

THERMAL MANAGEMENT INTERFACE MATERIALS 2025





NEW DIMENSIONS IN THERMAL MANAGEMENT

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1/	Total-Thermal-Management	•••••••••••••••••••••••••••••••••••••••		
	Heat Pine Assemblies	•••••••••••••••••••••••••••••••••••••••		
B TH	ERMAL INTERFACE MATERIALS			
10	Material	Product Code Insulating	Conductivity	
.19		•••••••••••••••••••••••••••••••••••••••	W/mK	
	Silicone			
20	Silicone Gap Filler Pad / soft		2.5	
21	Silicone Gap Filler Pad / solt		3.U / F	electrically
.22	Silicone Gap Filler Pad / soft		4.5 7. 5	insulating
24	Silicone Gap Filler Pad / yery soft		1 2	electrically
25	Silicone Gan Filler Pad /very soft		1.2	non-insulating
26	Silicone Gan Filler Pad /very soft		2 በ	low
27	Silicone Gan Filler Pad /very soft /I V		2.0	dielectric
28	Silicone Gap Filler Pad / very soft /	TGF-MXS-SI	2.4	
	optional fibreglass reinforced			/ LV = Low Volatile
29	Silicone Gap Filler Pad / very soft	TGF-LSS-SI	2.5	Siloxanes
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-VUS-SI	5.0	
35	Silicone Gap Filler Pad / very soft		5.5	
36	Silicone Gap Filler Pad / very soft / fibreglass reinforced		1,1	
37	Silicone Gap Filler Pad / very solt / libreglass reinforced		1.3	
30	Silicone Gap Filler Pad / plastic / soft		۱.4 ۸ D	
	Silicone Gan Filler Pad / plastic / soft	TGF-VP-SI		
40	Silicone Gan Filler Pad / plastic / soft			
42	Silicone Gap Filler Pad / plastic / soft	TGF-YP-SI	7.0	
43	Silicone Gap Filler Pad / plastic / very soft	TGF-YSP-SI	8.0	
44	Silicone Gap Filler Pad / highly conductive / LV	TEL-R-SI	15	
45	Silicone Gap Filler Pad / highly conductive / LV	TEL-Z-SI	50	
46	Silicone Gap Filler Pad / highly conductive / LV	TEL-YSS-SI	16	
47	Silicone Gap Filler Pad / highly conductive / LV	TEL-ZS-SI	20	
48	2-Part Gap Filler / dispensable / LV	TDG-L-SI-2C-Y	2.0	
49	2-Part Gap Filler / dispensable / LV	TDG-T-SI-2C	3.0	
50	2-Part Gap Filler / dispensable / LV	TDG-U-SI-2C	3.6	
51	2-Part Gap Filler / dispensable / LV	TDG-W-SI-2C	4.5	
52	2-Part Gap Filler / dispensable / LV	TDG-Y-SI-2C	6.0	
53	1-Part Silicone Gap Filler / Putty / dispensable	TGL-W-SI	5.5	
54	1-Part Silicone Gap Filler / Putty / dispensable	TGL-X-SI	6,5	
	Silicone-free			
55	Silicone-free Gap Filler Pad / soft	TGF-R-NS	3.0	
56	Silicone-free Gap Filler Pad / soft		5.0	
57	Silicone-free Gap Filler Pad / soft		6.U	
58	Silicone-free Gap Filler Pad / soft		8.U 1 E	
57	Silicone-Tree Gap Filler Pad / Very Soft		1.5	
6U 	Silicone free Gap Filler Pad / Very Soft		2.0	
61	1. Part Silicopo, froo Can Eillor / Dutty / diagonachia		2.5 / 0	
02	TFF art Shicohe-free Gap Filler / Pully / dispensable		4,0	



