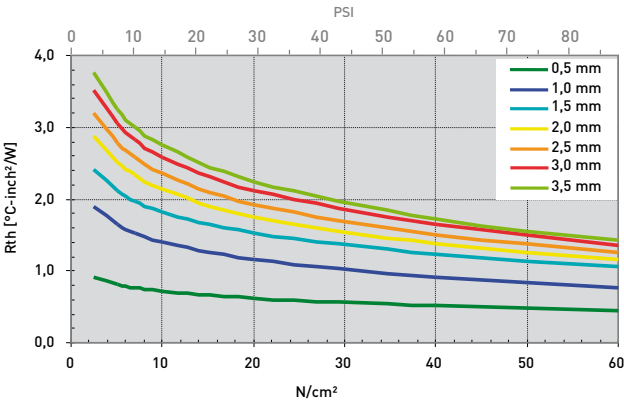
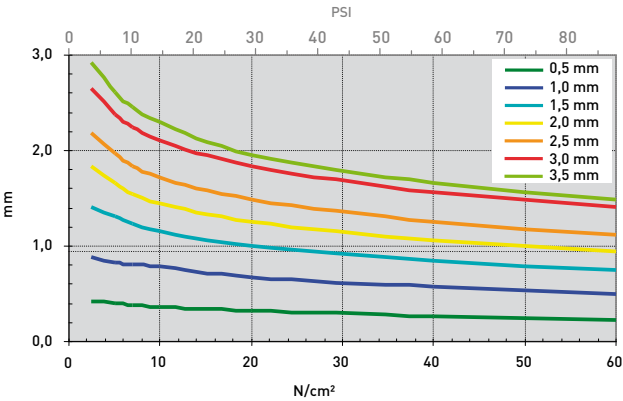
- Thermal link of:
- SMD packages
 - Through-hole vias
 - Capacitors
 - Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-JUS0500-SI | TGF-JUS1000-SI | TGF-JUS2000-SI | TGF-JUS3000-SI |
|----------------------------------|-----------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Grey | Grey | Grey | Grey |
| Thickness | mm | 0.5 ±0.05 | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 |
| Hardness | Shore 00 | 40 | 40 | 40 | 40 |
| UL Flammability | UL 94 | V1 | V1 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance¹ @ 60 PSI @ thickness | °C-inch²/W (mm) | 0.60 (0.35) | 1.00 (0.65) | 1.40 (1.10) | 1.70 (1.60) |
| Resistance¹ @ 30 PSI @ thickness | °C-inch²/W (mm) | 0.70 (0.40) | 1.20 (0.75) | 1.80 (1.30) | 2.10 (1.85) |
| Resistance¹ @ 10 PSI @ thickness | °C-inch²/W (mm) | 0.80 (0.45) | 1.50 (0.85) | 2.30 (1.58) | 2.80 (2.25) |
| Thermal Conductivity¹ | W/mK | 2.0 | 2.0 | 2.0 | 2.0 |
| Operating Temperature Range | °C | - 60 to + 180 | - 60 to + 180 | - 60 to + 180 | - 60 to + 180 |
| ELECTRICALLY | | | | | |
| Dielectric Strength | kV / mm | 10 | 10 | 10 | 10 |
| Volume Resistivity | Ohm - cm | 1.0 x 10¹¹ | 1.0 x 10¹¹ | 1.0 x 10¹¹ | 1.0 x 10¹¹ |
| Dielectric Constant | @ 1 kHz | 5 | 5 | 5 | 5 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses:0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 3.5 mm / 4.0 mm / 4.5 mm / 5.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-JXS-SI

ultra soft, flexible / Low Volatile Siloxanes (LV)

TGF-JXS-SI is an electrically insulating thermally conductive LV silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a high thermal conductivity. Through its ultra softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at minimum pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The material is one-side tacky through lamination with a thermally conductive film.



GAP FILLER

PROPERTIES

- ☐ Ultra soft and compliable
- ☐ Low volatile siloxane content (LV)
- ☐ No paint wetting impairment
- ☐ Thermal conductivity: 2.0 W/mK
- ☐ Operates at minimum pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One-side self-tacky

AVAILABILITY

- ☐ Sheet 210 x 420 mm (0.5 - 3.0 mm)
- ☐ Sheet of 210 x 350 mm (3.5 - 6.0 mm)
- ☐ Tacky on one side by film laminate (TGF-JXSXXX-SI-A1)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

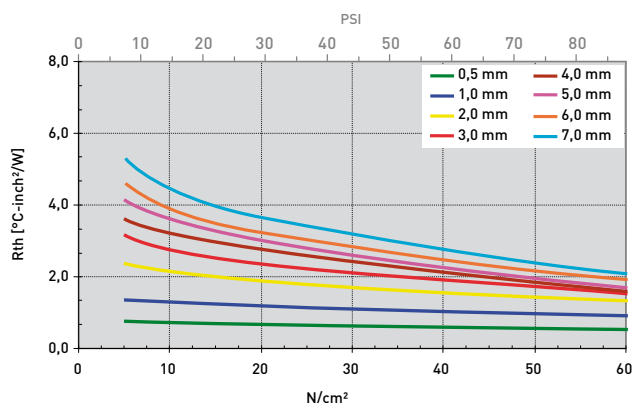
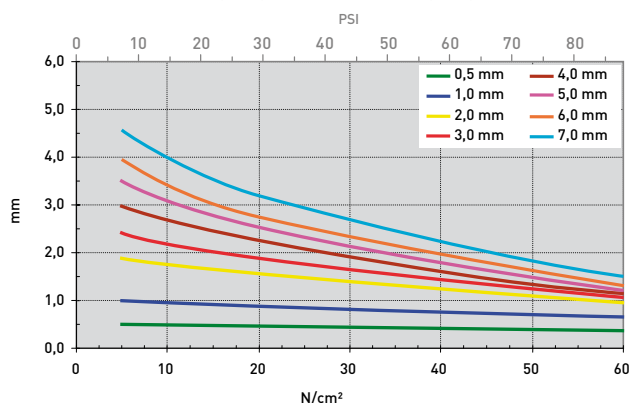
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs Smemory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications / Laptops / Medicine engineering / Embedded boards

| PROPERTY | UNIT | TGF-JXS0500-SI-A1 | TGF-JXS1000-SI-A1 | TGF-JXS2000-SI-A1 | TGF-JXS3000-SI-A1 | TGF-JXS5000-SI-A1 |
|--|------------------------------|---|---|---|---|---|
| MATERIAL | | | | | | |
| Colour | | Light blue / Grey | Light blue / Grey | Light blue / Grey | Light blue / Grey | Light blue / Grey |
| Thickness | mm | 0.5 ^{+0.20} / _{-0.10} | 1.0 ^{+0.20} / _{-0.10} | 2.0 ^{+0.20} / _{-0.10} | 3.0 ^{+0.30} / _{-0.10} | 5.0 ^{+0.50} / _{-0.10} |
| Hardness | Shore 00 | 20 | 20 | 20 | 20 | 20 |
| No Paint Wetting Impairment Substances (PWIS) ¹ | | Passed | Passed | Passed | Passed | Passed |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance ² @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.59 (0.41) | 1.03 (0.75) | 1.57 (1.25) | 1.90 (1.46) | 2.26 (1.81) |
| Resistance ² @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.64 (0.45) | 1.16 (0.86) | 1.85 (1.55) | 2.33 (1.87) | 2.98 (2.52) |
| Resistance ² @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.74 (0.49) | 1.32 (0.96) | 2.27 (1.82) | 2.96 (2.31) | 3.89 (3.32) |
| Thermal Conductivity | W/mK | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Operating Temperature Range | °C | - 40 to + 200 | - 40 to + 200 | - 40 to + 200 | - 40 to + 200 | - 40 to + 200 |
| ELECTRICALLY | | | | | | |
| Dielectric Strength | kV / mm | >10 | >10 | >10 | >10 | >10 |
| Volume Resistivity | Ohm · cm | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ |

Measurement technique according to: ¹P-VW 3-10.7 57650 Temp. Test, ²ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 2.0 mm / 2.5 mm / 3.0 mm / 4.0 mm / 5.0 mm / 6.0 mm / 7.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-MXS-SI

ultra soft, with or without fibreglass reinforcement

TGF-MXS-SI is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a high thermal conductivity. Through its ultra softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at minimum pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The optional conductive fibreglass reinforced silicone laminate on one side provides for a high mechanic stability and strength.



PROPERTIES

- ❑ Ultra soft and compliant
- ❑ Thermal conductivity: 2.4 W/mK
- ❑ Operates at minimum pressure
- ❑ Extraordinary chemical resistance and longterm stability
- ❑ Shock absorbing
- ❑ Easy mounting through self tackiness
- ❑ One or two-side self-tacky

AVAILABILITY

- ❑ Sheet 200 x 400 mm
- ❑ Tacky on both sides (TGF-MXSXXX-SI)
- ❑ Tacky on one side by fibreglass reinforced laminate (TGF-MXSXXX-SI-GF)
- ❑ Die cut parts
- ❑ Kiss cut parts on sheet

APPLICATION EXAMPLES

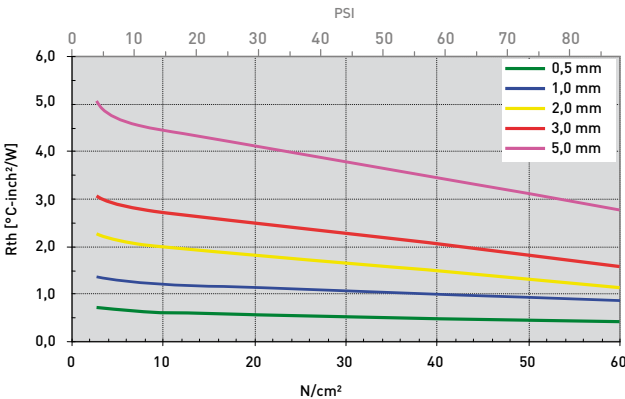
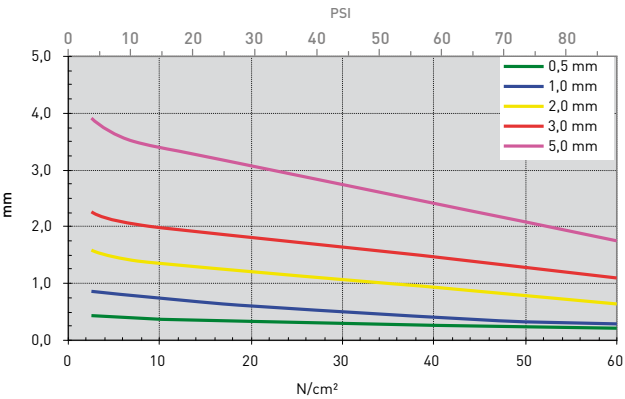
- Thermal link of:
- ❑ SMD packages
 - ❑ Through-hole vias
 - ❑ Capacitors
 - ❑ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-MXS0500-SI | TGF-MXS1000-SI | TGF-MXS2000-SI | TGF-MXS3000-SI |
|---|-----------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Grey (/ Red laminate) | Grey (/ Red laminate) | Grey (/ Red laminate) | Grey (/ Red laminate) |
| Optional Reinforcement (TGF-MXSXXX-SI-GF) | | Fibreglass laminate | Fibreglass laminate | Fibreglass laminate | Fibreglass laminate |
| Thickness | mm | 0.5 ±0.10 | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 |
| Hardness | Shore 00 | 25 | 25 | 25 | 25 |
| UL Flammability | UL 94 | V1 | V1 | V1 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance¹ @ 60 PSI @ Thickness | °C-inch²/W (mm) | 0.44 (0.25) | 1.00 (0.45) | 1.49 (0.86) | 2.05 (1.50) |
| Resistance¹ @ 30 PSI @ Thickness | °C-inch²/W (mm) | 0.53 (0.32) | 1.15 (0.63) | 1.79 (1.15) | 2.50 (1.73) |
| Resistance¹ @ 10 PSI @ Thickness | °C-inch²/W (mm) | 0.63 (0.40) | 1.26 (0.75) | 2.03 (1.40) | 2.77 (2.05) |
| Thermal Conductivity | W/mK | 2.4 | 2.4 | 2.4 | 2.4 |
| Operating Temperature Range | °C | - 40 to + 200 | - 40 to + 200 | - 40 to + 200 | - 40 to + 200 |
| ELECTRICAL | | | | | |
| Dielectric Strength | kV / mm | 4 | 4 | 4 | 4 |
| Volume Resistivity | Ohm - cm | 1.7 x 10¹³ | 1.7 x 10¹³ | 1.7 x 10¹³ | 1.7 x 10¹³ |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm / ... / 10.0 mm. Other thicknesses on request

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-LSS-SI

very soft, flexible

TGF-LSS-SI is an electrically insulating thermally conductive high performance silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a very high thermal conductivity. Through its extraordinary softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at very low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The material can be mechanically reinforced by a fibreglass mesh inlay or a film laminate with fibreglass or by a PI film laminate.



GAP FILLER

PROPERTIES

- ☐ Extraordinary soft and compliant
- ☐ Thermal conductivity: 2.5 W/mK
- ☐ Operates at very low pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ Two-side self-tacky

AVAILABILITY

- ☐ Sheet 200 x 400 mm
- ☐ Two-side self-tacky (TGF-LSSXXX-SI)
- ☐ With fibreglass mesh inlay (TGF-LSSXXX-SI-GF)
- ☐ With fibreglass reinforced film laminate (TGF-LSSXXX-SI-LGF)
- ☐ With PI film laminate (TGF-LSSXXX-SI-LPI)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

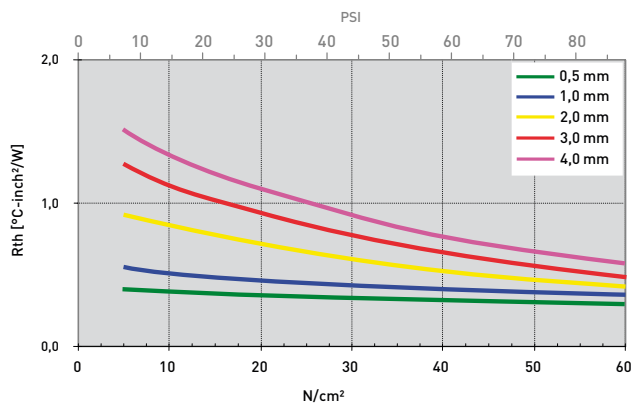
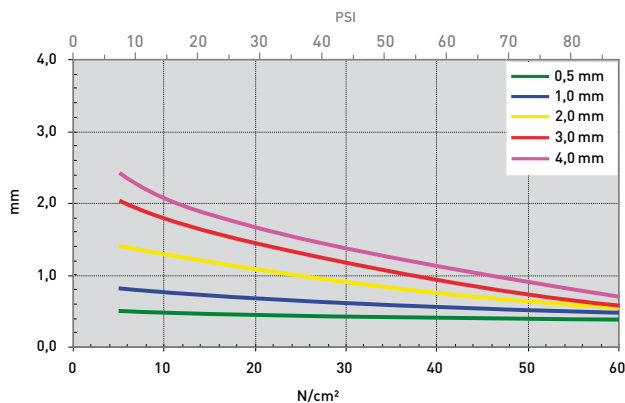
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications / Laptops / Medical engineering / Embedded boards / Graphic cards / Memory modules / LED light / LCD and plasma TV

| PROPERTY | UNIT | TGF-LSS0500-SI | TGF-LSS1000-SI | TGF-LSS2000-SI | TGF-LSS3000-SI | TGF-LSS4000-SI |
|--|------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Light beige | Light beige | Light beige | Light beige | Light beige |
| Thickness | mm | 0.5 ±0.05 | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 | 4.0 ±0.40 |
| Hardness | Shore 00 | 34 | 34 | 34 | 34 | 34 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.32 [0.39] | 0.40 [0.54] | 0.54 [0.71] | 0.65 [0.90] | 0.75 [1.10] |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.35 [0.43] | 0.46 [0.65] | 0.75 [1.09] | 0.96 [1.46] | 1.11 [1.67] |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.39 [0.47] | 0.55 [0.77] | 0.90 [1.35] | 1.22 [1.93] | 1.44 [2.30] |
| Thermal Conductivity ¹ | W/mK | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Operating Temperature Range | °C | - 50 to + 170 | - 50 to + 170 | - 50 to + 170 | - 50 to + 170 | - 50 to + 170 |
| ELECTRICAL | | | | | | |
| Dielectric Strength | kV / mm | > 7.0 | > 7.0 | > 7.0 | > 7.0 | > 7.0 |
| Volume Resistivity | Ohm - cm | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ |
| Dielectric Constant | @ 1 MHz | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 |

Measurement technique according to: *ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm / ... / 10.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-MUS-SI

extremely soft, flexible

TGF-MUS-SI is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a very high thermal conductivity. Through its extreme softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at very low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- Extremely soft and compliant
- Thermal conductivity: 3.0 W/mK
- Operates at very low pressure
- Extraordinary chemical resistance and longterm stability
- Shock absorbing
- Easy mounting through self tackiness
- One or two-side self-tacky

AVAILABILITY

- Sheet 480 x 460 mm (1.0 mm)
- Sheet 460 x 460 mm (2.0 mm)
- Sheet 450 x 460 mm (≥3.0 mm)
- Tacky on both sides (TGF-MUSXXX-SI)
- Tacky on one side (TGF-MUSXXX-SI-A1)
- Die cut parts
- Kiss cut parts on sheet

APPLICATION EXAMPLES

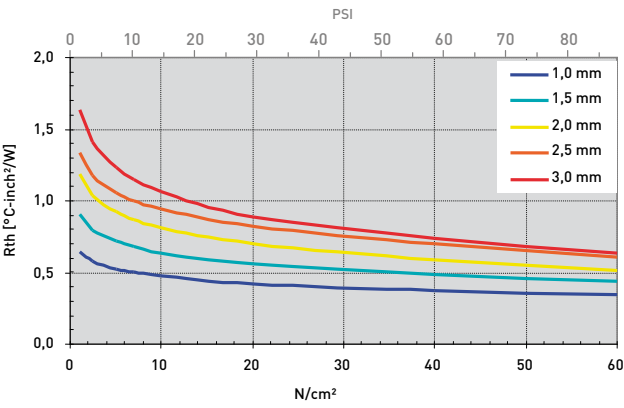
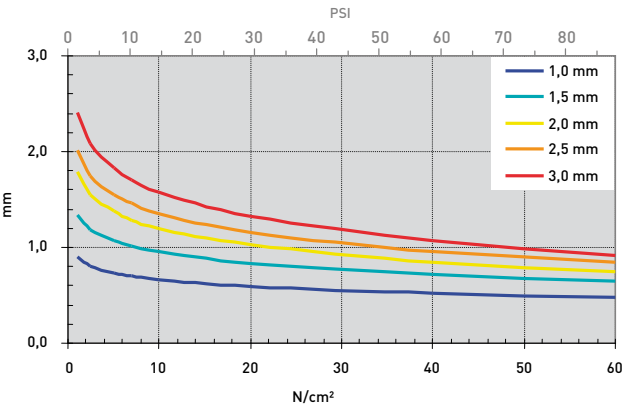
- Thermal link of:
- SMD packages
 - Through-hole vias
 - Capacitors
 - Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-MUS1000-SI | TGF-MUS2000-SI | TGF-MUS3000-SI |
|----------------------------------|-----------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | | | |
| Material | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Light blue | Light blue | Light blue |
| Thickness | mm | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 |
| Hardness | Shore 00 | 20 | 20 | 20 |
| UL Flammability | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance¹ @ 60 PSI @ Thickness | °C-inch²/W (mm) | 0.37 (0.52) | 0.58 (0.85) | 0.74 (1.06) |
| Resistance¹ @ 30 PSI @ Thickness | °C-inch²/W (mm) | 0.42 (0.59) | 0.70 (1.02) | 0.89 (1.32) |
| Resistance¹ @ 10 PSI @ Thickness | °C-inch²/W (mm) | 0.49 (0.70) | 0.89 (1.29) | 1.20 (1.70) |
| Thermal Conductivity¹ | W/mK | 3.0 | 3.0 | 3.0 |
| Operating Temperature Range | °C | - 60 to + 180 | - 60 to + 180 | - 60 to + 180 |
| ELECTRICAL | | | | |
| Dielectric Strength | kV / mm | 10 | 10 | 10 |
| Volume Resistivity | Ohm - cm | 1.0 x 10¹¹ | 1.0 x 10¹¹ | 1.0 x 10¹¹ |
| Dielectric Constant | @ 1 kHz | 5.2 | 5.2 | 5.2 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 4.0 mm / 5.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-RSS-SI

very soft, flexible

TGF-RSS-SI is an electrically insulating thermally conductive high performance silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a very high thermal conductivity. Through its extraordinary softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at very low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The material can be mechanically reinforced by a fibreglass mesh inlay or a film laminate with fibreglass or by a PI film laminate.



GAP FILLER

PROPERTIES

- ☐ Extraordinary soft and compliant
- ☐ Thermal conductivity: 3.0 W/mK
- ☐ Operates at very low pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ Two-side self-tacky

AVAILABILITY

- ☐ Sheet 200 x 400 mm
- ☐ Two-side self-tacky (TGF-RSSXXX-SI)
- ☐ With fibreglass mesh inlay (TGF-RSSXXX-SI-GF)
- ☐ With fibreglass reinforced film laminate (TGF-RSSXXX-SI-LGF)
- ☐ With PI film laminate (TGF-RSSXXX-SI-LPI)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

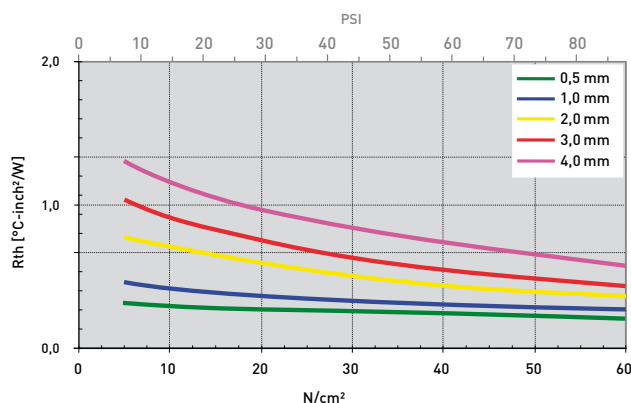
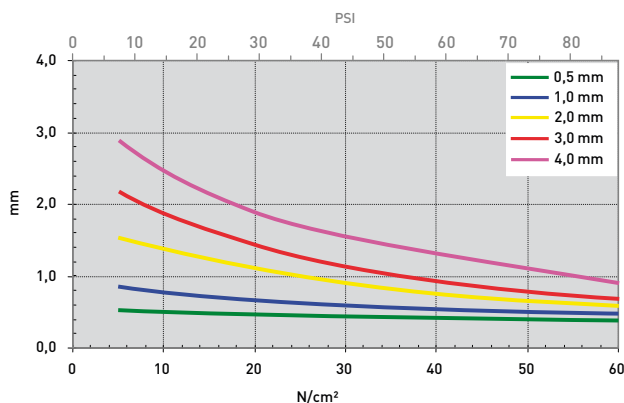
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications / Laptops / Medical engineering / Embedded boards / Graphic cards / Memory modules / LED light / LCD and plasma TV

| PROPERTY | UNIT | TGF-RSS0500-SI | TGF-RSS1000-SI | TGF-RSS2000-SI | TGF-RSS3000-SI | TGF-RSS4000-SI |
|--|------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| MATERIAL | | | | | | |
| Colour | | Ceramic filled silicone Light blue | Ceramic filled silicone Light blue | Ceramic filled silicone Light blue | Ceramic filled silicone Light blue | Ceramic filled silicone Light blue |
| Thickness | mm | 0.5 ±0.05 | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 | 4.0 ±0.40 |
| Hardness | Shore 00 | 43 | 43 | 43 | 43 | 43 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.25 (0.41) | 0.31 (0.52) | 0.44 (0.73) | 0.54 (0.93) | 0.74 (1.33) |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.27 (0.44) | 0.37 (0.67) | 0.59 (1.10) | 0.75 (1.44) | 0.95 (1.89) |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.30 (0.48) | 0.45 (0.81) | 0.75 (1.48) | 0.99 (2.08) | 1.25 (2.74) |
| Thermal Conductivity ¹ | W/mK | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Operating Temperature Range | °C | - 50 to + 170 | - 50 to + 170 | - 50 to + 170 | - 50 to + 170 | - 50 to + 170 |
| ELECTRICAL | | | | | | |
| Dielectric Strength | kV / mm | >7.0 | >7.0 | >7.0 | >7.0 | >7.0 |
| Volume Resistivity | Ohm - cm | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ |
| Dielectric Constant | @ 1 MHz | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm / ... / 10.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-TSS-SI

very soft, flexible

TGF-TSS-SI is an electrically insulating thermally conductive high performance silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a very high thermal conductivity. Through its extraordinary softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at very low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- Extremely soft and compliant
- Thermal conductivity: 3.2 W/mK
- Operates at minimum pressure
- Extraordinary chemical resistance and longterm stability
- Shock absorbing
- Easy mounting through self tackiness

AVAILABILITY

- Sheet 300 x 400 mm
- Tacky on both sides [TGF-TSSXXX-SI]
- Die cut parts
- Kiss cut parts on sheet

APPLICATION EXAMPLES

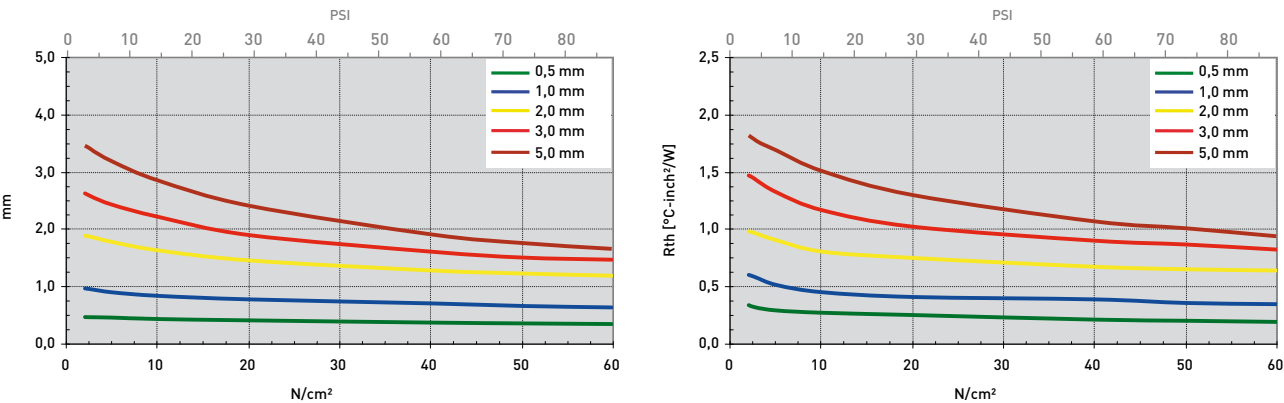
- Thermal link of:
- SMD packages
 - Through-hole vias
 - RDRAMs memory modules
 - Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications / Laptops / Medicine engineering / Embedded boards

| PROPERTY | UNIT | TGF-TSS0500-SI | TGF-TSS1000-SI | TGF-TSS2000-SI | TGF-TSS3000-SI | TGF-TSS5000-SI |
|----------------------------------|-----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Light reddish purple | Light reddish purple | Light reddish purple | Light reddish purple | Light reddish purple |
| Thickness | mm | 0.5 ±0.10 | 1.0 ±0.15 | 2.0 ±0.20 | 3.0 ±0.25 | 5.0 ±0.30 |
| Hardness | Shore 00 | 37 | 37 | 37 | 37 | 37 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance¹ @ 60 PSI @ Thickness | °C-inch²/W (mm) | 0.22 (0.37) | 0.40 (0.70) | 0.68 (1.27) | 0.91 (1.60) | 1.08 (1.90) |
| Resistance¹ @ 30 PSI @ Thickness | °C-inch²/W (mm) | 0.26 (0.41) | 0.42 (0.77) | 0.76 (1.45) | 1.03 (1.89) | 1.31 (2.40) |
| Resistance¹ @ 10 PSI @ Thickness | °C-inch²/W (mm) | 0.29 (0.44) | 0.49 (0.86) | 0.86 (1.70) | 1.25 (2.31) | 1.61 (3.01) |
| Thermal Conductivity¹ | W/mK | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| Operating Temperature Range | °C | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 |
| ELECTRICALLY | | | | | | |
| Dielectric Strength | kV / mm | 15 | 15 | 15 | 15 | 15 |

Measurement technique according to: *ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 2.0 mm / 2.5 mm / 3.0 mm / 4.0 mm / 5.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-USS-SI

very soft, flexible / Low Volatile Siloxanes (LV)

TGF-USS-SI is an electrically insulating thermally conductive high performance LV silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic articles the silicone elastomer has a very high thermal conductivity. Through its ultra softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at minimum pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The material is one-side tacky through lamination with a thermally conductive film.



GAP FILLER

PROPERTIES

- ☐ Ultra soft and compliant
- ☐ Low volatile siloxane content (LV)
- ☐ No paint wetting impairment
- ☐ Thermal conductivity: 3.3 W/mK
- ☐ Operates at minimum pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One-side self-tacky

AVAILABILITY

- ☐ Sheet 200 x 200 mm (0.5 - 3.0 mm)
- ☐ Sheet 200 x 400 mm (0.5 - 3.0 mm)
- ☐ Tacky on one side by film laminate (TGF-USSXXX-SI-A1)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

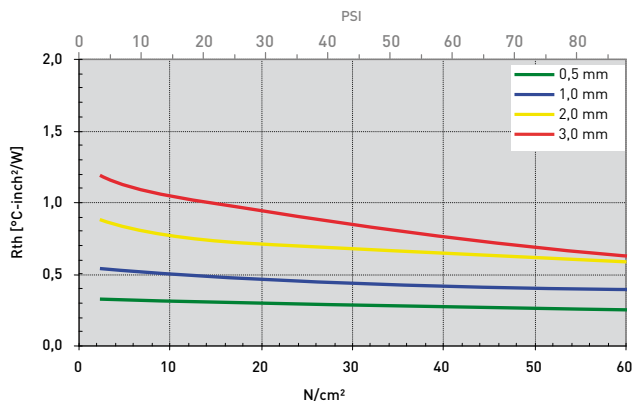
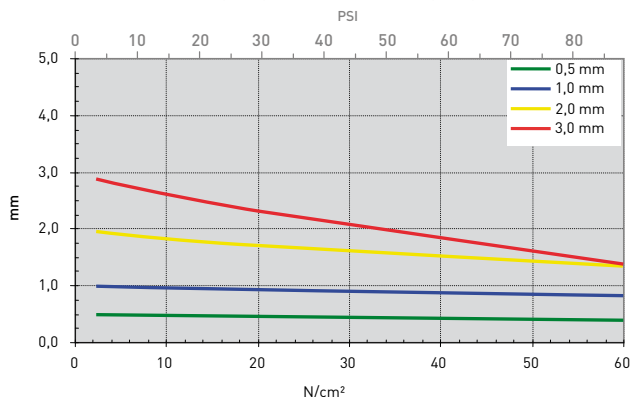
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications / Laptops / Medicine engineering / Embedded boards

| PROPERTY | UNIT | TGF-USS0500-SI-A1 | TGF-USS1000-SI-A1 | TGF-USS2000-SI-A1 | TGF-USS3000-SI-A1 |
|--|------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Dark grey / Grey | Dark grey / Grey | Dark grey / Grey | Dark grey / Grey |
| Thickness | mm | 0.5 $\pm_{-0.10}^{+0.20}$ | 1.0 $\pm_{-0.10}^{+0.20}$ | 2.0 $\pm_{-0.10}^{+0.20}$ | 3.0 $\pm_{-0.10}^{+0.30}$ |
| Hardness | Shore 00 | 45 | 45 | 45 | 45 |
| No Paint Wetting Impairment Substances (PWIS) ¹ | | Passed | Passed | Passed | Passed |
| UL Flammability (Equivalent) | UL 94 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance ² @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.26 [0.47] | 0.40 [0.87] | 0.63 [1.55] | 0.75 [1.84] |
| Resistance ² @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.29 [0.48] | 0.45 [0.93] | 0.70 [1.70] | 0.94 [2.30] |
| Resistance ² @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.31 [0.49] | 0.51 [0.99] | 0.80 [1.85] | 1.07 [2.68] |
| Thermal Conductivity ¹ | W/mK | 3.3 | 3.3 | 3.3 | 3.3 |
| Operating Temperature Range | °C | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 |
| ELECTRICAL | | | | | |
| Breakdown Voltage | kV / mm | >10 | >10 | >10 | >10 |
| Volume Resistivity | Ohm - cm | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ |

Test Methods: ¹P-VW 3-10.7 57650 Temp. Test, ²ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 2.0 mm / 3.0 mm

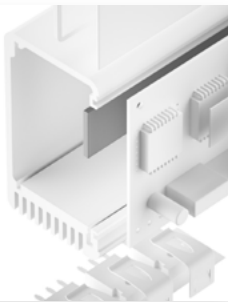
mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-WSS-SI

very soft, flexible

TGF-WSS-SI is an electrically insulating thermally conductive high performance silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has an extremely high thermal conductivity. Through its high softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at very low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- ☐ Very soft and compliant
- ☐ Thermal conductivity: 5.5 W/mK
- ☐ Operates at very low pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One or two-side self-tacky

AVAILABILITY

- ☐ Sheet 460 x 100 mm
- ☐ Tacky on both sides (TGF-WSSXXX-SI)
- ☐ Tacky on one side (TGF-WSSXXX-SI-A1)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

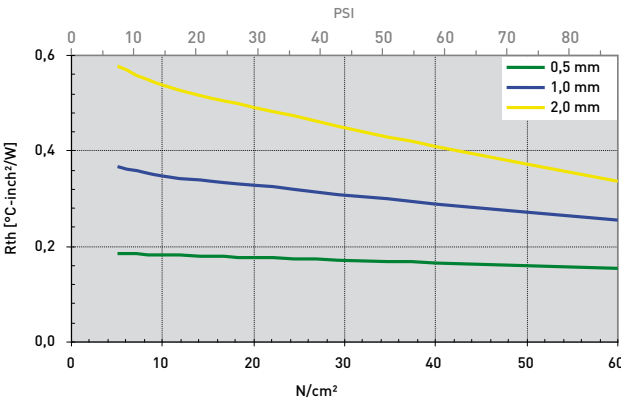
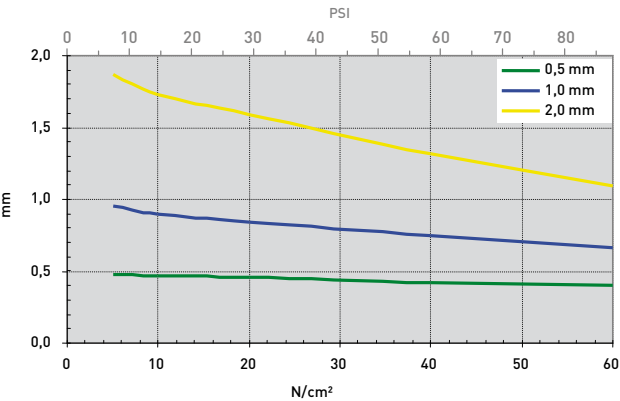
- Thermal link of:
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications / Laptops / Medicine engineering / Embedded boards

| PROPERTY | UNIT | TGF-WSS1000-SI | TGF-WSS2000-SI |
|----------------------------------|-----------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Grey | Grey |
| Thickness | mm | 1.0 ±0.10 | 2.0 ±0.20 |
| Hardness | Shore 00 | 55 | 55 |
| UL Flammability | UL 94 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| THERMAL | | | |
| Resistance¹ @ 60 PSI @ Thickness | °C-inch²/W (mm) | 0.30 (0.75) | 0.41 (1.32) |
| Resistance¹ @ 30 PSI @ Thickness | °C-inch²/W (mm) | 0.32 (0.85) | 0.49 (1.59) |
| Resistance¹ @ 10 PSI @ Thickness | °C-inch²/W (mm) | 0.36 (0.93) | 0.56 (1.80) |
| Thermal Conductivity¹ | W/mK | 5.5 | 5.5 |
| Operating Temperature Range | °C | - 60 to + 180 | - 60 to + 180 |
| ELECTRICAL | | | |
| Dielectric Strength | kV / mm | 10 | 10 |
| Volume Resistivity | Ohm - cm | 1.0 x 10¹³ | 1.0 x 10¹³ |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-AXS-SI-GF

ultra soft, with fibreglass reinforcement

TGF-AXS-SI-GF is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a good thermal conductivity. Through its ultra softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at minimum pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The conductive fibreglass reinforced silicone laminate on one side provides for a high mechanic stability and strength.



