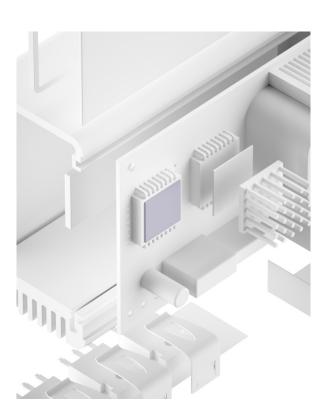
KØLEPROFILER

TERMISK LEDENDE MATERIALE



PHASE CHANGE MATERIALS





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 unevenesses 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 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

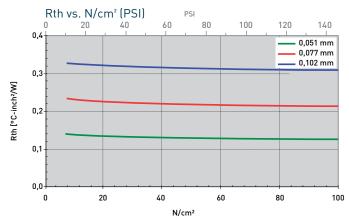
Thermal link of:

- 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		Devinall TH Polyimide film with phase change coating on both sides	Devinall TH Polyimide film with phase change coating on both sides	Devinall TH Polyimide fi with phase change coati on both sides
Colour		Light orange	Light orange	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				
Resistance ¹ @ 150 PSI	°C-inch²/W	0.126	0.215	0.311
Resistance¹ @ 30 PSI	°C-inch²/W	0.130	0.220	0.315
Resistance ¹ @ 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	0hm - cm	1.0 x 10 ¹⁶	1.0 x 10 ¹⁶	1.0 x 10 ¹⁶
Dielectric Constant	ര 25°C	4.0	4.0	4.0

Measurement technique according to: 'ASTM D 5470. All data without warrenty 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: $25~\mu m$ / $51~\mu m$ / $76~\mu m$. Total Thicknessess: $51~\mu m$ / $77~\mu m$ / $102~\mu m$

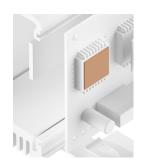


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KAPTON®FILM WITH PHASE CHANGE TPC-P-KA

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 unevenesses 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 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

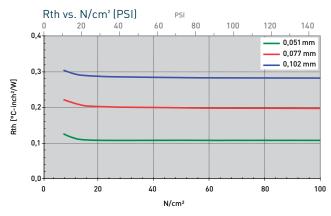
Thermal link of:

- 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		Kapton®MT with phase change coating on both sides	Kapton®MT with phase change coating on both sides	Kapton®MT with phase change coating on both sides
Colour	•••••	Light orange	Light orange	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 Kapton®MT	UL 94	V0	VO	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ² @ 150 PSI	°C-inch²/W	0.110	0.195	0.285
Resistance ² @ 30 PSI	°C-inch²/W	0.113	0.200	0.290
Resistance ² @ 10 PSI	°C-inch²/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	0hm - 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: 'ASTM D 412, 'ASTM D 5470, '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 Thicknessess: 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 particular formulation and the thixotropic nature prevents from run-out as well as migration. 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
- No migrating, pump-out or run out due to thixotropic properties
- 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

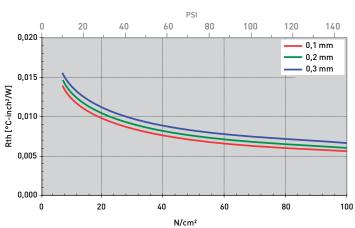
For use in Servo drive control units / Computers / Automation appliances / Microelectronics

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 +0.12	0.2 + 0.23	0.3 +0.33 -0.27
Specific Density	g/cm³	2.0	2.0	2.0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ¹ @ 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: 'ASTM 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)



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 unevenesses 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 particular formulation and the thixotropic nature prevents from run-out, dry-up as well as migration. The aluminum carrier effects high mechanical stability and easy handling.



PROPERTIES

- Optimal thermal contact
- · Silicone-free
- No migrating, run out or pump-out due to thixotropic properties
- 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:

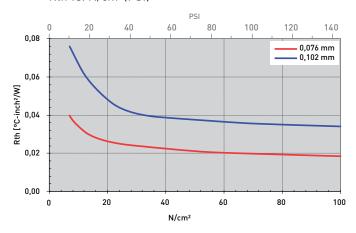
- MOSFETs or IGBTs
- Insulated diodes
- Power modules
- CPUs

For use in Servo drive control units / Traction drives / Automation appliances / Microelectronics

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

Rth vs. N/cm² (PSI)



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 unevenesses 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 particular formulation and the thixotropic nature prevents from run-out, dry-up as well as migration. The aluminum carrier effects high mechanical stability and easy handling.