66 Silicone foil / fibreglass reinforced TF0-D-SI 1.2 65 Silicone foil / fibreglass reinforced TF0-J-SI 2.0 67 Silicone foil / fibreglass reinforced TF0-J-SI 2.0 68 Silicone foil / fibreglass reinforced TF0-J-SI 2.0 69 Silicone foil / fibreglass reinforced TF0-O-SI 6.0 70 Silicone foil / fibreglass reinforced TF0-TSI 6.1 71 Silicone foil / fibreglass reinforced TF0-TSI 6.1 73 Silicone foil / fibreglass reinforced TF0-TSI 6.1 74 Insultaing film / silicone coaled TF0-TSI 6.1 75 Silicone cap TCP-CSI 0.8 76 Silicone cap TCP-LSI 0.8 77 Silicone cap TCP-LSI 0.2 0 78 Silicone cap TCP-LSI 0.8 - 79 Polymide film / phase change coated TPC-N-PI - - 70 Silicone foil / phase change coated TPC-Y-PC 5.0 0 71 Silicone film / phase change coated T	63	2 FOILS & FILMS			W/mK
66 Silicone foil / fibreglass reinforced TFO-5-51 • 1.4 66 Silicone foil / fibreglass reinforced TFO-151 • 2.0 67 Silicone foil / fibreglass reinforced TFO-0-S1 • 3.0 67 Silicone foil / fibreglass reinforced TFO-0-S1 • 3.0 67 Silicone foil / fibreglass reinforced TFO-7-S1 • 4.1 70 Silicone foil / fibreglass reinforced TFO-7-S1 • 4.1 71 Silicone foil / fibreglass reinforced TFO-7-S1 • 4.1 72 Silicone cap TCP-7-S1 • 5.0 73 Silicone cap TCP-1-S1 • - 74 Insulating film / silicone caed TCP-2-S1 • 0.8 75 Silicone cap TCP-1-S1 • 1.5 76 Silicone cap TCP-1-S1 • 1.5 77 Silicone cap TCP-1-S1 • 2.0 77 Silicone cap TCP-1-S1 • 1.5 78 Silicone cap TCP-1-S1 • <td>64</td> <td>Silicone foil / fibreglass reinforced</td> <td>TF0-D-SI</td> <td></td> <td>1.2</td>	64	Silicone foil / fibreglass reinforced	TF0-D-SI		1.2
66 Silicone foil / fibreglass reinforced TF0-J-SI 2.0 67 Silicone foil / fibreglass reinforced TF0-O-SI 2.0 68 Silicone foil / fibreglass reinforced TF0-O-SI 3.0 67 Silicone foil / fibreglass reinforced TF0-P-SI 4.0 70 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-X-SI 6.0 74 Silicone foil / fibreglass reinforced TF0-X-SI 6.0 75 Silicone cap TCP-C-SI 0.8 76 Silicone cap TCP-L-SI 1.5 75 Silicone cap TCP-L-SI 2.0 77 Silicone cap TCP-L-SI 2.0 78 Silicone cap TCP-L-SI 2.0 79 SILCONE CAPS - - 70 Silicone cap TCP-L-SI - 71 Silicone cap TCP-L-SI - 72 SILCONE CAPS - - 7	65	Silicone foil / fibreglass reinforced	TFO-G-SI		1.6
67 Silicone foil / fibreglass reinforced TFO-K-SI 2.5 68 Silicone foil / fibreglass reinforced TFO-O-SI 3.0 70 Silicone foil / fibreglass reinforced TFO-C-SI 4.1 71 Silicone foil / fibreglass reinforced TFO-R-SI 5.0 72 Silicone foil / fibreglass reinforced TFO-XSI 5.0 73 Silicone foil / fibreglass reinforced TFO-A-SI 8.0 74 Insulating film / silicone coated TFO-A-SI 8.0 75 Silicone cap TCP-C-SI 0.8 76 Silicone cap TCP-LSI 2.0 77 Silicone cap TCP-VSI 2.0 78 Silicone cap TPC-P-VA - 78 Phase Change Coated TPC-P-VA - 79 SP Hase change coated TPC-P-VC 3.5 70 Phase change coated TPC-P-VA - 70 Phase change film TPC-Y-PC 5.0 84 Aluminum film / phase change coated TPC-T-AL-CB - 87 GarAphite foil / protytic TFO-Y-PG	66	Silicone foil / fibreglass reinforced	TF0-J-SI	••••••	2.0
68 Silicone foil / fibreglass reinforced TFD-0-SI 3.0 69 Silicone foil / fibreglass reinforced TFD-R-SI 4.0 71 Silicone foil / fibreglass reinforced TFD-R-SI 3.5 71 Silicone foil / fibreglass reinforced TFD-R-SI 4.1 72 Silicone foil / fibreglass reinforced TFD-X-SI 5.0 73 Silicone foil / fibreglass reinforced TFD-X-SI 8.0 74 Insulating film / silicone coated TCP-C-SI 0.8 75 Silicone cap TCP-L-SI 0.8 76 Silicone cap TCP-L-SI 1.5 78 Silicone cap TCP-L-SI 2.0 79 S PLASE CHANGE MATERIAL - - 80 Polyimide film / phase change coated TPC-N-PI - 81 Polyimide film / phase change coated TPC-N-PI - 82 Phase change film TPC-Y-PC 3.5 83 Phase change film TPC-Y-PC 5.0 84 Aluminum film / phase change coated TPC-Y-PC 5.0 85 Aluminum film / pha	67	Silicone foil / fibreglass reinforced	TFO-K-SI	••••••	2.5
69 Silicone foil / fibreglass reinforced TFO-0-Si 6,0 70 Silicone foil / fibreglass reinforced TFO-R-SI 3,5 71 Silicone foil / fibreglass reinforced TFO-X-SI 4,1 72 Silicone foil / fibreglass reinforced TFO-X-SI 6,0 73 Silicone foil / fibreglass reinforced TFO-X-SI 8,0 74 Insulating film / silicone coated TFO-75.5 8,0 75 Silicone cap TCP-0-SI 0,8 76 Silicone cap TCP-1.5I 1.5 76 Silicone cap TCP-1.5I 2.0 77 Silicone cap TCP-1.5I 2.0 78 Silicone cap TCP-1.5I 2.0 79 Silicone cap TCP-1.5I 2.0 79 Polyimide film / phase change coated TPC-N-PI - 80 Polyimide film / phase change coated TPC-Y-PC 3.5 81 Oraphite foil / prolyitic TFO-5-CB 2.8 / X-y:140 83 Graphite foil / prolyitic TFO-5-CB 2.3 / X-y:500 70 Graphite foil / prolyitic	68	Silicone foil / fibreglass reinforced	TF0-0-SI	••••	3.0
70 Silicone foil / fibreglass reinforced TFO-R-SI 2,5 71 Silicone foil / fibreglass reinforced TFO-T-SI 4,1 72 Silicone foil / fibreglass reinforced TFO-X-SI 5,0 73 Silicone foil / fibreglass reinforced TFO-X-SI 6,0 74 Insulating film / silicone coated TFO-M-SI-PI - 75 G SILICONE CAPS 0.8 7 76 Silicone cap TCP-L-SI 0.8 77 G PLASE CHANGE MATERIAL 0 0.8 78 Silicone cap TCP-L-SI 2.0 79 G PLASE CHANGE MATERIAL - - 70 Polyimide film / phase change coated TPC-N-PI - 71 Phase change film TPC-W-PC 3.5 73 Phase change film TPC-T-AL - 74 Aluminum film / phase change coated TPC-T-AL-CB - 75 G RAPHITE FOILS - 3.6 x-y:140 76 TS ICAPAHITE FOILS - 2	69	Silicone foil / fibreglass reinforced	TFO-Q-SI		6.0