PROPERTIES

- ☐ Ultra soft and compliant
- ☐ Thermal conductivity: 1.1 W/mK
- ☐ Operates at minimum pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One side self-tacky

AVAILABILITY

- ☐ Sheet 200 x 400 mm
- ☐ Tacky on one side by fibreglass reinforced laminate (TGF-AXSXXX-SI-GF)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

- ☐ SMD packages
- ☐ Through-hole vias
- ☐ Capacitors
- ☐ Battery cells
- ☐ Induction coils

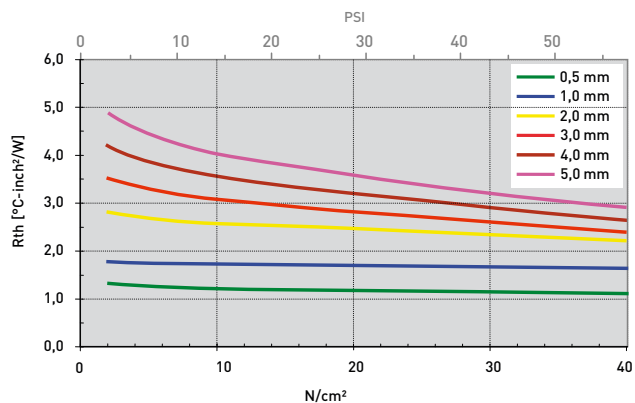
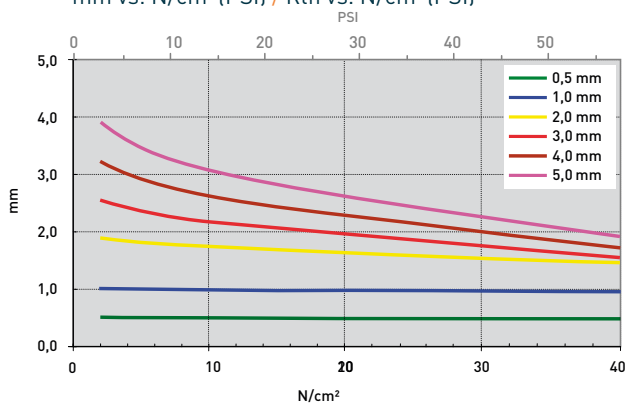
For use in Automotive applications
/ Laptops / Medicine engineering /
Industrial PCs / Graphics cards

| PROPERTY | UNIT | TGF-AXS0500-SI-GF | TGF-AXS1000-SI-GF | TGF-AXS2000-SI-GF | TGF-AXS3000-SI-GF | TGF-AXS5000-SI-GF |
|---|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| MATERIAL | | | | | | |
| Colour | | White / Pink | White / Pink | White / Pink | White / Pink | White / Pink |
| Reinforcement | | Fibreglass laminate | Fibreglass laminate | Fibreglass laminate | Fibreglass laminate | Fibreglass laminate |
| Specific Density | g/cm ³ | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| Thickness | mm | 0.5 ±0.10 | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 | 5.0 ±0.50 |
| Hardness (Bulk Rubber) | Shore 00 | 5 | 5 | 5 | 5 | 5 |
| Shelf Life (unopened, dry storage conditions @ < 40° C) | Months | 24 | 24 | 24 | 24 | 24 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance ¹ @ 35 PSI @ Thickness | °C-inch ² /W (mm) | 1.13 [0.47] | 1.66 [0.94] | 2.38 [1.57] | 2.69 [1.85] | 3.38 [2.41] |
| Resistance ¹ @ 15 PSI @ Thickness | °C-inch ² /W (mm) | 1.18 [0.48] | 1.71 [0.97] | 2.58 [1.73] | 3.08 [2.18] | 4.00 [3.05] |
| Resistance ¹ @ 7 PSI @ Thickness | °C-inch ² /W (mm) | 1.27 [0.49] | 1.73 [0.98] | 2.69 [1.80] | 3.30 [2.37] | 4.41 [3.45] |
| Thermal Conductivity ¹ | W/mK | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| Operating Temperature Range | °C | - 50 to + 200 | - 50 to + 200 | - 50 to + 200 | - 50 to + 200 | - 50 to + 200 |
| ELECTRICAL | | | | | | |
| Dielectric Strength | kV / mm | > 8 | > 8 | > 8 | > 8 | > 8 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm / ... / 10.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-DXS-SI-GF

ultra soft, with fibreglass reinforcement

TGF-DXS-SI-GF is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a good thermal conductivity. Through its ultra softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at minimum pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The conductive fibreglass reinforced silicone laminate on one side provides for a high mechanic stability and strength.



PROPERTIES

- ☐ Ultra soft and compliant
- ☐ Thermal conductivity: 1.3 W/mK
- ☐ Operates at minimum pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One side self-tacky

AVAILABILITY

- ☐ Sheet 200 x 400 mm
- ☐ Tacky on one side by fibreglass reinforced laminate (TGF-DXSXXX-SI-GF)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

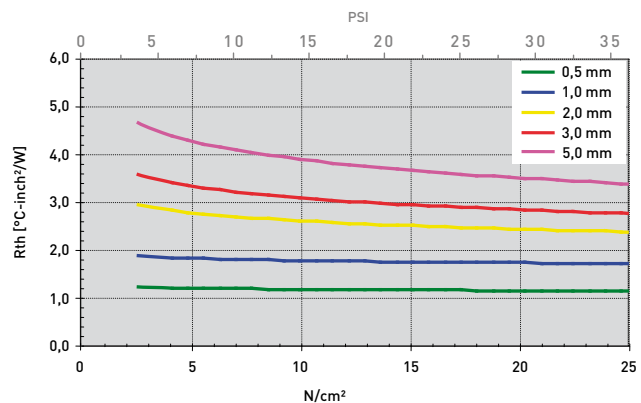
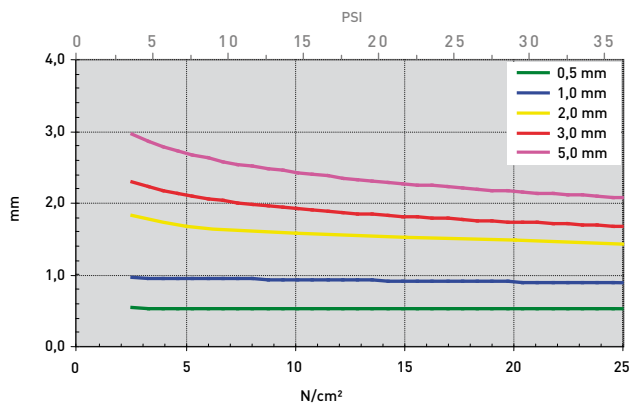
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ Capacitors
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-DXS1000-SI-GF | TGF-DXS2000-SI-GF | TGF-DXS3000-SI-GF | TGF-DXS5000-SI-GF |
|--|------------------------------|---|---|---|---|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | White / Pink | White / Pink | White / Pink | White / Pink |
| Reinforcement | | Fibreglass laminate | Fibreglass laminate | Fibreglass laminate | Fibreglass laminate |
| Thickness | mm | 1.0 ^{+0.10} / _{-0.01} | 2.0 ^{+0.20} / _{-0.02} | 3.0 ^{+0.30} / _{-0.03} | 5.0 ^{+0.50} / _{-0.05} |
| Hardness | Shore 00 | 25 | 25 | 25 | 25 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance ¹ @ 35 PSI @ Thickness | °C-inch ² /W (mm) | 1.77 (0.94) | 2.43 (1.40) | 2.80 (1.65) | 3.40 (2.10) |
| Resistance ¹ @ 15 PSI @ Thickness | °C-inch ² /W (mm) | 1.85 (0.95) | 2.70 (1.60) | 3.10 (1.95) | 3.95 (2.55) |
| Resistance ¹ @ 7 PSI @ Thickness | °C-inch ² /W (mm) | 1.86 (0.97) | 2.80 (1.70) | 3.30 (2.20) | 4.40 (2.70) |
| Thermal Conductivity | W/mK | 1.3 | 1.3 | 1.3 | 1.3 |
| Operating Temperature Range | °C | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 |
| ELECTRICAL | | | | | |
| Dielectric Strength | kV / mm | 6 | 6 | 6 | 6 |
| Volume Resistivity | Ohm - cm | 6.2 x 10 ¹⁵ | 6.2 x 10 ¹⁵ | 6.2 x 10 ¹⁵ | 6.2 x 10 ¹⁵ |
| Dielectric Constant | @ 1 MHz | 5.27 | 5.27 | 5.27 | 5.27 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm / 6.0 mm / 7.0 mm / 8.0 mm / 9.0 mm / 10.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-EXS-SI-GF

ultra soft, flexible

TGF-EXS-SI-GF is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has a high thermal conductivity. Through its ultra softness and flexibility the material perfectly mates to irregular surfaces thus filling gaps at minimum pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The conductive fiberglass reinforced silicone laminate on one side allows for a high mechanic stability and strength.



GAP FILLER

PROPERTIES

- ☐ Ultra soft and compliable
- ☐ Thermal conductivity: 1.4 W/mK
- ☐ Operates at minimum pressure
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One-side self-tacky

AVAILABILITY

- ☐ Sheet 300 x 400 mm
- ☐ Tacky on one side by fibreglass reinforced laminate (TGF-EXSXXX-SI-GF)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

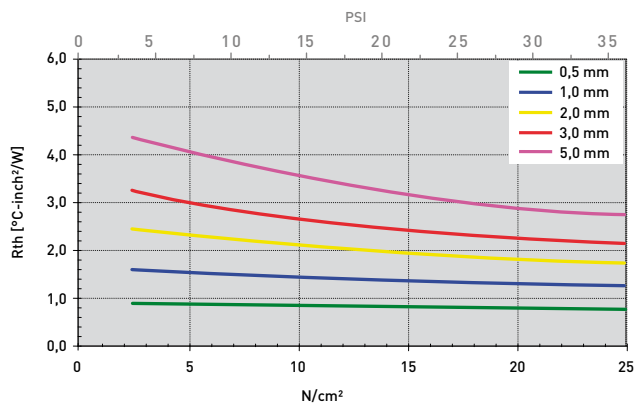
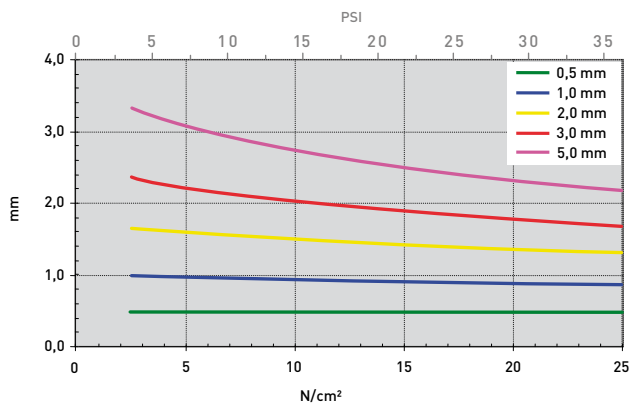
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs Smemory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications / Laptops / Medicine engineering / Embedded boards

| PROPERTY | UNIT | TGF-EXS0500-SI-GF | TGF-EXS1000-SI-GF | TGF-EXS2000-SI-GF | TGF-EXS3000-SI-GF | TGF-EXS5000-SI-GF |
|--|------------------------------|---|---|---|---|---|
| MATERIAL | | | | | | |
| Colour | | Ceramic filled silicone Reddish brown / Grey | Ceramic filled silicone Reddish brown / Grey | Ceramic filled silicone Reddish brown / Grey | Ceramic filled silicone Reddish brown / Grey | Ceramic filled silicone Reddish brown / Grey |
| Reinforcement | | Fibreglass laminate | Fibreglass laminate | Fibreglass laminate | Fibreglass laminate | Fibreglass laminate |
| Thickness | mm | 0.5 ±0.10 | 1.0 ±0.15 | 2.0 ±0.25 | 3.0 ±0.25 | 5.0 ±0.30 |
| Hardness | Shore 00 | 25 | 25 | 25 | 25 | 25 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance ¹ @ 35 PSI @ Thickness | °C-inch ² /W (mm) | 0.76 [0.46] | 1.26 [0.86] | 1.73 [1.30] | 2.14 [1.68] | 2.73 [2.17] |
| Resistance ¹ @ 15 PSI @ Thickness | °C-inch ² /W (mm) | 0.85 [0.47] | 1.44 [0.92] | 2.07 [1.50] | 2.63 [2.03] | 3.58 [2.72] |
| Resistance ¹ @ 7 PSI @ Thickness | °C-inch ² /W (mm) | 0.89 [0.48] | 1.54 [0.95] | 2.31 [1.58] | 3.00 [2.20] | 4.08 [3.06] |
| Thermal Conductivity ¹ | W/mK | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| Operating Temperature Range | °C | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 |
| ELECTRICALLY | | | | | | |
| Dielectric Strength | kV / mm | 20 | 20 | 20 | 20 | 20 |

Measurement technique according to: *ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm

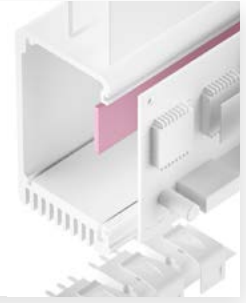
mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER TGF-UP-SI

plastic

TGF-UP-SI is an electrically insulating thermally conductive very high performance silicone gap filler. It is ideal for use in applications where a very good thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has an outstandingly high thermal conductivity. Through its softness and plasticity the material perfectly mates to irregular surfaces thus filling gaps at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- ☐ Plastic
- ☐ Soft and compliant
- ☐ Thermal conductivity: 4.0 W/mK
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Two-side self-tacky

AVAILABILITY

- ☐ Sheet 400 x 200 mm
- ☐ Tacky on both sides (TGF-UPXXX-SI)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

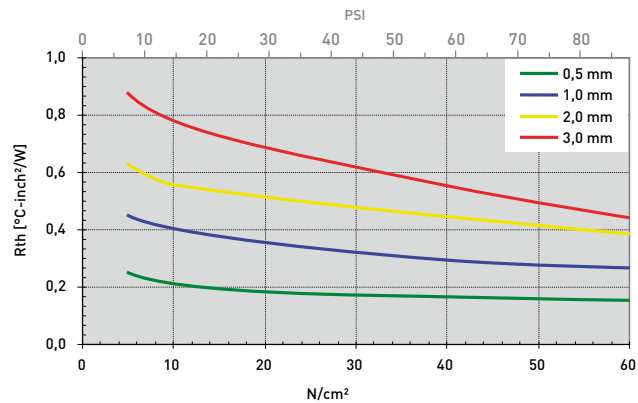
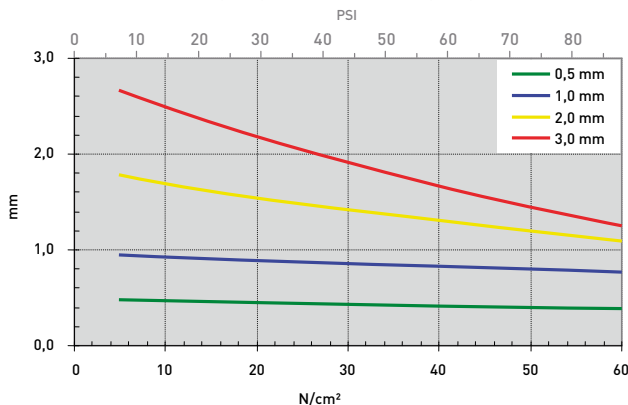
- ☐ ASICs, BGAs
 - ☐ Through-hole vias
 - ☐ Capacitors
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications /
Laptops / Medicine engineering /
Industrial PCs / Network Communication

| PROPERTY | UNIT | TGF-UP0500-SI | TGF-UP1000-SI | TGF-UP2000-SI | TGF-UP3000-SI |
|--|------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Purple | Purple | Purple | Purple |
| Density | g/cm ³ | 3.1 | 3.1 | 3.1 | 3.1 |
| Thickness | mm | 0.5 ±0.10 | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 |
| Hardness | Shore 00 | 60 | 60 | 55 | 55 |
| Shelf Life (unopened, dry storage conditions @ < 40°C) | Months | 12 | 12 | 12 | 12 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.17 [0.41] | 0.29 [0.82] | 0.44 [1.31] | 0.55 [1.66] |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.18 [0.44] | 0.36 [0.88] | 0.52 [1.54] | 0.68 [2.20] |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.23 [0.48] | 0.43 [0.94] | 0.60 [1.75] | 0.83 [2.61] |
| Thermal Conductivity ¹ | W/mK | 4.0 | 4.0 | 4.0 | 4.0 |
| Operating Temperature Range | °C | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 |
| ELECTRICALLY | | | | | |
| Dielectric Strength | kV / mm | > 6 | > 6 | > 6 | > 6 |
| Volume Resistivity | Ohm - cm | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ |
| Dielectric Constant | @ 1 MHz | 7.5 | 7.5 | 7.5 | 7.5 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.3 mm / 0.5 mm / 1.0 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm / 6.0 mm / ... / 10.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER TGF-WP-SI

plastic

TGF-WP-SI is an electrically insulating thermally conductive very high performance silicone gap filler. It is ideal for use in applications where a very good thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has an outstandingly high thermal conductivity. Through its softness and plasticity the material perfectly mates to irregular surfaces thus filling gaps at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



GAP FILLER

PROPERTIES

- ☐ Plastic
- ☐ Soft and compliant
- ☐ Thermal conductivity: 6.0 W/mK
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Two-side self-tacky

AVAILABILITY

- ☐ Sheet 400 x 200 mm
- ☐ Tacky on both sides (TGF-WPXXX-SI)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

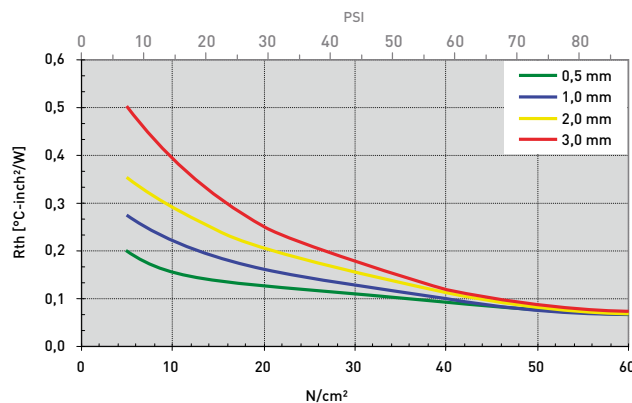
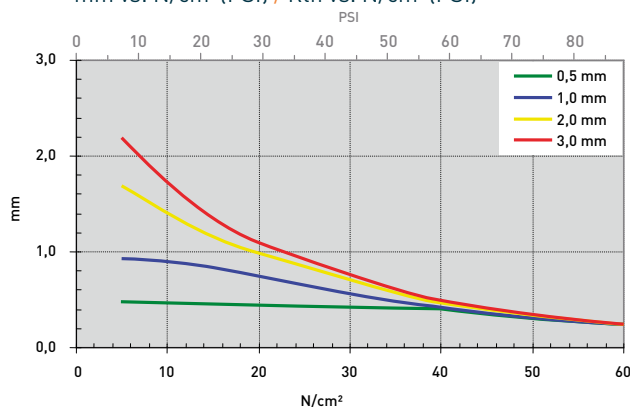
- ☐ ASICs, BGAs
 - ☐ Through-hole vias
 - ☐ Capacitors
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs / Network Communication

| PROPERTY | UNIT | TGF-WP0500-SI | TGF-WP1000-SI | TGF-WP2000-SI | TGF-WP3000-SI |
|--|------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Apricot | Apricot | Apricot | Apricot |
| Density | g/cm ³ | 3.3 | 3.3 | 3.3 | 3.3 |
| Thickness | mm | 0.5 ±0.10 | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 |
| Hardness | Shore 00 | 55 | 40 | 40 | 40 |
| Shelf Life (unopened, dry storage conditions @ < 40°C) | Months | 12 | 12 | 12 | 12 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.09 [0.40] | 0.10 [0.42] | 0.11 [0.48] | 0.11 [0.49] |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.12 [0.45] | 0.16 [0.75] | 0.20 [1.00] | 0.25 [1.10] |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.18 [0.48] | 0.25 [0.93] | 0.33 [1.59] | 0.46 [2.01] |
| Thermal Conductivity | W/mK | 6.0 | 6.0 | 6.0 | 6.0 |
| Operating Temperature Range | °C | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 | - 40 to + 150 |
| ELECTRICALLY | | | | | |
| Dielectric Strength | kV / mm | > 5 | > 5 | > 5 | > 5 |
| Volume Resistivity | Ohm - cm | 1.0 x 10 ¹² | 1.0 x 10 ¹² | 1.0 x 10 ¹² | 1.0 x 10 ¹² |
| Dielectric Constant | @ 1 MHz | 7.9 | 7.9 | 7.9 | 7.9 |

Measurement technique according to: ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 0.75 mm / 1.0 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm / ... / 10.0 mm

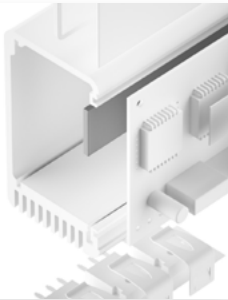
mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER TGF-YP-SI

plastic

TGF-YP-SI is an electrically insulating thermally conductive very high performance silicone gap filler. It is ideal for use in applications where a very good thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has an outstandingly high thermal conductivity. Through its softness and plasticity the material perfectly mates to irregular surfaces thus filling gaps at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- ☐ Plastic
- ☐ Soft and compliant
- ☐ Thermal conductivity: 7.0 W/mK
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Two-side self-tacky

AVAILABILITY

- ☐ Sheet 460 x 100 mm
- ☐ Tacky on both sides (TGF-YPXXX-SI)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

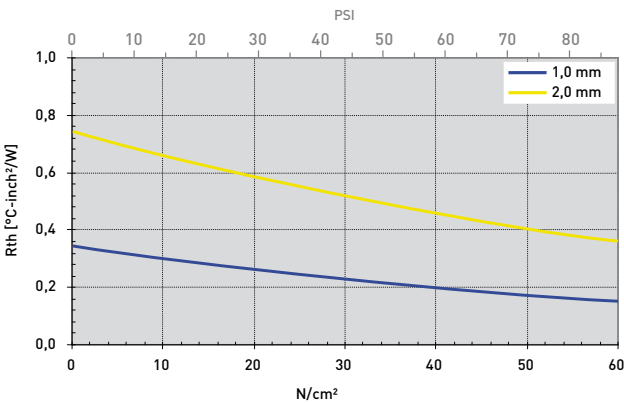
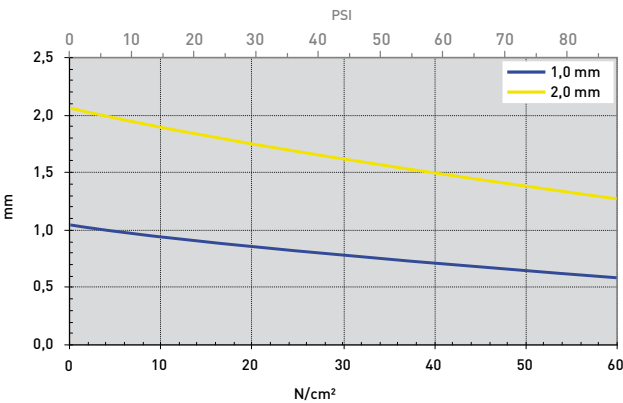
- Thermal link of:
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ Capacitors
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-YP1000-SI | TGF-YP2000-SI |
|----------------------------------|-----------------|---------------------------------|---------------------------------|
| MATERIAL | | | |
| Colour | | Ceramic filled silicone Grey | Ceramic filled silicone Grey |
| Thickness | mm | 1.0 ±0.10 | 2.0 ±0.20 |
| Hardness | Shore 00 | 55 | 55 |
| UL Flammability (Equivalent) | UL 94 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| THERMAL | | | |
| Resistance¹ @ 60 PSI @ Thickness | °C-inch²/W (mm) | 0.20 (0.75) | 0.45 (1.50) |
| Resistance¹ @ 30 PSI @ Thickness | °C-inch²/W (mm) | 0.27 (0.90) | 0.59 (1.75) |
| Resistance¹ @ 10 PSI @ Thickness | °C-inch²/W (mm) | 0.32 (0.95) | 0.67 (1.90) |
| Thermal Conductivity | W/mK | 7.0 | 7.0 |
| Operating Temperature Range | °C | - 40 to + 150 | - 40 to + 150 |
| ELECTRICALLY | | | |
| Dielectric Strength | kV / mm | >10 | >10 |
| Volume Resistivity | Ohm - cm | > 1.0 x 10¹² | > 1.0 x 10¹² |
| Dielectric Constant | @ 1 MHz | 7 | 7 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 1.0 mm / 2.0 mm / 3.0 mm

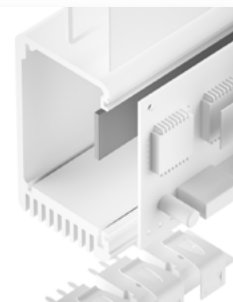
mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TGF-YSP-SI

plastic, soft

TGF-YSP-SI is an electrically insulating thermally conductive very high performance silicone gap filler. It is ideal for use in applications where a very good thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has an outstandingly high thermal conductivity. Through its high softness and plasticity the material perfectly mates to irregular surfaces thus filling gaps at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- ☐ Plastic
- ☐ Soft and compliant
- ☐ Thermal conductivity: 8.0 W/mK
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Two-side self-tacky

AVAILABILITY

- ☐ Sheet 300 x 400 mm
- ☐ Tacky on both sides (TGF-YSPXXX-SI)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

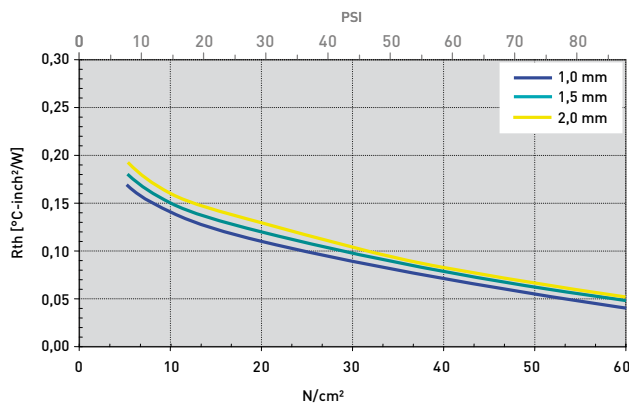
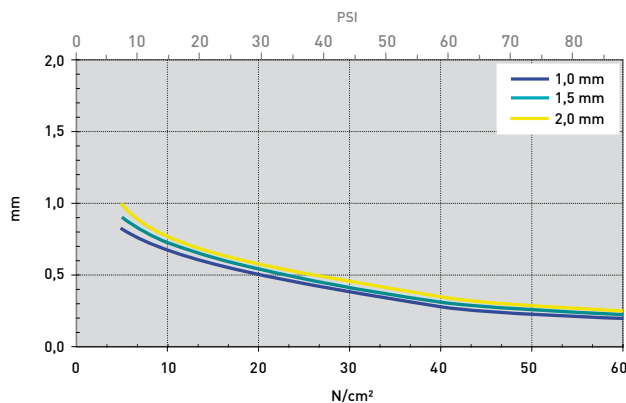
- ☐ SMD packages
 - ☐ Through-hole-vias
 - ☐ Capacitors
 - ☐ Electronic parts to heat pipes
- For use in 5G base stations / Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-YSP1000-SI | TGF-YSP1500-SI | TGF-YSP2000-SI |
|--|------------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Grey | Grey | Grey |
| Density | g/cm ³ | 3.4 | 3.4 | 3.4 |
| Thickness | mm | 1.0 ±0.15 | 1.5 ±0.15 | 2.0 ±0.20 |
| Hardness | Shore 00 | 40 | 40 | 40 |
| UL Flammability (Equivalent) | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.07 [0.28] | 0.07 [0.32] | 0.08 [0.35] |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.11 [0.51] | 0.12 [0.55] | 0.13 [0.58] |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.16 [0.76] | 0.17 [0.83] | 0.18 [0.91] |
| Thermal Conductivity | W/mK | 8.0 | 8.0 | 8.0 |
| Operating Temperature Range | °C | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 |
| ELECTRICALLY | | | | |
| Dielectric Strength | kV / mm | 7.5 | 7.5 | 7.5 |
| Volume Resistivity | Ohm - cm | 1.3 x 10 ¹² | 1.3 x 10 ¹² | 1.3 x 10 ¹² |
| Dielectric Constant | @ 1 MHz | 11 | 11 | 11 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 1.0 mm / 1.5 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER TGF-ZP-SI

plastic

TGF-ZP-SI is an electrically insulating thermally conductive silicone gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. Due to the specific formulation and filling with ceramic particles the silicone elastomer has an extremely high thermal conductivity. Through its extreme softness and plasticity the material perfectly mates to irregular surfaces thus filling gaps at almost zero pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- ☐ Plastic
- ☐ Extremely soft and compliant
- ☐ Thermal conductivity: 11 W/mK
- ☐ Operates at almost zero pressure
- ☐ For minimal gaps
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Easy mounting through self tackiness

AVAILABILITY

- ☐ Sheet 300 x 200 mm
- ☐ Tacky on both sides (TGF-ZPXXXX-SI)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

- Thermal link of:
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Capacitors
- For use in Automotive applications / Laptops / Medicine engineering / Embedded boards

| PROPERTY | UNIT | TGF-ZP1500-SI | TGF-ZP2000-SI |
|-----------------------------|-----------------|---------------------------------------|---------------------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Light grey | Light grey |
| Reinforcement | | None | None |
| Thickness | mm | 1.5 ^{+0.50} _{-0.00} | 2.0 ^{+0.70} _{-0.00} |
| Density | g/cm³ | 3.3 | 3.3 |
| UL Flammability | UL 94 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| THERMAL | | | |
| Resistance¹ @ 1.5 mm | °C-inch²/W | --- | 0.24 |
| Resistance¹ @ 0.8 mm | °C-inch²/W | 0.14 | 0.14 |
| Resistance¹ @ 0.5 mm | °C-inch²/W | 0.10 | 0.10 |
| Resistance¹ @ 0.2 mm | °C-inch²/W | 0.06 | 0.06 |
| Thermal Conductivity | W/mK | 11 | 11 |
| Operating Temperature Range | °C | - 50 to + 180 | -50 to + 180 |
| ELECTRICAL | | | |
| Dielectric Strength | kV / mm | 11 | 11 |
| Dielectric Constant | @ 1 MHz | 7.5 | 7.5 |
| Volume Resistivity | Ohm - cm | 7.0 x 10 ⁷ | 7.0 x 10 ⁷ |

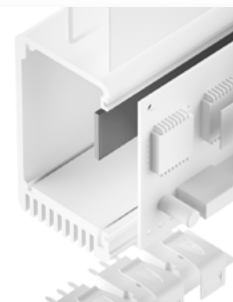
Measurement technique according to: ¹ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 1.5 mm / 2.0 mm

SILICONE GAP FILLER PAD TEL-R-SI

highly thermally conductive elastomer / Low Volatile Siloxanes (LV)

TEL-R-SI is a low dielectric, high performance thermally conductive LV silicone gap filler for an optimised thermal coupling between electronic packages and heat sinks even over large gaps or big tolerances. Through the specific formulation and filling with highly thermally conductive particles an extraordinary high anisotropic thermal conductivity is reached. Its conformal surface structure and extreme softness guarantee a very good compliance to the contact surfaces at very low pressure. Thus the total thermal resistance is minimised. The elastomer shows a low dielectric strength.



PROPERTIES

- ☐ High surface compliance and extremely soft
- ☐ Low volatile siloxane content (LV)
- ☐ Thermal conductivity: 15 W/mK (anisotropic)
- ☐ Low dielectric
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing

AVAILABILITY

- ☐ Sheet 150 x 150 mm (Thickness 0.5 – 1.5 mm)
- ☐ Sheet 140 x 140 mm (Thickness 2.0 – 3.0 mm)
- ☐ Double-side self tacky (TEL-RXXXX-SI)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

- ☐ MOSFETs und IGBTs
- ☐ Power diodes or AC/DC converters
- ☐ Power modules
- ☐ CPUs

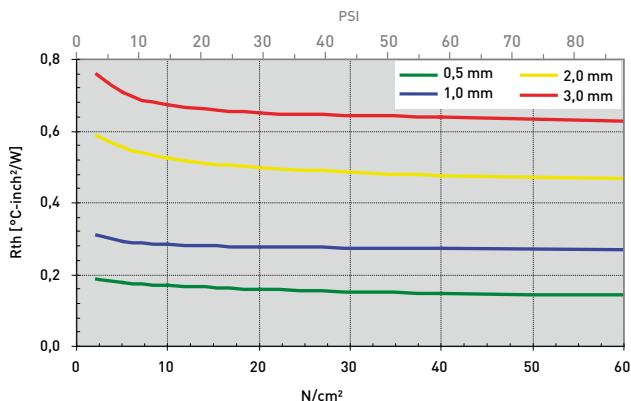
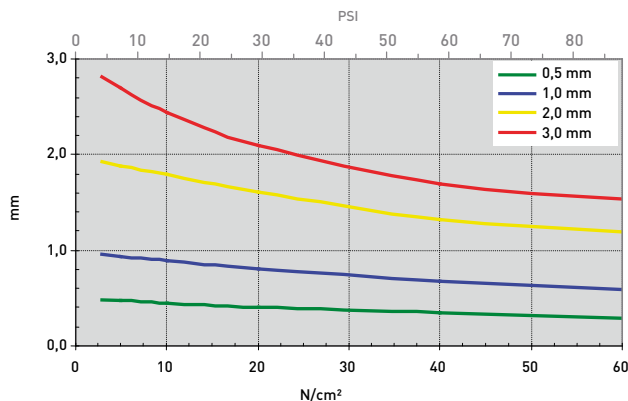
For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TEL-R0500-SI | TEL-R1000-SI | TEL-R2000-SI |
|--|------------------------------|------------------------|------------------------|------------------------|
| MATERIAL | | | | |
| Colour | | Black | Black | Black |
| Thickness | mm | 0.5 ±0.05 | 1.0 ±0.10 | 2.0 ±0.20 |
| Hardness | Shore 00 | 55 | 55 | 55 |
| Flammability (Equivalent) | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ¹ @ 90 PSI Thickness | °C-inch ² /W (mm) | 0.15 (0.30) | 0.27 (0.60) | 0.47 (1.20) |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.16 (0.41) | 0.28 (0.81) | 0.50 (1.61) |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.18 (0.47) | 0.29 (0.93) | 0.54 (1.85) |
| Thermal Conductivity | W/mK | 15 | 15 | 15 |
| Operating Temperature Range | °C | - 50 to + 180 | - 50 to + 180 | - 50 to + 180 |
| ELECTRICAL | | | | |
| Dielectric Strength | kV/mm | 1.0 | 1.0 | 1.0 |
| Volume Resistivity | Ohm - cm | ≥ 1 x 10 ¹² | ≥ 1 x 10 ¹² | ≥ 1 x 10 ¹² |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.5 mm / 1.0 mm / 2.0 mm / 3.0 mm

mm vs. N/cm² (PSI) / R_{th} vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TEL-Z-SI

highly thermally conductive elastomer / Low Volatile Siloxanes (LV)

TEL-Z-SI is a non dielectric high performance thermally conductive LV silicone foil for an optimised thermal coupling between electronic packages and heat sinks even over large gaps or big tolerances. Through the specific formulation and filling an extraordinary high anisotropic thermal conductivity is reached. Its conformal surface structure and high softness guarantee a very good compliance to the contact surfaces at low pressure. Thus the total thermal resistance is minimised.



PROPERTIES

- High surface compliance and softness
- Low volatile siloxane content (LV)
- Non dielectric
- No paint wetting impairment
- Thermal conductivity: 50 W/mK (anisotropic)
- Extraordinary chemical resistance and longterm stability
- Shock absorbing

AVAILABILITY

- Sheet 140 x 140 mm (TEL-ZXXXX-SI)
- Die cut parts
- Optional with adhesive stripes or dots (TEL-ZXXXX-SI-A1)

APPLICATION EXAMPLES

Thermal link of:

- MOSFETs or IGBTs
- Power diodes or AC/DC converters
- Power modules

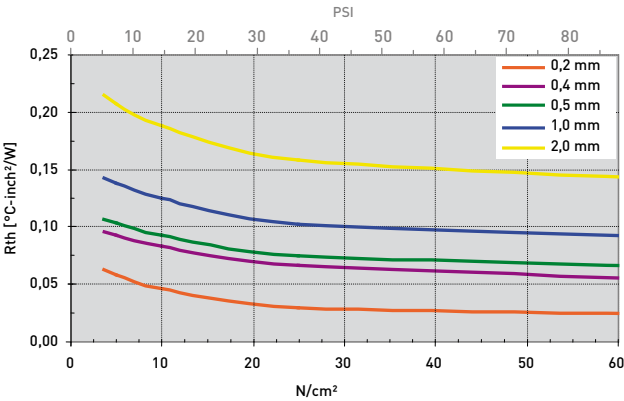
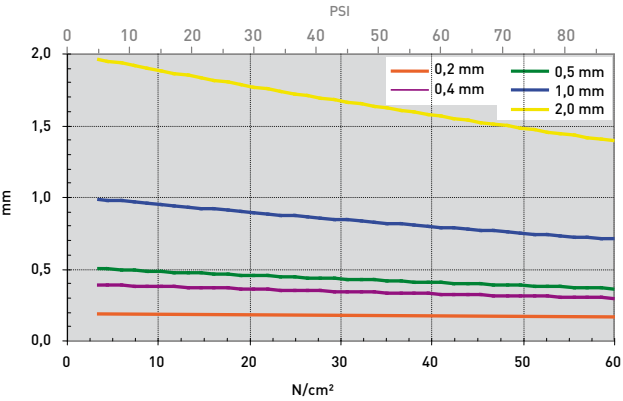
For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TEL-Z0200-SI | TEL-Z0500-SI | TEL-Z1000-SI |
|--|-----------------|-------------------------------------|-------------------------------------|-------------------------------------|
| MATERIAL | | | | |
| Colour | | Graphite filled silicone elastomere | Graphite filled silicone elastomere | Graphite filled silicone elastomere |
| Thickness | mm | Black | Black | Black |
| Hardness | Shore 00 | 0.2 ±0.05 | 0.5 ±0.05 | 1.0 ±0.10 |
| No Paint Wetting Impairment Substances (PWIS) ¹ | | 75 | 75 | 75 |
| Flammability | UL 94 | Passed | Passed | Passed |
| RoHS Conformity | 2015 / 863 / EU | V0 | V0 | V0 |
| Yes | | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance² @ 90 PSI @ Thickness | °C-inch²/W (mm) | 0.020 (0.16) | 0.060 (0.33) | 0.09 (0.70) |
| Resistance² @ 30 PSI @ Thickness | °C-inch²/W (mm) | 0.027 (0.18) | 0.075 (0.48) | 0.11 (0.91) |
| Resistance² @ 10 PSI @ Thickness | °C-inch²/W (mm) | 0.050 (0.19) | 0.095 (0.49) | 0.13 (0.97) |
| Thermal Conductivity | W/mK | 50 | 50 | 50 |
| Operating Temperature Range | °C | - 50 to + 180 | - 50 to + 180 | - 50 to + 180 |
| ELECTRICAL | | | | |
| Volume Resistivity | Ohm - cm | < 50,000 | < 50,000 | < 50,000 |

Measurement technique according to: ¹P-VW 3-10.7 57650 Temp. Test, ²ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.2 mm / 0.4 mm / 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE GAP FILLER PAD TEL-YSS-SI

very soft, highly thermally conductive elastomer / Low Volatile Siloxanes (LV)

TEL-YSS-SI is a non dielectric high performance thermally conductive LV silicone gap filler for an optimised thermal coupling between electronic packages and heat sinks even over large gaps or big tolerances. Through the specific formulation and filling an extraordinary high anisotropic thermal conductivity is reached. Its conformal surface structure and extraordinary softness guarantee a very good compliance to the contact surfaces at low pressure. Thus the total thermal resistance is minimised.