PROPERTIES

- Optimal thermal contact
- Silicone-free
- No migrating, run out, pump-out due to thixotropic properties
- 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
- Memory modules
- Power modules
- CPUs

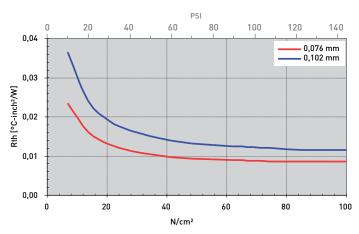
For use in Servo drive control units / Traction drives / Automation appliances / Microelectronics

PROPERTY	UNIT	TPC-T076-AL-CB	TPC-T102-AL-CB
MATERIAL		Aluminum with graphite filled phase change coating on both sides	Aluminum with graphite filled phase change coating on both sides
Colour		Black	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: $12.5 \,\mu\text{m} / 25.5 \,\mu\text{m}$ Total Thicknessess: $76 \,\mu\text{m} / 102 \,\mu\text{m}$

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 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. 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:

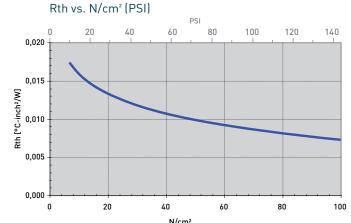
- MOSFETs und IGBTs
- Memory Modules
- · IGBT Power Modules
- CPUs

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 undried	g/cm³ g/cm³	1.8 @ RT 1.6 @ RT	1.8 @ RT 1.7 @ RT
Viscosity dried @ 10 rpm Viscosity undried @ 10 rpm	Pas Pas	60 @ 60°C / 42 @ 80°C / 25 @ 100°C / 18 @ 120°C 85 @ RT	60 @ 60°C / 42 @ 80°C / 25 @ 100°C / 18 @ 120°C 96 @ RT
Drying @ Temperature @ Thickness	Time	@ 22°C: @ 60°C: @ 125°C: 24 h (0.05 mm) 24 min (0.05 mm) 4 min (0.05 mm) 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) 9 min (0.25 mm)	6 60°C: 6 125°C: 3,5 h (0.05 mm) 8 min (0.05 mm) 8 h (0.15 mm) 15 min (0.15 mm) 13 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-inch²/W	0.007	0.007
Resistance ¹ @ 30 PSI	°C-inch²/W	0.013	0.013
Resistance ¹ @ 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

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



PHASE CHANGE COM POUND 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 preapplied 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:

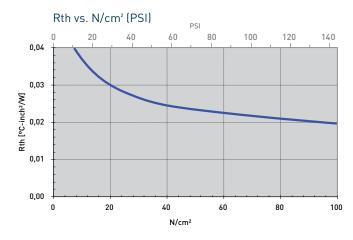
- MOSFETs and IGBTs
- Memory Modules
- IGBT Power Modules
- CPUs

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

	Dryable Phase Change Compound	Dryable Phase Change Compound
• • • • • • • • • • • • • • • • • • • •	White	White
•	~ Print	~ Print
g/cm³ g/cm³	1.1 @ RT 1.0 @ RT	1.10 @ RT 1.05 @ RT
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 85
Time	6 22°C: 6 60°C: 6 125°C: 24 h (0.05 mm) 24 min (0.05 mm) 4 min (0.05 mm) 48 h (0.15 mm) 53 min (0.15 mm) 6 min (0.15 mm) 56 h (0.25 mm) 56 min (0.25 mm) 10 min (0.25 mm)	
Months	9	9
2015/863/EU	Yes	Yes
°C-inch²/W	0.02	0.02
°C-inch²/W	0.03	0.03
°C-inch²/W	0.04	0.04
W/mK	3.0	3.0
°C	ca. 45	ca. 45
°C	< 140	< 140
°C	25	25
	g/cm³ Pas Pas Time Months 2015/863/EU °C-inch²/W °C-inch²/W W/mK °C °C	~ Print g/cm³

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 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 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-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:

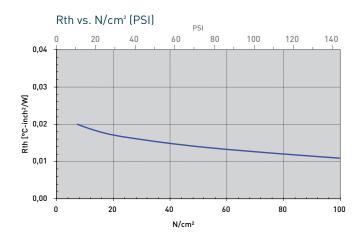
- MOSFETs and IGBTs
- Memory Modules
- IGBT Power Modules
- CPUs

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 undried	g/cm³ g/cm³	2.3 @ RT 2.0 @ RT	2.3 @ RT 2.1 @ RT
Viscosity dried @ 10 rpm Viscosity undried @ 10 rpm	Pas Pas	45 @ 60°C / 30 @ 80°C / 21 @ 100°C / 15 @ 120°C 60	45 @ 60°C/30 @ 80°C/20 @ 100°C/15 @ 12 77.5
Drying @ Temperature @ Thickness	Time	6 22°C: 6 60°C: 6 125°C: 24 h (0.05 mm) 24 min (0.05 mm) 3 min (0.05 mm) 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)	0 60°C: 0 125°C: 4 h (0.05 mm) 8 min (0.05 mm) 12 h (0.15 mm) 15 min (0.15 mm) 20 h (0.25mm) 20 min (0.25 mm)
Storage (@ RT)	Months	9	9
RoHS Conformity	2015/863/EU	Yes	Yes
THERMAL			
Resistance ¹ @ 150 PSI	°C-inch²/W	0.011	0.011
Resistance ¹ @ 30 PSI	°C-inch²/W	0.017	0.017
Resistance ¹ @ 10 PSI	°C-inch²/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.





VORES PRODUKTSORTIMENT INKLUDERER:













VI FØRER PRODUKTER INDENFOR KATEGORIERNE:



AUTOMATIK



HVAC & BYGNINGS-AUTOMATIK



ELVARME