Silicone foil / fibreglass reinforced TFO-T-SI 4.1 72 Silicone foil / fibreglass reinforced TFO-X-SI 5.0 73 Silicone foil / fibreglass reinforced TFO-X-SI 5.0 73 Silicone foil / fibreglass reinforced TFO-X-SI 8.0 74 Insulating film / silicone coaled TFO-M-SI-PI - 75 Si Silicone cap TCP-J-SI 1.5 76 Silicone cap TCP-J-SI 2.0 77 Silicone cap TCP-L-SI 2.0 78 Silicone cap TCP-L-SI 2.0 79 CI PASE CHANGE MATERIAL - - 80 Polyimide film / phase change coated TPC-N-PI - 81 Polyimide film / phase change coated TPC-Y-PC 5.0 83 Aluminum film / phase change coated TPC-T-AL-CB - 84 Aluminum film / phase change coated TPC-T-AL-CB - 85 Aluminum film / phase change coated TPC-T-AL-CB - 86 Graphite foil / pyrolytic	70	Silicone foil / fibreglass reinforced	TFO-R-SI	•••••	3 5
Johnson Directions Procession Control The Control The Control 71 Silicone foil / libreglass reinforced TFO-X-SI 5.0 73 Silicone foil / libreglass reinforced TFO-X-SI 5.0 74 Insulating film / silicone costed TFO-X-SI 6.0 75 6 Silicone costed TCP-C-SI 0.8 77 Silicone cap TCP-L-SI 1.5 78 Silicone cap TCP-L-SI 2.0 79 CI PHASE CHANGE MATERIAL 0.8 71 Silicone cap TCP-V-PI - 78 Phase change film TPC-W-PC 3.5 79 A Phase change film TPC-W-PC 3.5 79 A Phase change coated TPC-W-PC 3.0 70 B A Aluminum film / phase change coated TPC-T-AL-CB - 87 B G A Aluminum film / phase change coated TPC-T-AL-CB - 87 G G G	71	Silicone foil / fibreglass reinforced		•••••••••••••••••••••••••••••••••••••••	
72 Silicone Iol / Ibreglass reinforced TF0-725-51 6.0 74 Insulating film / silicone coated TF0-725-51 6.0 75 Silicone cap TCP-C-SI 0.8 76 Silicone cap TCP-1-SI 0.8 77 Silicone cap TCP-1-SI 0.8 78 Silicone cap TCP-1-SI 0.8 78 Silicone cap TCP-1-SI 2.0 79 Second State Change Coated TPC-N-PI - 79 Phase Change Change coated TPC-N-PKA - 80 Polyimide film / phase change coated TPC-N-PC 3.5 70 Phase change film TPC-Y-PC 5.0 84 Aluminum film / phase change coated TPC-T-AL-CB - 87 Graphite foil / prolytic TF0-S-CB z.8 /x-y: 140 88 Graphite foil / prolytic TF0-Y-PG z.>/S /x-y: 5700 97 G PAAINSULATING TAPE 0.7 PSA insulating tape / silicone 1.0 98 Graphite foil / prolytic TF0-Y-PG z.>/S /x-y: 5700 99 Graphite foil / prolyt		Silicone foil / fibroglass reinforced			5.0
75 51 51 62 73 63 63 76 Insulating film / silone coated TF0-M-SI-PI - 76 Silicone cap TCP-C-SI 0.8 77 Silicone cap TCP-L-SI 0.2 78 Silicone cap TCP-L-SI 2.0 77 Silicone cap TCP-L-SI 2.0 78 Silicone cap TCP-L-SI 2.0 79 Silicone cap TCP-L-SI 2.0 79 Phase Change film TPC-N-PI - 80 Polyimide film / phase change coated TPC-N-PC 3.5 81 Phase change film TPC-N-PC 5.0 82 Phase change film TPC-T-AL-CB - 83 Graphite foil / anisotropic TF0-S-CB z:8 /x-y:140 84 Graphite foil / pyrolytic TF0-S-CB z:8 /x-y:700 90 Graphite foil / pyrolytic TF0-S-CB z:8 /x-y:700 91 S PAInsulating tape / acrytate with insulating film TAT-J-PE <td< td=""><td>72 72</td><td>Silicone foil / fibreglass reinforced</td><td></td><td>•••••••••••••••••••••••••••••••••••••••</td><td>0.0</td></td<>	72 72	Silicone foil / fibreglass reinforced		•••••••••••••••••••••••••••••••••••••••	0.0
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75 B SILCONE CAPS 76 Silicone cap TCP-C-SI 0.8 77 Silicone cap TCP-L-SI 1.5 78 Silicone cap TCP-L-SI 2.0 79 C PHASE CHANGE MATERIAL Polyimide film / phase change coated TPC-N-PI - 80 Polyimide film / phase change coated TPC-P-KA - 81 Polyimide film / phase change coated TPC-P-KA - 82 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 - 84 Graphite foil / paise change coated TPC-S-CB 2:8 / x-y:140 87 Graphite foil / pyrolytic TFO-S-CB 2:8 / x-y:140 88 Graphite foil / pyrolytic TFO-S-CB 2:30 / x-y:500 90 Graphite foil / pyrolytic TFO-S-CB 2:30 / x-y:500 91 6 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 92 PSA Insulating tape / acrylate with insulating film TAT-J-SI 1.0 <t< td=""><td></td><td></td><td></td><td></td><td></td></t<>					
76 Silicone cap TCP-L-SI ■ 0.8 77 Silicone cap TCP-L-SI ■ 1.5 78 Silicone cap TCP-L-SI ■ 1.5 79 G PHASE CHANGE MATERIAL ■ - 80 Polyimide film / phase change coated TPC-N-PI ■ - 81 Polyimide film / phase change coated TPC-W-PC ■ 3.5 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-Y-PC ■ 5.0 86 Graphite foil / anisotropic TPO-S-CB ■ 2.8 /x-y:140 87 G GRAPHITE FOILS ■ ■ - 500 88 Graphite foil / pyrolytic TFO-S-CB ■ 2.8 /x-y:140 89 Graphite foil / pyrolytic TFO-S-CB ■ 2.8 /x -y:150 91 G PSA INSULATING TAPE ■ 0.7 7	75	3 SILICONE CAPS			••••••
77 Silicone cap TCP-J-SI 1.5 78 Silicone cap TCP-L-SI 2.0 78 Silicone cap TCP-L-SI 2.0 79 C PHASE CHANGE MATERIAL 2.0 80 Polyimide film / phase change coated TPC-N-PI - 81 Polyimide film / phase change coated TPC-W-PC 3.5 83 Phase change film TPC-W-PC 5.0 84 Aluminum film / phase change coated TPC-R-AL - 85 Aluminum film / phase change coated TPC-T-AL-CB - 86 Graphite foil / anisotropic TFO-S-CB z:8/x-y:140 87 G GRAPHITE FOILS TFO-Y-PG z:30/x-y:500 88 Graphite foil / pyrolytic TFO-S-CB z:30/x-y:500 90 Graphite foil / pyrolytic TFO-S-CB z:30/x-y:500 91 C PSA INSULATING TAPE - - 92 PSA Insulating tape / arylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / silicone TAT-M-SI 1.0 94 THERMAL GREASE - <	76	Silicone cap	TCP-C-SI		0.8
78 Silicone cap TCP-L-SI 2.0 79 CPHASE 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-Y-PC 3.5 83 Phase change film TPC-Y-PC 5.0 84 Aluminum film / phase change coated TPC-Y-PC 5.0 85 Aluminum film / phase change coated TPC-T-AL-CB - 86 Graphite foil / anisotropic TFO-S-CB z:8/x-y:140 87 G GRAPHITE FOILS z:8/x-y:140 - 87 G Graphite foil / pyrolytic TFO-S-CB z:8/x-y:140 89 Graphite foil / pyrolytic TFO-S-CB z:8/x-y:140 80 Graphite foil / pyrolytic TFO-S-CB z:8/x-y:140 81 Graphite foil / pyrolytic TFO-S-CB z:8/x-y:140 82 Graphite foil / pyrolytic TFO-S-CB z:8/x-y:140 83 Graphite foil / pyrolytic TAD-SI 1.0 94 PSA Insulating tape / artistion	77	Silicone cap	TCP-J-SI		1.5