GAP FILLER

PROPERTIES

- ☐ High surface compliance and extraordinary softness
- ☐ Low volatile siloxane content (LV)
- ☐ Non dielectric
- ☐ Thermal conductivity: 16 W/mK (anisotropic)
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Shock absorbing

AVAILABILITY

- ☐ Sheet 130 x 130 mm (TEL-YSSXXX-SI)
- ☐ Die cut parts
- ☐ Optional with adhesive stripes or dots (TEL-YSSXXX-SI-A1)

APPLICATION EXAMPLES

Thermal link of:

- ☐ MOSFETs or IGBTs
- ☐ Power diodes or AC/DC converters
- ☐ Power modules

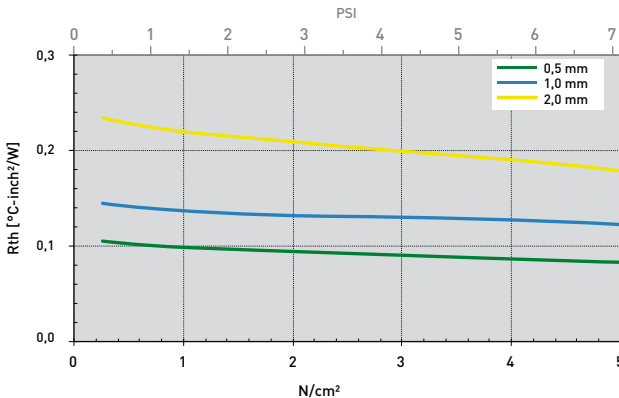
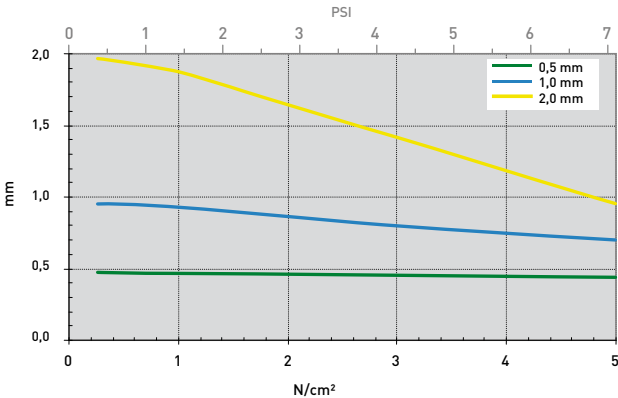
For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TEL-YSS0500-SI | TEL-YSS1000-SI | TEL-YSS2000-SI |
|---|------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| MATERIAL | | | | |
| Material | | Graphite filled silicone elastomere | Graphite filled silicone elastomere | Graphite filled silicone elastomere |
| Colour | | Black | Black | Black |
| Thickness | mm | 0.5 ±0.05 | 1.0 ±0.10 | 2.0 ±0.20 |
| Hardness | Shore 00 | 40 | 40 | 40 |
| Flammability | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ¹ @ 7.5 PSI @ Thickness | °C-inch ² /W (mm) | 0.083 (0.42) | 0.124 (0.700) | 0.180 (0.954) |
| Resistance ¹ @ 3.5 PSI @ Thickness | °C-inch ² /W (mm) | 0.089 (0.45) | 0.129 (0.785) | 0.205 (1.550) |
| Resistance ¹ @ 1.5 PSI @ Thickness | °C-inch ² /W (mm) | 0.100 (0.47) | 0.137 (0.934) | 0.220 (1.874) |
| Thermal Conductivity ¹ | W/mK | 16 | 16 | 16 |
| Operating Temperature Range | °C | - 50 to + 180 | - 50 to + 180 | - 50 to + 180 |
| ELECTRICAL | | | | |
| Volume Resistivity | Ohm - cm | < 50,000 | < 50,000 | < 50,000 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 3.0 mm

mm vs. N/cm² [PSI] / Rth vs. N/cm² [PSI]



SILICONE GAP FILLER PAD TEL-ZS-SI

soft, highly thermally conductive elastomer / Low Volatile Siloxanes (LV)

TEL-ZS-SI is a non dielectric high performance thermally conductive LV silicone foil for an optimised thermal coupling between electronic packages and heat sinks even over large gaps or big tolerances. Through the specific formulation and filling an extraordinary high anisotropic thermal conductivity is reached. Its conformal surface structure and high softness guarantee a very good compliance to the contact surfaces at low pressure. Thus the total thermal resistance is minimised.



PROPERTIES

- High surface compliance and softness
- Low volatile siloxane content (LV)
- Non dielectric
- Thermal conductivity: 20 W/mK (anisotropic)
- Extraordinary chemical resistance and longterm stability
- Shock absorbing

AVAILABILITY

- Sheet 120 x 120 mm (TEL-ZSXXXX-SI)
- Die cut parts
- Optional with adhesive stripes or dots (TEL-ZSXXXX-SI-A1)

APPLICATION EXAMPLES

Thermal link of:

- MOSFETs or IGBTs
- Power diodes or AC/DC converters
- Power modules

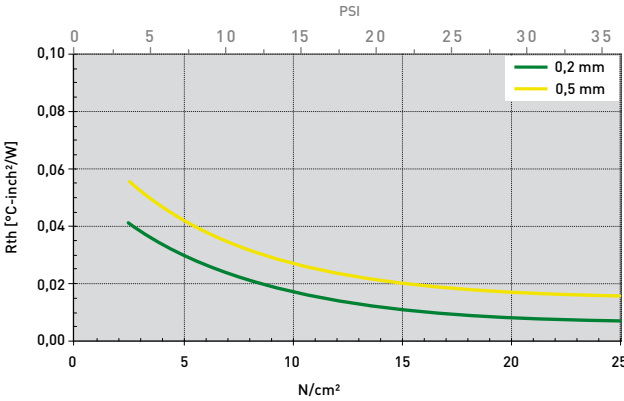
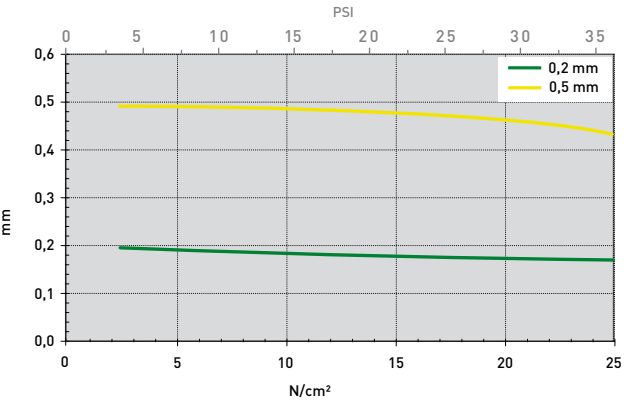
For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TEL-ZS0200-SI | TEL-ZS0500-SI |
|----------------------------------|-----------------|-----------------------------------|-----------------------------------|
| MATERIAL | | | |
| Material | | Carbon filled silicone elastomere | Carbon filled silicone elastomere |
| Colour | | Black | Black |
| Thickness | mm | 0.2 ±0.05 | 0.5 ±0.05 |
| Hardness | Shore 00 | 60 | 60 |
| Flammability | UL 94 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| THERMAL | | | |
| Resistance¹ @ 35 PSI @ Thickness | °C-inch²/W (mm) | 0.007 (0.17) | 0.018 (0.44) |
| Resistance¹ @ 15 PSI @ Thickness | °C-inch²/W (mm) | 0.017 (0.18) | 0.027 (0.48) |
| Resistance¹ @ 7 PSI @ Thickness | °C-inch²/W (mm) | 0.030 (0.19) | 0.042 (0.49) |
| Thermal Conductivity¹ | W/mK | 20 | 20 |
| Operating Temperature Range | °C | - 40 to + 150 | - 40 to + 150 |
| ELECTRICAL | | | |
| Volume Resistivity | Ohm - cm | < 50,000 | < 50,000 |

Test Methods: ¹ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.2 mm / 0.3 mm / 0.5 mm

mm vs. N/cm² [PSI] / Rth vs. N/cm² [PSI]



2-PART SILICONE GAP FILLER TDG-L-SI-2C-Y

dispensable / 2 parts / Low Volatile Siloxanes (LV) / Form-in-Place

TDG-L-SI-2C-Y is a 2-part dispensable low volatile LV silicone gap filler which is filled with thermally conductive fillers. After curing under heat the system remains elastic. It is characterised by very good dielectric and mechanic properties and is suited for compensating extreme tolerances and spaces at non-coplanar systems. Its thixotropic behaviour allows for a definite placement and cure-in-place. It has a natural low level tack that enhances a good thermal contact. Due to its negligible and controlled volatile content it is suited for environments where volatile silicones and paint wetting impairment are critical.



PROPERTIES

- ☐ Dispensable 2-part silicone
- ☐ Low volatile siloxane content (LV)
- ☐ No paint wetting impairment
- ☐ Thermal conductivity: 2.0 W/mK
- ☐ Remains elastic after polymerisation
- ☐ Zero stress on components
- ☐ Heat accelerated curing
- ☐ Shock absorbing

AVAILABILITY

- ☐ Optional in blue colour: TDG-L-SI-2C
- ☐ Cartridges 2 x 25 ml / 2 x 100 ml / 2 x 200 ml / 2 x 600 ml
- ☐ Pail 2 x 25 kg / 2 x 35 kg
- ☐ On request

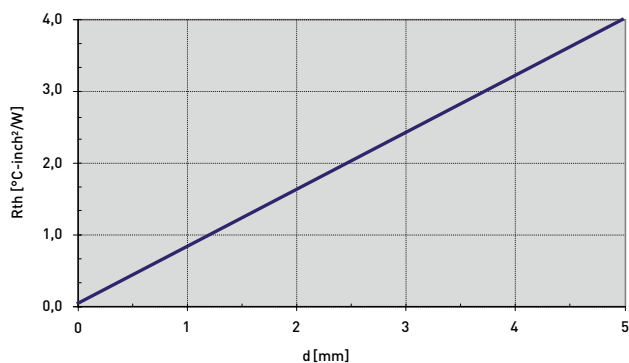
APPLICATION EXAMPLES

Thermal link of:

- ☐ FPBGA
 - ☐ Capacitors
 - ☐ Heat Pipes
 - ☐ BGA
- For use in Automotive applications / Telecommunication / Multimedia / Industrial PCs

| PROPERTY | UNIT | A Part | B Part |
|--|--------------------|----------------------|----------------------|
| MATERIAL | | | |
| Colour | | Yellow | White |
| Density @ 25 °C | g/cm ³ | 1.9 | 1.9 |
| Mixing Ratio | Weight or Volume | 1 : 1 | 1 : 1 |
| Hardness | Shore 00 | 52 | 52 |
| Viscosity [Brookfield @ 10 rpm, 25 °C] | Pas | 260 | 260 |
| Viscosity (mixed) [Brookfield @ 10 rpm, 25 °C] | Pas | 260 | 260 |
| Pot Life @ 25 °C and 65 % RH (Time for viscosity to double) | min | > 120 | > 120 |
| Curing Time @ 25 °C / 100 °C | | < 24h / 15 - 30 min | < 24h / 15 - 30 min |
| Shelf Life (from Date of Manufacturing, unopened, @ < 35 °C) | Months | 6 | 6 |
| Outgasing ¹ | TML / CVCM / WVR % | 0.16 / 0.03 / 0.04 | 0.16 / 0.03 / 0.04 |
| No Paint Wetting Impairment Substances (PWIS) ² | | Passed | Passed |
| Flammability | UL 94 | VO | VO |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| TECHNICAL | | | |
| Thermal Conductivity ³ | W/mK | 2.0 | 2.0 |
| Operating Temperature | °C | - 50 to + 150 | - 50 to + 150 |
| Dielectric Strength | kV/mm | > 10 | > 10 |
| Volume Resistivity | Ohm - cm | 1 x 10 ¹⁰ | 1 x 10 ¹⁰ |

Measurement technique according to: ¹ ASTM E 595, ² P-VW 3-10.7 57650 Temp. Test, ³ ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Warning: Only A / B part of the same lot number may be processed together.



2-PART SILICONE GAP FILLER TDG-T-SI-2C

dispensable / 2 parts / Low Volatile Siloxanes (LV) / Form-in-Place

TDG-T-SI-2C is a 2-part dispensable low volatile LV silicone gap filler which is filled with thermally conductive fillers. After curing under heat the system remains elastic. It is characterised by very good dielectric and mechanic properties and is suited for compensating extreme tolerances and spaces at non-coplanar systems. Its thixotropic behaviour allows for a definite placement and cure-in-place. It has a natural low level tack that enhances a good thermal contact. Due to its negligible and controlled volatile content it is suited for environments where volatile silicones and paint wetting impairment are critical.



PROPERTIES

- ☐ Dispensable 2-part silicone
- ☐ Low volatile siloxane content (LV)
- ☐ No paint wetting impairment
- ☐ Thermal conductivity: 3.0 W/mK
- ☐ Remains elastic after polymerisation
- ☐ Zero stress on components
- ☐ Heat accelerated curing
- ☐ Shock absorbing

AVAILABILITY

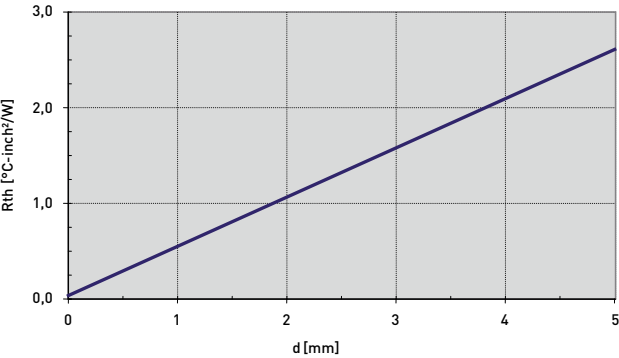
- ☐ Cartridges 2 x 25 ml / 2 x 100 ml / 2 x 200 ml / 2 x 600 ml
- ☐ Pail 2 x 25 kg / 2 x 35 kg
- ☐ On request

APPLICATION EXAMPLES

- Thermal link of:
- ☐ FPBGA
 - ☐ Capacitors
 - ☐ Heat Pipes
 - ☐ BGA
- For use in Automotive applications / Telecommunication / Multimedia / Industrial PCs

| PROPERTY | UNIT | A Part | B Part |
|--|--------------------|---------------------|---------------------|
| MATERIAL | | | |
| Colour | | Blue | White |
| Density @ 25 °C | g/cm³ | 2.75 | 2.75 |
| Mixing Ratio | Weight or Volume | 1 : 1 | 1 : 1 |
| Hardness | Shore 00 | 55 | 55 |
| Viscosity (Brookfield @ 10 rpm, 25 °C) | Pas | 290 | 260 |
| Viscosity (mixed) (Brookfield @ 10 rpm, 25 °C) | Pas | 275 | 275 |
| Pot Life @ 25 °C and 65 % RH (Time for viscosity to double) | min | > 120 | > 120 |
| Curing Time @ 25 °C / 100 °C | | < 15h / 15 - 30 min | < 15h / 15 - 30 min |
| Shelf Life (from Date of Manufacturing, unopened, @ < 35 °C) | Months | 6 | 6 |
| Outgasing¹ | TML / CVCM / WVR % | 0.07 / 0.02 / 0.02 | 0.07 / 0.02 / 0.02 |
| No Paint Wetting Impairment Substances (PWIS)² | | Passed | Passed |
| Flammability | UL 94 | VO | VO |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| TECHNICAL | | | |
| Thermal Conductivity³ | W/mK | 3.0 | 3.0 |
| Operating Temperature | °C | - 50 to + 150 | - 50 to + 150 |
| Dielectric Strength | kV/mm | > 10 | > 10 |
| Volume Resistivity | Ohm - cm | 1 x 10¹⁰ | 1 x 10¹⁰ |

Measurement technique according to: ¹ASTM E 595, ²P-VW 3-10.7 57650 Temp. Test, ³ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Warning: Only A / B part of the same lot number may be processed together.



2-PART SILICONE GAP FILLER TDG-U-SI-2C

dispensable / 2 parts / Low Volatile Siloxanes (LV) / Form-in-Place

TDG-U-SI-2C is a 2-part dispensable low volatile LV silicone gap filler which is filled with thermally conductive fillers. After curing under heat the system remains elastic. It is characterised by very good dielectric and mechanic properties and is suited for compensating extreme tolerances and spaces at non-coplanar systems. Its thixotropic behaviour allows for a definite placement and cure-in-place. It has a natural low level tack that enhances a good thermal contact. Due to its negligible and controlled volatile content it is suited for environments where volatile silicones and paint wetting impairment are critical.



GAP FILLER

PROPERTIES

- ☐ Dispensable 2-part silicone
- ☐ Low volatile siloxane content (LV)
- ☐ No paint wetting impairment
- ☐ Thermal conductivity: 3.6 W/mK
- ☐ Remains elastic after polymerisation
- ☐ Zero stress on components
- ☐ Heat accelerated curing
- ☐ Shock absorbing

AVAILABILITY

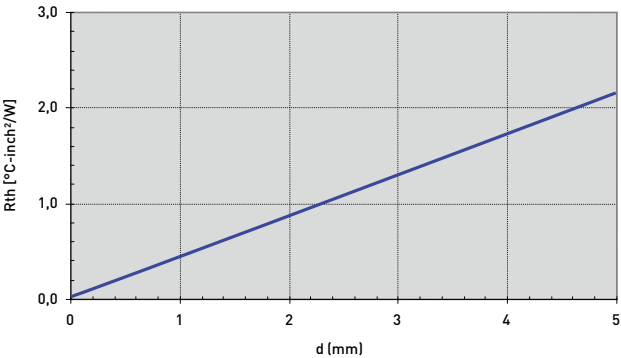
- ☐ Cartridges 2 x 25 ml / 2 x 100 ml / 2 x 200 ml / 2 x 600 ml
- ☐ Pail 2 x 25 kg / 2 x 35 kg
- ☐ On request
- ☐ Optional with glass beads

APPLICATION EXAMPLES

- Thermal link of:
- ☐ FPBGA
 - ☐ Capacitors
 - ☐ Heat Pipes
 - ☐ BGA
- For use in Automotive applications / Telecommunication / Multimedia / Industrial PCs

| PROPERTY | UNIT | A Part | B Part |
|--|--------------------|----------------------|----------------------|
| MATERIAL | | | |
| Colour | | Light Blue | White |
| Density @ 25 °C | g/cm³ | 2.85 | 2.85 |
| Mixing Ratio | Weight or Volume | 1 : 1 | 1 : 1 |
| Hardness | Shore 00 | 38 | 38 |
| Viscosity (Brookfield @ 10 rpm, 25 °C) | Pas | 220 | 190 |
| Viscosity (mixed) (Brookfield @ 10 rpm, 25 °C) | Pas | 260 | 260 |
| Pot Life @ 25 °C and 65 % RH (Time for viscosity to double) | min | > 100 | > 100 |
| Curing Time @ 25 °C / 100 °C | | < 15h / 15 - 30 min | < 15h / 15 - 30 min |
| Shelf Life (from Date of Manufacturing, unopened, @ < 35 °C) | Months | 6 | 6 |
| Outgasing ¹ | TML / CVCM / WVR % | 0.07 / 0.02 / 0.04 | 0.07 / 0.02 / 0.04 |
| No Paint Wetting Impairment Substances (PWIS) ² | | Passed | Passed |
| Flammability | UL 94 | VO | VO |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| TECHNICAL | | | |
| Thermal Conductivity ³ | W/mK | 3.6 | 3.6 |
| Operating Temperature | °C | - 50 to + 150 | - 50 to + 150 |
| Dielectric Strength | kV/mm | > 10 | > 10 |
| Volume Resistivity | Ohm - cm | 1 x 10 ¹⁰ | 1 x 10 ¹⁰ |

Measurement technique according to: ¹ ASTM E 595, ² P-VW 3-10.7 57650 Temp. Test, ³ ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information. Warning: Only A / B part of the same lot number may be processed together.



2-PART SILICONE GAP FILLER TDG-W-SI-2C

dispensable / 2 parts / Low Volatile Siloxanes (LV) / Form-in-Place

TDG-W-SI-2C is a 2-part dispensable low volatile LV silicone gap filler which is filled with thermally conductive fillers. After curing under heat the system remains elastic. It is characterised by very good dielectric and mechanic properties and is suited for compensating extreme tolerances and spaces at non-coplanar systems. Its thixotropic behaviour allows for a definite placement and cure-in-place. It has a natural low level tack that enhances a good thermal contact. Due to its negligible and controlled volatile content it is suited for environments where volatile silicones and paint wetting impairment are critical.



PROPERTIES

- ☐ Dispensable 2-part silicone
- ☐ Low volatile siloxane content (LV)
- ☐ No paint wetting impairment
- ☐ Thermal conductivity: 4.5 W/mK
- ☐ Remains elastic after polymerisation
- ☐ Zero stress on components
- ☐ Heat accelerated curing
- ☐ Shock absorbing

AVAILABILITY

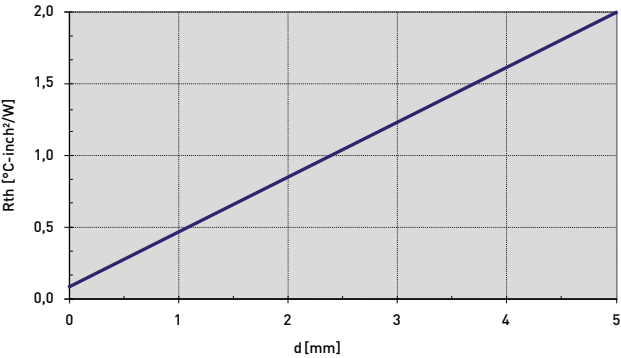
- ☐ Cartridges 2 x 25 ml / 2 x 100 ml / 2 x 200 ml / 2 x 600 ml
- ☐ Pail 2 x 25 kg
- ☐ On request

APPLICATION EXAMPLES

- Thermal link of:
- ☐ FPBGA
 - ☐ Capacitors
 - ☐ Heat Pipes
 - ☐ BGA
- For use in Automotive applications / Telecommunication / Multimedia / Industrial PCs

| PROPERTY | UNIT | A Part | B Part |
|--|------------------|--------------------|--------------------|
| MATERIAL | | Silicone | Silicone |
| Colour | | Pink | White |
| Density @ 25 °C | g/cm³ | 3.15 | 3.15 |
| Mixing Ratio | Weight or Volume | 1 : 1 | 1 : 1 |
| Hardness | Shore 00 | 55 | 55 |
| Viscosity (Brookfield @ 10 rpm, 25 °C) | Pas | 250 | 250 |
| Viscosity (mixed) (Brookfield @ 10 rpm, 25 °C) | Pas | 250 | 250 |
| Pot Life @ 25 °C and 65 % RH (Time for viscosity to double) | min | > 120 | > 120 |
| Curing Time @ 25 °C / 100 °C | | < 24 h / 15-30 min | < 24 h / 15-30 min |
| Shelf Life (from Date of Manufacturing, unopened, @ < 35 °C) | Months | 6 | 6 |
| No Paint Wetting Impairment Substances (PWIS)¹ | | Passed | Passed |
| Flammability | UL 94 | V0 (≥ 0.15 mm) | V0 (≥ 0.15 mm) |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| TECHNICAL | | | |
| Thermal Conductivity² | W/mK | 4.5 | 4.5 |
| Operating Temperature | °C | - 40 to + 150 | - 40 to + 150 |
| Dielectric Strength | kV/mm | > 10 | > 10 |
| Volume Resistivity | Ohm - cm | > 1 x 10¹⁰ | > 1 x 10¹⁰ |

Measurement technique according to: ¹P-VW 3-10.7 57650 Temp. Test, ²ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Warning: Only A / B part of the same lot number may be processed together.



2-PART SILICONE GAP FILLER TDG-Y-SI-2C

dispensable / 2 parts / Low Volatile Siloxanes (LV) / Form-in-Place

TDG-Y-SI-2C is a 2-part dispensable low volatile LV silicone gap filler which is filled with thermally conductive fillers. After curing under heat the system remains elastic. It is characterised by very good dielectric and mechanic properties and is suited for compensating extreme tolerances and spaces at non-coplanar systems. Its thixotropic behaviour allows for a definite placement and cure-in-place. It has a natural low level tack that enhances a good thermal contact. Due to its negligible and controlled volatile content it is suited for environments where volatile silicones are critical.



GAP FILLER

PROPERTIES

- ☐ Dispensable 2-part silicone
- ☐ Low volatile siloxane content (LV)
- ☐ Thermal conductivity: 6 W/mK
- ☐ Remains elastic after polymerisation
- ☐ Zero stress on components
- ☐ Heat accelerated curing
- ☐ Shock absorbing

AVAILABILITY

- ☐ Cartridges 2 x 25 ml / 2 x 100 ml / 2 x 200 ml / 2 x 330 ml / 2 x 600 ml
- ☐ Pail 2 x 25 kg
- ☐ On request

APPLICATION EXAMPLES

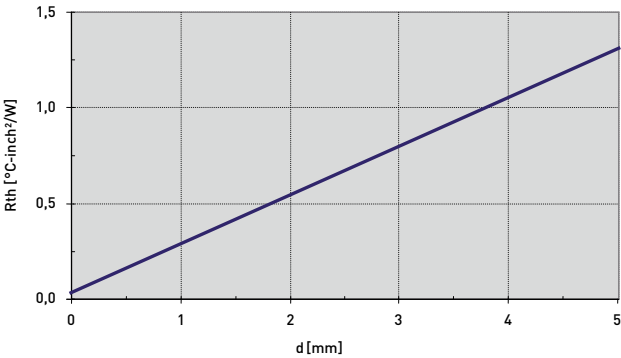
Thermal link of:

- ☐ FPBGA
- ☐ Capacitors
- ☐ Heat Pipes
- ☐ BGA

For use in Automotive applications / Telecommunication / Multimedia / Industrial PCs

| PROPERTY | UNIT | A Part | B Part |
|--|------------------|------------------------|------------------------|
| MATERIAL | | Silicone | Silicone |
| Colour | | Dark Blue | White |
| Density @ 25 °C | g/cm³ | 3.4 | 3.4 |
| Mixing Ratio | Weight or Volume | 1 : 1 | 1 : 1 |
| Hardness | Shore 00 | 50 | 50 |
| Viscosity (Brookfield @ 10 rpm, 25 °C) | Pas | 350 | 350 |
| Viscosity (mixed) (Brookfield @ 10 rpm, 25 °C) | Pas | 350 | 350 |
| Pot Life @ 25 °C and 65 % RH (Time for viscosity to double) | min | > 60 | > 60 |
| Curing Time @ 25 °C | | < 24 h | < 24 h |
| Shelf Life (from Date of Manufacturing, unopened, @ < 35 °C) | Months | 6 | 6 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| TECHNICAL | | | |
| Thermal Conductivity¹ | W/mK | 6 | 6 |
| Operating Temperature | °C | - 40 to + 150 | - 40 to + 150 |
| Dielectric Strength | kV/mm | ≥ 10 | ≥ 10 |
| Volume Resistivity | Ohm - cm | ≥ 1 x 10 ¹⁰ | ≥ 1 x 10 ¹⁰ |

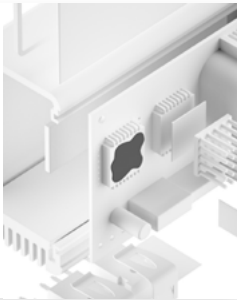
Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Warning: Only A / B part of the same lot number may be processed together.



SILICONE GAP FILLER / PUTTY TGL-W-SI

dispensable

TGL-W-SI is an electrically insulating thermally conductive, highly viscous dispensable form-in-place gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. The ready-made compound does not require an additional crosslinking process. Due to the specific formulation and filling with ceramic particles the material has a very high thermal conductivity. After dispensing the viscoplastic material leads to an optimum thermal contact at no pressure. By its use the total thermal resistance is minimised.



PROPERTIES

- ☐ Dispensable
- ☐ Almost zero pressure at assembly due to viscoplasticity
- ☐ Thermal conductivity: 3.3¹ / 5.5² W/mK
- ☐ Ready-made, no additional crosslinking required

AVAILABILITY

- ☐ Cartridge 30 ml
- ☐ Pail 2 kg
- ☐ Others on request

APPLICATION EXAMPLES

Thermal link of:

- ☐ SMD packages
- ☐ Through-hole vias
- ☐ RDRAMs memory modules
- ☐ Flip Chips, DSPs, BGAs, PPGAs

For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

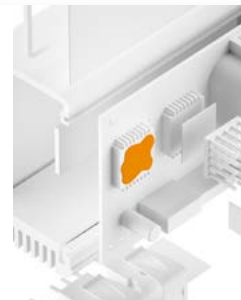
| PROPERTY | UNIT | TGL-W-SI |
|--------------------------------|-----------------|----------------------------------|
| MATERIAL | | |
| Colour | | Ceramic filled silicone compound |
| Density | g/cm³ | Grey |
| Viscosity (at 10 1/min, 25 °C) | Pas | 3.1 |
| Penetration | mm/10 | 500 |
| RoHS Conformity | 2015 / 863 / EU | 290 |
| | | Yes |
| THERMAL | | |
| Thermal Conductivity 1 | W/mK | 3.3 |
| Thermal Conductivity 2 | W/mK | 5.5 |
| Operating Temperature Range | °C | - 40 to + 130 |
| ELECTRICAL | | |
| Dielectric Strength | kV / mm | 7 |
| Volume Resistance | Ohm - cm | 1.1 x 10 ¹⁴ |

Test Methods: ¹ASTM D 5470. ²Intern method. All data without warranty and subject to change. Please contact us for further data and information.

SILICONE GAP FILLER / PUTTY TGL-X-SI

dispensable

TGL-X-SI is an electrically insulating thermally conductive, highly viscous dispensable form-in-place gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. The ready-made compound does not require an additional crosslinking process. Due to the specific formulation and filling with ceramic particles the material has an extremely high thermal conductivity. After dispensing the viscoplastic material leads to an optimum thermal contact at no pressure. By its use the total thermal resistance is minimised.



GAP FILLER

PROPERTIES

- ☐ Dispensable
- ☐ Almost zero pressure at assembly due to viscoplasticity
- ☐ Thermal conductivity: 6.5 W/mK
- ☐ Ready-made, no additional crosslinking required

AVAILABILITY

- ☐ Cartridge 50 ml, 300 ml, 5 kg
- ☐ Others on request

APPLICATION EXAMPLES

Thermal link of:

- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs / 5G Telecommunication equipment

| PROPERTY | UNIT | TGL-X-SI |
|--|-------------------|--|
| MATERIAL | | |
| Colour | | Ceramic filled silicone compound Orange |
| Density | g/cm ³ | 3.4 |
| Flow rate | g/s g/min | ≥ 30 ¹ 3~4 ² |
| Penetration | mm | 170 |
| Shelf Life (from Date of Manufacturing, unopened, dry storage conditions @ < 40°C) | Months | 6 |
| Flammability (Equivalent) | UL 94 | V0 |
| RoHS Conformity | 2015/863/EU | Yes |
| THERMAL | | |
| Thermal Conductivity ³ | W/mK | 6.5 |
| Operating Temperature Range | °C | - 40 to + 150 |
| ELECTRICAL | | |
| Dielectric Strength ⁴ | kV / mm | ≥ 4.5 |
| Volume Resistance | Ohm - cm | 1.0 x 10 ¹⁴ |

Measurement technique according to: ¹ ISO 9048, ² 50 cc/14# @ 0.42 MPa, ³ ASTM D 5470, ⁴ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.

SILICONE-FREE GAP FILLER PAD TGF-R-NS

siloxane-free, soft acrylate

TGF-R-NS is an electrically insulating highly thermally conductive silicone-free gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. The acrylate based elastomer does not contain any volatile siloxanes which are inevitably emitted by silicones. Due to the specific formulation and filling with ceramic particles the material has a high thermal conductivity. Through its softness the material perfectly mates to irregular surfaces thus filling gaps and operates at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- ☐ Silicone-free acrylate
- ☐ No emission of volatile siloxanes
- ☐ Soft and compliant
- ☐ Thermal conductivity: 3.0 W/mK
- ☐ Shock absorbing
- ☐ Easy mounting through self-tackiness

AVAILABILITY

- ☐ Sheet 400 x 200 mm
- ☐ Double-side tacky (TGF-RXXXX-NS)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

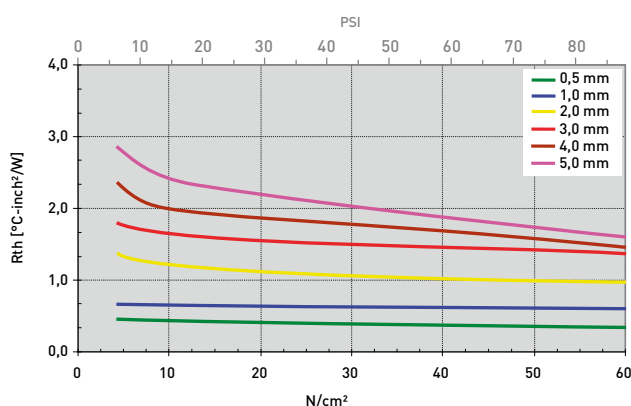
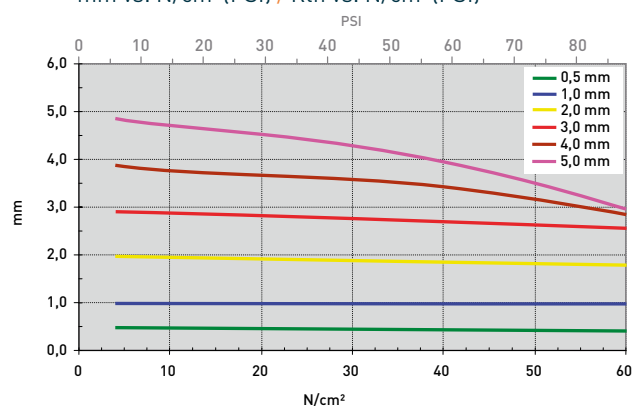
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-R0500-NS | TGF-R1000-NS | TGF-R2000-NS | TGF-R3000-NS | TGF-R5000-NS |
|--|------------------------------|--|--|--|--|--|
| MATERIAL | | Ceramic filled silicone-free acrylic elastomer | Ceramic filled silicone-free acrylic elastomer | Ceramic filled silicone-free acrylic elastomer | Ceramic filled silicone-free acrylic elastomer | Ceramic filled silicone-free acrylic elastomer |
| Colour | | White | White | White | White | White |
| Specific Gravity | g/cm ³ | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 |
| Thickness | mm | 0.5 ±0.05 | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 | 5.0 ±0.50 |
| Hardness | Shore 00 | 70 | 70 | 70 | 70 | 70 |
| Flammability (Equivalent) | UL 94 | V0 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.38 [0.44] | 0.63 [0.97] | 1.03 [1.85] | 1.47 [2.71] | 1.87 [3.96] |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.42 [0.46] | 0.64 [0.98] | 1.12 [1.91] | 1.57 [2.81] | 2.18 [4.53] |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.45 [0.47] | 0.65 [0.99] | 1.25 [1.96] | 1.72 [2.88] | 2.60 [4.79] |
| Thermal Conductivity ¹ | W/mK | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Operating Temperature Range | °C | - 40 to +130 | - 40 to +130 | - 40 to +130 | - 40 to +130 | - 40 to +130 |
| ELECTRICAL | | | | | | |
| Dielectric Strength | kV / mm | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |
| Volume Resistivity | Ohm - cm | 1 x 10 ¹³ | 1 x 10 ¹¹ | 1 x 10 ¹¹ | 1 x 10 ¹¹ | 1 x 10 ¹¹ |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE-FREE GAP FILLER PAD TGF-V-NS

siloxane-free, soft acrylate

TGF-V-NS is an electrically insulating extremely thermally conductive silicone-free gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. The acrylate based elastomer does not contain any volatile siloxanes which are inevitably emitted by silicones. Due to the specific formulation and filling with ceramic particles the material has an extremely high thermal conductivity. Through its softness the material perfectly mates to irregular surfaces thus filling gaps and operates at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The material is double-side tacky or alternatively one-side tacky through lamination with a transparent film.



PROPERTIES

- ☐ Silicone-free acrylate
- ☐ No emission of volatile siloxanes
- ☐ Soft and compliant
- ☐ Thermal conductivity: 5 W/mK
- ☐ Shock absorbing
- ☐ Easy mounting through self-tackiness
- ☐ One or two-side self tacky

AVAILABILITY

- ☐ Sheet 510 x 210 mm
- ☐ Double-side tacky (TGF-VXXXX-NS) ≥ 1.0 mm
- ☐ Tacky on one side by film laminate (TGF-VXXXX-NS-F) ≥ 0.5 mm
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

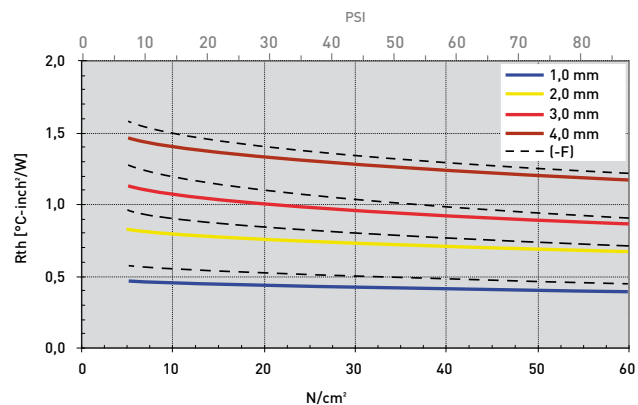
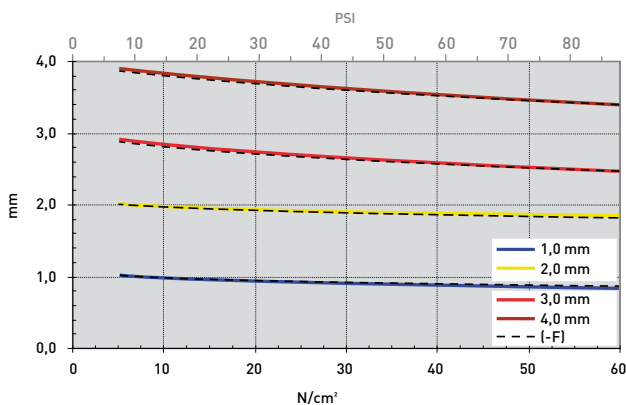
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-V1000-NS | TGF-V2000-NS | TGF-V3000-NS | TGF-V4000-NS |
|--|------------------------------|--|--|--|--|
| MATERIAL | | | | | |
| Colour | | Ceramic filled silicone-free acrylic elastomer | Ceramic filled silicone-free acrylic elastomer | Ceramic filled silicone-free acrylic elastomer | Ceramic filled silicone-free acrylic elastomer |
| Specific Gravity | g/cm ³ | 2.89 | 2.89 | 2.89 | 2.89 |
| Thickness | mm | 1.0 ± 0.10 | 2.0 ± 0.20 | 3.0 ± 0.30 | 4.0 ± 0.40 |
| Hardness | Shore 00 | 64 | 64 | 64 | 64 |
| Flammability | UL 94 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.42 [0.89] | 0.73 [1.89] | 0.93 [2.57] | 1.25 [3.50] |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.45 [0.93] | 0.77 [1.93] | 1.01 [2.72] | 1.33 [3.70] |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.47 [0.96] | 0.83 [1.97] | 1.11 [2.86] | 1.44 [3.90] |
| Thermal Conductivity ¹ | W/mK | 5 | 5 | 5 | 5 |
| Operating Temperature Range | °C | - 40 to + 125 | - 40 to + 125 | - 40 to + 125 | - 40 to + 125 |
| ELECTRICAL | | | | | |
| Dielectric Strength | kV / mm | 1.2 | 1.2 | 1.2 | 1.2 |
| Volume Resistivity | Ohm - cm | 1×10^{11} | 1×10^{11} | 1×10^{11} | 1×10^{11} |
| Dielectric Constant | @ 1 MHz | 18.2 | 18.2 | 18.2 | 18.2 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 4.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE-FREE GAP FILLER PAD TGF-W-NS

siloxane-free, soft acrylate

TGF-W-NS is an electrically insulating extremely thermally conductive silicone-free gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. The acrylate based elastomer does not contain any volatile siloxanes which are inevitably emitted by silicones. Due to the specific formulation and filling with ceramic particles the material has an extremely high thermal conductivity. Through its softness the material perfectly mates to irregular surfaces thus filling gaps and operates at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- ☐ Silicone-free acrylate
- ☐ No emission of volatile siloxanes
- ☐ Soft and compliant
- ☐ Thermal conductivity: 6.0 W/mK
- ☐ Shock absorbing
- ☐ Easy mounting through self-tackiness

AVAILABILITY

- ☐ Sheet 400 x 200 mm
- ☐ Double-side tacky (TGF-WXXXX-NS)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

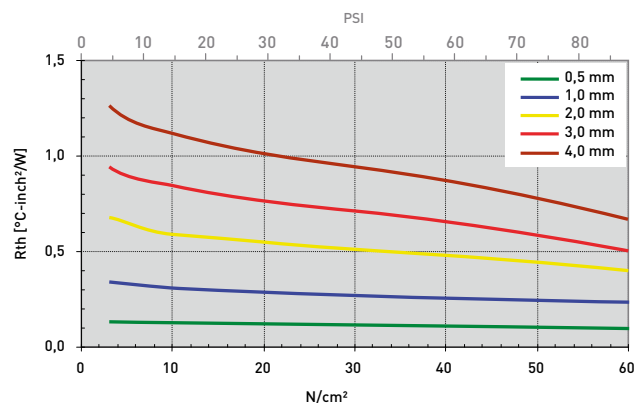
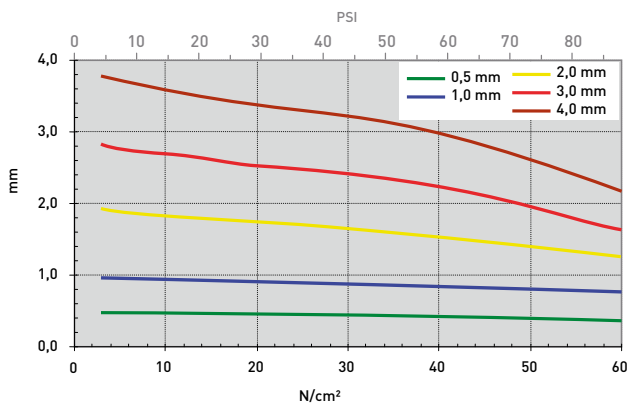
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-W0500-NS | TGF-W1000-NS | TGF-W2000-NS | TGF-W3000-NS | TGF-W4000-NS |
|--|------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| MATERIAL | | | | | | |
| Colour | | White | White | White | White | White |
| Specific Gravity | g/cm ³ | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Thickness | mm | 0.5 ±0.10 | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 | 4.0 ±0.40 |
| Hardness | Shore 00 | 70 | 70 | 70 | 70 | 70 |
| Flammability (Equivalent) | UL 94 | V0 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes | Yes |
| THERMAL | | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.11 [0.43] | 0.26 [0.84] | 0.48 [1.54] | 0.66 [2.25] | 0.88 [3.00] |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.12 [0.46] | 0.28 [0.90] | 0.55 [1.75] | 0.76 [2.55] | 1.02 [3.39] |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.13 [0.48] | 0.32 [0.95] | 0.61 [1.85] | 0.87 [2.75] | 1.16 [3.66] |
| Thermal Conductivity ¹ | W/mK | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Operating Temperature Range | °C | - 40 to +130 | - 40 to +130 | - 40 to +130 | - 40 to +130 | - 40 to +130 |
| ELECTRICAL | | | | | | |
| Dielectric Strength | kV / mm | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |
| Volume Resistivity | Ohm - cm | 1 x 10 ¹³ | 1 x 10 ¹³ | 1 x 10 ¹³ | 1 x 10 ¹³ | 1 x 10 ¹³ |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 3.5 mm / 4.0 mm / 4.5 mm / 5.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE-FREE GAP FILLER PAD TGF-Y-NS

siloxane-free, soft acrylate

TGF-Y-NS is an electrically insulating extremely thermally conductive silicone-free gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. The acrylate based elastomer does not contain any volatile siloxanes which are inevitably emitted by silicones. Due to the specific formulation and filling with ceramic particles the material has an extremely high thermal conductivity. Through its softness the material perfectly mates to irregular surfaces thus filling gaps and operates at low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



GAP FILLER

PROPERTIES

- ☐ Silicone-free acrylate
- ☐ No emission of volatile siloxanes
- ☐ Soft and compliant
- ☐ Thermal conductivity: 8.0 W/mK
- ☐ Shock absorbing
- ☐ Easy mounting through self-tackiness

AVAILABILITY

- ☐ Sheet 400 x 200 mm
- ☐ Double-side tacky (TGF-XXXX-NS)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

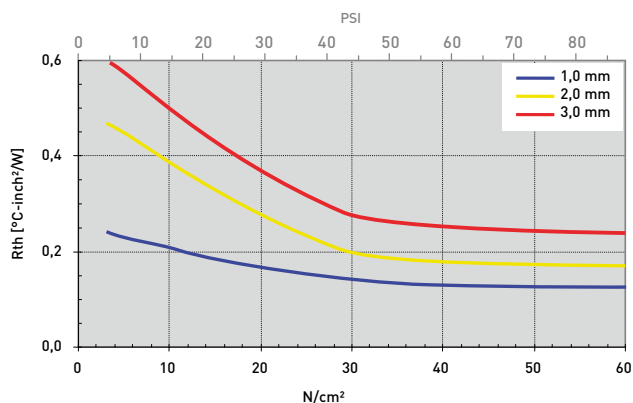
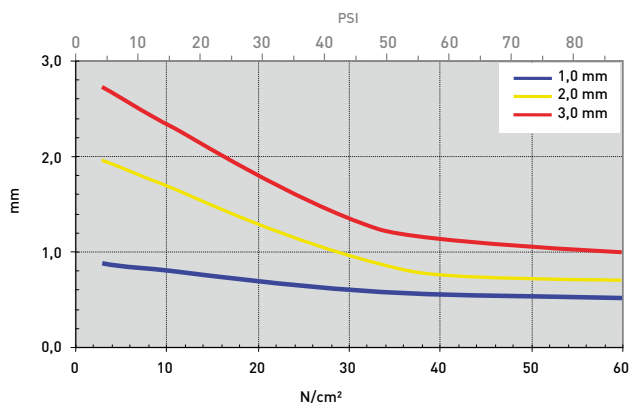
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-Y1000-NS | TGF-Y2000-NS | TGF-Y3000-NS |
|--|------------------------------|----------------------|----------------------|----------------------|
| MATERIAL | | | | |
| Colour | | White | White | White |
| Specific Gravity | g/cm ³ | 3.4 | 3.4 | 3.4 |
| Thickness | mm | 1.0 ±0.10 | 2.0 ±0.20 | 3.0 ±0.30 |
| Hardness | Shore 00 | 70 | 70 | 70 |
| Flammability (Equivalent) | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.13 [0.55] | 0.18 [0.75] | 0.25 [1.13] |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.17 [0.72] | 0.28 [1.30] | 0.37 [1.80] |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.22 [0.83] | 0.43 [1.80] | 0.55 [2.52] |
| Thermal Conductivity ¹ | W/mK | 8.0 | 8.0 | 8.0 |
| Operating Temperature Range | °C | - 40 to +120 | - 40 to +120 | - 40 to +120 |
| ELECTRICAL | | | | |
| Dielectric Strength | kV / mm | 7.8 | 7.8 | 7.8 |
| Volume Resistivity | Ohm - cm | 1 x 10 ¹¹ | 1 x 10 ¹¹ | 1 x 10 ¹¹ |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 3.5 mm / 4.0 mm / 4.5 mm / 5.0 mm

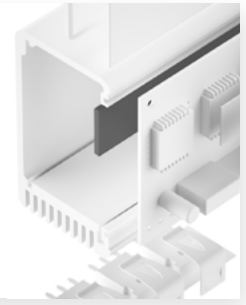
mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE-FREE GAP FILLER PAD TGF-GUS-NS

siloxane-free, extremely elastic TPE

TGF-GUS-NS is an electrically insulating thermally conductive silicone-free gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. The TPE polymer based elastomer does not contain any volatile siloxanes which are inevitably emitted by silicones. Due to the specific formulation and filling with ceramic particles the material has a high thermal conductivity. Through its extreme softness the material perfectly mates to irregular surfaces thus filling gaps and operates at very low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly.



PROPERTIES

- ☐ Silicone-free TPE polymer
- ☐ Extremely soft and compliant
- ☐ Thermal conductivity: 1.5 W/mK
- ☐ Operates at very low pressure
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ Two-side self-tacky

AVAILABILITY

- ☐ Sheet 300 x 200 mm
- ☐ Tacky on both sides (TGF-GUSXXX-NS)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

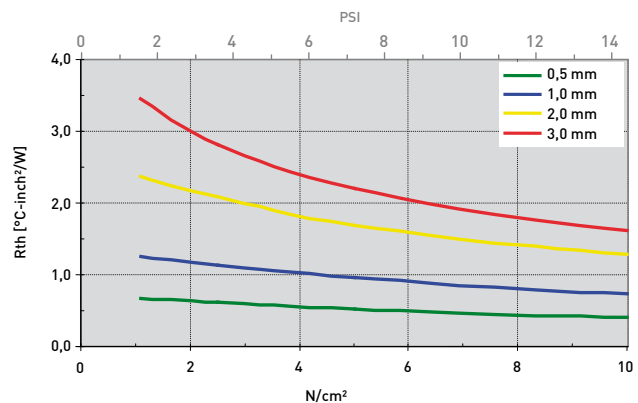
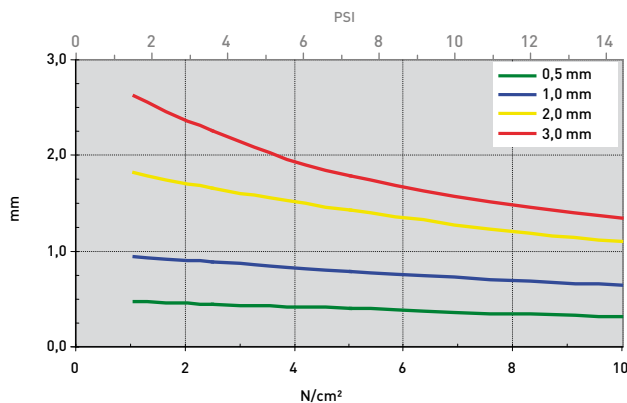
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-GUS0500-NS | TGF-GUS1000-NS | TGF-GUS2000-NS |
|--|------------------------------|--|---|--|
| MATERIAL | | | | |
| | | Ceramic filled silicone-free TPE elastomer | Ceramic filled, silicone-free TPE elastomer | Ceramic filled silicone-free TPE elastomer |
| Colour | | Black | Black | Black |
| Thickness | mm | 0.5 ^{+0.20} _{-0.10} | 1.0 ^{+0.20} _{-0.10} | 2.0 ^{+0.20} _{-0.10} |
| Specific Gravity | g/cm ³ | 1.7 | 1.7 | 1.7 |
| Hardness | Shore 00 | 25 | 25 | 25 |
| UL Flammability (Equivalent) | UL 94 | VO | VO | VO |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ¹ @ 15 PSI @ Thickness | °C-inch ² /W (mm) | 0.42 [0.32] | 0.74 [0.63] | 1.30 [1.11] |
| Resistance ¹ @ 7 PSI @ Thickness | °C-inch ² /W (mm) | 0.54 [0.39] | 0.98 [0.78] | 1.70 [1.44] |
| Resistance ¹ @ 3 PSI @ Thickness | °C-inch ² /W (mm) | 0.64 [0.45] | 1.19 [0.90] | 2.20 [1.72] |
| Thermal Conductivity | W/mK | 1.5 | 1.5 | 1.5 |
| Operating Temperature Range | °C | - 40 to + 120 | - 40 to + 120 | - 40 to + 120 |
| ELECTRICAL | | | | |
| Dielectric Strength | kV / mm | > 10 | > 10 | > 10 |
| Volume Resistivity | Ohm · cm | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ | > 1.0 x 10 ¹⁰ |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 3.5 mm / 4.0 mm / 4.5 mm / 5.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE-FREE GAP FILLER PAD TGF-IXS-NS

siloxane-free, extremely soft acrylate

TGF-IXS-NS is an electrically insulating thermally conductive silicone-free gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. The acrylate based elastomer does not contain any volatile siloxanes which are inevitably emitted by silicones. Due to the specific formulation and filling with ceramic particles the material has a high thermal conductivity. Through its extreme softness the material perfectly mates to irregular surfaces thus filling gaps and operates at very low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The material is one-side tacky through lamination with a transparent film.



GAP FILLER

PROPERTIES

- ☐ Multilayer silicone-free acrylate: Soft-Ultrasoft-Film
- ☐ No emission of volatile siloxanes
- ☐ Extremely soft and compliant
- ☐ Thermal conductivity: 2 W/mK
- ☐ Operates at very low pressure
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One-side self-tacky

AVAILABILITY

- ☐ Sheet 525 x 210 mm
- ☐ Tacky on one side by film laminate (TGF-IXSXXX-NS-F)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

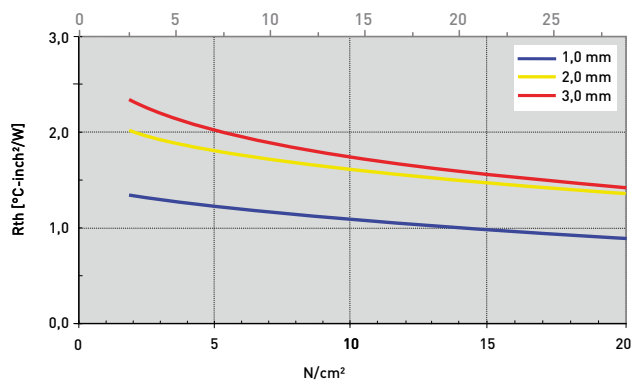
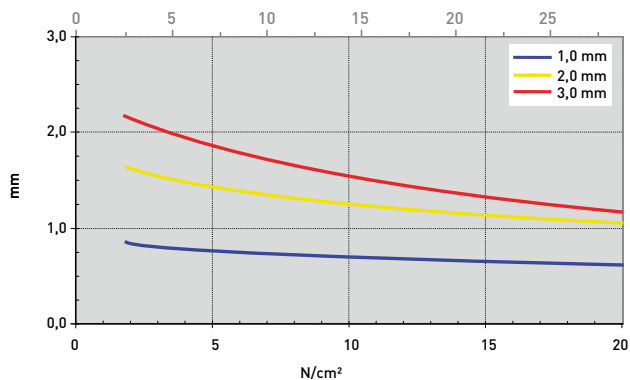
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-IXS1000-NS-F | TGF-IXS2000-NS-F | TGF-IXS3000-NS-F |
|--|------------------------------|---|---|---|
| MATERIAL | | Ceramic filled multilayer silicone-free acrylic elastomer | Ceramic filled multilayer silicone-free acrylic elastomer | Ceramic filled multilayer silicone-free acrylic elastomer |
| Colour | | Dark green / White | Dark green / White | Dark green / White |
| Thickness | mm | 1.0 ±0.1 | 2.0 ±0.2 | 3.0 ±0.3 |
| Hardness (White layer) | Shore 00 | 27 | 27 | 27 |
| UL Flammability | UL 94 | VO | VO | VO |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ¹ @ 15 PSI @ Thickness | °C-inch ² /W (mm) | 1.07 [0.70] | 1.60 [1.25] | 1.70 [1.52] |
| Resistance ¹ @ 7 PSI @ Thickness | °C-inch ² /W (mm) | 1.22 [0.74] | 1.78 [1.40] | 2.20 [1.85] |
| Resistance ¹ @ 3 PSI @ Thickness | °C-inch ² /W (mm) | 1.32 [0.83] | 2.00 [1.60] | 2.30 [2.13] |
| Thermal Conductivity ¹ | W/mK | 2 | 2 | 2 |
| Operating Temperature Range | °C | - 40 to + 125 | - 40 to + 125 | - 40 to + 125 |
| ELECTRICAL | | | | |
| Dielectric Strength | kV / mm | 2.0 | 2.0 | 2.0 |
| Volume Resistivity | Ohm · cm | 1.0 x 10 ¹¹ | 1.0 x 10 ¹¹ | > 1.0 x 10 ¹¹ |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 1.0 mm / 2.0 mm / 3.0 mm / 4.0 mm / 5.0 mm / 6.0 mm

mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE-FREE GAP FILLER PAD TGF-NSS-NS

siloxane-free, very soft acrylate

TGF-NSS-NS is an electrically insulating thermally conductive silicone-free gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. The acrylate based elastomer does not contain any volatile siloxanes which are inevitably emitted by silicones. Due to the specific formulation and filling with ceramic particles the material has a high thermal conductivity. Through its extraordinary softness the material perfectly mates to irregular surfaces thus filling gaps and operates at very low pressure. By its use the total thermal resistance is minimised. The natural tackiness of the material allows for an easy and reliable pre-assembly. The material is double-side tacky or alternatively one-side tacky through lamination with a transparent film.



PROPERTIES

- ☐ Silicone-free acrylate
- ☐ No emission of volatile siloxanes
- ☐ Extremely soft and compliant
- ☐ Thermal conductivity: 2.5 W/mK
- ☐ Operates at very low pressure
- ☐ Shock absorbing
- ☐ Easy mounting through self tackiness
- ☐ One-side self-tacky

AVAILABILITY

- ☐ Sheet 510 x 210 mm
- ☐ Tacky on both sides (TGF-NSSXXX-NS) ≥ 2.0 mm
- ☐ Tacky on one side by film laminate (TGF-NSSXXX-NS-F)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

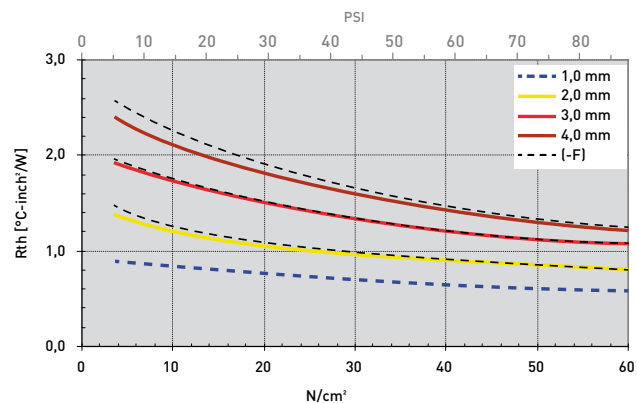
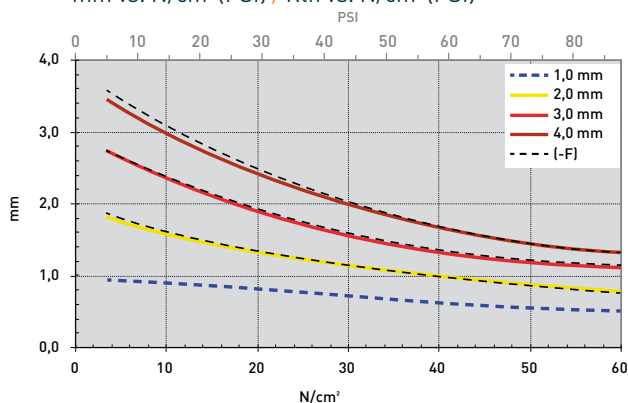
- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Electronic parts to heat pipes
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs

| PROPERTY | UNIT | TGF-NSS1000-NS-F | TGF-NSS2000-NS | TGF-NSS3000-NS | TGF-NSS4000-NS |
|--|------------------------------|--|--|--|--|
| MATERIAL | | | | | |
| Colour | | Ceramic filled silicone-free acrylic elastomer | Ceramic filled silicone-free acrylic elastomer | Ceramic filled silicone-free acrylic elastomer | Ceramic filled silicone-free acrylic elastomer |
| Thickness | mm | Brown | Brown | Brown | Brown |
| Specific Gravity | g/cm ³ | 1.0 ± 0.10 | 2.0 ± 0.20 | 3.0 ± 0.30 | 4.0 ± 0.40 |
| Hardness | Shore 00 | 2.33 | 2.33 | 2.33 | 2.33 |
| UL Flammability | UL 94 | 47 | 47 | 47 | 47 |
| RoHS Conformity | 2015 / 863 / EU | V0 | V0 | V0 | V0 |
| | | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance ¹ @ 60 PSI @ Thickness | °C-inch ² /W (mm) | 0.60 [0.62] | 0.92 [0.99] | 1.19 [1.32] | 1.41 [1.64] |
| Resistance ¹ @ 30 PSI @ Thickness | °C-inch ² /W (mm) | 0.67 [0.80] | 1.05 [1.33] | 1.51 [1.90] | 1.81 [2.41] |
| Resistance ¹ @ 10 PSI @ Thickness | °C-inch ² /W (mm) | 0.80 [0.91] | 1.28 [1.68] | 1.79 [2.50] | 2.20 [3.20] |
| Thermal Conductivity ¹ | W/mK | 2.5 | 2.5 | 2.5 | 2.5 |
| Operating Temperature Range | °C | - 40 to + 125 | - 40 to + 125 | - 40 to + 125 | - 40 to + 125 |
| ELECTRICAL | | | | | |
| Dielectric Strength | kV / mm | 2.1 | 1.9 | 1.9 | 1.9 |
| Volume Resistivity | Ohm - cm | 1.0×10^{11} | 1.0×10^{11} | 1.0×10^{11} | 1.0×10^{11} |
| Dielectric Constant | @ 1 MHz | 18.2 | 19.6 | 19.6 | 19.6 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.5 mm / 1.0 mm / 1.5 mm / 2.0 mm / 2.5 mm / 3.0 mm / 3.5 mm / 4.0 mm

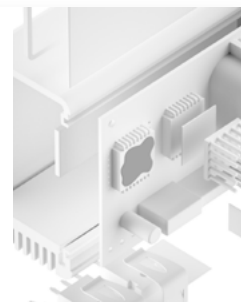
mm vs. N/cm² (PSI) / Rth vs. N/cm² (PSI)



SILICONE-FREE GAP-FILLER/PUTTY TGL-U-NS

dispensable

TGL-U-NS is an electrically insulating thermally conductive, highly viscous dispensable silicone-free form-in-place gap filler. It is ideal for use in applications where thermal transfer over large gaps caused e.g. by big tolerances or different stack up heights must be achieved. The ready-made compound does not require an additional crosslinking process. Due to the specific formulation and filling with ceramic particles the material has a very high thermal conductivity. After dispensing the viscoplastic material leads to an optimum thermal contact at no pressure. By its use the total thermal resistance is minimised.



GAP FILLER

PROPERTIES

- ☐ Dispensable
- ☐ Almost zero pressure at assembly due to viscoplasticity
- ☐ Thermal conductivity: 4.0 W/mK
- ☐ Ready-made, no additional crosslinking required

AVAILABILITY

- ☐ Cartridge 330 ml
- ☐ Others on request

APPLICATION EXAMPLES

Thermal link of:

- ☐ SMD packages
 - ☐ Through-hole vias
 - ☐ RDRAMs memory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications / Laptops / Medicine engineering / Industrial PCs / 5G Telecommunication equipment

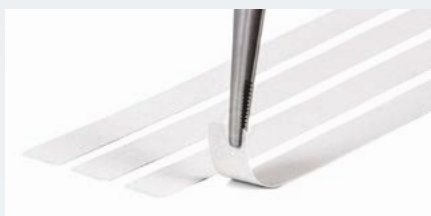
| PROPERTY | UNIT | TGL-U-NS |
|---|---------------------|---|
| MATERIAL | | |
| Colour | | Ceramic filled silicone-free compound Grey |
| Density | g/cm ³ | 2.9 |
| Viscosity (at 0,5 1/s) (at 1,0 1/s) | Pas | 3,300 2,500 |
| Shelf Life (unopened, dry storage conditions at 5–30°C) | Months | 6 |
| UL Flammability (Equivalent) | UL 94 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| THERMAL | | |
| Thermal Conductivity ¹ | W/mK | 4.0 |
| Operating Temperature Range | °C | - 40 to + 125 |
| ELECTRICAL | | |
| Dielectric Strength | kV / mm | 8 |
| Volume Resistance | Ohm - cm | 1.0 x 10 ⁹ |
| Dielectric Constant | @ 500 MHz / @ 1 GHz | 8.98 / 8.88 |

Measurement technique according to: ¹ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.



2 FOILS & FILMS

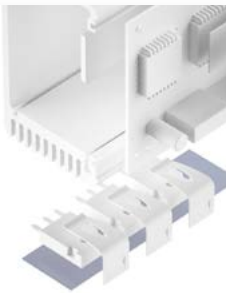
/ SILICONE FOILS / INSULATING FILM
SILICONE COATED



SILICONE FOIL TFO-D-SI

fibreglass reinforced, highly dielectric

TFO-D-SI is an electrically insulating thermally conductive silicone foil for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with thermally conductive ceramic particles a high thermal conductivity is reached. Under pressure the total thermal resistance is minimised. The material is characterised by its very high dielectric properties. The fibreglass reinforcement provides for an outstanding mechanic stability and cut-through resistance as well as easy handling. For an easy and reliable pre-assembly the interface material is available with a one side adhesive coating.



PROPERTIES

- ❑ Thermal conductivity: 1.2 W/mK
- ❑ High thermal contact
- ❑ Outstanding mechanic stability through fibreglass reinforcement
- ❑ Very high dielectric strength
- ❑ Extraordinary chemical resistance and longterm stability
- ❑ Residue-free removal after use

AVAILABILITY

- ❑ Sheet 300 x 1000 mm
- ❑ Roll 300 mm x 50 m
- ❑ Non tacky (TFO-DXXX-SI)
- ❑ One side adhesive (TFO-DXXX-SI-A1)
- ❑ Die cut parts
- ❑ Kiss cut parts on roll
- ❑ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

- ❑ MOSFETs or IGBTs
- ❑ Power diodes or AC/DC converters
- ❑ Power modules

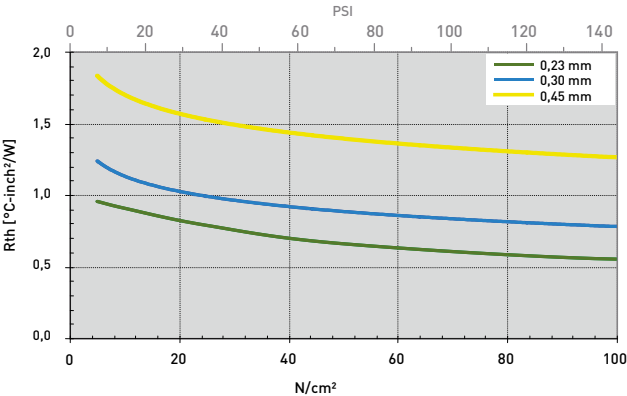
For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTIES | UNIT | TFO-D230-SI | TFO-D300-SI | TFO-D450-SI |
|-----------------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
| MATERIAL | | | | |
| Colour | | Grey | Grey | Grey |
| Reinforcement | | Fibreglass | Fibreglass | Fibreglass |
| Thickness | mm | 0.23 ±0.05 | 0.3 ±0.05 | 0.45 ±0.05 |
| Tensile Strength ¹ | kpsi | 5.0 | 4.1 | 2.9 |
| UL Flammability | UL 94 | VO | VO | VO |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.55 | 0.75 | 1.25 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.79 | 1.05 | 1.55 |
| Thermal Conductivity | W/mK | 1.2 | 1.2 | 1.2 |
| Operating Temperature Range | °C | - 50 to + 180 | - 50 to + 180 | - 50 to + 180 |
| ELECTRICAL | | | | |
| Breakdown Voltage ³ | kV AC | 5.5 | > 6.0 | > 6.0 |
| Volume Resistivity | Ohm - cm | > 1.0 x 10 ¹¹ | > 1.0 x 10 ¹¹ | > 1.0 x 10 ¹¹ |
| Dielectric Constant | @ 1 MHz | 6.0 | 6.0 | 6.0 |

Measurement technique according to: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.23 mm / 0.30 mm / 0.45 mm

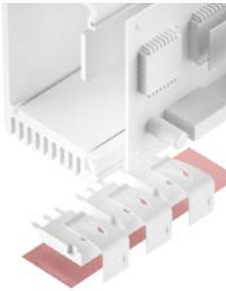
Rth vs. N/cm² (PSI)



SILICONE FOIL TFO-G-SI

fibreglass reinforced, highly dielectric

TFO-G-SI is an electrically insulating thermally conductive silicone foil for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with thermally conductive ceramic particles a high thermal conductivity is reached. Under pressure the total thermal resistance is minimised. The material is characterised by its very high dielectric properties. The fibreglass reinforcement provides for an outstanding mechanic stability and cut-through resistance as well as easy handling. For an easy and reliable pre-assembly the interface material is available with low tack pressure sensitive adhesive on one side.



FOILS & FILMS

PROPERTIES

- Thermal conductivity: 1.6 W/mK
- High thermal contact
- Outstanding mechanic stability through fibreglass reinforcement
- Very high dielectric strength
- Extraordinary chemical resistance and longterm stability
- Residue-free removal after use

AVAILABILITY

- Sheet
- Roll 290 mm x 50 m
- Non tacky
- Tacky on one side (TFO-GXXX-SI-A1)
- Die cut parts
- Kiss cut parts on sheet or roll

APPLICATION EXAMPLES

Thermal link of:

- MOSFETs or IGBTs
- Power diodes or AC/DC converters
- Power modules

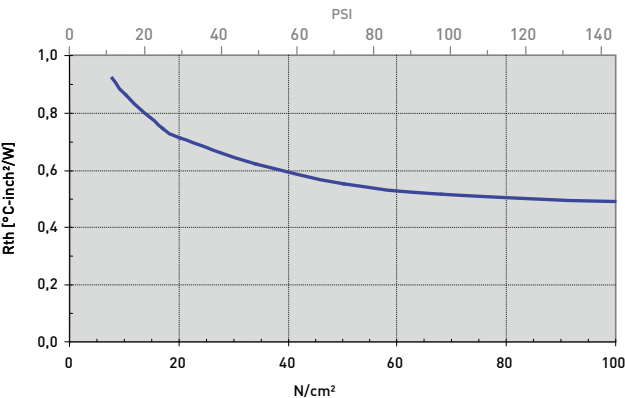
For use in Switch mode power supplies / Motor control units / High voltage hybrid automotive applications / PS units / Solar systems

| PROPERTY | UNIT | TFO-G230-SI |
|-----------------------------------|-------------------------|--|
| MATERIAL | | |
| Colour | | Pink |
| Reinforcement | | Fibreglass |
| Thickness | mm | 0.23 ^{+0.023} _{-0.002} |
| Tensile Strength ¹ | kpsi | 2.9 |
| UL Flammability | UL 94 | VO |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| THERMAL | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.49 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.71 |
| Thermal Conductivity | W/mK | 1.6 |
| Operating Temperature Range | °C | - 50 to + 180 |
| ELECTRICAL | | |
| Breakdown Voltage ³ | kV AC | 5.5 |
| Volume Resistivity | Ohm - cm | 1.0 x 10 ¹¹ |

Measurement technique according to: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.23 mm

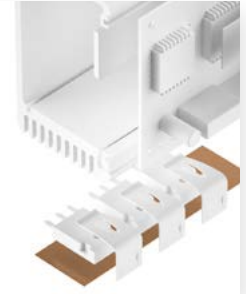
Rth vs. N/cm² (PSI)



SILICONE FOIL TFO-J-SI

fibreglass reinforced, highly dielectric

TFO-J-SI is an electrically insulating thermally conductive silicone foil for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with thermally conductive ceramic particles a high thermal conductivity is reached. Under pressure the total thermal resistance is minimised. The material is characterised by its very high dielectric properties. The fibreglass reinforcement provides for an outstanding mechanic stability and cut-through resistance as well as easy handling. For an easy and reliable pre-assembly the interface material is available with low tack pressure sensitive adhesive on one side.



PROPERTIES

- ☐ Thermal conductivity: 2.0 W/mK
- ☐ High thermal contact
- ☐ Outstanding mechanic stability through fibreglass reinforcement
- ☐ Very high dielectric strength
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Residue-free removal after use

AVAILABILITY

- ☐ Sheet
- ☐ Roll 300 mm x 50 m (0.20 / 0.30 mm)
- ☐ Roll 300 mm x 25 m (0.45 mm)
- ☐ Non tacky (TFO-JXXX-SI)
- ☐ Tacky on one side (TFO-JXXX-SI-A1)
- ☐ Die cut parts
- ☐ Kiss cut parts on roll
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

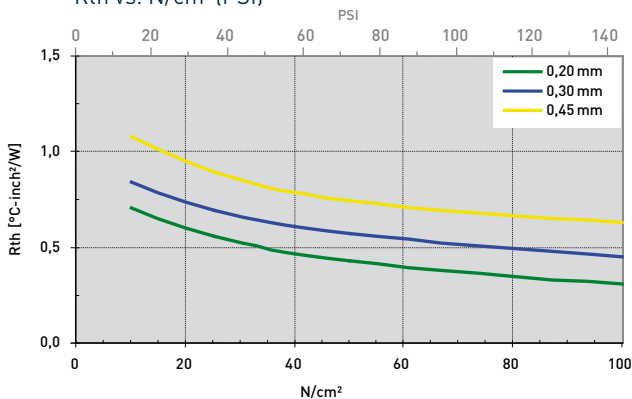
- ☐ MOSFETs or IGBTs
 - ☐ Power diodes or AC/DC converters
 - ☐ Power modules
- For use in Switch mode power supplies / Motor control units / High voltage hybrid automotive applications / PS units / Solar systems

| PROPERTY | UNIT | TFO-J200-SI | TFO-J300-SI | TFO-J450-SI |
|-----------------------------------|-------------------------|----------------------|----------------------|----------------------|
| MATERIAL | | | | |
| Colour | | Dark Brown | Dark Brown | Dark Brown |
| Reinforcement | | Fibreglass | Fibreglass | Fibreglass |
| Thickness | mm | 0.20 ± 0.05 | 0.30 ± 0.05 | 0.45 ± 0.05 |
| Tensile Strength ¹ | kpsi | 5.8 | 4.0 | 2.9 |
| UL Flammability | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.31 | 0.45 | 0.63 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.61 | 0.74 | 0.96 |
| Thermal Conductivity | W/mK | 2.0 | 2.0 | 2.0 |
| Operating Temperature Range | °C | -40 to +180 | -40 to +180 | -40 to +180 |
| ELECTRICAL | | | | |
| Breakdown Voltage ³ | kV AC | 5.0 | 7.0 | 10.0 |
| Volume Resistivity | Ohm - cm | 4.2×10^{14} | 3.5×10^{14} | 3.8×10^{14} |
| Dielectric Constant | @ 1 MHz | 3.8 | 4.2 | 4.3 |

Measurement technique according to: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.20 mm / 0.30 mm / 0.45 mm / 0.80 mm

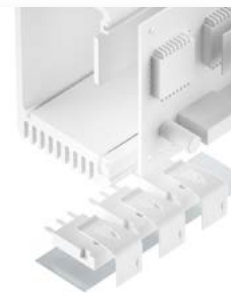
R_{th} vs. N/cm² (PSI)



SILICONE FOIL TFO-K-SI

fibreglass reinforced

TFO-K-SI is an electrically insulating thermally conductive silicone foil for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with thermally conductive ceramic particles a very high thermal conductivity is reached. Under pressure the total thermal resistance is minimised. The fibreglass reinforcement provides for an outstanding mechanic stability and cut-through resistance as well as easy handling. For an easy and reliable pre-assembly the interface material is available with low tack pressure sensitive adhesive on one side.