79 C 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 foil / anisotropic TFO-S-CB z:8/x-y:140 87 G Graphite foil / anisotropic TFO-S-CB z:8/x-y:400 80 Graphite foil / pyrolytic TFO-S-CB z:8/x-y:400 90 Graphite foil / pyrolytic TFO-S-CB z:8/x-y:400 91 G PSA INSULATING TAPE - 0.7 92 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 94 Silicone-free grease / highly thermatly conductive TGR-J-NS 2.0 97 Silicone-free grease / highly thermatly conductive TA-D-O-SI-1C 2.1 98 </td <td>78</td> <td>Silicone cap</td> <td>TCP-L-SI</td> <td></td> <td>2.0</td>	78	Silicone cap	TCP-L-SI		2.0
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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-Y-PC 5.0 84 Aluminum film / phase change coated TPC-T-AL-CB - 85 Aluminum film / phase change coated TPC-T-AL-CB - 86 Graphite foil / anisotropic TFO-S-CB 2:8/x-y:140 87 Graphite foil / pyrolytic TFO-Y-PG 2:3/x-y:500 90 Graphite foil / pyrolytic TFO-ZS-PG 2:30/x-y:500 91 G PSA INSULATING TAPE PSA 0.7 92 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / silicone TAT-MSI 1.0 94 Silicone-free grease / highly thermally conductive TGR-J-NS 2.0 95 THERMAL GREASE - - 1.4 96 Silicone adhesive / thermally conductive / TK TAD-O-SI-1C 1.4 - 97 Silicone adhesive / thermally conductive / 1	80	Polyimide film / phase change coated	TPC-N-PI		-
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 - 85 Aluminum film / phase change coated TPC-T-AL-CB - 87 G GRAPHITE FOILS - - 88 Graphite foil / pyrolytic TFO-Y-PG 2:8/x-y:140 89 Graphite foil / pyrolytic TFO-Y-PG 2:8/x-y:700 90 Graphite foil / pyrolytic TFO-ZS-PG 2:30/x-y:500 91 G PSA INSULATING TAPE 9 0.7 92 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 94 S Insulating tape / acrylate with insulating film TAT-J-PE 0.7 95 S Internal CREASE - 0.7 96 Silicone-free grease / highly thermally conductive TGR-J-NS 2.0 97 G ADHESIVES 10 5	81	Polyimide film / phase change coated	TPC-P-KA		-
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-R-AL - 87 G GRAPHITE FOILS - 88 Graphite foil / anisotropic TFO-S-CB z:8/x-y:140 89 Graphite foil / pyrolytic TFO-Y-PG z:3/x-y:500 90 Graphite foil / pyrolytic TFO-ZS-PG z:3/x-y:500 91 6 PSA INSULATING TAPE - 0.7 92 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 94 Silicone-free grease / highly thermally conductive TGR-J-NS 2.0 97 Silicone-free grease / highly thermally conductive TGR-M-NS 2.4 97 Silicone adhesive / thermally conductive /1K TAD-O-SI-1C 1.4 101 Silicone adhesive / thermally conductive /1K TAD-P-SI-1C 2.3 103 Silicone adhesive / thermally conductive /1K TAD-O-SI-1C 2.3 103 Silicone adhesive	82	Phase change film	TPC-W-PC		3.5
84 Aluminum film / phase change coated TPC-R-AL - 85 Aluminum film / phase change coated TPC-T-AL-CB - 87 G GRAPHITE FOILS - 88 Graphite foil / anisotropic TFO-S-CB z:8/x-y:140 89 Graphite foil / pyrolytic TFO-S-CB z:8/x-y:700 90 Graphite foil / pyrolytic TFO-ZS-PG z:30/x-y:500 91 G PSA INSULATING TAPE - - 92 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 94 Silicone-free grease / highly thermally conductive TGR-J-NS 2.0 97 Silicone-free grease / highly thermally conductive TGR-M-NS 2.4 97 Silicone adhesive / thermally conductive /1K TAD-0-SI-1C 1.4 101 Silicone adhesive / thermally conductive /1K TAD-0-SI-1C 2.1 102 Silicone adhesive / thermally conductive /1K TAD-0-SI-1C 2.3 103 Silicone adhesive / thermally conductive /1K TAD-0-SI-1C 2.3 103	83	Phase change film	TPC-Y-PC		5,0
85 Aluminum film / phase change coated TPC-T-AL-CB - 87 G GRAPHITE FOILS TFO-S-CB z:8/X-y:140 88 Graphite foil / anisotropic TFO-Y-PG z:>15/x-y:>700 90 Graphite foil / pyrolytic TFO-ZS-PG z:>30/x-y:500 91 G PSA INSULATING TAPE 0.7 92 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 94 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 95 INTERMAL GREASE 5 1.0 96 Silicone-free grease / highly thermally conductive TGR-J-NS 2.0 97 Silicone adhesive / thermally conductive / 1K TAD-G-SI-1C 1.4 100 Silicone adhesive / thermally conductive / 1K TAD-O-SI-1C 2.1 102 Silicone adhesive / thermally conductive / 1K TAD-O-SI-1C 2.3 103 Silicone adhesive / thermally conductive / 1K TAD-U-SI-1C 2.3	84	Aluminum film / phase change coated	TPC-R-AL		-
 87 GRAPHITE FOILS 88 Graphite foil / anisotropic 89 Graphite foil / pyrolytic 89 Graphite foil / pyrolytic 80 Graphite foil / pyrolytic 81 FO-ZS-PG 82 SIL SULATING TAPE 92 PSA Insulating tape / acrylate with insulating film 94 TAT-J-PE 95 II THERMAL GREASE 96 Silicone-free grease / highly thermally conductive 97 THERMAL GREASE 98 Silicone adhesive / thermally conductive 99 GAPHESIVES 90 Silicone adhesive / thermally conductive / 1K 91 TAD-0-SI-1C 92 ADHESIVES 93 Silicone adhesive / thermally conductive / 1K 94 ADHESIVES 95 Silicone adhesive / thermally conductive / 1K 96 JU ADHESIVES 97 Silicone adhesive / thermally conductive / 1K 97 TAD-0-SI-1C 98 Silicone adhesive / thermally conductive / 1K 99 Portning GEL 90 Silicone potting gel / 2 parts 90 TCR-D-SI-2C 91 OFTING GEL 91 POTTING GEL 91 POTTING GEL 91 PU Potting gel / 2 parts 92 TCR-N-PU-2C-LV-AR 93 Silicone potting gel / 2 parts 94 TCR-N-PU-2C-LV-AR 95 TCR-N-PU-2C-LV-AR 97 Silicone potting gel / 2 parts 97 CR-N-PU-2C-LV-AR 98 PU Potting gel / 2 parts 99 TCR-N-PU-2C-LV-AR 90 PU Potting gel / 2 parts 90 TCR-V-PU-2C-LV-AR 91 HALA CLIPS 91 Hala Clip for T0-220 91 T0-220-1 91 Hala Clip for T0-247 91 T0-247-1 	85	Aluminum film / phase change coated	TPC-T-AL-CB		_