PROPERTIES

- ☐ Thermal conductivity: 2.5 W/mK
- ☐ High thermal contact
- ☐ Outstanding mechanic stability through fibreglass reinforcement
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Residue-free removal after use

AVAILABILITY

- ☐ Sheet 320 x 1000 mm
- ☐ Roll 320 mm x 50 m
- ☐ Non tacky (TFO-K200-SI)
- ☐ Tacky on one side (TFO-K200-SI-A1)
- ☐ Die cut parts
- ☐ Kiss cut parts on roll
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

- ☐ MOSFETs or IGBTs
- ☐ Power diodes or AC/DC converters
- ☐ Power modules

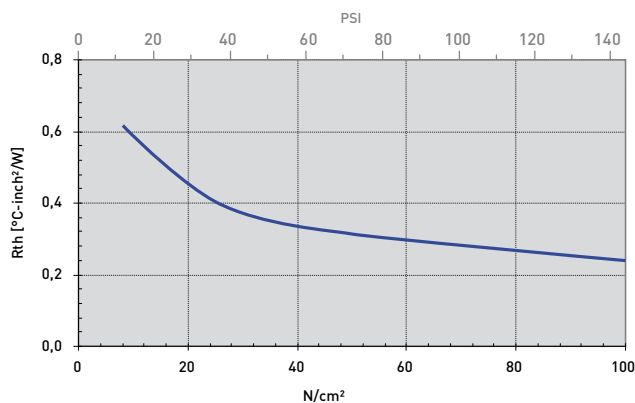
For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTIES | UNIT | TFO-K200-SI |
|-----------------------------------|-------------------------|------------------------|
| MATERIAL | | |
| Colour | | Grey |
| Reinforcement | | Fibreglass |
| Thickness | mm | 0.23 ±0.05 |
| Tensile Strength ¹ | kpsi | 2.9 |
| UL Flammability | UL 94 | V 0 |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| THERMAL | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.24 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.47 |
| Thermal Conductivity | W/mK | 2.5 |
| Operating Temperature Range | °C | - 50 to + 200 |
| ELECTRICAL | | |
| Breakdown Voltage ³ | kV AC | 2.0 |
| Volume Resistivity | Ohm - cm | 2.0 x 10 ¹⁴ |
| Dielectric Constant | @ 1 MHz | 4.0 |

Measurement technique according to: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thickness: 0.23 mm

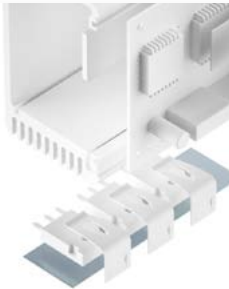
R_{th} vs. N/cm² (PSI)



SILICONE FOIL TFO-0-SI

fibreglass reinforced, highly dielectric

TFO-0-SI is an electrically insulating thermally conductive silicone foil for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with thermally conductive ceramic particles a very high thermal conductivity is reached. Under pressure the total thermal resistance is minimised. The material is characterised by its very high dielectric properties. The fibreglass reinforcement provides for an outstanding mechanic stability and cut-through resistance as well as easy handling. For an easy and reliable pre-assembly the interface material is available with low tack pressure sensitive adhesive on one side.



PROPERTIES

- Thermal conductivity: 3.0 W/mK
- High thermal contact
- Outstanding mechanic stability through fibreglass reinforcement
- Very high dielectric strength
- Extraordinary chemical resistance and longterm stability
- Residue-free removal after use

AVAILABILITY

- Sheet
- Roll 300 mm x 50 m (0.20 / 0.30 mm)
- Roll 300 mm x 25 m (0.45 mm)
- Non tacky (TFO-OXXX-SI)
- Tacky on one side (TFO-OXXX-SI-A1)
- Die cut parts
- Kiss cut parts on roll
- Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

- MOSFETs or IGBTs
- Power diodes or AC/DC converters
- Power modules

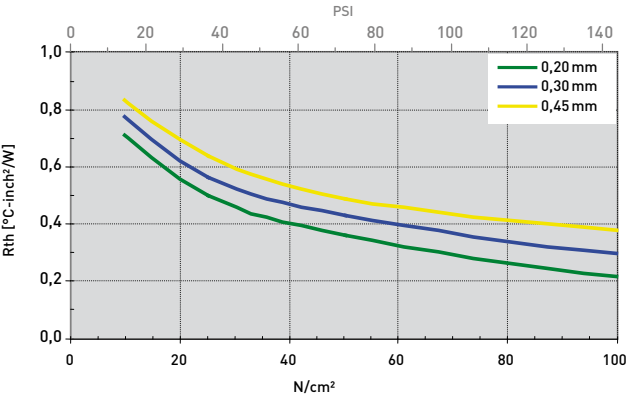
For use in Switch mode power supplies / Motor control units / High voltage hybrid automotive applications / PS units / Solar systems

| PROPERTY | UNIT | TFO-0200-SI | TFO-0300-SI | TFO-0450-SI |
|-----------------------------------|-------------------------|------------------------|------------------------|------------------------|
| MATERIAL | | | | |
| Colour | | Grey | Grey | Grey |
| Reinforcement | | Fibreglass | Fibreglass | Fibreglass |
| Thickness | mm | 0.20 ±0.05 | 0.30 ±0.05 | 0.45 ±0.05 |
| Tensile Strength ¹ | kpsi | 3.3 | 2.3 | 1.6 |
| UL Flammability | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.22 | 0.30 | 0.38 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.55 | 0.60 | 0.70 |
| Thermal Conductivity | W/mK | 3.0 | 3.0 | 3.0 |
| Operating Temperature Range | °C | -40 to +180 | -40 to +180 | -40 to +180 |
| ELECTRICAL | | | | |
| Breakdown Voltage ³ | kV AC | 5.0 | 7.0 | 8.0 |
| Volume Resistivity | Ohm - cm | 9,2 x 10 ¹³ | 8,8 x 10 ¹³ | 3,4 x 10 ¹² |
| Dielectric Constant | @ 1 MHz | 4.8 | 5.6 | 6.2 |

Measurement technique according to: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50 % relative humidity.

Thicknesses: 0.20 mm / 0.30 mm / 0.45 mm

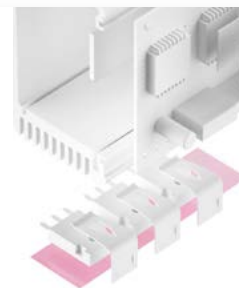
Rth vs. N/cm² (PSI)



SILICONE FOIL TFO-Q-SI

fibreglass reinforced, highly dielectric

TFO-Q-SI is an electrically insulating thermally conductive silicone foil for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with thermally conductive ceramic particles a very high thermal conductivity is reached. Under pressure the total thermal resistance is minimised. The material is characterised by its very high dielectric properties. The fibreglass reinforcement provides for an outstanding mechanic stability and cutthrough resistance as well as easy handling. For an easy and reliable preassembly the interface material is available with low tack pressure sensitive adhesive on one side.



PROPERTIES

- ☐ Thermal conductivity: 6.0 W/mK
- ☐ High thermal contact
- ☐ Outstanding mechanic stability through fibreglass reinforcement
- ☐ Very high dielectric strength
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Residue-free removal after use

AVAILABILITY

- ☐ Sheet 420 x 500 mm
- ☐ Non tacky (TFO-QXXX-SI)
- ☐ Tacky on one side (TFO-QXXX-SI-A1H)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

- ☐ MOSFETs or IGBTs
- ☐ Power diodes or AC/DC converters
- ☐ Power modules

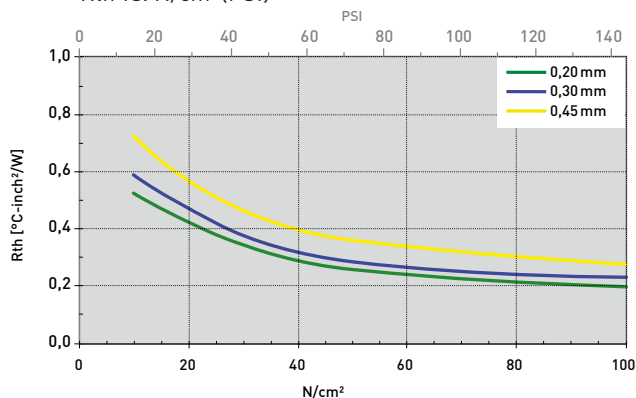
For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TFO-Q200-SI | TFO-Q300-SI | TFO-Q450-SI |
|-----------------------------------|-------------------------|----------------------|----------------------|----------------------|
| MATERIAL | | | | |
| Colour | | Pink | Pink | Pink |
| Reinforcement | | Fibreglass | Fibreglass | Fibreglass |
| Thickness | mm | 0.20 ±0.05 | 0.30 ±0.05 | 0.45 ±0.05 |
| Tensile Strength ¹ | kpsi | 2.4 | 1.7 | 1.3 |
| UL Flammability | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.20 | 0.23 | 0.28 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.43 | 0.47 | 0.57 |
| Thermal Conductivity | W/mK | 6.0 | 6.0 | 6.0 |
| Operating Temperature Range | °C | - 40 to + 180 | - 40 to + 180 | - 40 to + 180 |
| ELECTRICAL | | | | |
| Breakdown Voltage ³ | kV AC | 5.0 | 7.0 | 10.0 |
| Volume Resistivity | Ohm - cm | 4.8×10^{14} | 6.4×10^{14} | 1.1×10^{15} |
| Dielectric Constant | @ 1 MHz | 3.3 | 2.9 | 3.1 |

Test Methods: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.20 mm / 0.30 mm / 0.45 mm

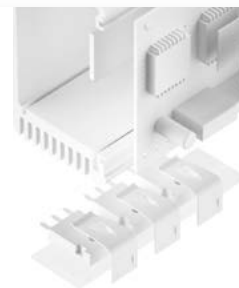
R_{th} vs. N/cm² (PSI)



SILICONE FOIL TFO-R-SI

fibreglass reinforced

TFO-R-SI is an electrically insulating thermally conductive silicone foil for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with thermally conductive ceramic particles a very high thermal conductivity is reached. Under pressure the total thermal resistance is minimised. The fibreglass reinforcement provides for an outstanding mechanic stability and cutthrough resistance as well as easy handling. For an easy and reliable preassembly the interface material is available with low tack pressure sensitive adhesive on one side.



PROPERTIES

- ☐ Thermal conductivity: 3.5 W/mK
- ☐ High thermal contact
- ☐ Outstanding mechanic stability through fibreglass reinforcement
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Residue-free removal after use

AVAILABILITY

- ☐ Sheet 300 x 280 mm
- ☐ Non tacky (TFO-RXXX-SI)
- ☐ Tacky on one side (TFO-RXXX-SI-A1)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

- ☐ MOSFETs or IGBTs
- ☐ Power diodes or AC/DC converters
- ☐ Power modules

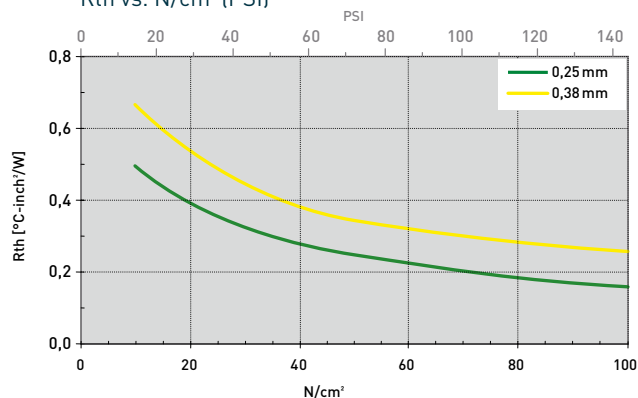
For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems / Automotive pre-heaters

| PROPERTY | UNIT | TFO-R250-SI | TFO-R380-SI |
|--|-------------------------|----------------------------------|----------------------------------|
| MATERIAL | | | |
| Colour | | Ceramic filled silicone White | Ceramic filled silicone White |
| Reinforcement | | Fibreglass | Fibreglass |
| Thickness | mm | 0.25 ±0.03 | 0.38 ±0.03 |
| Tensile Strength ¹ | kpsi | > 2.18 | > 2.18 |
| Shelf Life (unopened, dry storage conditions @ < 40°C) | Months | 12 | 12 |
| UL Flammability | UL 94 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| THERMAL | | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.16 | 0.26 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.41 | 0.55 |
| Thermal Conductivity ² | W/mK | 3.5 | 3.5 |
| Operating Temperature Range | °C | - 40 to + 150 | - 40 to + 150 |
| ELECTRICAL | | | |
| Breakdown Voltage ³ | kV AC | 3.0 | 4.0 |
| Volume Resistivity | Ohm - cm | 1 x 10 ¹⁴ | 1 x 10 ¹⁴ |
| Dielectric Constant | @ 1 MHz | 2.4 | 2.4 |

Test Methods: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.25 mm / 0.38 mm

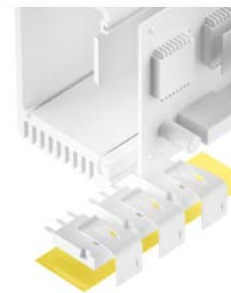
Rth vs. N/cm² (PSI)



SILICONE FOIL TFO-T-SI

fibreglass reinforced

TFO-T-SI is a high performance electrically insulating thermally conductive silicone foil for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with highly thermally conductive ceramic particles a very high thermal conductivity is reached. Its conformal surface structure guarantees a very good compliance to the contact surfaces. Thus the total thermal resistance is minimised. The fibreglass reinforcement provides for an outstanding mechanic stability and cutthrough resistance as well as easy handling. For an easy and reliable preassembly the interface material is available with low tack pressure sensitive adhesive on one side.



PROPERTIES

- ☐ Thermal conductivity: 4.1 W/mK
- ☐ High surface compliance
- ☐ Excellent thermal contact
- ☐ Outstanding mechanic stability through fibreglass reinforcement
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Residue-free removal after use

AVAILABILITY

- ☐ Sheet 440 x 510 mm
- ☐ Non tacky (TFO-TXXX-SI)
- ☐ Tacky on one side (TFO-TXXX-SI-A1)
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

- ☐ MOSFETs or IGBTs
- ☐ Power diodes or AC/DC converters
- ☐ Power modules

For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

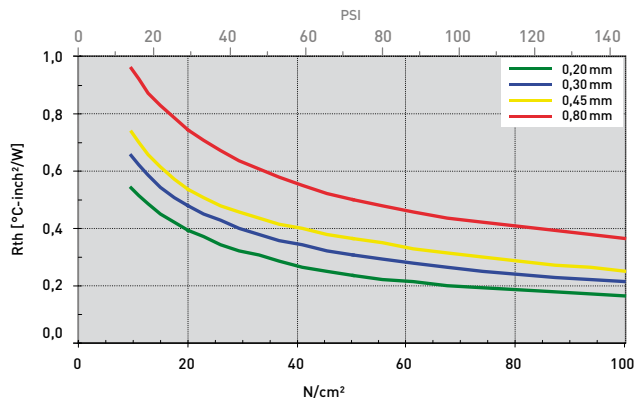
| PROPERTY | UNIT | TFO-T200-SI | TFO-T300-SI | TFO-T450-SI | TFO-T800-SI |
|-----------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | | | | |
| Material | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Light green | White | White | White |
| Reinforcement | | Fibreglass | Fibreglass | Fibreglass | Fibreglass |
| Thickness | mm | 0.20 ±0.05 | 0.30 ±0.05 | 0.45 ±0.05 | 0.80 ±0.20 |
| Tensile Strength ¹ | kpsi | 3.6 | 2.9 | 2.0 | 1.3 |
| UL Flammability | UL 94 | VO | VO | VO | VO |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| THERMAL | | | | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.16 | 0.21 | 0.24 | 0.36 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.39 | 0.47 | 0.53 | 0.74 |
| Thermal Conductivity ² | W/mK | 4.1 | 4.1 | 4.1 | 4.1 |
| Operating Temperature Range | °C | - 50 to + 200 | - 50 to + 200 | - 50 to + 200 | - 50 to + 200 |
| ELECTRICAL | | | | | |
| Breakdown Voltage ³ | kV AC | 3.0 | 6.5 | 9.0 | > 10 |
| Volume Resistivity | Ohm - cm | 1.9 x 10 ¹⁵ | 2.4 x 10 ¹⁵ | 3.3 x 10 ¹⁵ | 4.1 x 10 ¹⁵ |
| Dielectric Constant | @ 1 MHz | 3.6 | 3.6 | 3.6 | 3.6 |

Measurement technique according to: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.

Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.20 mm / 0.30 mm / 0.45 mm / 0.80 mm

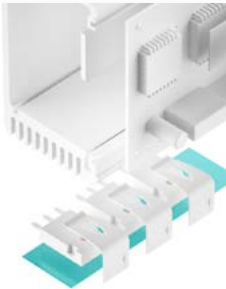
Rth vs. N/cm² (PSI)



SILICONE FOIL TFO-X-SI

fibreglass reinforced

TFO-X-SI is a high performance electrically insulating thermally conductive silicone foil for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with highly thermally conductive ceramic particles an excellent thermal conductivity is reached. Its conformal surface structure guarantees a very good compliance to the contact surfaces. Thus the total thermal resistance is minimised. The fibreglass reinforcement provides for an outstanding mechanic stability and cutthrough resistance as well as easy handling. For an easy and reliable preassembly the interface material is available with low tack pressure sensitive adhesive on one side.



PROPERTIES

- Thermal conductivity: 5.0 W/mK
- High surface compliance
- Excellent thermal contact
- Outstanding mechanic stability through fibreglass reinforcement
- Extraordinary chemical resistance and longterm stability
- Residue-free removal after use

AVAILABILITY

- Sheet 440 x 510 mm
- Non tacky (TFO-XXXX-SI)
- Tacky on one side (TFO-XXXX-SI-A1)
- Die cut parts
- Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

- MOSFETs or IGBTs
- Power diodes or AC/DC converters
- Power modules

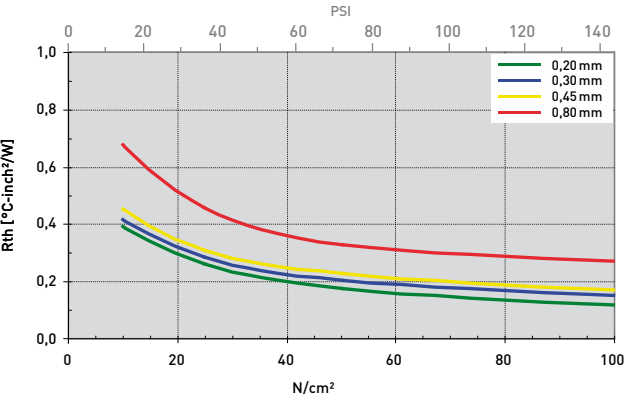
For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TFO-X200-SI | TFO-X300-SI | TFO-X450-SI | TFO-X800-SI |
|-----------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | White | White | White | White |
| Reinforcement | | Fibreglass | Fibreglass | Fibreglass | Fibreglass |
| Thickness | mm | 0.20 ±0.05 | 0.30 ±0.05 | 0.45 ±0.05 | 0.80 ±0.05 |
| Tensile Strength ¹ | kpsi | 1.3 | 1.2 | 0.7 | 0.6 |
| UL Flammability | UL 94 | V0 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes | Yes |
| Thermal | | | | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.11 | 0.15 | 0.17 | 0.27 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.29 | 0.32 | 0.35 | 0.52 |
| Thermal Conductivity ² | W/mK | 5.0 | 5.0 | 5.0 | 5.0 |
| Operating Temperature Range | °C | - 50 to + 200 | - 50 to + 200 | - 50 to + 200 | - 50 to + 200 |
| Electrical | | | | | |
| Breakdown Voltage ³ | kV AC | 3.0 | 6.0 | 9.0 | > 10 |
| Volume Resistivity | Ohm - cm | 1.7 x 10 ¹⁵ | 7.9 x 10 ¹⁵ | 9.2 x 10 ¹⁵ | 8.9 x 10 ¹⁵ |
| Dielectric Constant | @ 1 MHz | 3.3 | 3.3 | 3.3 | 3.3 |

Measurement technique according to: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.20 mm / 0.30 mm / 0.45 mm / 0.80 mm

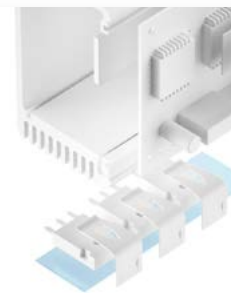
Rth vs. N/cm² (PSI)



SILICONE FOIL TFO-ZS-SI

fibreglass reinforced

TFO-ZS-SI is a high performance electrically insulating thermally conductive silicone foil for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with highly thermally conductive ceramic particles an extremely high thermal conductivity is reached. Its conformal surface structure and flexibility guarantees a very good compliance to the contact surfaces. Thus the total thermal resistance is minimised. The fibreglass reinforcement provides for an outstanding mechanic stability and cutthrough resistance as well as easy handling.



PROPERTIES

- ☐ Thermal conductivity: 8.0 W/mK
- ☐ High surface compliance and flexibility
- ☐ Excellent thermal contact
- ☐ Outstanding mechanic stability through fibreglass reinforcement
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Residue-free removal after use

AVAILABILITY

- ☐ Sheet 440 x 510 mm
- ☐ Non tacky (TFO-ZSXXX-SI)
- ☐ Die cut parts

APPLICATION EXAMPLES

Thermal link of:

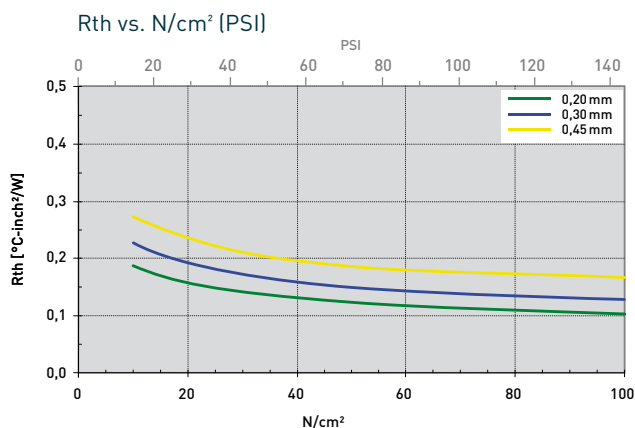
- ☐ MOSFETs or IGBTs
- ☐ Power diodes or AC/DC converters
- ☐ Power modules

For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TFO-ZS0200-SI | TFO-ZS0300-SI | TFO-ZS0450-SI |
|-----------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | | | |
| Material | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Light Blue | Light Blue | Light Blue |
| Reinforcement | | Fibreglass | Fibreglass | Fibreglass |
| Thickness | mm | 0.20 ±0.05 | 0.30 ±0.05 | 0.45 ±0.05 |
| Tensile Strength ¹ | kpsi | 1.32 | 0.97 | 0.67 |
| UL Flammability | UL 94 | VO | VO | VO |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.10 | 0.13 | 0.17 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.15 | 0.19 | 0.24 |
| Thermal Conductivity ² | W/mK | 8.0 | 8.0 | 8.0 |
| Operating Temperature Range | °C | -40 to +180 | -40 to +180 | -40 to +180 |
| ELECTRICAL | | | | |
| Breakdown Voltage ³ | kV AC | 3.6 | 4.5 | 5.0 |

Measurement technique according to: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.

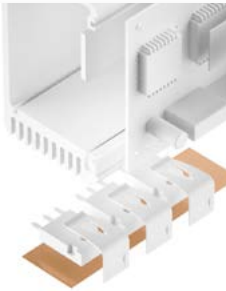
Thicknesses: 0.20 mm / 0.30 mm / 0.45 mm



INSULATING FILM TFO-M-SI-PI

silicone coated, highly dielectric

TFO-M-SI-PI is an electrically insulating thermally conductive foil made of a high voltage resistant Polyimide film with thermally conductive silicone coating on both sides for an optimised thermal coupling between electronic packages and heat sinks. Through the specific formulation and filling with thermally conductive ceramic particles a very high thermal conductivity is reached. Under pressure the total thermal resistance is minimised. The material is characterised by its very high dielectric properties. The substrate film provides for an outstanding mechanic stability and cutthrough resistance as well as easy handling.



PROPERTIES

- High thermal contact
- Very high dielectric strength
- Outstanding mechanic stability through substrate film
- Extraordinary chemical resistance and longterm stability
- Residue-free removal after use

AVAILABILITY

- Sheet 320 x 400 mm
Others on request
- Roll 320 mm x 50 m
- Non tacky (TFO-MXXX-SI-PI)
- Die cut parts

APPLICATION EXAMPLES

Thermal link of:

- MOSFETs or IGBTs
- Power diodes or AC/DC converters
- Power modules

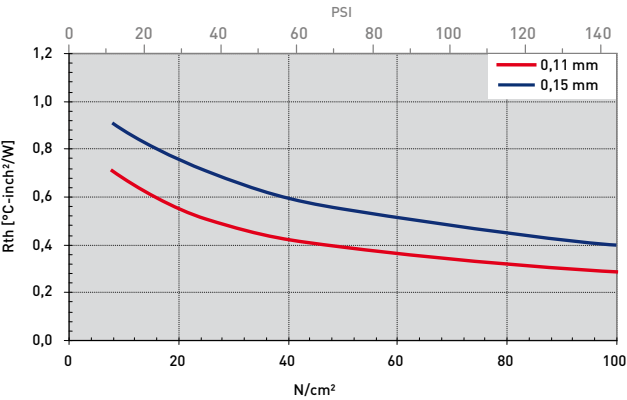
For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TFO-M110-SI-PI | TFO-M150-SI-PI |
|-----------------------------|-----------------|--|--|
| MATERIAL | | | |
| Colour | | Insulating film coated with ceramic filled silicone Light brown | Insulating film coated with ceramic filled silicone Light brown |
| Reinforcement | | Polyimide film | Polyimide film |
| Thickness | mm | 0.11 ±0.02 | 0.15 ±0.02 |
| UL Flammability | UL 94 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| THERMAL | | | |
| Resistance¹ @ 150 PSI | °C-inch²/W | 0.29 | 0.40 |
| Resistance¹ @ 30 PSI | °C-inch²/W | 0.55 | 0.75 |
| Operating Temperature Range | °C | - 40 to + 180 | - 40 to + 180 |
| ELECTRICAL | | | |
| Breakdown Voltage² | kV AC | 6 | > 6 |

Measurement technique according to: ¹ ASTM D 5470, ² ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.

Thickness: 0.11 / 0.15 mm

Rth vs. N/cm² (PSI)



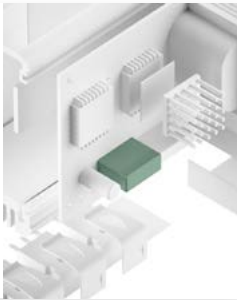
3 SILICONE CAPS



SILICONE CAP TCP-C-SI

all around dielectric

TCP-C-SI is a thermally conductive silicone cap for an optimised thermal coupling between electronic packages and heat sinks which provides for a reliable electrical all-around insulation. Through the specific formulation and filling with thermally conductive ceramic particles a good thermal conductivity is reached. Its conformal surface structure guarantees a very good compliance to the contact surfaces. Thus the total thermal resistance is minimised.



PROPERTIES

- Very good surface compliance
- High thermal contact
- Extraordinary chemical resistance and longterm stability
- Residue-free removal after use

AVAILABILITY

- Thicknesses: 0.5 mm and 0.8 mm
- Different sizes available

APPLICATION EXAMPLES

Thermal link of:

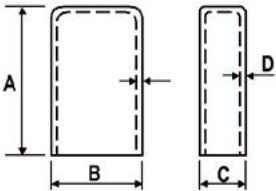
- MOSFETs or IGBTs
- Power diodes or AC/DC converters

For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TCP-C250-SI | TCP-C280-SI |
|--------------------------------|-------------------------|------------------------|------------------------|
| MATERIAL | | | |
| Colour | | Grey | Grey |
| Thickness | mm | 0.50 | 0.80 |
| Tensile Strength ¹ | kpsi | 0.5 | 0.5 |
| Tear Strength | kN/m | 6.0 | 6.0 |
| UL Flammability | UL 94 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| THERMAL | | | |
| Resistance @ 30 PSI | °C-inch ² /W | 0.48 | 0.58 |
| Thermal Conductivity | W/mK | 1.0 | 1.0 |
| Operating Temperature Range | °C | - 40 to + 155 | - 40 to + 155 |
| ELECTRICAL | | | |
| Breakdown Voltage ² | kV AC | 4 | 10 |
| Volume Resistivity | Ohm - cm | 2.6 x 10 ¹⁵ | 2.6 x 10 ¹⁵ |
| Dielectric Constant | @ 1 MHz | 4.85 | 4.85 |

Measurement technique according to: ¹ ASTM D 412, ² ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.

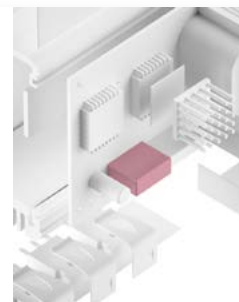
| SIZES IN MM | A | B | C | D |
|-------------|------------|------------|-----------|---|
| TCP-C150-SI | 16.0 ± 0.8 | 11.5 ± 0.5 | 5.9 ± 0.3 | 0.5 ^{+0.15} / _{-0.05} |
| TCP-C250-SI | 21.5 ± 0.8 | 11.5 ± 0.5 | 5.9 ± 0.3 | 0.5 ^{+0.15} / _{-0.05} |
| TCP-C280-SI | 21.8 ± 0.8 | 12.1 ± 0.5 | 6.5 ± 0.3 | 0.8 ^{+0.15} / _{-0.05} |
| TCP-C450-SI | 28.5 ± 0.8 | 17.5 ± 0.5 | 5.9 ± 0.3 | 0.5 ^{+0.15} / _{-0.05} |
| TCP-C480-SI | 28.8 ± 0.8 | 18.2 ± 0.5 | 6.6 ± 0.3 | 0.8 ^{+0.15} / _{-0.05} |



SILICONE CAP TCP-J-SI

all around dielectric

TCP-J-SI is a thermally conductive silicone cap for an optimised thermal coupling between electronic packages and heat sinks which provides for a reliable electrical all-around insulation. Through the specific formulation and filling with thermally conductive ceramic particles a high thermal conductivity is reached. Its conformal surface structure guarantees a very good compliance to the contact surfaces. Thus the total thermal resistance is minimised.



PROPERTIES

- ☐ Very good surface compliance
- ☐ High thermal contact
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Residue-free removal after use

AVAILABILITY

- ☐ Thicknesses:
0.30 mm / 0.45 mm / 0.80 mm
- ☐ Different sizes available
(See table Sizes)

APPLICATION EXAMPLES

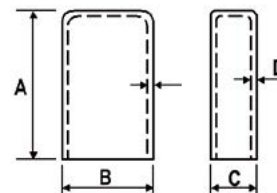
Thermal link of:

- ☐ MOSFETs or IGBTs
 - ☐ Power diodes or AC/DC converters
- For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TCP-J300-SI | TCP-J450-SI | TCP-J800-CP |
|-----------------------------------|-----------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Ceramic filled silicone | Ceramic filled silicone | Ceramic filled silicone |
| Colour | | Reddish | Reddish | Reddish |
| Thickness | mm | 0.30 | 0.45 | 0.80 |
| Tensile Strength | kpsi | 0.5 | 0.5 | 0.5 |
| Tear Strength | kN/m | 9.8 | 9.8 | 9.8 |
| UL Flammability | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance (@ T0-3P) | °C/W | 0.68 | 0.95 | 1.60 |
| Thermal Conductivity ¹ | W/mK | 1.5 | 1.5 | 1.5 |
| Operating Temperature Range | °C | - 50 to + 200 | - 50 to + 200 | - 50 to + 200 |
| ELECTRICAL | | | | |
| Breakdown Voltage | kV AC | 10 | 13 | 18 |
| Volume Resistivity | Ohm - cm | 3.2×10^{14} | 3.2×10^{14} | 3.2×10^{14} |
| Dielectric Constant | @ 1 MHz | 6.0 | 6.0 | 6.0 |

Measurement technique according to: ¹ ASTM E 1530. All data without warranty and subject to change. Please contact us for further data and information.

| SIZES IN MM | A | B | C | D |
|--------------------------|------------|------------|-----------|---------------------|
| TCP-J300-SI (für T0-220) | 21.5 ± 1.0 | 11.4 ± 0.5 | 5.8 ± 0.3 | 0.30 + 0.15 / -0.00 |
| TCP-J300-SI (für T0-3P) | 28.5 ± 1.0 | 17.5 ± 0.5 | 5.8 ± 0.3 | 0.30 + 0.15 / -0.00 |
| TCP-J450-SI (für T0-220) | 21.5 ± 1.0 | 11.4 ± 0.5 | 5.8 ± 0.3 | 0.45 + 0.10 / -0.05 |
| TCP-J450-SI (für T0-3P) | 28.5 ± 1.0 | 17.5 ± 0.5 | 5.9 ± 0.3 | 0.45 + 0.10 / -0.05 |
| TCP-J800-SI (für T0-220) | 21.8 ± 1.0 | 12.1 ± 0.5 | 6.5 ± 0.3 | 0.80 + 0.15 / -0.00 |
| TCP-J800-SI (für T0-3P) | 28.8 ± 1.0 | 18.2 ± 0.5 | 6.6 ± 0.3 | 0.80 + 0.15 / -0.00 |



SILICONE CAP TCP-L-SI

all around dielectric

TCP-L-SI is a thermally conductive silicone cap for an optimised thermal coupling between electronic packages and heat sinks which provides for a reliable electrical all-around insulation. Through the specific formulation and filling with thermally conductive ceramic particles a very high thermal conductivity is reached. Its conformal surface structure guarantees a very good compliance to the contact surfaces. Thus the total thermal resistance is minimised.



PROPERTIES

- ☐ Thermal conductivity: 2.0 W/mK
- ☐ Very good surface compliance
- ☐ High thermal contact
- ☐ Extraordinary chemical resistance and longterm stability
- ☐ Residue-free removal after use

AVAILABILITY

- ☐ Thicknesses:
0.30 mm / 0.45 mm / 0.80 mm
- ☐ Different sizes available
(See table Sizes)

APPLICATION EXAMPLES

Thermal link of:

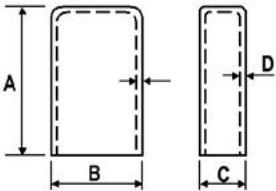
- ☐ MOSFETs or IGBTs
- ☐ Power diodes or AC/DC converters

For use in Switch mode power supplies / Motor control units / Automotive engine management systems / UPS units / Solar systems

| PROPERTY | UNIT | TCP-L300-SI | TCP-L450-SI | TCP-L800-CP |
|-----------------------------------|-----------------|----------------------------------|----------------------------------|----------------------------------|
| MATERIAL | | | | |
| Colour | | Ceramic filled silicone Brown | Ceramic filled silicone Brown | Ceramic filled silicone Brown |
| Thickness | mm | 0.30 | 0.45 | 0.80 |
| Tensile Strength | kpsi | 0.44 | 0.44 | 0.44 |
| Tear Strength | kN/m | 6.0 | 6.0 | 6.0 |
| UL Flammability | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance (@ T0-3P) | °C/W | 0.4 | 0.6 | 1.1 |
| Thermal Conductivity ¹ | W/mK | 2.0 | 2.0 | 2.0 |
| Operating Temperature Range | °C | - 50 to + 200 | - 50 to + 200 | - 50 to + 200 |
| ELECTRICAL | | | | |
| Breakdown Voltage | kV AC | 5 | 7 | 12 |
| Volume Resistivity | Ohm - cm | 3.5 x 10 ¹⁴ | 3.5 x 10 ¹⁴ | 3.5 x 10 ¹⁴ |
| Dielectric Constant | @ 1 MHz | 6.2 | 6.2 | 6.2 |

Measurement technique according to: ¹ ASTM E 1530. All data without warranty and subject to change. Please contact us for further data and information.

| SIZES IN MM | A | B | C | D |
|--------------------------|-----------|-----------|----------|--------------------|
| TCP-L300-SI (für T0-220) | 21.5 ±1.0 | 11.4 ±0.5 | 5.8 ±0.3 | 0.30 +0.15 / -0.00 |
| TCP-L300-SI (für T0-3P) | 28.5 ±1.0 | 17.5 ±0.5 | 5.8 ±0.3 | 0.30 +0.15 / -0.00 |
| TCP-L450-SI (für T0-220) | 21.5 ±1.0 | 11.4 ±0.5 | 5.8 ±0.3 | 0.45 +0.10 / -0.05 |
| TCP-L450-SI (für T0-3P) | 28.5 ±1.0 | 17.5 ±0.5 | 5.9 ±0.3 | 0.45 +0.10 / -0.05 |
| TCP-L800-SI (für T0-220) | 21.8 ±1.0 | 12.1 ±0.5 | 6.5 ±0.3 | 0.80 +0.15 / -0.00 |
| TCP-L800-SI (for T0-3P) | 28.8 ±1.0 | 18.2 ±0.5 | 6.6 ±0.3 | 0.80 +0.15 / -0.00 |



4 PHASE CHANGE MATERIAL

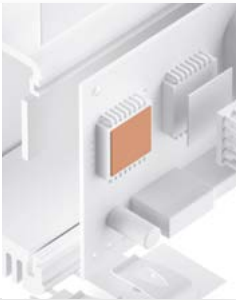
/ POLYIMIDE FILM COATED /
ALUMINUM FILM COATED /
FILM



POLYIMIDE FILM/PHASE CHANGE TPC-N-PI

phase change coating, highly dielectric

TPC-N-PI is a thermally conductive film with an electrically insulator made of Devinall TH Polyimide which is coated with a thermally conductive phase changing compound on both sides thus optimising the thermal path e.g. between electronic packages and heat sinks. During warm-up the phase change coating starts filling up surface-specific roughnesses and unevennesses and expels any air enclosures from micro structures even at low pressure. The wetting of the contact areas is further on improved by volumetric material expansion of approximately 10 to 15% at increasing temperature. Thus the total thermal resistance is minimised. The material is characterised by its very high dielectric properties.



PROPERTIES

- ☐ Optimal thermal contact
- ☐ High dielectric strength
- ☐ Silicone-free
- ☐ No dry up, pump-out migration
- ☐ No run-out through thixotropic properties
- ☐ Process reliable coating thickness
- ☐ Ideal replacement of messy thermal grease

AVAILABILITY

- ☐ Sheet 305 x 495 / 610 x 495 mm
- ☐ Roll 495 mm x 152 m
- ☐ Non tacky (TPC-NXXX-PI)
- ☐ Tacky on one side with PSA (TPC-NXXX-PI-A1)
- ☐ With adhesive strips on request
- ☐ Thicker phase coating (25 µm)
- ☐ Die cut parts
- ☐ Kiss cut parts

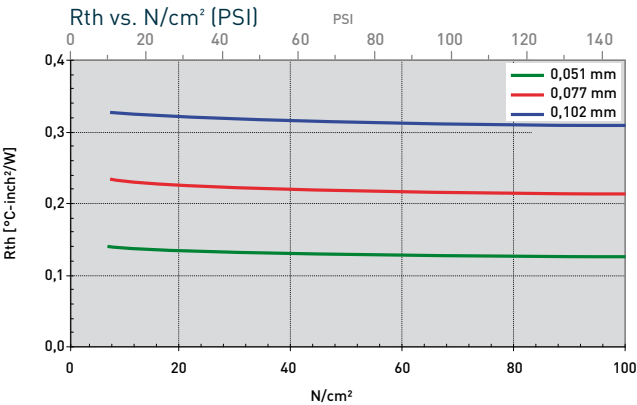
APPLICATION EXAMPLES

- Thermal link of:
- ☐ MOSFETs or IGBTs
 - ☐ Diodes
 - ☐ A.C. converter
 - ☐ Uninsulated power modules
- For use in Automotive motor control units / Power supplies / Traction drives / Telecom appliances

| PROPERTY | UNIT | TPC-N051-PI | TPC-N077-PI | TPC-N102-PI |
|--|-------------|--|--|--|
| MATERIAL | | | | |
| Colour | | Devinall TH Polyimide film with phase change coating on both sides Light orange | Devinall TH Polyimide film with phase change coating on both sides Light orange | Devinall TH Polyimide film with phase change coating on both sides Light orange |
| Thickness Devinall TH | µm | 25 ±4 | 51 ±8 | 77 ±12 |
| Thickness Phase Change (per side) | µm | 13 | 13 | 13 |
| Total Thickness | µm | 51 | 77 | 102 |
| Tensile Strength | kpsi | 19.7 | 19.7 | 19.7 |
| UL Flammability Devinall TH (Equivalent) | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015/863/EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance¹ @ 150 PSI | °C-inch²/W | 0.126 | 0.215 | 0.311 |
| Resistance¹ @ 30 PSI | °C-inch²/W | 0.130 | 0.220 | 0.315 |
| Resistance¹ @ 10 PSI | °C-inch²/W | 0.143 | 0.237 | 0.332 |
| Thermal Conductivity Devinall TH | W/mK | 0.36 | 0.36 | 0.36 |
| Phase Change Temperature | °C | ca. 60 | ca. 60 | ca. 60 |
| ELECTRICAL | | | | |
| Breakdown Voltage | kV AC | 5.4 | 9.0 | 13.5 |
| Volume Resistivity | Ohm - cm | 1.0 x 10¹⁶ | 1.0 x 10¹⁶ | 1.0 x 10¹⁶ |
| Dielectric Constant | @ 25°C | 4.0 | 4.0 | 4.0 |

Measurement technique according to: ¹ ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

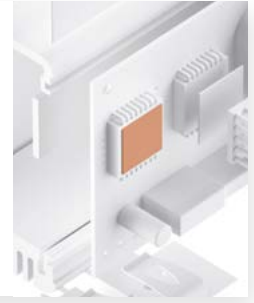
Thicknesses: Devinall TH Polyimide: 25 µm / 51 µm / 76 µm. Total Thicknesses: 51 µm / 77 µm / 102 µm



KAPTON® FILM WITH PHASE CHANGE TPC-P-KA

phase change coating, highly dielectric

TPC-P-KA is a thermally conductive film with an electrically insulator made of Kapton®MT which is coated with a thermally conductive phase changing compound on both sides thus optimising the thermal path e.g. between electronic packages and heat sinks. During warm-up the phase change coating starts filling up surface-specific roughnesses and unevennesses and expels any air enclosures from micro structures even at low pressure. The wetting of the contact areas is further on improved by volumetric material expansion of approximately 10 to 15% at increasing temperature. Thus the total thermal resistance is minimised. The material is characterised by its very high dielectric properties.



PROPERTIES

- ☐ Optimal thermal contact
- ☐ High dielectric strength
- ☐ Silicone-free
- ☐ No dry up, pump-out migration
- ☐ No run-out through thixotropic properties
- ☐ Process reliable coating thickness
- ☐ Ideal replacement of messy thermal grease

AVAILABILITY

- ☐ Sheet 305 x 394 / 610 x 394 mm
- ☐ Roll 394 mm x 152 m
- ☐ Non tacky (TPC-PXXX-KA)
- ☐ Tacky on one side with PSA (TPC-PXXX-KA-A1)
- ☐ With adhesive strips on request
- ☐ Thicker phase coating (25 µm)
- ☐ Die cut parts
- ☐ Kiss cut parts

APPLICATION EXAMPLES

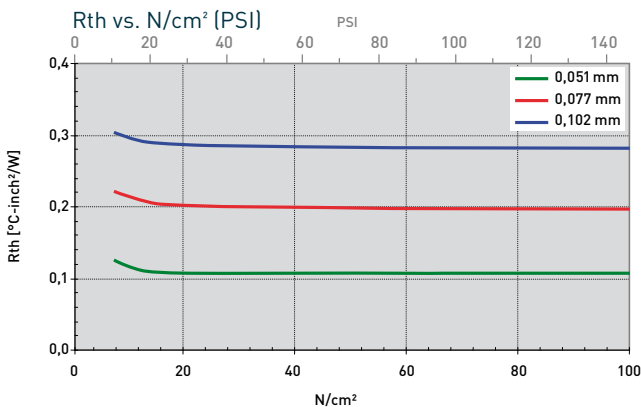
Thermal link of:

- ☐ MOSFETs or IGBTs
 - ☐ Diodes
 - ☐ A.C. converter
 - ☐ Uninsulated power modules
- For use in Automotive motor control units / Power supplies / Traction drives / Telecom appliances

| PROPERTY | UNIT | TPC-P051-KA | TPC-P077-KA | TPC-P102-KA |
|-----------------------------------|-------------------------|---|---|---|
| MATERIAL | | | | |
| Colour | | Kapton®MT with phase change coating on both sides Light orange | Kapton®MT with phase change coating on both sides Light orange | Kapton®MT with phase change coating on both sides Light orange |
| Thickness Kapton®MT | µm | 25 ±4 | 51 ±8 | 77 ±12 |
| Thickness Phase Change (per side) | µm | 13 | 13 | 13 |
| Total Thickness | µm | 51 | 77 | 102 |
| Tensile Strength ¹ | kpsi | 20 | 22 | 23 |
| UL Flammability | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ² @ 150 PSI | °C-inch ² /W | 0.110 | 0.195 | 0.285 |
| Resistance ² @ 30 PSI | °C-inch ² /W | 0.113 | 0.200 | 0.290 |
| Resistance ² @ 10 PSI | °C-inch ² /W | 0.125 | 0.213 | 0.300 |
| Thermal Conductivity Kapton®MT | W/mK | 0.45 | 0.45 | 0.45 |
| Phase Change Temperatur | °C | ca. 60 | ca. 60 | ca. 60 |
| ELECTRICAL | | | | |
| Breakdown Voltage ³ | kV AC | 5.5 | 9.2 | 12.3 |
| Volume Resistivity | Ohm - cm | 1.0 x 10 ¹⁴ | 1.0 x 10 ¹⁴ | 1.0 x 10 ¹⁴ |
| Dielectric Constant | @ 1 MHz | 4.2 | 4.2 | 4.2 |

Measurement technique according to: ¹ ASTM D 412, ² ASTM D 5470, ³ ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

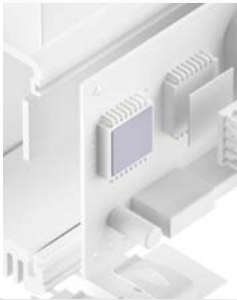
Thicknesses: Kapton® MT 25 µm / 51 µm / 76 µm. Total Thicknesses: 51 µm / 77 µm / 102 µm



PHASE CHANGE TPC-W-PC

as stand alone or with substrate

TPC-W-PC is thermally conductive phase changing film optimising the thermal path e.g. between electronic packages and heat sinks. During warm-up the phase change compound starts filling up surface-specific roughnesses and unevenesses and expels any air enclosures from micro structures even at very low pressure. The material is available as TPC-W-PC as free standing film or with different substrates thus reworkability is improved since no compound residues remain on one side.



PROPERTIES

- ☐ Optimal thermal contact
- ☐ Thermal conductivity: 3.5 W/mK
- ☐ Silicone-free
- ☐ Ideal alternative and replacement of messy thermal grease
- ☐ Different optional substrates allow for one-side residue-freeness and improved reworkability

AVAILABILITY

- ☐ Sheet 305 x 152 mm
- ☐ Roll 356 mm (Liner 394 mm) x L (up to 150 m)
- ☐ TPC-WXXX-PC: Die cut parts between 2 release liners
- ☐ One-side coated substrates: Aluminum TPC-WXXX-PC-ALYYY Copper TPC-WXXX-PC-CUYYY

APPLICATION EXAMPLES

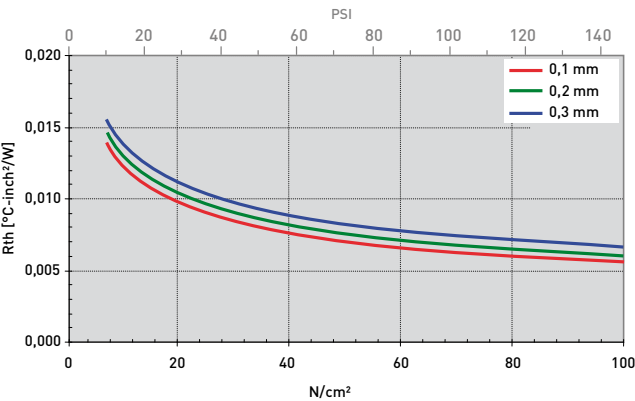
- Thermal link of:
- ☐ MOSFETs or IGBTs
 - ☐ Memory modules
 - ☐ Power modules
 - ☐ CPUs
- For use in Servo drive control units / Computers / Automation appliances / Microelectronics

| PROPERTY | UNIT | TPC-W100-PC | TPC-W200-PC | TPC-W300-PC |
|--------------------------|-----------------|-------------------|-------------------|-------------------|
| MATERIAL | | Phase Change Film | Phase Change Film | Phase Change Film |
| Colour | | Grey | Grey | Grey |
| Total Thickness | mm | 0.1 ±0.02 | 0.2 ±0.03 | 0.3 ±0.03 |
| Specific Density | g/cm³ | 2.0 | 2.0 | 2.0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance¹ @ 150 PSI | °C-inch²/W | 0.0056 | 0.0061 | 0.0067 |
| Resistance¹ @ 30 PSI | °C-inch²/W | 0.0097 | 0.0103 | 0.0111 |
| Resistance¹ @ 10 PSI | °C-inch²/W | 0.0138 | 0.0148 | 0.0158 |
| Thermal Conductivity | W/mK | 3.5 | 3.5 | 3.5 |
| Phase Change Temperature | °C | ca. 45 | ca. 45 | ca. 45 |
| Storage | Months | 24 | 24 | 24 |
| Max. Storage Temperature | °C | 27 | 27 | 27 |

Measurement technique according to: ¹ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.1 mm / 0.2 mm / 0.3 mm / 0.4 mm

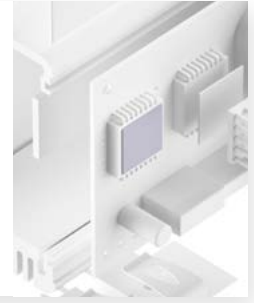
Rth vs. N/cm² (PSI)



PHASE CHANGE TPC-Y-PC

as stand alone or with substrate

TPC-Y-PC is thermally conductive phase changing film optimising the thermal path e.g. between electronic packages and heat sinks. During warm-up the phase change compound starts filling up surface-specific roughnesses and unevennesses and expels any air enclosures from micro structures even at very low pressure. The material is available as TPC-Y-PC as free standing film or with different substrates thus reworkability is improved since no compound residues remain on one side.



PROPERTIES

- ☐ Optimal thermal contact
- ☐ Thermal conductivity: 5.0 W/mK
- ☐ Silicone-free
- ☐ Ideal alternative and replacement of messy thermal grease
- ☐ Different optional substrates allow for one-side residue-freeness and improved reworkability

AVAILABILITY

- ☐ Sheet 355 x 152 mm
- ☐ TPC-YXXX-PC: Die cut parts between 2 release liners
- ☐ One-side coated substrates: Aluminum TPC-YXXX-PC-AL Copper TPC-YXXX-PC-CU

APPLICATION EXAMPLES

Thermal link of:

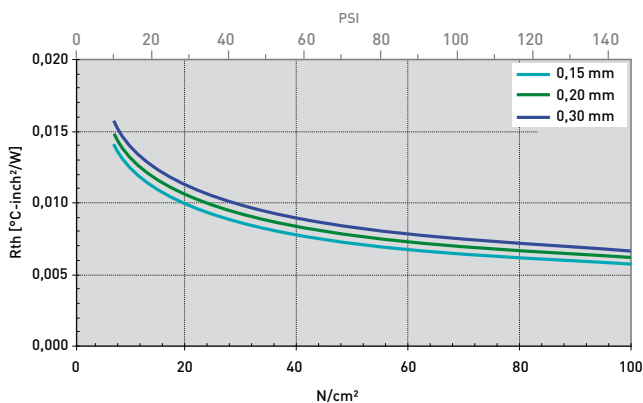
- ☐ MOSFETs or IGBTs
 - ☐ Memory modules
 - ☐ Modules / Heat Pipe Assemblies
 - ☐ CPUs
- For use in Servo drive control units / Computers / Automation appliances / Microelectronics

| PROPERTY | UNIT | TPC-Y150-PC | TPC-Y200-PC | TPC-Y300-PC |
|-----------------------------------|-------------------------|-------------------|-------------------|-------------------|
| MATERIAL | | Phase Change Film | Phase Change Film | Phase Change Film |
| Colour | | Grey | Grey | Grey |
| Total Thickness | mm | 0.15 ±0.02 | 0.2 ±0.03 | 0.3 ±0.03 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ¹ @ 150 PSI | °C-inch ² /W | 0.0056 | 0.0060 | 0.0066 |
| Resistance ¹ @ 30 PSI | °C-inch ² /W | 0.0095 | 0.0102 | 0.0110 |
| Resistance ¹ @ 10 PSI | °C-inch ² /W | 0.0130 | 0.0147 | 0.0155 |
| Thermal Conductivity | W/mK | 5.0 | 5.0 | 5.0 |
| Phase Change Temperature | °C | ca. 45 | ca. 45 | ca. 45 |
| Operating Temperature Range | °C | max. 125 | max. 125 | max. 125 |
| Storage | Months | 24 | 24 | 24 |
| Max. Storage Temperature | °C | 27 | 27 | 27 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Thicknesses: 0.15 mm / 0.2 mm / 0.3 mm

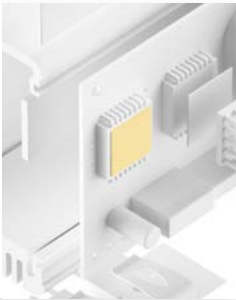
R_{th} vs. N/cm² (PSI)



ALUMINUM FILM WITH PHASE CHANGE TPC-R-AL

phase change coating

TPC-R-AL is an aluminum film which is coated with a thermally conductive phase changing compound on both sides thus optimising the thermal path e.g. between electronic packages and heat sinks. During warm-up the phase change coating starts filling up surface-specific roughnesses and unevennesses and expels any air enclosures from micro structures even at low pressure. The wettening of the contact areas is further on improved by volumetric material expansion at increasing temperature. Thus the total thermal resistance is minimised. The aluminum carrier effects high mechanical stability and easy handling.



PROPERTIES

- ☐ Optimal thermal contact
- ☐ Silicone-free
- ☐ Process reliable coating thickness
- ☐ Ideal alternative and replacement of messy thermal grease

AVAILABILITY

- ☐ Sheet 305 x 610 mm or 457 x 610 mm
- ☐ Roll 292 or 445 mm x 152 m
- ☐ Non tacky (TPC-RXXX-AL)
- ☐ Tacky on one side with PSA (TPC-RXXX-AL-A1)
- ☐ With adhesive strips on request
- ☐ Optional AL (25 / 51 / 76 / 127 / 254 µm), phase change coating (13 / 25 / 51 µm)
- ☐ Die cut or kiss cut parts

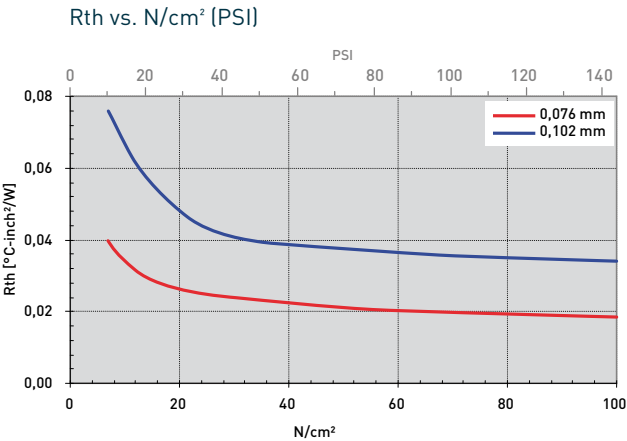
APPLICATION EXAMPLES

- Thermal link of:
- ☐ MOSFETs or IGBTs
 - ☐ Insulated diodes
 - ☐ Power modules
 - ☐ CPUs
- For use in Servo drive control units / Traction drives / Automation appliances / Micro-electronics

| PROPERTY | UNIT | TPC-R076-AL | TPC-R102-AL |
|-----------------------------------|-----------------|--|--|
| MATERIAL | | Aluminum with phase change coating on both sides | Aluminum with phase change coating on both sides |
| Colour | | White | White |
| Thickness Aluminum | µm | 51 ±8 | 51 ±8 |
| Thickness Phase Change (per side) | µm | 13 | 25 |
| Total Thickness | µm | 76 | 102 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| THERMAL | | | |
| Resistance¹ @ 150 PSI | °C-inch²/W | 0.019 | 0.034 |
| Resistance¹ @ 30 PSI | °C-inch²/W | 0.026 | 0.047 |
| Resistance¹ @ 10 PSI | °C-inch²/W | 0.040 | 0.076 |
| Phase Change Temperature | °C | ca. 60 | ca. 60 |

Measurement technique according to: ¹ ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

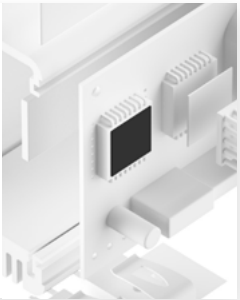
Thicknesses: 51 µm / 76 µm / 102 µm / 127 µm / 152 µm / 177 µm / 279 µm / 304 µm



ALUMINUM FILM WITH PHASE CHANGE TPC-T-AL-CB

phase change coating

TPC-T-AL-CB is an aluminum film which is coated with a thermally conductive phase changing compound on both sides thus optimising the thermal path e.g. between electronic packages and heat sinks. During warm-up the phase change coating starts filling up surface-specific roughnesses and unevennesses and expels any air enclosures from micro structures even at low pressure. The wetting of the contact areas is further on improved by volumetric material expansion at increasing temperature. Thus the total thermal resistance is minimised. The aluminum carrier effects high mechanical stability and easy handling.



PROPERTIES

- ☐ Optimal thermal contact
- ☐ Silicone-free
- ☐ Process reliable coating thickness
- ☐ Ideal alternative and replacement of messy thermal grease

AVAILABILITY

- ☐ Sheet 445 x 500 mm
- ☐ Roll 445 mm x 152 m
- ☐ Non tacky
- ☐ (TPC-TXXX-AL-CB)
- ☐ Die cut parts

APPLICATION EXAMPLES

Thermal link of:

- ☐ MOSFETs or IGBTs
- ☐ Insulated diodes
- ☐ Power modules
- ☐ CPUs

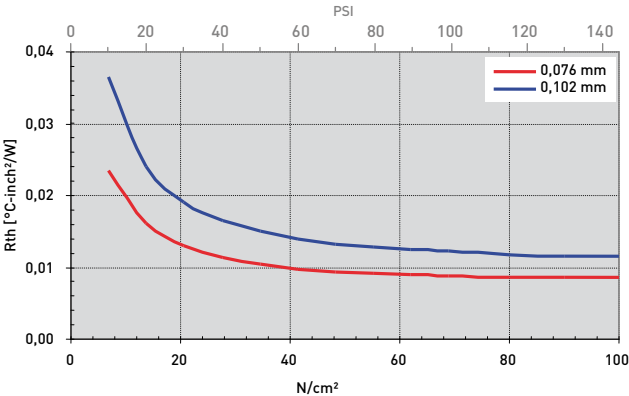
For use in Servo drive control units
/ Traction drives / Automation ap-
pliances / Microelectronics

| PROPERTY | UNIT | TPC-T076-AL-CB | TPC-T102-AL-CB |
|-----------------------------------|-----------------|---|---|
| MATERIAL | | | |
| Colour | | Aluminum with graphite filled phase change coating on both sides Black | Aluminum with graphite filled phase change coating on both sides Black |
| Thickness Aluminum | µm | 51 ±8 | 51 ±8 |
| Thickness Phase Change (per side) | µm | 12.5 | 25.5 |
| Total Thickness | µm | 76 | 102 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| THERMAL | | | |
| Resistance¹ @ 150 PSI | °C-inch²/W | 0.009 | 0.011 |
| Resistance¹ @ 30 PSI | °C-inch²/W | 0.013 | 0.019 |
| Resistance¹ @ 10 PSI | °C-inch²/W | 0.022 | 0.037 |
| Phase Change Temperature | °C | ca. 52 | ca. 52 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Phase Change coatings per side: 12.5 µm / 25.5 µm
Total Thicknesses: 76 µm / 102 µm

Rth vs. N/cm² (PSI)

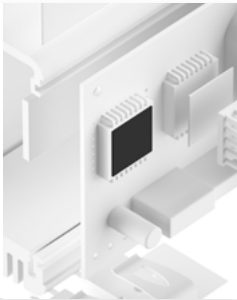


GRAPHITE FILM WITH PHASE CHANGE

TPC-V-PG-CB

Pyrolytic graphite, phase change coating

TPC-V-PG-CB is an anisotropic thermally conductive pyrolytic graphite film which is coated with a thermally conductive phase changing compound on both sides thus optimising the thermal path e.g. between electronic packages and heat sinks. During warm-up the phase change coating starts filling up surface-specific roughnesses and unevennesses and expels any air enclosures from micro structures even at low pressure. The wetting of the contact areas is further on improved by volumetric material expansion at increasing temperature. Thus the total thermal resistance is minimised. The flexible pyrolytic graphite carrier effects mechanical stability and easy handling.



PROPERTIES

- ☐ Optimal thermal contact
- ☐ Silicone-free
- ☐ Flexible, easy to handle
- ☐ Process reliable coating thickness
- ☐ Ideal alternative and replacement of messy thermal grease
- ☐ EMI shielding

AVAILABILITY

- ☐ Sheet 190 x 355 mm (40 µm)
- ☐ Sheet 139 x 355 mm (70 / 100 µm)
- ☐ Roll 190 mm x 25 m (min.) (40 µm)
- ☐ Roll 139 mm x 25 m (min.) (70 / 100 µm)
- ☐ Non tacky (TPC-VXXX-PG-CB)
- ☐ Tacky on one side (TPC-VXXX-PG-CB-A1)
- ☐ Die cut parts

APPLICATION EXAMPLES

Thermal link of:

- ☐ MOSFETs or IGBTs
- ☐ Insulated diodes
- ☐ Power modules
- ☐ CPUs

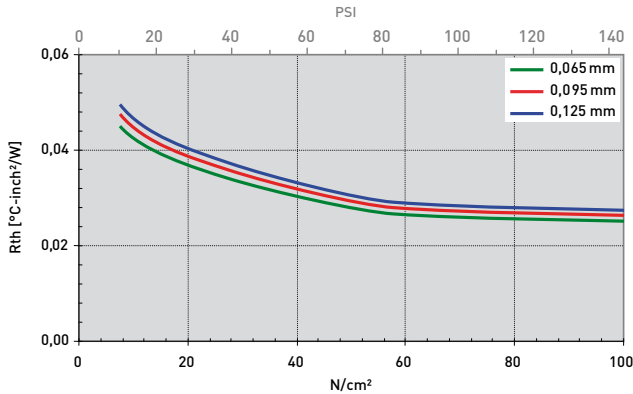
For use in Servo drive control units / Heat Pipe Assemblies / Traction drives / Automation appliances / Microelectronics / IT-Servers

| PROPERTY | UNIT | TPC-V065-PG-CB | TPC-V095-PG-CB | TPC-V125-PG-CB |
|---|-----------------|--|--|--|
| MATERIAL | | Pyrolytic graphite with graphite filled phase change coating on both sides | Pyrolytic graphite with graphite filled phase change coating on both sides | Pyrolytic graphite with graphite filled phase change coating on both sides |
| Colour | | Black | Black | Black |
| Thickness pyrolytic graphite | µm | 40 | 70 | 100 |
| Thickness Phase Change (per side) | µm | 12.5 | 12.5 | 12.5 |
| Total Thickness | µm | 65 ±5 | 95 ±7 | 125 ±8 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance¹ @ 150 PSI | °C-inch²/W | 0.025 | 0.026 | 0.027 |
| Resistance¹ @ 30 PSI | °C-inch²/W | 0.037 | 0.039 | 0.041 |
| Resistance¹ @ 10 PSI | °C-inch²/W | 0.046 | 0.048 | 0.051 |
| Thermal Conductivity Pyrolytic graphite (Z Direction) | W/mK | 6 | 7 | 8 |
| Thermal Conductivity Pyrolytic graphite (X-Y Direction) | W/mK | 1,450 | 1,400 | 1,350 |
| Phase Change Temperature | °C | ca. 52 | ca. 52 | ca. 52 |

Measurement technique according to: ¹ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Phase Change coatings per side: 12.5 µm / 25.5 µm / 31.8 µm
Thicknesses pyrolytic graphite: 40 µm / 70 µm / 100 µm

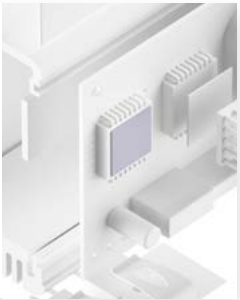
Rth vs. N/cm² (PSI)



PHASE CHANGE COMPOUND TPC-W-PC-M/-E

printable

TPC-W-PC is a thixotropic thermally conductive phase changing compound optimising the thermal path e.g. between electronic packages and heat sinks. During warm-up the phase change compound starts filling up surface-specific roughnesses and unevennesses and expels any air enclosures from micro structures even at very low pressure. Both thin bondline and high thermal conductivity minimise the total thermal resistance. It can be pre-applied by screen printing. After drying the compound is dry-to-the-touch and ready for use on the thermal contact area. TPC-W-PC-M and TPC-W-PC-E are printable compounds with alternatively long and extended dry times. TPC-W-PC-E dries only at elevated temperature.



PROPERTIES

- ☐ Optimal thermal contact by thin bondline
- ☐ Silicone-free
- ☐ Thermal conductivity: 3.5 W/mK
- ☐ Thixotropic
- ☐ Ideal alternative and replacement of messy thermal grease
- ☐ Accurate automated application by stencil printing for mass production
- ☐ TPC-W-PC-M med dry time: @ RT or elevated temp.
- ☐ TPC-W-PC-E extended dry time: only @ elevated temp.

AVAILABILITY

- ☐ TPC-W-PC-M and TPC-W-PC-E: Printable type med dry -M and extended dry -E
- ☐ -E dries at elevated temperature only
- ☐ 360 ml SEMCO cartridges (transparent)
- ☐ 30 ml syringes

APPLICATION EXAMPLES

Thermal link of:

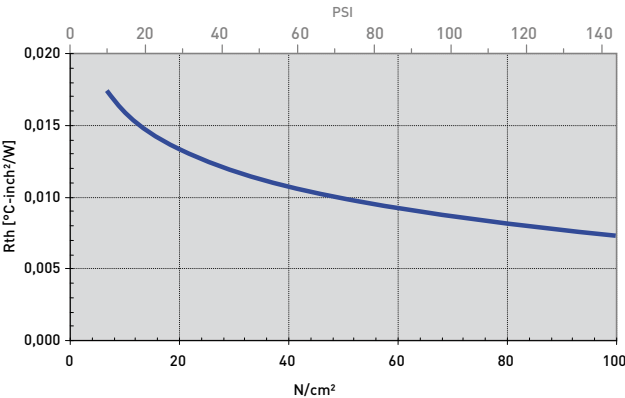
- ☐ MOSFETs und IGBTs
- ☐ Memory Modules
- ☐ IGBT Power Modules
- ☐ CPUs

For use in Servo drive control units / Computers / Automation appliances / Microelectronics

| PROPERTY | UNIT | TPC-W-PC-M | TPC-W-PC-E |
|-----------------------------|-------------|--|---|
| MATERIAL | | Dryable Phase Change Compound | Dryable Phase Change Compound |
| Colour | | Grey | Grey |
| Assembly | | ~ Print | ~ Print |
| Specific Gravity dried | g/cm³ | 1.8 @ RT | 1.8 @ RT |
| undried | g/cm³ | 1.6 @ RT | 1.7 @ RT |
| Viscosity dried @ 10 rpm | Pas | 60 @ 60°C / 42 @ 80°C / 25 @ 100°C / 18 @ 120°C | 60 @ 60°C / 42 @ 80°C / 25 @ 100°C / 18 @ 120°C |
| Viscosity undried @ 10 rpm | Pas | 85 @ RT | 96 @ RT |
| Drying @ Temperature | Time | @ 22°C: 24 h (0.05 mm) @ 60°C: 24 min (0.05 mm) @ 125°C: 4 min (0.05 mm) | @ 60°C: 3,5 h (0.05 mm) @ 125°C: 8 min (0.05 mm) |
| @ Thickness | | 48 h (0.15 mm) 56 h (0.25 mm) | 8 h (0.15 mm) 15 min (0.15 mm) 20 min (0.25 mm) |
| Storage (@ RT) | Months | 9 | 9 |
| RoHS Conformity | 2015/863/EU | Yes | Yes |
| THERMAL | | | |
| Resistance¹ @ 150 PSI | °C-inch²/W | 0.007 | 0.007 |
| Resistance¹ @ 30 PSI | °C-inch²/W | 0.013 | 0.013 |
| Resistance¹ @ 10 PSI | °C-inch²/W | 0.017 | 0.017 |
| Thermal Conductivity | W/mK | 3.5 | 3.5 |
| Phase Change Temperature | °C | ca. 45 | ca. 45 |
| Operating Temperature Range | °C | < 110 | < 110 |
| Max. Storage Temp. | °C | 25 | 25 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

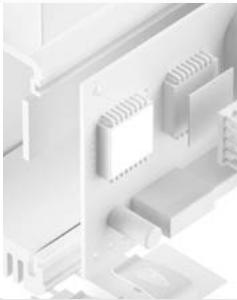
Rth vs. N/cm² (PSI)



PHASE CHANGE COMPOUND TPC-X-PC-NC-HT-M/-E

printable, dielectric

TPC-X-PC-NC-HT-M/-E is a thixotropic thermally conductive phase changing compound optimising the thermal path e.g. between electronic packages and heat sinks. During warm-up the phase change compound starts filling up surface-specific roughnesses and unevenesses and expels any air enclosures from micro structures even at very low pressure. Both thin bondline and high thermal conductivity minimise the total thermal resistance. It can be pre-applied by screen printing. After drying the compound is dry-to-the-touch and ready for use on the thermal contact area. The compound is designed for applications with extended temperature requirements. TPC-X-PC-NC-HT-M and TPC-X-PC-NC-HT-E are printable compounds with alternatively long and extended dry times. TPC-X-PC-NC-HT-E dries only at elevated temperature.



PROPERTIES

- Optimal thermal contact by thin bondline
- Silicone-free
- Thermal conductivity: 3.0 W/mK
- Dielectric
- Thixotropic
- Ideal alternative and replacement of messy thermal grease
- Accurate automated application by stencil printing for mass production
- TPC-X-PC-NC-HT-M med dry time: @ RT or elevated temp.
- TPC-X-PC-NC-HT-E extended dry time: only @ elevated temp.

AVAILABILITY

- TPC-X-PC-NC-HT-M and TPC-X-PC-NC-HT-E: Printable type med dry -M and extended dry -E
- E dries at elevated temperature only
- 360 ml SEMCO cartridges (transparent)
- 30 ml syringes

APPLICATION EXAMPLES

Thermal link of:

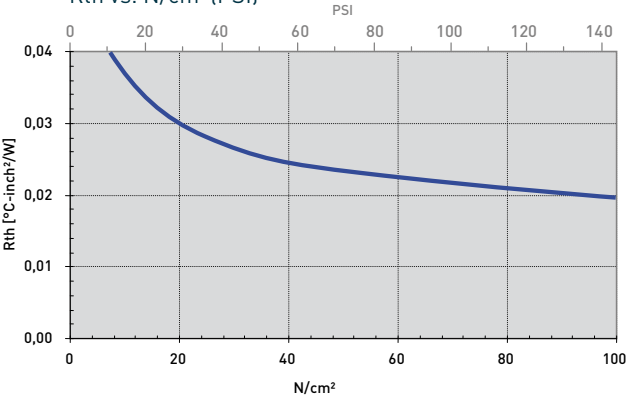
- MOSFETs and IGBTs
- Memory Modules
- IGBT Power Modules
- CPUs

For use in Servo drive control units / Computers / Automation appliances / Microelectronics

| PROPERTY | UNIT | TPC-X-PC-NC-HT-M | TPC-X-PC-NC-HT-E |
|---|-------------|--|--|
| MATERIAL | | Dryable Phase Change Compound | Dryable Phase Change Compound |
| Colour | | White | White |
| Assembly | | ~ Print | ~ Print |
| Specific Gravity dried undried | g/cm³ g/cm³ | 1.1 @ RT 1.0 @ RT | 1.10 @ RT 1.05 @ RT |
| Viscosity dried @ 10 rpm Viscosity undried @ 10 rpm | Pas Pas | 65 @ 60°C / 38 @ 80°C / 25 @ 100°C / 18 @ 120°C 70 | 65 @ 60°C / 38 @ 80°C / 25 @ 100°C / 18 @ 120°C 85 |
| Drying @ Temperature @ Thickness | Time | @ 22°C: 24 h (0.05 mm) 48 h (0.15 mm) 56 h (0.25 mm) @ 60°C: 24 min (0.05 mm) 53 min (0.15 mm) 56 min (0.25mm) @ 125°C: 4 min (0.05 mm) 6 min (0.15 mm) 10 min (0.25 mm) | @ 60°C: 4 h (0.05 mm) 12 h (0.15 mm) 20 h (0.25mm) @ 125°C: 10 min (0.05 mm) 15 min (0.15 mm) 20 min (0.25 mm) |
| Storage (@ RT) | Months | 9 | 9 |
| RoHS Conformity | 2015/863/EU | Yes | Yes |
| THERMAL | | | |
| Resistance¹ @ 150 PSI | °C-inch²/W | 0.02 | 0.02 |
| Resistance¹ @ 30 PSI | °C-inch²/W | 0.03 | 0.03 |
| Resistance¹ @ 10 PSI | °C-inch²/W | 0.04 | 0.04 |
| Thermal Conductivity | W/mK | 3.0 | 3.0 |
| Phase Change Temperature | °C | ca. 45 | ca. 45 |
| Operating Temperature Range | °C | < 140 | < 140 |
| Max. Storage Temp. | °C | 25 | 25 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

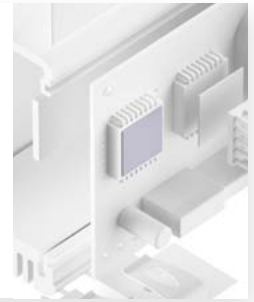
Rth vs. N/cm² (PSI)



PHASE CHANGE COMPOUND TPC-Z-PC-HT-M/-E

printable

TPC-Z-PC-HT is a thixotropic thermally conductive phase changing compound optimising the thermal path e.g. between electronic packages and heat sinks. During warm-up the phase change compound starts filling up surface-specific roughnesses and unevennesses and expels any air enclosures from micro structures even at very low pressure. Both thin bondline and high thermal conductivity minimise the total thermal resistance. It can be pre-applied by screen printing. After drying the compound is dry-to-the-touch and ready for use on the thermal contact area. The compound is designed for applications with extended temperature requirements. TPC-Z-PC-HT-M and TPC-Z-PC-HT-E are printable compounds with alternatively long and extended dry times. TPC-Z-PC-HT-E dries only at elevated temperature.