87 E GRAPHITE FOILS 88 Graphite foil / anisotropic TFO-S-CB z:8/x-y:140 89 Graphite foil / pyrolytic TFO-Y-PG z:>15/x-y:>700 90 Graphite foil / pyrolytic TFO-ZS-PG z:>15/x-y:>700 91 G PSA INSULATING TAPE 0.7 92 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / acrylate with insulating film TAT-M-SI 1.0 94 PSA Insulating tape / acrylate with insulating film TAT-M-SI 1.0 95 ITHERMAL GREASE 5 2.0 96 Silicone-free grease / highly thermally conductive TGR-M-NS 2.4 97 Silicone adhesive / thermally conductive / 1K TAD-0-SI-1C 1.4 100 Silicone adhesive / thermally conductive / 1K TAD-0-SI-1C 2.3 103 Silicone adhesive / thermally conductive / 1K TAD-0-SI-1C 2.3 103 Silicone adhesive / thermally conductive / 1K TAD-0-SI-1C 2.3 103 Silicone adhesive / thermally conductive / 2K TAD-N-PU-2C 2.0 104 Polyurethane adhesive /					
88 Graphite foil / anisotropic TFO-S-CB 2:8 / x-y: 140 89 Graphite foil / pyrolytic TFO-Y-PG 2:>15 / x-y:>700 90 Graphite foil / pyrolytic TFO-Y-PG 2:>30 / x-y:500 91 G PSA INSULATING TAPE 92 92 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / silicone TAT-M-SI 1.0 95 17 THERMAL GREASE 5 2.0 97 Silicone-free grease / highly thermally conductive TGR-J-NS 2.0 97 Silicone adhesive / thermally conductive / 1K TAD-0-SI-1C 1.4 100 Silicone adhesive / thermally conductive / 1K TAD-0-SI-1C 2.3 100 Silicone adhesive / thermally conductive / 1K TAD-0-SI-1C 2.3 101 Silicone adhesive / thermally conductive / 1K TAD-0-SI-1C 2.3 102 Silicone adhesive / thermally conductive / 1K TAD-0-SI-1C 2.3 103 Silicone adhesive / thermally conductive / 1K TAD-0-SI-1C 3.3 </td <td>87</td> <td>5 GRAPHITE FOILS</td> <td></td> <td></td> <td></td>	87	5 GRAPHITE FOILS			
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90 Graphite foil / pyrolytic TFO-ZS-PG 2:30/x-y:500 91 Image: PSA INSULATING TAPE 0.7 92 PSA Insulating tape / acrylate with insulating film TAT-J-PE 0.7 93 PSA Insulating tape / silicone TAT-M-SI 1.0 95 Image: TAT-M-SI 1.0 96 Silicone-free grease / highly thermally conductive TGR-J-NS 2.0 97 Silicone-free grease / highly thermally conductive TGR-M-NS 2.4 97 Silicone adhesive / thermally conductive / 1K TAD-G-SI-1C 1.4 100 Silicone adhesive / thermally conductive / 1K TAD-O-SI-1C 2.1 102 Silicone adhesive / thermally conductive / 1K TAD-O-SI-1C 2.3 103 Silicone adhesive / thermally conductive / 1K TAD-V-SI-1C 2.3 103 Silicone adhesive / thermally conductive / 2K TAD-N-PU-2C 2.0 104 Polyurethane adhesive / thermally conductive / 2K TAD-N-PU-2C 2.0 105 P POTTING GEL 1.2 1.2 106 Silicone potting gel / 2 parts TCR-D-SI-2C 0.7 107 Silic	89	Graphite foil / pyrolytic	TFO-Y-PG		z:>15/x-y:>700
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103Silicone adhesive / thermally conductive /1KTAD-U-SI-1C3,3104Polyurethane adhesive / thermally conductive /2KTAD-N-PU-2C2,0105 9 POTTING GEL2,0106Silicone potting gel/2 partsTCR-D-SI-2C0.7107Silicone potting gel/2 partsTCR-H-SI-2C1.2108PU Potting gel/2 partsTCR-J-PU-2C-LV-AR1.5109PU Potting gel/2 partsTCR-N-PU-2C-LV-AR2.6110PU Potting gel/2 partsTCR-V-PU-2C-MV-AR3.5111 10 HALA CLIPST0-220-1113Hala Clip for T0-247T0-247-1114LEGAL INFORMATION	96 97 <mark>99</mark> 100 101	 2 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive 8 ADHESIVES Silicone adhesive / thermally conductive / 1K Silicone adhesive / thermally conductive / thermally cond	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C		2.0 2.4 1.4 2.1
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105 ? POTTING GEL 106 Silicone potting gel/2 parts TCR-D-SI-2C 0.7 107 Silicone potting gel/2 parts TCR-H-SI-2C 1.2 108 PU Potting gel/2 parts TCR-J-PU-2C-LV-AR 1.5 109 PU Potting gel/2 parts TCR-N-PU-2C-LV-AR 2.6 110 PU Potting gel/2 parts TCR-V-PU-2C-MV-AR 3.5 111 111 HALA CLIPS 112 112 Hala Clip for T0-220 T0-220-1 113 113 Hala Clip for T0-247 T0-247-1 114	96 97 99 100 101 102 103	 2 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive B ADHESIVES Silicone adhesive / thermally conductive / 1K Silicone adh	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-U-SI-1C		2.0 2.4 1.4 2.1 2.3 3.3
103 103 104 POTTING GEL 106 Silicone potting gel/2 parts TCR-D-SI-2C 0.7 107 Silicone potting gel/2 parts TCR-H-SI-2C 1.2 108 PU Potting gel/2 parts TCR-J-PU-2C-LV-AR 1.5 109 PU Potting gel/2 parts TCR-N-PU-2C-LV-AR 2.6 110 PU Potting gel/2 parts TCR-V-PU-2C-MV-AR 3.5 111 10 HALA CLIPS 10 112 Hala Clip for T0-220 T0-220-1 113 113 Hala Clip for T0-247 T0-247-1 114	96 97 99 100 101 102 103 104	 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive ADHESIVES Silicone adhesive / thermally conductive / 1K 	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-U-SI-1C TAD-U-SI-1C TAD-N-PU-2C		2.0 2.4 1.4 2.1 2.3 3,3 2,0
106 Slucone potting get/2 parts 1CR-D-SI-2C 0.7 107 Silicone potting get/2 parts TCR-H-SI-2C 1.2 108 PU Potting get/2 parts TCR-J-PU-2C-LV-AR 1.5 109 PU Potting get/2 parts TCR-N-PU-2C-LV-AR 2.6 110 PU Potting get/2 parts TCR-V-PU-2C-MV-AR 3.5 111 III HALA CLIPS Hala Clip for T0-220 T0-220-1 113 Hala Clip for T0-247 T0-247-1	96 97 99 100 101 102 103 104	 7 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive 8 ADHESIVES Silicone adhesive / thermally conductive /1K 	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-U-SI-1C TAD-U-SI-1C TAD-N-PU-2C		2.0 2.4 1.4 2.1 2.3 3,3 2,0