PROPERTIES

- ☐ Optimal thermal contact by thin bondline
- ☐ Silicone-free
- ☐ Thermal conductivity: 3.0 W/mK
- ☐ Thixotropic
- ☐ Ideal alternative and replacement of messy thermal grease
- ☐ Accurate automated application by stencil printing for mass production
- ☐ TPC-Z-PC-HT-M med dry time: @ RT or elevated temp.
- ☐ TPC-Z-PC-HT-E extended dry time: only @ elevated temp.

AVAILABILITY

- ☐ TPC-Z-PC-HT-M and TPC-Z-PC-HT-E: Printable type med dry -M and extended dry -E
- ☐ -E dries at elevated temperature only
- ☐ 360 ml SEMCO cartridges (transparent)
- ☐ 30 ml syringes

APPLICATION EXAMPLES

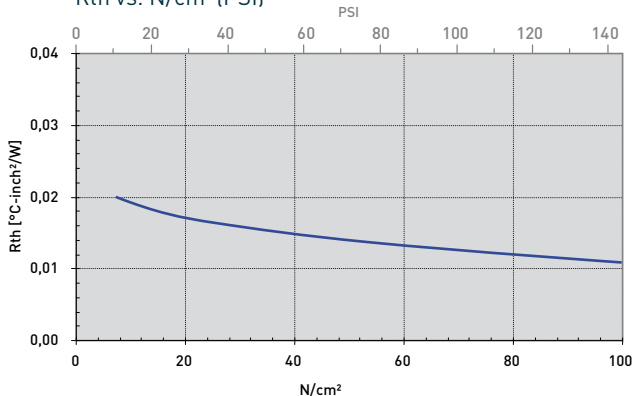
Thermal link of:

- ☐ MOSFETs und IGBTs
 - ☐ Memory Modules
 - ☐ IGBT Power Modules
 - ☐ CPUs
- For use in Servo drive control units / Computers / Automation appliances / Microelectronics

| PROPERTY | UNIT | TPC-Z-PC-HT-M | TPC-Z-PC-HT-E |
|-----------------------------------|-------------------------|---|--|
| MATERIAL | | Dryable Phase Change Compound | Dryable Phase Change Compound |
| Colour | | Grey | Grey |
| Assembly | | ~ Print | ~ Print |
| Specific Gravity dried | g/cm ³ | 2.3 @ RT | 2.3 @ RT |
| undried | g/cm ³ | 2.0 @ RT | 2.1 @ RT |
| Viscosity dried @ 10 rpm | Pas | 45 @ 60°C / 30 @ 80°C / 21 @ 100°C / 15 @ 120°C | 45 @ 60°C / 30 @ 80°C / 20 @ 100°C / 15 @ 120°C |
| undried @ 10 rpm | Pas | 60 | 77.5 |
| Drying @ Temperature | Time | @ 22°C: 24 h (0.05 mm) @ 60°C: 24 min (0.05 mm) @ 125°C: 3 min (0.05 mm) | @ 60°C: 4 h (0.05 mm) @ 125°C: 8 min (0.05 mm) |
| @ Thickness | | 48 h (0.15 mm) 50 min (0.15 mm) 5 min (0.15 mm) 56 h (0.25 mm) 60 min (0.25 mm) 10 min (0.25 mm) | 12 h (0.15 mm) 15 min (0.15 mm) 20 h (0.25 mm) 20 min (0.25 mm) |
| Storage (@ RT) | Months | 9 | 9 |
| RoHS Conformity | 2015/863/EU | Yes | Yes |
| THERMAL | | | |
| Resistance ¹ @ 150 PSI | °C-inch ² /W | 0.011 | 0.011 |
| Resistance ¹ @ 30 PSI | °C-inch ² /W | 0.017 | 0.017 |
| Resistance ¹ @ 10 PSI | °C-inch ² /W | 0.020 | 0.020 |
| Thermal Conductivity | W/mK | 3.0 | 3.0 |
| Phase Change Temperature | °C | ca. 45 | ca. 45 |
| Operating Temperature Range | °C | < 140 | < 140 |
| Max. Storage Temp. | °C | 25 | 25 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

R_{th} vs. N/cm² (PSI)





5 GRAPHITE FOILS

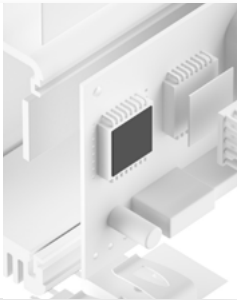
/ ANISOTROPIC / PYROLYTIC



GRAPHITE FOIL TFO-S-CB

anisotropic

TFO-S-CB consists of more than 98% pure natural graphite. Due to the flake-like shape they show anisotropic thermal conductivities in-plane (x-y-plane) and in through direction (z-direction). Their softness allows for a good compliance to the contact surfaces. Thus the total thermal resistance is minimised. Their low densities compared to copper (15%) or aluminum (50%) make them ideal for applications where low weight is required. The very high temperature resistance allows for the use in extreme hot environments.



PROPERTIES

- Maximum contact through good surface compliance
- Very low weight
- Silicone-free
- Very high temperature resistance
- EMI-shielding through high electrical conductivity

AVAILABILITY

- Sheet 300 x 500 mm
- Roll 300 mm x 50 m
- Die cut parts
- Non adhesive (TFO-SXXX-CB)
- Adhesive on one side (TFO-SXXX-CB-A1)

APPLICATION EXAMPLES

Thermal link of:

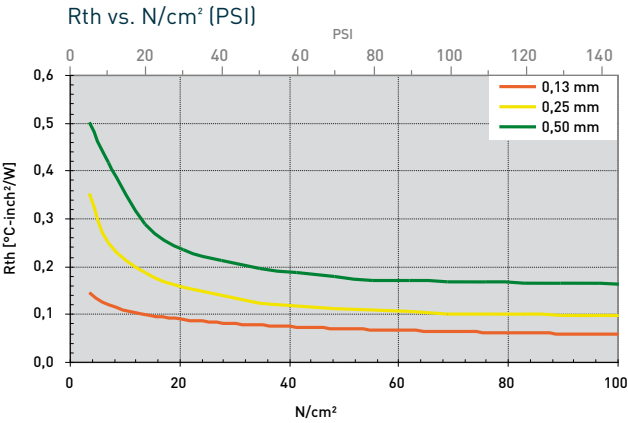
- CPUs to heat sinks
- Power modules
- Semiconductors
- IGBTs

For use in Power inverters / Lap-tops / Automotive power supplies / Industrial PCs

| PROPERTY | UNIT | TFO-S130-CB | TFO-S250-CB | TFO-S500-CB |
|--------------------------------------|-----------------|-------------------------|-------------------------|-------------------------|
| MATERIAL | | | | |
| Colour | | Natural Graphite 98% | Natural Graphite 98% | Natural Graphite 98% |
| Thickness | mm | Grey | Grey | Grey |
| Hardness | Shore A | 0.13 ±0.03 | 0.25 ±0.03 | 0.5 ±0.05 |
| UL Flammability | UL 94 | 85 | 85 | 85 |
| RoHS Conformity | 2015 / 863 / EU | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance¹ @ 150 PSI | °C-inch²/W | 0.06 | 0.10 | 0.16 |
| Resistance¹ @ 30 PSI | °C-inch²/W | 0.09 | 0.16 | 0.23 |
| Resistance¹ @ 10 PSI | °C-inch²/W | 0.12 | 0.24 | 0.40 |
| Thermal Conductivity (Z Direction) | W/mK | 8 | 8 | 8 |
| Thermal Conductivity (X-Y Direction) | W/mK | 140 | 140 | 140 |
| Operating Temperature Range | °C | - 250 to + 400 | - 250 to + 400 | - 250 to + 400 |
| ELECTRICAL | | | | |
| Volume Resistivity | Ohm - cm | 11.0 x 10 ⁻⁴ | 11.0 x 10 ⁻⁴ | 11.0 x 10 ⁻⁴ |
| Dielectric Constant | @ 1 MHz | < 0.001 | < 0.001 | < 0.001 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

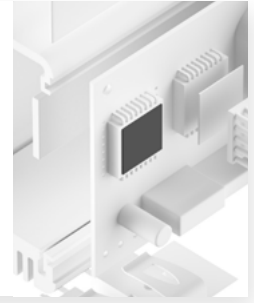
Thicknesses: 0.13 mm / 0.25 mm / 0.5 mm



PYROLYTIC GRAPHITE FOIL TFO-V-PG

highly anisotropic conductive

TFO-V-PG consists of pure pyrolytic graphite. Due to the synthetic structure it shows highly anisotropic heat spreading conductivities in-plane (x-y-plane) and in through direction (z-direction). Its flexibility allows for a good compliance to the contact surfaces. Thus the total thermal resistance is minimised. Their low densities make them ideal for applications where low weight is required. The very high temperature resistance allows for the use in extreme hot environments. Due to its high flexibility it is very bending-resistant and mechanically stable. It can be used for curved surfaces and corners because its thermal conductivity will remain unchanged in the absence of sharp folds. The film can be configured with phase change coating on both sides.



PROPERTIES

- ☐ Maximum contact through good surface compliance and high flexibility
- ☐ Very low weight
- ☐ Silicone-free
- ☐ Very high temperature resistance
- ☐ EMI-shielding through high electrical conductivity
- ☐ Ultra low water absorption

AVAILABILITY

- ☐ Sheet 203 x 355 mm (40 µm)
- ☐ Sheet 152 x 355 mm (32 / 50 / 70 / 100 µm) or on demand
- ☐ Roll non tacky (TFO-VXXX-PG)
 - 203 mm x 25 m (min.) (40 µm)
 - 152 mm x 25 m (min.) (32 / 50 / 70 / 100 µm)
- ☐ Roll tacky on one side (TFO-VXXX-PG-A1)
 - 177.8 mm x 25 m (min.) (40 µm)
 - 127 mm x 25 m (min.) (32 / 50 / 70 / 100 µm)
- ☐ Phase change (TPC-VXXX-PG-CB)
- ☐ Die cut parts

APPLICATION EXAMPLES

Thermal link of:

- ☐ CPUs to heat sinks
- ☐ Laser diodes
- ☐ TEC modules

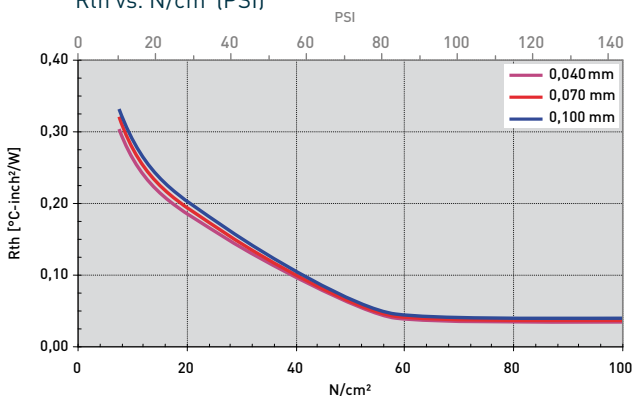
For use in high end computers / Analyzers / Photonics / Heat Pipe Assemblies

| PROPERTY | UNIT | TFO-V040-PG | TFO-V070-PG | TFO-V100-PG |
|--------------------------------------|-------------------------|--------------------|--------------------|--------------------|
| MATERIAL | | Pyrolytic Graphite | Pyrolytic Graphite | Pyrolytic Graphite |
| Colour | | Grey | Grey | Grey |
| Thickness | µm | 40 ^{±2} | 70 ^{±4} | 100 ^{±5} |
| Density | g/cm ³ | 2.0 | 2.0 | 2.0 |
| UL Flammability (Equivalent) | UL 94 | V0 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes | Yes |
| THERMAL | | | | |
| Resistance ¹ @ 150 PSI | °C-inch ² /W | 0,035 | 0,037 | 0,038 |
| Resistance ¹ @ 30 PSI | °C-inch ² /W | 0,190 | 0,198 | 0,206 |
| Resistance ¹ @ 10 PSI | °C-inch ² /W | 0,315 | 0,331 | 0,343 |
| Thermal Conductivity (Z Direction) | W/mK | 6 | 7 | 8 |
| Thermal Conductivity (X-Y Direction) | W/mK | 1,450 | 1,400 | 1,350 |
| Operating Temperature Range | °C | - 250 bis + 500 | - 250 bis + 500 | - 250 bis + 500 |
| ELECTRICAL | | | | |
| Electrical Conductivity | S/cm | 14,000 | 14,000 | 14,000 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 32 µm / 40 µm / 50 µm / 70 µm / 100 µm

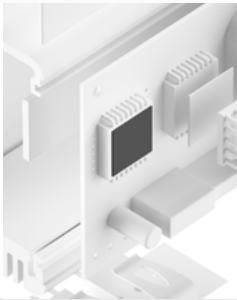
Rth vs. N/cm² (PSI)



PYROLYTIC GRAPHITE FOIL TFO-Y-PG

highly anisotropic conductive

TFO-Y-PG consists of pure pyrolytic graphite. Due to the synthetic structure it shows highly anisotropic heat spreading conductivities in-plane (x-y-plane) and in through direction (z-direction). Its softness allows for a good compliance to the contact surfaces. Thus the total thermal resistance is minimised. Their low densities make them ideal for applications where low weight is required. The very high temperature resistance allows for the use in extreme hot environments. Due to its flexibility it is bending-resistant. It can be used for curved surfaces and corners because its thermal conductivity will remain unchanged in the absence of sharp folds. Special configurations are dielectric with insulating films or laminated on flexible gap filler elastomers.



PROPERTIES

- ☐ Maximum contact through good surface compliance
- ☐ Very low weight
- ☐ Silicone-free
- ☐ Very high temperature resistance
- ☐ EMI-shielding through high electrical conductivity
- ☐ UL V0

AVAILABILITY

- ☐ Sheet 180 x 230 mm
- ☐ Sheet 115 x 180 mm (Adhesive construction)
- ☐ Non adhesive (TFO-YXXX-PG)
- ☐ Adhesive (TFO-YXXX-PG-A1)
- ☐ Die cut parts

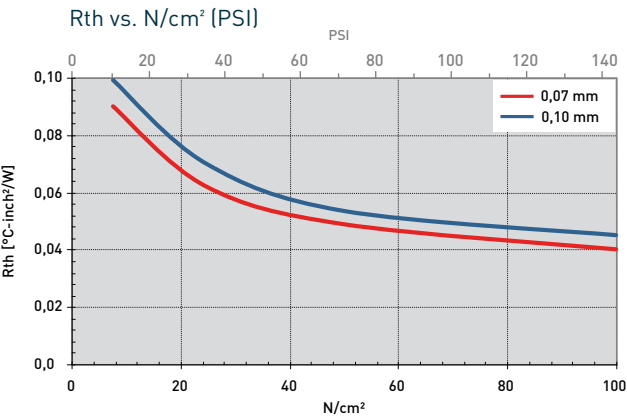
APPLICATION EXAMPLES

- Thermal link of:
- ☐ CPUs to heat sinks
 - ☐ Laser diodes
 - ☐ TEC modules
- For use in high end computers / Analyzers / Photonics

| PROPERTY | UNIT | TFO-Y070-PG | TFO-Y100-PG |
|--------------------------------------|-----------------|----------------|----------------|
| MATERIAL | | | |
| Colour | | Grey | Grey |
| Thickness | mm | 0.07 ±0.015 | 0.10 ±0.030 |
| Density | g/cm³ | 1.21 | 0.85 |
| UL Flammability | UL 94 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| THERMAL | | | |
| Resistance¹ @ 150 PSI | °C-inch²/W | 0.04 | 0,045 |
| Resistance¹ @ 30 PSI | °C-inch²/W | 0.07 | 0,078 |
| Resistance¹ @ 10 PSI | °C-inch²/W | 0.09 | 0,10 |
| Thermal Conductivity (Z Direction) | W/mK | 20 | 25 |
| Thermal Conductivity (X-Y Direction) | W/mK | 1,000 | 700 |
| Operating Temperature Range | °C | - 250 to + 400 | - 250 to + 400 |
| ELECTRICAL | | | |
| Electrical Conductivity | S/cm | 10,000 | 10,000 |

Measurement technique according to: ¹ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

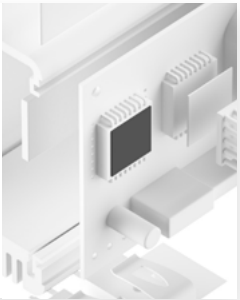
Thicknesses: 0.07 mm / 0.10 mm



PYROLYTIC GRAPHITE FOIL TFO-ZS-PG

soft, anisotropic highly conductive

TFO-ZS-PG consists of pure soft pyrolytic graphite. Due to the synthetic structure it shows a high anisotropic heat spreading conductivity in-plane (x-y-plane) and an outstanding thermal conductivity in through thickness direction (z-direction). Its flexibility and softness allow for a very good compliance to larger uneven contact surfaces such as IGBT base plates. Thus the total thermal resistance is minimised. Compared to copper or aluminum the material is ideal for applications where low weight is required. The very high temperature resistance allows for the use in extreme hot environments.



PROPERTIES

- ☐ Maximum contact through good surface compliance
- ☐ Very soft
- ☐ Very low weight
- ☐ Silicone-free
- ☐ Extremely temperature resistant
- ☐ EMI-shielding through high electrical conductivity

AVAILABILITY

- ☐ Sheet 180 x 180 mm
- ☐ Die cut parts

APPLICATION EXAMPLES

Thermal link of:

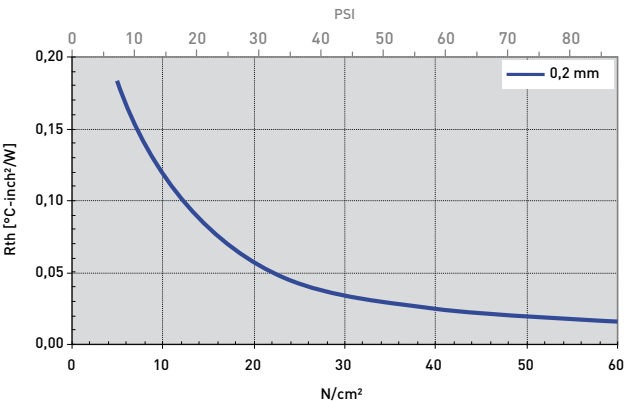
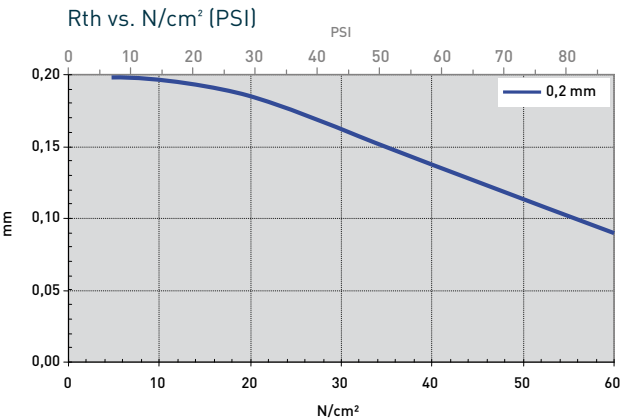
- ☐ IGBT modules
- ☐ Laser diodes
- ☐ TEC modules
- ☐ High flux LEDs

For use in liquid cold plates / high end computers / Analyzers / Photonics / LED arrays

| PROPERTY | UNIT | TFO-ZS200-PG |
|--------------------------------------|-----------------|----------------|
| MATERIAL | | |
| Colour | | Grey |
| Thickness | mm | 0.2 ±0.05 |
| Density | g/cm³ | 0.5 |
| Flammability | UL 94 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| THERMAL | | |
| Resistance¹ @ 90 PSI @ Thickness | °C-inch²/W (mm) | 0.015 (0.09) |
| Resistance¹ @ 30 PSI @ Thickness | °C-inch²/W (mm) | 0.055 (0.18) |
| Resistance¹ @ 10 PSI @ Thickness | °C-inch²/W (mm) | 0.181 (0.19) |
| Thermal Conductivity (Z Direction) | W/mK | 30 |
| Thermal Conductivity (X-Y Direction) | W/mK | 500 |
| Operating Temperature Range | °C | - 250 to + 400 |
| ELECTRICAL | | |
| Electrical Conductivity | S/cm | 10,000 |

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.20 mm





6 PSA INSULATING TAPES

/ ACRYLATE / SILICONE



PSA INSULATING TAPE TAT-J-PE

acrylate adhesive with polyester insulating film

TAT-J-PE is a thermally conductive PSA tape with an electrically insulating polyester film reinforcement. Through the thermally conductive acrylate adhesive coated on both sides of the polyester film the thermal contact is highly improved even at low pressures. Convex and concave surface structures and stack up tolerances are effectively compensated. Materials with different expansion coefficients can easily be bonded. Thus the total thermal resistance is minimised. The tape works well for realizing an effective and cost efficient thermal coupling in a broad field of applications. Above all it is used in applications having little space only and where the permitted weight is limited. Using screws, springs, clips as mechanic fasteners thus becomes superfluous.



PROPERTIES

- ☐ Low thermal resistance
- ☐ High dielectric strength
- ☐ Reliable strong adherence on uneven or hardly machineable surfaces
- ☐ Silicone-free
- ☐ Neither mixing of components nor curing processes
- ☐ High mechanical stability and an easy handling through polyester film
- ☐ Replacement of fasteners e.g. screws, clips, etc.

AVAILABILITY

- ☐ Sheet
- ☐ Roll 10 ~1,000 mm x 20 m
- ☐ Both side tacky [TAT-J200-PE]
- ☐ Die cut parts
- ☐ Kiss cut parts on sheet

APPLICATION EXAMPLES

Thermal link of:

- ☐ LEDs
 - ☐ CPUs
 - ☐ RDRAM memory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
 - ☐ MOSFETs to heat sinks
- For use in Power supplies / PCs / Telecom engineering / Automotive applications / LED arrays

| PROPERTY | UNIT | TAT-J200-PE |
|--|-----------------|---------------|
| MATERIAL | | |
| Colour | | White |
| Tape Thickness | mm | 0.20 ±0.03 |
| PE Film Thickness | µm | 12 |
| Peel Off Strength (@ Stainless Steel @ RT) | N/cm | 5.6 |
| Peel Off Strength (@ Al 6063, @ RT) | N/cm | 6.1 |
| UL Flammability | UL 94 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| THERMAL | | |
| Thermal Conductivity | W/mK | 0.7 |
| Resistance¹ @ 7 PSI | °C-inch²/W | 0.73 |
| Resistance¹ @ 70 PSI | °C-inch²/W | 0.50 |
| Operating Temperature Range | °C | - 40 to + 125 |
| ELECTRICAL | | |
| Breakdown Voltage | kV AC | 8.9 |

Measurement technique according to: ¹ ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

PSA TAPE TAT-M-SI

silicone adhesive, thermally conductive

TAT-M-SI is a thermally conductive electrically insulating silicone PSA transfer tape. Through the thermally conductive adhesive the thermal contact is highly improved even at low pressures. Convex and concave surface structures and stack up tolerances are effectively compensated. Materials with different expansion coefficients can easily be bonded. Thus the total thermal resistance is minimised. The tape works well for realizing an effective and cost efficient thermal coupling in a broad field of applications. Above all it is used in applications having little space only and where the permitted weight is limited. Using screws, springs, clips as mechanic fasteners thus becomes superfluous.



PROPERTIES

- ☐ Low thermal resistance
- ☐ Thermal conductivity: 1.0 W/mK
- ☐ High dielectric strength
- ☐ Reliable strong adherence on uneven or hardly machineable surfaces
- ☐ Neither mixing of components nor curing processes
- ☐ Replacement of fasteners e.g. screws clips, etc.

AVAILABILITY

- ☐ Sheet 300 mm x 400 mm
- ☐ Roll 300 mm x 50 m
- ☐ Both side tacky
- ☐ Die cut parts

APPLICATION EXAMPLES

Thermal link of:

- ☐ CPUs
- ☐ RDRAM memory modules
- ☐ Flip Chips, DSPs, BGAs, PPGAs
- ☐ MOSFETs to heat sinks
- ☐ LED

For use in Power supplies / PCs / Telecom engineering / Automotive applications / LED arrays

| PROPERTY | UNIT | TAT-M100-SI | TAT-M200-SI |
|--|-------------------------|--------------------------------------|--------------------------------------|
| MATERIAL | | Ceramic filled silicone PSA adhesive | Ceramic filled silicone PSA adhesive |
| Colour | | White | White |
| Thickness | mm | 0.10 ±0.01 | 0.20 ±0.02 |
| Peel Off Strength (@ 23 °C) @ Aluminum / @ Glass | N/cm | 6.0 / 7.6 | 6.4 / 7.6 |
| Shear Strength (@ 125 °C after 10,000 hrs.) | N/cm ² | > 200 | > 200 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| UL Flammability | UL 94 | V0 | V0 |
| THERMAL | | | |
| Thermal Conductivity | W/mK | 1.0 | 1.0 |
| Resistance ¹ | °C-inch ² /W | 0.28 | 0.49 |
| ELECTRICAL | | | |
| Breakdown Voltage ² (@ Initial Thickness, 25 °C) | kV AC | 2.0 | 5.0 |

Measurement technique according to: ¹ASTM D 5470, ²ASTM D 149. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.1 mm / 0.20 mm



7 THERMAL GREASE

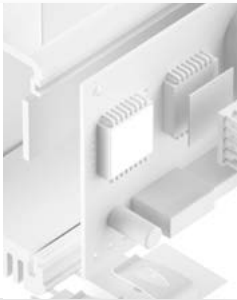
/ SILICONE / SILICONE-FREE



SILICONE-FREE THERMAL GREASE TGR-J-NS

highly thermally conductive

TGR-J-NS is high performing silicone-free thermal grease based on an ester oil matrix. It is ideal for use in applications where a very good and highly reliable thermal transfer must be achieved. Due to the specific formulation and filling with ceramic particles the material has a high thermal conductivity. By its use the thermal contact is maximised, hence the total thermal resistance is minimised.



PROPERTIES

- ☐ Thermal conductivity: 2.0 W/mK
- ☐ Silicone-free
- ☐ Dispensable
- ☐ Almost zero pressure at assembly
- ☐ Dielectric strength
- ☐ Operating temperature range: -40 to 150°C

AVAILABILITY

- ☐ Syringes 70 ml
- ☐ Jars 1 kg

APPLICATION EXAMPLES

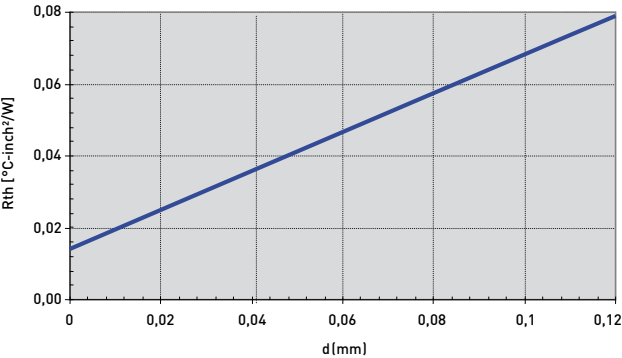
Thermal link of:

- ☐ LED Boards
- ☐ Power modules
- ☐ RDRAMs memory modules
- ☐ Flip Chips, DSPs , BGAs, PPGAs

For use in Automotive applications / Power electronics / Light technology / Industrial PCs

| PROPERTY | UNIT | TGR-J-NS |
|---|-----------------|---------------|
| MATERIAL | | |
| Colour | | White |
| Density | g /cm³ | 3.1 |
| Viscosity @ 25°C (Brookfield @ 10 rpm, 25 °C) | Pas | 170 |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| THERMAL | | |
| Thermal Conductivity | W/mK | 2.0 |
| Operating Temperature Range | °C | - 40 to + 150 |
| Storage Temperature | °C | < 35 |
| Shelf Life (from Date of Manufacturing, unopened) | Months @ RT | 12 |
| ELECTRIC | | |
| Dielectric Strength | kV / mm | 5.0 |

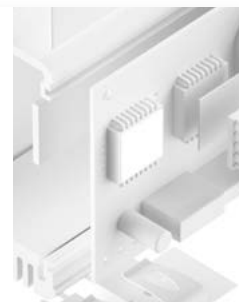
All data without warranty and subject to change. Please contact us for further data and information.



SILICONE-FREE THERMAL GREASE TGR-M-NS

highly thermally conductive

TGR-M-NS is high performing silicone-free thermal grease based on an ester oil matrix. It is ideal for use in applications where a very good and highly reliable thermal transfer must be achieved. Due to the specific formulation and filling with ceramic particles the material has a high thermal conductivity. By its use the thermal contact is maximised, hence the total thermal resistance is minimised.



PROPERTIES

- ☐ Thermal conductivity: 2.4 W/mK
- ☐ Silicone-free
- ☐ Dispensable
- ☐ Almost zero pressure at assembly
- ☐ Dielectric strength
- ☐ Operating temperature range: -40 to 150°C

AVAILABILITY

- ☐ Syringes 70 ml
- ☐ Jars 1 kg

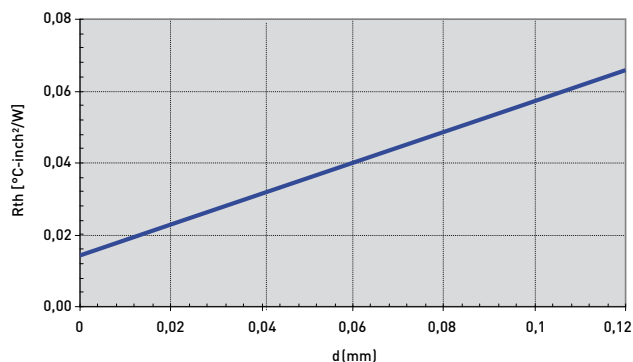
APPLICATION EXAMPLES

Thermal link of:

- ☐ LED Boards
 - ☐ Power modules
 - ☐ RDRAMs memory modules
 - ☐ Flip Chips, DSPs, BGAs, PPGAs
- For use in Automotive applications /
Power electronics / Light technology /
Industrial PCs

| PROPERTY | UNIT | TGR-M-NS |
|--|--------------------|---------------|
| MATERIAL | | |
| Colour | | White |
| Density | g /cm ³ | 3.2 |
| Viscosity @ 25°C (Brookfield @ 10 rpm, 25 °C) | Pas | 110 |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| THERMAL | | |
| Thermal Conductivity | W/mK | 2.4 |
| Operating Temperature Range | °C | - 40 to + 150 |
| Storage Temperature | °C | < 35 |
| Shelf Life (from Date of Manufacturing, unopened) | Months @ RT | 12 |
| ELECTRIC | | |
| Dielectric Strength | kV / mm | 4.5 |

All data without warranty and subject to change. Please contact us for further data and information.





8 ADHESIVES

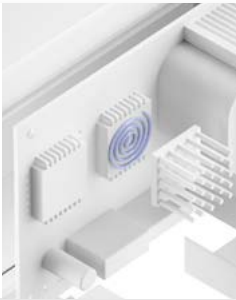
/ ADDITIONAL CURING /
CONDENSATIONAL CURING



SILICONE ADHESIVE TAD-G-SI-1C

thermally conductive 1 part / addition cure

TAD-G-SI-1C is a liquid addition cure corrosion-free highly thermally conductive 1 part silicone adhesive. It cures at elevated temperature over 100°C to a strong but still elastic rubber and exhibits excellent primerless adhesion to most surfaces. The adhesive features good thermal conductivity. It allows for being operated at temperatures up to 260°C and does not corrode copper or its alloys when fully cured. It is characterised by high resistance to water, acids, bases and most organic solvents and is especially suitable for applications where high thermal conductivity, adhesion, fast curing and controlled, precision application are essential.



PROPERTIES

- ☐ Thermal conductivity: 1.38 W/mK
- ☐ High bonding properties
- ☐ Heat addition cure
- ☐ Non corrosive
- ☐ High operating temperatures up to 260°C
- ☐ Extraordinary chemical resistance and longterm stability

AVAILABILITY

- ☐ 1 kg jars
- ☐ Bulk packaging options on request
- ☐ Optional with glass beads

APPLICATION EXAMPLES

- ☐ LED systems
- ☐ Processor cooling
- ☐ Memory chip assembly
- ☐ CPU board

| PROPERTY | UNIT | TAD-G-SI-1C |
|---|-----------------------|------------------------|
| MATERIAL | | Silicone |
| Colour | | Grey |
| Specific Gravity | g/cm³ | 2.06 |
| Linear Shrinkage | % | 2.0 |
| Viscosity | Pas | 43 |
| Hardness | Shore A | 67 |
| Tensile Strength | MPa | 3.1 |
| Elongation at Break | % | 70 |
| Curing Time (@ 100°C) | min | 30 |
| Shelf Life (from Date of Manufacturing, unopened, @ < 15°C) | Months | 6 |
| Flammability (Equivalent) | UL 94 | HB (1.5 mm) |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| THERMAL | | |
| Thermal Conductivity | W/mK | 1.38 |
| Coefficient of Thermal Expansion Volumetric | x 10 ⁻⁶ /K | 562 |
| Coefficient of Thermal Expansion linear | x 10 ⁻⁶ /K | 187 |
| Operating Temperature Range | °C | - 50 to + 260 |
| ELECTRICAL | | |
| Dielectric Strength | kV/mm | 22.5 |
| Volume Resistivity | Ohm - cm | 7.7 x 10 ¹⁵ |
| Surface Resistivity | Ohm - cm | 1.3 x 10 ¹⁵ |

All data without warranty and subject to change. Please contact us for further data and information.

SILICONE ADHESIVE TAD-O-SI-1C

thermally conductive 1 part / addition cure

TAD-O-SI-1C is an addition cure corrosion-free highly thermally conductive 1 part silicone adhesive. It cures at elevated temperature over 100°C to a strong but still elastic rubber and exhibits excellent primerless adhesion to most surfaces. The adhesive features high thermal conductivity and a thixotropic rheology that will prevent slumping or flow during the process. It allows for being operated at temperatures up to 210°C and does not corrode copper or its alloys when fully cured. It is characterised by high resistance to water, acids, bases and most organic solvents and is especially suitable for applications where high thermal conductivity, adhesion, fast curing and controlled, precision application are essential.



PROPERTIES

- ☐ Thermal conductivity: 2.1 W/mK
- ☐ High bonding properties
- ☐ Heat cure
- ☐ Non corrosive
- ☐ Thixotropic rheology preventing flow during the process
- ☐ High operating temperatures up to 210°C
- ☐ Extraordinary chemical resistance and longterm stability

AVAILABILITY

- ☐ 1 kg jars
- ☐ 310 ml cartridges
- ☐ Bulk packaging options on request
- ☐ Optional with glass beads

APPLICATION EXAMPLES

- ☐ LED systems
- ☐ Processor cooling
- ☐ Memory chip assembly
- ☐ CPU boards

| PROPERTY | UNIT | TAD-O-SI-1C |
|---|-----------------------|--------------------------|
| MATERIAL | | |
| Colour | | Grey |
| Specific Gravity | g/cm ³ | 2.18 |
| Viscosity | Pas | 140 |
| Hardness | Shore A | 56 |
| Tensile Strength | MPa | 2.20 |
| Elongation at Break | % | 105 |
| Curing Time (3 mm @ 125°C / @ 100°C) | min | 10 / 16 |
| Shelf Life (from Date of Manufacturing, unopened, @ 10 – 30°C / @ < 10°C) | Months | 2 / 12 |
| Flammability | UL 94 | HB (1.5 mm, V0 6.0 mm) |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| THERMAL | | |
| Thermal Conductivity | W/mK | 2.10 |
| Coefficient of Thermal Expansion Volumetric | x 10 ⁻⁶ /K | 586 |
| Coefficient of Thermal Expansion Linear | x 10 ⁻⁶ /K | 195 |
| Operating Temperature Range | °C | - 50 to + 210 |
| ELECTRICAL | | |
| Dielectric Strength | kV/mm | > 18 |
| Volume Resistivity | Ohm - cm | > 3.5 x 10 ¹³ |

All data without warranty and subject to change. Please contact us for further data and information.

SILICONE ADHESIVE TAD-P-SI-1C

thermally conductive 1 part / RTV condensation cure

TAD-P-SI-1C is a condensation curing, non-corrosive highly thermally conductive 1 part silicone adhesive. It vulcanises at room temperature (RTV) to a strong but still elastic rubber and exhibits excellent primerless adhesion to most surfaces. Due to rapid acetone curing while being in contact with atmospheric moisture it is solvent free. The adhesive features good thermal conductivity and a thixotropic rheology that will prevent slumping or flow during the process. It allows for being operated at temperatures up to 220°C and does not corrode copper or its alloys when fully cured. It is characterised by high resistance to water, acids, bases and most organic solvents and is especially suitable for applications where high thermal conductivity, adhesion, fast curing and controlled, precision application are essential.