107 Stucone potting gel/2 parts ICR-H-SI-2C 1.2 108 PU Potting gel/2 parts TCR-J-PU-2C-LV-AR 1.5 109 PU Potting gel/2 parts TCR-N-PU-2C-LV-AR 2.6 110 PU Potting gel/2 parts TCR-V-PU-2C-MV-AR 3.5 111 Image: Hala Clip for T0-220 T0-220-1 113 113 Hala Clip for T0-247 T0-247-1 114	96 97 97 100 101 102 103 104 105 107	 2 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive 8 ADHESIVES Silicone adhesive / thermally conductive / 1K Polyurethane adhesive / thermally conductive / 2K 9 POTTING GEL Output: Description: Output: Description: Description:<td>TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-P-SI-1C TAD-U-SI-1C TAD-N-PU-2C</td><td></td><td>2.0 2.4 1.4 2.1 2.3 3,3 2,0</td>	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-P-SI-1C TAD-U-SI-1C TAD-N-PU-2C		2.0 2.4 1.4 2.1 2.3 3,3 2,0
108 PU Potting gel / 2 parts TCR-J-PU-2C-LV-AR 1.5 109 PU Potting gel / 2 parts TCR-N-PU-2C-LV-AR 2.6 110 PU Potting gel / 2 parts TCR-V-PU-2C-MV-AR 3.5 111 10 HALA CLIPS 112 112 Hala Clip for T0-220 T0-220-1 113 Hala Clip for T0-247 T0-247-1	96 97 99 100 101 102 103 104 105 106	 2 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive 8 ADHESIVES Silicone adhesive / thermally conductive / 1K POUTING GEL Silicone potting gel / 2 parts Silicone adhesive / 10 	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-U-SI-1C TAD-U-SI-1C TAD-N-PU-2C TCR-D-SI-2C		2.0 2.4 1.4 2.1 2.3 3,3 2,0 0.7
109 PU Potting gel / 2 parts TCR-N-PU-2C-LV-AR 2.6 110 PU Potting gel / 2 parts TCR-V-PU-2C-MV-AR 3.5 111 III HALA CLIPS 112 Hala Clip for T0-220 T0-220-1 113 Hala Clip for T0-247 T0-247-1 114 LEGAL INFORMATION	96 97 99 100 101 102 103 104 105 106 107	 2 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive 8 ADHESIVES Silicone adhesive / thermally conductive / 1K Polyurethane adhesive / thermally conductive / 2K 9 POTTING GEL Silicone potting gel / 2 parts Silicone potting gel / 2 parts	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-U-SI-1C TAD-U-SI-1C TAD-N-PU-2C TCR-D-SI-2C TCR-H-SI-2C		2.0 2.4 1.4 2.1 2.3 3,3 2,0 0.7 1.2
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111 111 HALA CLIPS 112 Hala Clip for TO-220 TO-220-1 113 Hala Clip for TO-247 TO-247-1 114 LEGAL INFORMATION	96 97 99 100 101 102 103 104 105 106 107 108 109	 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive ADHESIVES Silicone adhesive / thermally conductive /1K Polyurethane adhesive / thermally conductive /2K POTTING GEL Silicone potting gel / 2 parts PU Potting gel / 2 parts PU Potting gel / 2 parts 	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-U-SI-1C TAD-N-PU-2C TCR-D-SI-2C TCR-H-SI-2C TCR-H-SI-2C TCR-J-PU-2C-LV-AR		2.0 2.4 1.4 2.1 2.3 3,3 2,0 0.7 1.2 1.5 2.6
112 Hala Clip for TO-220 TO-220-1 113 Hala Clip for TO-247 TO-247-1 114 LEGAL INFORMATION	96 97 99 100 101 102 103 104 105 106 107 108 109 110	 2 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive 3 ADHESIVES Silicone adhesive / thermally conductive / 1K Silicone adhesive / thermally conductive / 1K Silicone adhesive / thermally conductive / 1K RTV Silicone adhesive / thermally conductive / 1K Polyurethane adhesive / thermally conductive / 2K 9 POTTING GEL Silicone potting gel / 2 parts Silicone potting gel / 2 parts PU Potting gel / 2 parts PU Potting gel / 2 parts PU Potting gel / 2 parts PU Potting gel / 2 parts PU Potting gel / 2 parts 	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-U-SI-1C TAD-N-PU-2C TCR-D-SI-2C TCR-H-SI-2C TCR-H-SI-2C TCR-J-PU-2C-LV-AR TCR-N-PU-2C-LV-AR		2.0 2.4 1.4 2.1 2.3 3,3 2,0 0.7 1.2 1.5 2.6 3.5
113 Hala Clip for T0-247 T0-247-1 114 LEGAL INFORMATION	96 97 99 100 101 102 103 104 105 106 107 108 109 110	 2 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive B ADHESIVES Silicone adhesive / thermally conductive / 1K Silicone adhesive / thermally conductive / 1K Silicone adhesive / thermally conductive / 1K RTV Silicone adhesive / thermally conductive / 1K Polyurethane adhesive / thermally conductive / 2K 2 POTTING GEL Silicone potting gel / 2 parts Silicone potting gel / 2 parts PU Potting gel / 2 parts PU Potting gel / 2 parts PU Potting gel / 2 parts 	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-O-SI-1C TAD-P-SI-1C TAD-U-SI-1C TAD-U-SI-1C TAD-N-PU-2C TCR-D-SI-2C TCR-H-SI-2C TCR-H-SI-2C TCR-J-PU-2C-LV-AR TCR-N-PU-2C-LV-AR TCR-V-PU-2C-MV-AR		2.0 2.4 1.4 2.1 2.3 3,3 2,0 0.7 1.2 1.5 2.6 3.5
	96 97 99 100 101 102 103 104 105 106 107 108 109 110 111	 2 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive 8 ADHESIVES Silicone adhesive / thermally conductive / 1K Polyure adhesive / thermally conductive / 1K Polyure thane adhesive / thermally conductive / 2K 9 POTTING GEL Silicone potting gel / 2 parts Silicone potting gel / 2 parts PU Potting for TO-220 PU Potting for TO-220	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-U-SI-1C TAD-N-PU-2C TCR-D-SI-2C TCR-H-SI-2C TCR-J-PU-2C-LV-AR TCR-V-PU-2C-LV-AR TCR-V-PU-2C-LV-AR TCR-V-PU-2C-MV-AR T0-220-1		2.0 2.4 1.4 2.1 2.3 3,3 2,0 0.7 1.2 1.5 2.6 3.5
	96 97 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113	 2 THERMAL GREASE Silicone-free grease / highly thermally conductive Silicone-free grease / highly thermally conductive 3 ADHESIVES Silicone adhesive / thermally conductive / 1K Polyurethane adhesive / thermally conductive / 2K 9 POTTING GEL Silicone potting gel / 2 parts PU Potting gel / 2 parts 	TGR-J-NS TGR-M-NS TAD-G-SI-1C TAD-0-SI-1C TAD-P-SI-1C TAD-N-PU-SI-1C TAD-N-PU-2C TCR-D-SI-2C TCR-H-SI-2C TCR-N-PU-2C-LV-AR TCR-V-PU-2C-LV-AR TO-220-1 T0-247-1		2.0 2.4 1.4 2.1 2.3 3,3 2,0 0.7 1.2 1.5 2.6 3.5