PROPERTIES

- ☐ Thermal conductivity: 2.3 W/mK
- ☐ High bonding properties
- ☐ Cures at room temperature (RTV condensation cure)
- ☐ Fast skinning
- ☐ Low linear shrinkage
- ☐ Non corrosive
- ☐ Thixotropic rheology preventing flow during the process
- ☐ High operating temperatures up to 220°C
- ☐ Extraordinary chemical resistance and longterm stability

AVAILABILITY

- ☐ 310 ml cartridges
- ☐ Bulk packaging options on request
- ☐ Optional with glass beads

APPLICATION EXAMPLES

- ☐ LED systems
- ☐ Processor cooling
- ☐ Memory chip assembly
- ☐ CPU boards

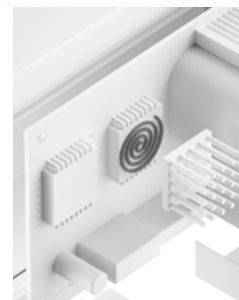
| PROPERTY | UNIT | TAD-P-SI-1C |
|---|-----------------------|--------------------------|
| MATERIAL | | Silicone |
| Colour | | Grey |
| Specific Gravity | g/cm³ | 2.11 |
| Linear Shrinkage | % | 0.5 |
| Viscosity | Pas | 350 |
| Hardness | Shore A | 67 |
| Tensile Strength | MPa | 3.9 |
| Elongation at Break | % | 103 |
| Tack Free Time (@ 23 °C and 65% RH) | min | 4 |
| Curing Time (3 mm @ 23 °C and 65% RH) | h | < 8 |
| Full Cure | d | 7 |
| Overlap Shear Strength (Al / Cu / St 304 / PC) | kg/cm² | 7.15 / 3.6 / 2.98 / 4.62 |
| Shelf Life (from Date of Manufacturing, unopened) | Months | 12 |
| Max. Storage Temperature | °C | 40 |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| Thermal | | |
| Thermal Conductivity | W/mK | 2.3 |
| Coefficient of Thermal Expansion Volumetric | x 10 ⁻⁶ /K | 493 |
| Coefficient of Thermal Expansion Linear | x 10 ⁻⁶ /K | 164 |
| Operating Temperature Range | °C | - 50 to + 220 |
| Electrical | | |
| Dielectric Strength | kV/mm | > 20 |
| Volume Resistivity | Ohm - cm | > 1 x 10 ¹⁴ |
| Dielectric Constant | @ 1 MHz | 4.9 |

All data without warranty and subject to change. Please contact us for further data and information.

SILICONE ADHESIVE TAD-U-SI-1C

thermally conductive 1 part / RTV condensation cure

TAD-U-SI-1C is a condensation curing, non-corrosive highly thermally conductive 1 part silicone adhesive. It vulcanises at room temperature (RTV) to a strong but still elastic rubber and exhibits excellent primerless adhesion to most surfaces. Due to rapid alcoxid curing while being in contact with atmospheric moisture it is solvent free. The adhesive features very high thermal conductivity and a thixotropic rheology that will prevent slumping or flow during the process. It allows for being operated at temperatures up to 230°C and does not corrode copper or its alloys when fully cured. It is characterised by high resistance to water, acids, bases and most organic solvents and is especially suitable for applications where very high thermal conductivity, adhesion, fast curing and controlled, precision application are essential.



PROPERTIES

- ☐ Thermal conductivity: 3.27 W/mK
- ☐ High bonding properties
- ☐ Cures at room temperature (RTV condensation cure)
- ☐ Fast skinning
- ☐ Non corrosive
- ☐ Thixotropic rheology preventing flow during the process
- ☐ High operating temperatures up to 230°C
- ☐ Extraordinary chemical resistance and longterm stability

AVAILABILITY

- ☐ 160 ml cartridges
- ☐ Bulk packaging options on request
- ☐ Optional with glass beads

APPLICATION EXAMPLES

- ☐ LED systems
- ☐ Processor cooling
- ☐ Memory chip assembly
- ☐ CPU boards

| PROPERTY | UNIT | TAD-U-SI-1C |
|---|--------------------|-------------------------|
| MATERIAL | | Silicone |
| Colour | | Grey |
| Specific Gravity | g/cm ³ | 2.95 |
| Extrusion Rate | g/min | 104 |
| Hardness | Shore A | 84 |
| Tensile Strength | psi | 264 |
| Elongation at Break | % | 11 |
| Tack Free Time | min | 10 |
| Max. Cure | h | 48 |
| Overlap Shear Strength (Al) | kg/cm ² | 13.1 |
| Young Modulus | psi | 3,330 |
| Shelf Life (from Date of Manufacturing, unopened) | Months | 12 |
| Max. Storage Temperature | °C | 40 |
| Flammability | UL 94 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes |
| Thermal | | |
| Thermal Conductivity | W/mK | 3.27 |
| Operating Temperature Range | °C | - 65 to + 230 |
| Electrical | | |
| Volume Resistivity | Ohm - cm | 1.26 x 10 ¹⁴ |

All data without warranty and subject to change. Please contact us for further data and information.

POLYURETHANE ADHESIVE TAD-N-PU-2C

thermally conductive / 2 part / dispensable / Form-in-Place

TAD-N-PU-2C is a thermally conductive two part thixotropic PU-adhesive with thermally conductive fillers in both components. It cures once the two parts come into contact without requiring heat or primer. It has good wetting and high bonding adhesion to most surfaces. The system cures at room temperature or by accelerated heat. Because of its thixotropic properties, the material can also be used as dispensable 2 part form-in-place gap filler that cures precisely positioned in place. This allows for compensating extreme tolerances and spaces at non-coplanar systems.



PROPERTIES

- ❑ Thermal conductivity: 2 W/mK
- ❑ Very high bonding properties
- ❑ Extraordinary chemical resistance and longterm stability
- ❑ Zero stress on components
- ❑ Heat accelerated curing

AVAILABILITY

- ❑ 400 ml (2 x 200 ml) twin cartridges
- ❑ 2 x 1 kg cans
- ❑ 18 l in pails

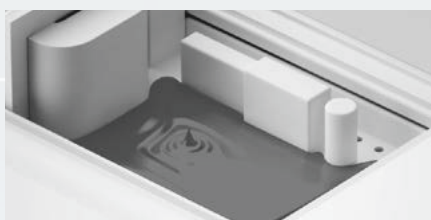
APPLICATION EXAMPLES

- ❑ LED systems
- ❑ Processor cooling
- ❑ Memory chip assembly
- ❑ CPU boards
- ❑ EHV battery systems

| PROPERTY | UNIT | A-Part | B-Part |
|-----------------------------|-----------------|--------------|--------------|
| MATERIAL | | Polyurethane | Polyurethane |
| Colour | | Black | White |
| Viscosity @ 5 rpm / 10 rpm | Pas | 300 / 284 | 272 / 165 |
| Viscosity (Mixed) @ 5 rpm | Pas | | 520 |
| Specific Gravity | g/cm³ | 2.3 | 2.6 |
| Specific Gravity (Mixed) | g/cm³ | | 2.45 |
| Hardness | Shore D | | 70 |
| Mixing Ratio | Weight | | 1 : 1 |
| Tensile Shear Strength (Al) | psi | | 1,380 |
| Tensile Strength | psi | | 2,030 |
| Elongation | % | | 30 |
| Shelf Live @ 25 °C | Months | | 6 |
| Curing Time @ 25 °C | | | < 24 h |
| Flammability | UL 94 | | V0 |
| RoHS Conformity | 2015 / 863 / EU | | Yes |
| THERMAL | | | |
| Thermal Conductivity¹ | W/mK | | 2.0 |
| Operating Temperature Range | °C | | - 40 to + 85 |
| ELECTRICAL | | | |
| Dielectric Strength | kV/mm | | 13.5 |
| Volume Resistivity | Ohm - cm | | 4.55 x 10¹² |

Measurement technique according to: ¹ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

9 **POTTING GEL**



SILICONE POTTING GEL TCR-D-SI-2C

dispensable / 2 parts

TCR-D-SI-2C is a 2-part addition cure silicone potting compound which is filled with thermally conductive fillers of high temperature stability. After curing the system remains elastic. It is characterised by very good dielectric and mechanic properties and is suited for encapsulating electric and electronic parts such as transformers, capacitors, inductors, sensors, LEDs and can be moulded or dispensed at normal conditions at room temperature or in vacuum. Its rheologic behaviour allows for usage in geometries that are difficult to access.



PROPERTIES

- ☐ Silicone
- ☐ 2 part addition cure
- ☐ Thermal conductivity: 0.68 W/mK
- ☐ Remains elastic after curing
- ☐ Almost zero stress on components
- ☐ Dispensable or mouldable
- ☐ High resistivity against water and humidity
- ☐ Shock absorbing

AVAILABILITY

- ☐ 2 kg / 40 kg (2 x 20 kg) AB Kit

APPLICATION EXAMPLES

Thermal link of:

- ☐ Inductors
- ☐ Capacitors
- ☐ Heat Pipes
- ☐ BGA

For use in Automotive applications
/ Telecommunication / Controlling
units / Industrial PCs

| PROPERTY | UNIT | A PART | B PART |
|---|-------------------------|-------------------------|-------------------------|
| MATERIAL | | Silicone | Hardener |
| Colour | | Beige | Black |
| Density @ 23 °C | g/cm³ | 1.63 | 1.63 |
| Mixing Ratio | Weight or Volume | 1:1 | 1:1 |
| Hardness | Shore A | 45 | 45 |
| Viscosity [Brookfield] | Pas | 6 | 6 |
| Viscosity [Mixed] [Brookfield] | Pas | 6 | 6 |
| Tensile Strength (cured elastomer after 7 minutes @ 150 °C) | psi | 252 | 252 |
| Elongation at Break (cured elastomer after 7 minutes @ 150 °C) | % | 240 | 240 |
| Coefficient of Thermal Expansion (cured elastomer after 7 minutes @ 150 °C) | | | |
| Volumetric | 1 x 10 ⁻⁶ /K | 650 | 650 |
| Linear | 1 x 10 ⁻⁶ /K | 217 | 217 |
| Pot Life @ 23 °C, 65 % rel. H. | min | ca.100 | ca. 100 |
| Curing Time @ 25 °C / 100 °C | | 24 h / 7 min | 24 h / 7 min |
| Shelf Life (from Date of Manufacturing, unopened, @ < 30 °C) | Months | 24 | 24 |
| Flammability | UL 94 | V0 | V0 |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| TECHNICAL | | | |
| Thermal Conductivity | W/mK | 0.68 | 0.68 |
| Operating Temperature | °C | - 55 to + 260 | - 55 to + 260 |
| Dielectric Strength | kV/mm | > 18 | > 18 |
| Volume Resistivity | Ohm - cm | 4.02 x 10 ¹⁴ | 4.02 x 10 ¹⁴ |
| Dielectric Constant | @ 1 kHz | 3.08 | 3.08 |
| Dissipation Factor | @ 1 kHz | 0.009 | 0.009 |

All data without warranty and subject to change. Please contact us for further data and information.

SILICONE POTTING GEL TCR-H-SI-2C

dispensable / 2 parts / low viscosity

TCR-H-SI-2C is a 2-part addition cure silicone potting compound which is filled with thermally conductive fillers of high temperature stability. It is characterised by very good dielectric and mechanic properties and is suited for encapsulating electric and electronic parts such as transformers, capacitors, inductors, sensors, LEDs and can be moulded or dispensed under normal conditions at room temperature or in vacuum. Its rheologic behaviour allows for usage in geometries that are difficult to access.



PROPERTIES

- ☐ Silicone
- ☐ Low viscosity
- ☐ 2 part addition cure
- ☐ Thermal conductivity: 1.2 W/mK
- ☐ Almost zero stress on components
- ☐ Dispensable or mouldable
- ☐ Heat accelerated curing
- ☐ High resistivity against water and humidity
- ☐ Shock absorbing

AVAILABILITY

- ☐ 2 kg / 10 kg (2 x 5 kg) AB Kit

APPLICATION EXAMPLES

Thermal link of:

- ☐ Inductors
- ☐ Capacitors
- ☐ Heat Pipes
- ☐ BGA

For use in Automotive applications
/ Telecommunication / Controlling
units / Industrial PCs

| PROPERTY | UNIT | A PART | B PART |
|---|--------------------------|------------------------|------------------------|
| MATERIAL | | Silicone | Silicone |
| Colour | | Light grey | Orange |
| Density @ -23 °C | g/cm ³ | 2.2 | 2.2 |
| Mixing Ratio | Weight or Volume | 1:1 | 1:1 |
| Hardness (7 days @ -23 °C and 50 % rel. H.) | Shore A | 40 | 40 |
| Viscosity [Brookfield] | Pas | 2 | 1.9 |
| Viscosity [Mixed] [Brookfield] | Pas | 1.95 | 1.95 |
| Tensile Strength (7 days @ -23 °C and 50 % rel. H.) | psi | 117 | 117 |
| Elongation at Break (7 days @ -23 °C and 50 % rel. H.) | % | 30 | 30 |
| Tear Strength (7 days @ -23 °C and 50 % rel. H.) | kN/m | 4.56 | 4.56 |
| Young Modulus (7 days @ -23 °C and 50 % rel. H.) | psi | 722 | 722 |
| Coefficient of Thermal Expansion (7 days @ -23 °C and 50 % rel. H.) | | | |
| Volumetric | 1 x 10 ⁻⁶ / K | 402 | 402 |
| Linear | 1 x 10 ⁻⁶ / K | 134 | 134 |
| Linear Shrinking (7 days @ -23 °C and 50 % rel. H.) | % | 0.03 | 0.03 |
| Pot Life | min | ca. 50 | ca. 50 |
| Curing Time @ 25 °C / 100 °C | | 4 hrs. / 6 min | 4 hrs. / 6 min |
| Shelf Life (from Date of Manufacturing, unopened, @ < 30 °C) | Months | 12 | 12 |
| Flammability | UL 94 | VO (5.6 mm) | VO (5.6 mm) |
| RoHS Conformity | 2015 / 863 / EU | Yes | Yes |
| TECHNICAL | | | |
| Thermal Conductivity | W/mK | 1.2 | 1.2 |
| Operating Temperature | °C | - 70 bis + 250 | - 70 bis + 250 |
| Dielectric Strength | kV/mm | 14 | 14 |
| Volume Resistivity | Ohm - cm | 1.8 x 10 ¹⁴ | 1.8 x 10 ¹⁴ |
| Dielectric Constant | @ 1 kHz | 4.53 | 4.53 |

All data without warranty and subject to change. Please contact us for further data and information.

POLYURETHAN POTTING GEL

TCR-J-PU-2C-LV-AR

dispensable / 2 parts / low viscosity

TCR-J-PU-2C-LV-AR is a 2-part addition cure polyurethan potting compound which is filled with thermally conductive fillers of high temperature stability. It is characterised by very good dielectric and mechanic properties and is suited for encapsulating electric and electronic parts such as transformers, capacitors, inductors, sensors, LEDs and can be moulded or dispensed under normal conditions at room temperature or in vacuum. Its rheologic behaviour allows for usage in geometries that are difficult to access.



PROPERTIES

- ☐ Polyurethan
- ☐ Low viscosity
- ☐ 2 part addition cure
- ☐ Thermal conductivity: 1.5 W/mK
- ☐ Almost zero stress on components
- ☐ Dispensable or mouldable
- ☐ Solvent-free
- ☐ High resistivity against water and humidity
- ☐ Free of halogenated flame retardants

AVAILABILITY

- ☐ Tinline container

APPLICATION EXAMPLES

Thermal link of:

- ☐ Inductors
 - ☐ Capacitors
 - ☐ LED
 - ☐ Battery packs
- For use in Automotive applications
/ Telecommunication / Controlling
units / Industrial PCs

| PROPERTY | UNIT | CASTING RESIN | HARDENER |
|---|------------------------------------|-----------------|----------------------|
| MATERIAL | | Polyurethan | Aromatic Isocyanate |
| Colour | | Natural | Brown |
| Density @ 22 °C | g/cm³ | 2.45 – 2.55 | 1.20 – 1.25 |
| Mixing Ratio | Weight | | 100 : 8 |
| Viscosity (@ 22 °C, 10 rpm) | mPas | 45,000 – 50,000 | 160 – 240 |
| Viscosity (Mixed, @ 22 °C, 10 rpm) | mPas | | 5,800 – 6,500 |
| Hardness | Shore D | | 40 – 50 |
| Tensile Strength | psi | | 580 |
| Elongation at Break | % | | 25 |
| Water absorption (30 days @ 23 °C) | % | | 0.2 |
| Young Modulus | kpsi | | 9.4 |
| Coefficient of Thermal Expansion < Tg, TMA | 1 x 10 ⁻⁶ /K | | 72.5 |
| > Tg, TMA | 1 x 10 ⁻⁶ /K | | 141.7 |
| Curing Shrinkage | % | | < 1 |
| Pot Life (100 g @ 22 °C / adjustable) | min | | 25 – 35 |
| Curing Time @ 22 °C / Full chemical hardening | h / days | | 16 – 30 / 10 – 14 |
| Shelf Life (from Date of Manufacturing, unopened @ 15 – 25 °C) | Months | | 6 |
| Flammability (Equivalent) | UL 94 | | VO (1.5 mm) |
| RoHS Conformity | 2015 / 863 / EU | | Ja |
| Class of Insulation | | | F |
| TECHNICAL | | | |
| Thermal Conductivity | W/mK | | 1.5 |
| Operating Temperature | °C | | - 50 to + 160 |
| Dielectric Strength | kV/mm | | 28 |
| Volume Resistivity (@ 23 °C, 50 % rel. H.) | Ohm - cm | | 1 x 10 ¹⁵ |
| Dielectric Constant (εr) | @ 50 Hz / 1 kHz / 1 MHz @ 23 °C | | 5.6 / 4.5 / 3.9 |
| Dielectric Loss Factor (tan δ) | @ 50 Hz @ 23 °C | | 0.09 |
| Comparative Tracking Index (CTI) | | | 600 |

All data without warranty and subject to change. Please contact us for further data and information.

POLYURETHAN POTTING GEL

TCR-N-PU-2C-LV-AR

dispensable / 2 parts / low viscosity

TCR-N-PU-2C-LV-AR is a 2-part addition cure polyurethan potting compound which is filled with thermally conductive fillers of high temperature stability. It is characterised by very good dielectric and mechanic properties and is suited for encapsulating electric and electronic parts such as transformers, capacitors, inductors, sensors, LEDs and can be moulded or dispensed under normal conditions at room temperature or in vacuum. Its rheologic behaviour allows for usage in geometries that are difficult to access.



PROPERTIES

- ☐ Polyurethan
- ☐ Low viscosity
- ☐ 2 part addition cure
- ☐ Thermal conductivity: 2.6 W/mK
- ☐ Almost zero stress on components
- ☐ Dispensable or mouldable
- ☐ Solvent-free
- ☐ High resistivity against water and humidity
- ☐ Free of halogenated flame retardants

AVAILABILITY

- ☐ Tinline container

APPLICATION EXAMPLES

Thermal link of:

- ☐ Inductors
 - ☐ Capacitors
 - ☐ LED
 - ☐ Battery packs
- For use in Automotive applications
/ Telecommunication / Controlling
units / Industrial PCs

| PROPERTY | UNIT | CASTING RESIN | HARDENER |
|--|------------------------------------|-------------------|----------------------|
| MATERIAL | | Polyurethan | Aromatic Isocyanate |
| Colour | | Natural | Brown |
| Density @ 22 °C | g/cm³ | 2.25 – 2.35 | 1.20 – 1.25 |
| Mixing Ratio | Weight | | 100 : 8 |
| Viscosity (@ 22 °C, 10 rpm) | mPas | 100,000 – 140,000 | 15 – 35 |
| Viscosity (Mixed, @ 22 °C, 10 rpm) | mPas | | 15,000 – 35,000 |
| Hardness | Shore D | | 40 – 50 |
| Water absorption (30 days @ 23 °C) | % | | 0.4 |
| Coefficient of Thermal Expansion < T _g , TMA | 1 x 10 ⁻⁶ / K | | 91.4 |
| > T _g , TMA | 1 x 10 ⁻⁶ / K | | 129.1 |
| Curing Shrinkage | % | | < 1 |
| Pot Life (100 g @ 22 °C / adjustable) | min | | 10 – 30 |
| Curing Time @ 22 °C / Full chemical hardening | h / days | | 14 – 24 / 10 – 14 |
| Shelf Life (from Date of Manufacturing, unopened @ 15 – 25 °C) | Months | | 6 |
| Flammability (Equivalent) | UL 94 | | VO (4.0 mm) |
| RoHS Conformity | 2015 / 863 / EU | | Yes |
| Class of Insulation | | | B |
| TECHNICAL | | | |
| Thermal Conductivity | W/mK | | 2.6 |
| Operating Temperature | °C | | - 40 to + 130 |
| Dielectric Strength | kV/mm | | 31 |
| Volume Resistivity (@ 23 °C, 50 % rel. H.) | Ohm - cm | | 1 x 10 ¹⁵ |
| Dielectric Constant (ε _r) | @ 50 Hz / 1 kHz / 1 MHz @ 23 °C | | 5.8 / 5.2 / 4.6 |
| Dielectric Loss Factor (tan δ) | @ 50 Hz @ 23 °C | | 0.09 |
| Comparative Tracking Index (CTI) | | | 600 |

All data without warranty and subject to change. Please contact us for further data and information.

POLYURETHAN POTTING GEL

TCR-N-PU-2C-MV-AL

dispensable / 2 parts / medium viscosity

TCR-N-PU-2C-MV-AL is a 2-part addition cure polyurethan potting compound which is filled with thermally conductive fillers of high temperature stability. It is characterised by very good dielectric and mechanic properties and is suited for encapsulating electric and electronic parts such as transformers, capacitors, inductors, sensors, LEDs and can be moulded or dispensed under normal conditions at room temperature or in vacuum. Its rheologic behaviour allows for usage in geometries that are difficult to access.



PROPERTIES

- ☐ Polyurethan
- ☐ Medium viscosity
- ☐ 2 part addition cure
- ☐ Thermal conductivity: 2.6 W/mK
- ☐ Almost zero stress on components
- ☐ Dispensable or mouldable
- ☐ Solvent-free
- ☐ High resistivity against water and humidity
- ☐ Free of halogenated flame retardants

AVAILABILITY

- ☐ Tinplate container

APPLICATION EXAMPLES

Thermal link of:

- ☐ Inductors
 - ☐ Capacitors
 - ☐ LED
 - ☐ Battery packs
- For use in Automotive applications
/ Telecommunication / Controlling
units / Industrial PCs

| PROPERTY | UNIT | CASTING RESIN | HARDENER |
|--|------------------------------------|-------------------|----------------------|
| MATERIAL | | Polyurethan | Aliphatic Isocyanate |
| Colour | | Natural | Transparent |
| Density @ 22 °C | g/cm³ | 2.3 – 2.4 | 1.10 – 1.15 |
| Mixing Ratio | Weight | | 100 : 9 |
| Viscosity (@ 22 °C, 10 rpm) | mPas | 110,000 – 130,000 | 450 – 750 |
| Viscosity (Mixed, @ 22 °C, 10 rpm) | mPas | | 60,000 – 70,000 |
| Hardness | Shore D | | 40 – 50 |
| Water absorption (30 days @ 23 °C) | % | | 0.4 |
| Coefficient of Thermal Expansion | | | |
| < T _g , TMA | 1 x 10 ⁻⁶ /K | | 137.9 |
| > T _g , TMA | 1 x 10 ⁻⁶ /K | | 162.0 |
| Curing Shrinkage | % | | < 1 |
| Pot Life (100 g @ 22 °C / adjustable) | min | | Adjustable |
| Curing Time @ 22 °C / Full chemical hardening | h / days | | 12 – 24 / 10 – 14 |
| Shelf Life (from Date of Manufacturing, unopened @ 15 – 25 °C) | Months | | 6 |
| Flammability (Equivalent) | UL 94 | | VO (4.0 mm) |
| RoHS Conformity | 2015 / 863 / EU | | Yes |
| Class of Insulation | | | B |
| TECHNICAL | | | |
| Thermal Conductivity | W/mK | | 2.6 |
| Operating Temperature | °C | | - 40 to + 130 |
| Dielectric Strength | kV/mm | | 31 |
| Volume Resistivity (@ 23 °C, 50 % rel. H.) | Ohm - cm | | 1 x 10 ¹⁵ |
| Dielectric Constant (ε _r) | @ 50 Hz / 1 kHz / 1 MHz @ 23 °C | | 5.8 / 5.2 / 4.6 |
| Dielectric Loss Factor (tan δ) | @ 50 Hz @ 23 °C | | 0.09 |
| Comparative Tracking Index (CTI) | | | 600 |

All data without warranty and subject to change. Please contact us for further data and information.

POLYURETHAN POTTING GEL

TCR-V-PU-2C-MV-AR

dispensable / 2 parts / medium viscosity

TCR-V-PU-2C-MV-AR is a 2-part addition cure polyurethan potting compound which is filled with thermally conductive fillers of high temperature stability. It is characterised by very good dielectric and mechanic properties and is suited for encapsulating electric and electronic parts such as transformers, capacitors, inductors, sensors, LEDs and can be moulded or dispensed under normal conditions at room temperature or in vacuum. Its rheologic behaviour allows for usage in geometries that are difficult to access.



PROPERTIES

- ☐ Polyurethan
- ☐ Medium viscosity
- ☐ 2 part addition cure
- ☐ Thermal conductivity: 3.5 W/mK
- ☐ Almost zero stress on components
- ☐ Dispensable or mouldable
- ☐ Solvent-free
- ☐ High resistivity against water and humidity
- ☐ Free of halogenated flame retardants

AVAILABILITY

- ☐ Tinline container

APPLICATION EXAMPLES

Thermal link of:

- ☐ Inductors
 - ☐ Capacitors
 - ☐ LED
 - ☐ Battery packs
- For use in Automotive applications
/ Telecommunication / Controlling
units / Industrial PCs

| PROPERTY | UNIT | CASTING RESIN | HARDENER |
|--|------------------------------------|-------------------|----------------------|
| MATERIAL | | Polyurethan | Aromatic Isocyanate |
| Colour | | Natural | Brown |
| Density @ 22 °C | g/cm³ | 2.0 – 2.2 | 1.20 – 1.25 |
| Mixing Ratio | Weight | | 100 : 7 |
| Viscosity (@ 22 °C, 10 rpm) | mPas | 100,000 – 140,000 | 15 – 35 |
| Viscosity (Mixed, @ 22 °C, 10 rpm) | mPas | | 60,000 – 100,000 |
| Hardness | Shore D | | 20 – 30 |
| Water absorption (30 days @ 23 °C) | % | | 0.4 |
| Coefficient of Thermal Expansion | | | |
| < Tg, TMA | 1 x 10 ⁻⁶ /K | | 131.5 |
| > Tg, TMA | 1 x 10 ⁻⁶ /K | | 157.4 |
| Curing Shrinkage | % | | < 1 |
| Pot Life (100 g @ 22 °C / adjustable) | min | | 10 – 30 |
| Curing Time @ 22 °C / Full chemical hardening | h / days | | 16 – 30 / 10 – 14 |
| Shelf Life (from Date of Manufacturing, unopened @ 15 – 25 °C) | Months | | 6 |
| Flammability (Equivalent) | UL 94 | | VO (4.0 mm) |
| RoHS Conformity | 2015 / 863 / EU | | Yes |
| Class of Insulation | | | B |
| TECHNICAL | | | |
| Thermal Conductivity | W/mK | | 3.5 |
| Operating Temperature | °C | | - 30 to + 130 |
| Dielectric Strength | kV/mm | | 28 |
| Volume Resistivity (@ 23 °C, 50 % rel. H.) | Ohm - cm | | 1 x 10 ¹⁵ |
| Dielectric Constant (εr) | @ 50 Hz / 1 kHz / 1 MHz @ 23 °C | | 5.5 / 4.5 / 3.9 |
| Dielectric Loss Factor (tan δ) | @ 50 Hz @ 23 °C | | 0.09 |
| Comparative Tracking Index (CTI) | | | 600 |

All data without warranty and subject to change. Please contact us for further data and information.

POLYURETHAN POTTING GEL

TCR-V-PU-2C-HV-AL

dispensable / 2 parts / high viscosity

TCR-V-PU-2C-HV-AL is a 2-part addition cure polyurethan potting compound which is filled with thermally conductive fillers of high temperature stability. It is characterised by very good dielectric and mechanic properties and is suited for encapsulating electric and electronic parts such as transformers, capacitors, inductors, sensors, LEDs and can be moulded or dispensed under normal conditions at room temperature or in vacuum. Its rheologic behaviour allows for usage in geometries that are difficult to access.



PROPERTIES

- ☐ Polyurethan
- ☐ High viscosity
- ☐ 2 part addition cure
- ☐ Thermal conductivity: 3.5 W/mK
- ☐ Almost zero stress on components
- ☐ Dispensable or mouldable
- ☐ Solvent-free
- ☐ High resistivity against water and humidity
- ☐ Free of halogenated flame retardants

AVAILABILITY

- ☐ Tinline container

APPLICATION EXAMPLES

Thermal link of:

- ☐ Inductors
 - ☐ Capacitors
 - ☐ LED
 - ☐ Battery packs
- For use in Automotive applications
/ Telecommunication / Controlling
units / Industrial PCs

| PROPERTY | UNIT | CASTING RESIN | HARDENER |
|--|------------------------------------|-------------------|----------------------|
| MATERIAL | | Polyurethan | Aliphatic Isocyanate |
| Colour | | Natural | Transparent |
| Density @ 22 °C | g/cm³ | 2.1 – 2.3 | 1.10 – 1.15 |
| Mixing Ratio | Weight | | 100 : 9 |
| Viscosity (@ 22 °C, 10 rpm) | mPas | 150,000 – 200,000 | 450 – 750 |
| Viscosity (Mixed, @ 22 °C, 10 rpm) | mPas | | 110,000 – 130,000 |
| Hardness | Shore D | | 35 – 45 |
| Water absorption (30 days @ 23 °C) | % | | 0.4 |
| Coefficient of Thermal Expansion | | | |
| < T _g , TMA | 1 x 10 ⁻⁶ /K | | 156.2 |
| > T _g , TMA | 1 x 10 ⁻⁶ /K | | 187.9 |
| Curing Shrinkage | % | | < 1 |
| Pot Life (100 g @ 22 °C / adjustable) | min | | 30 – 50 |
| Curing Time @ 22 °C / Full chemical hardening | h / days | | 16 – 30 / 10 – 14 |
| Shelf Life (from Date of Manufacturing, unopened @ 15 – 25 °C) | Months | | 6 |
| Flammability (Equivalent) | UL 94 | | VO (5.6 mm) |
| RoHS Conformity | 2015 / 863 / EU | | Yes |
| Class of Insulation | | | B |
| TECHNICAL | | | |
| Thermal Conductivity | W/mK | | 3.5 |
| Operating Temperature | °C | | - 40 to + 130 |
| Dielectric Strength | kV/mm | | 28 |
| Volume Resistivity (@ 23 °C, 50 % rel. H.) | Ohm - cm | | 1 x 10 ¹⁵ |
| Dielectric Constant (ε _r) | @ 50 Hz / 1 kHz / 1 MHz @ 23 °C | | 5.5 / 4.5 / 3.9 |
| Dielectric Loss Factor (tan δ) | @ 50 Hz @ 23 °C | | 0.09 |
| Comparative Tracking Index (CTI) | | | 600 |

All data without warranty and subject to change. Please contact us for further data and information.

10 HALA CLIPS

/ SINGLE SCREWING CLIPS



HALA CLIP TO 220-1

The single screwing clip HALA Clip TO 220-1 allows for a strong springy fixing of a semiconductor in a TO220 or comparable package and exerts a reliable pressure onto heatsinks. It can be easily fastened by use of M4 screws. Due to its particular shape an optimum mechanic stress behaviour within a wide operating range is achieved thus avoiding any overstrains of the material at the load limits. Even in case of maximum TO 220 tolerances the forces still suffice to generate adequate pressures. Through the special clip geometry the forces operate concentrated on the semiconductor package plates thus maximizing the contact zone and minimizing the thermal resistance. Due to the special surface treatment the clip is protected against corrosion.



PROPERTIES

- ☐ Fixing by M4-screw
- ☐ FE-simulation optimised stress behaviour
- ☐ Mounting friendly design
- ☐ Sufficient pressure even at minimum package height (ca. 3.5 mm for TO 220)
- ☐ Anticorrosive by Delta Seal surface treatment
- ☐ Easy chip identification by apertures

OPERATING RANGE

- ☐ Force range: ca. 55 – 85 N
- ☐ Pressure range: ca. 35 – 55 N/cm² (50 – 80 PSI) for different types of TO 220 packages (Surface area TO220 ca. 1.6 cm²)

APPLICATION EXAMPLES

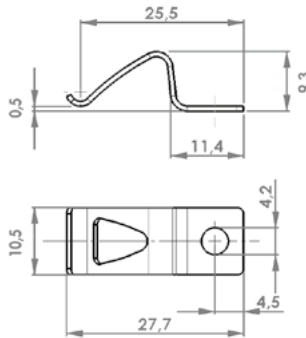
Fixing of semiconductors in TO220 or comparable packages onto heatsinks:

- ☐ MOSFETs and IGBTs
- ☐ Diodes and rectifiers
- ☐ Electronic modules

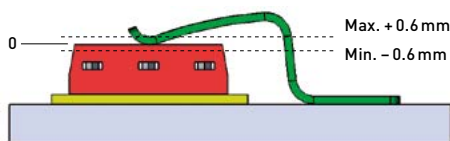
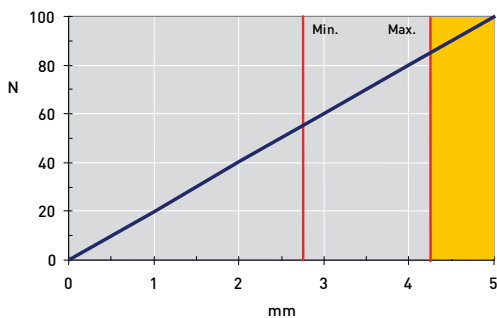
For use in switch mode power supplies / UPS units / Motor control units / Automotive applications / Solar technology



Dimensions



Force vs. Deflection



HALA CLIP TO 247-1

The single screwing clip HALA Clip TO 247-1 allows for a strong springy fixing of a semiconductor in a TO247 or comparable package and exerts a reliable pressure onto heatsinks. It can be easily fastened by use of M4-screws. Due to its particular shape an optimum mechanic stress behaviour within a wide operating range is achieved thus avoiding any overstrains of the material at the load limits. Even in case of maximum TO 247 tolerances the forces still suffice to generate adequate pressures. Through the special clip geometry the forces operate concentrated on the semiconductor package plates thus maximizing the contact zone and minimizing the thermal resistance. Due to the special surface treatment the clip is protected against corrosion.



PROPERTIES

- ☐ Fixing by M4-screw
- ☐ FE-simulation optimised stress behaviour
- ☐ Mounting friendly design
- ☐ Sufficient pressure even at minimum package height (ca. 4.7 mm for TO 247)
- ☐ Anticorrosive by Delta Seal surface treatment
- ☐ Easy chip identification by apertures

OPERATING RANGE

- ☐ Force range: ca. 95 – 110 N
- ☐ Pressure range: ca. 28 – 32 N/cm² (40 – 47 PSI) for different types of TO247 packages (Surface area TO247 ca. 3.4 cm²)

APPLICATION EXAMPLES

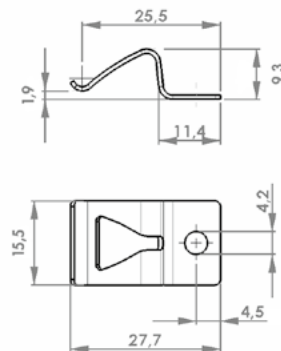
Fixing of semiconductors in TO247 or comparable packages onto heatsinks:

- ☐ MOSFETs
- ☐ IGBTs
- ☐ Diodes

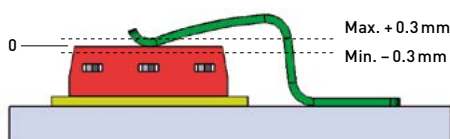
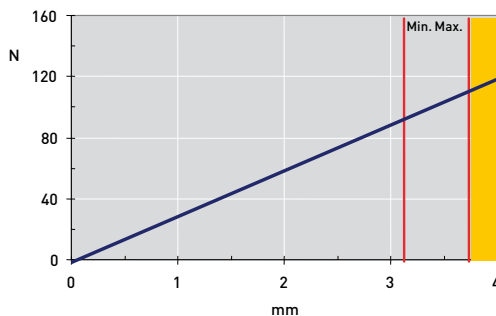
For use in switch mode power supplies / UPS units / Motor control units / Automotive applications



Dimensions



Force vs. Deflection



LEGAL INFORMATION

CONTACT

HALA Contec GmbH & Co. KG / Hans-Böckler-Straße 15 / D-73230 Kirchheim unter Teck / Germany
Fon +49 7021 73141-0 / Fax +49 7021 73141-99 / info@hala-tec.de / www.hala-tec.de

PICTURE CREDITS

shutterstock: pages 1, 7, 9 and covers materials, istockphoto: page 12, zoodesign: pages 10, 11, 14 and material photos

DESIGN

zoodesign – artgerechte gestaltung / D-73525 schwäbisch gmünd / www.zoodesign.de

DISCLAIMER

All technical data and information are without warranty and believed to be reliable and accurate corresponding to the latest state of the art. Since the products are not provided to conform with mutually agreed specifications and their use and processing are unknown we cannot guarantee results, freedom from patent infringement, or their suitability for any application. Product testing by the applicant is recommended. We reserve the right of changes.

Release 1 / 2024