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. 66



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. 66

/ 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 YOU BRING US YOUR JOBS AND IDEAS. ONE TEAM

WE EXECUTE THEM. FLEXIBLE. GLOBAL. AND AROUND THE CLOCK, IF NECESSARY. 66

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WE

QUA-

HALA IS IATF 16949:2016 CERTIFIED

ARE ⁹⁹FROM PROJECT CONCEPT TO SERIES PRODUCTION, **DEFINITION AND** CONTROL ARE ESSENTIAL.

> /WE REGULARLY AUDIT OUR PARTNERS

/WEIMPROVEOUROWN **PROCESSES CONTINUOUSLY** AND PROACTIVELY





A 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



Dr. Wilhelm Pohl Managing Director +49 89 665 477-84 wilhelm.pohl@hala-tec.de

CONSULT WITH US SO WE CAN WORK TOGETHER TO DEVELOP THE BEST SOLUTION FOR YOUR REQUIREMENTS 66



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TOTAL THERMAL MANAGEMENT

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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
- Flattnesses 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

Diameter	iameter Recommended Overall Length Range		Recommen- ded Flattened Thickness	
3	70–750	≥9	≥2.0	
4	70–750	≥12	≥2 (e.g. 2.4)	
5	70–750	≥15	≥2 (e.g. 3.0)	
6	70–750	≥18	≥2.5 (e.g. 3.6)	
6.35 (1/4")	70–750	≥19	≥2.5 (e.g. 3.5)	
8	70–750	≥24	≥3 (e.g. 4.0)	
9.52 (3/8")	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 (1/2")	70–750	≥38	≥3 (e.g. 6.3)	
15.875 (%")	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)	



Heat Pipe Thermal cycle



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.
- Working fluid flows back to the higher temperature end.

Qmax (W) Flattened Thickness	Pipe Diameter ø3mm	Pipe Diameter ø4mm	Pipe Diameter ø5mm	Pipe Diameter ø6mm	Pipe Diameter ø 8 mm
T = 2.0 mm	10 W	15 W	21 W	N/A	N/A
T = 2.5 mm	14 W	17 W	32 W	46 W	65 W
T = 3.0 mm	15 W	19 W	42 W	56 W	75 W
Rounded	16 W	20 W	46 W	60 W	85 W

Diameter: 3 / 4 / 5 / 6 / 6.35 [¹/₄"] / 8 / 9.52 [³/₈"] / 10 / 12 / 12.7 [¹/₂"] 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 ±0.10 to ±0.15 mm Width Tolerance

DIMENSION AND PERFORMANCE Range (mm)





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

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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 preassembly.

PROPERTIES

- Soft and compliable
- 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 \geq 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 appli-
- cations / Laptops / Medicine
- engineering/Industrial PCs

PROPERTY	UNIT	TGF-M0500-SI	TGF-M1000-SI	TGF-M2000-SI	TGF-M3000-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	50	50	50	50
UL Flammability	UL 94	V0	VO	V0	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes
THERMAL					
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.27 (0.38)	0.45 (0.71)	0.75(1.31)	0.96 (1.76)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.29 (0.42)	0.50 (0.80)	0.84 (1.50)	1.09 (2.07)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/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 x 10 ¹¹			
Dielectric Constant	@1kHz	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





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 preassembly.



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PROPERTIES

- Soft and compliable
- 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 appli-
- cations/ 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	VO	VO	V0	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes
THERMAL					
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.22 (0.39)	0.40 (0.73)	0.68 (1.31)	0.95 (1.86)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.24 (0.42)	0.44 (0.81)	0.77 (1.49)	1.09 (2.15)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/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			
ELECTRICALLY					
Dielectric Strength	kV / mm	10	10	10	10
Volume Resistivity	0hm - cm	1.0 x 10 ¹¹			
Dielectric Constant	@1kHz	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





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 heigths 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 compliable
- 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				
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	VO	VO	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes	Yes
THERMAL						
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/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-inch²/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-inch²/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





SILICONE GAP FILLER TGF-W-SI

soft, flexible

TGF-W-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 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 compliable
- Thermal conductivity: 4.5¹/ 6.0² W/mK
- Operates at low pressures
- Extraordinary chemical resistance and longterm stability
- Shock absorbing
- Two-side self-tacky

AVAILABILITY

- 🗆 Sheet 420 x 210 mm
- Tacky on both sides
- (TGF-WXXXX-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 appli-
- cations / Laptops / Medicine engineering / Industrial PCs
- PROPERTY UNIT **TGF-W0500-SI** TGF-W1000-SI TGF-W2000-SI TGF-W3000-SI MATERIAL Ceramic filled Ceramic filled Ceramic filled Ceramic filled silicone silicone silicone silicone Colour Grey Grey Grey Grey 1.0 Thickness 0.5 2.0 3.0 mm 65 65 65 Hardness Shore 00 65 UL Flammability (Equivalent) UL 94 VO VO VO VN **RoHS** Conformity 2015 / 863 / EU Yes Yes Yes Yes THERMAL °C-inch²/W (mm) Resistance¹ @ 60 PSI @ Thickness 0.16 (0.43) 0.29 (0.78) 0.54 (1.51) 0.81 (2.19) Resistance¹ @ 30 PSI @ Thickness °C-inch²/W (mm) 0.18 (0.45) 0.32 (0.84) 0.60 (1.69) 0.92 (2.48) Resistance¹ @ 10 PSI @ Thickness °C-inch²/W (mm) 0.38 (0.91) 0 21 (0 48) 0 71 (1 83) 1 11 (2 73) Thermal Conductivity¹ W/mK 4.5 4.5 4.5 4.5 Thermal Conductivity² W/mK 6.0 6.0 6.0 6.0 °C Operating Temperature Range - 40 to + 150 ELECTRICALLY Dielectric Strength kV/mm >10 >10 >10 >10 > 1.0 x 10¹² > 1.0 x 10¹² > 1.0 x 10¹² Volume Resistivity 0hm - cm > 1.0 x 10¹²

Test Methods: 'ASTM D 5470. 2 Intern method. 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





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.

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

AVAILABILITY

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				
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						
Resistance ¹ @ 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)
Resistance ¹ @ 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)
Resistance ¹ @ 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 Conductivity ¹	W/mK	1.2	1.2	1.2	1.2	1.2
Operating Temperature Range	°C	- 40 to + 150	-40 to + 150			
ELECTRIC						
Dielectric Strength	kV / mm	> 6.5	> 6.5	> 6.5	> 6.5	> 6.5
Volume Resistivity	0hm - cm	3.5 x 10 ¹²				
Dielectric Constant	ା 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)







PROPERTIES

- Ultra soft and compliable
- 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

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 preassembly.

PROPERTIES

- Extremely soft and compliable
- 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-HUSXXXX-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		Ceramic filled silicone				
Colour		Dark 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	30	30	30	30	30
UL Flammability	UL 94	V0	VO	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes	Yes
THERMAL						
Resistance ¹ @ 60 PSI @ thickness	°C-inch²/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-inch²/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-inch²/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				
ELECTRICALLY						
Dielectric Strength	kV / mm	> 10	> 10	> 10	> 10	> 10
Volume Resistivity	0hm - cm	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





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 preassembly.

PROPERTIES

- Extremely soft and compliable
- 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-JUSXXXX-SI)
- Tacky on one side
- (TGF-JUSXXXX-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 appli-
- cations / 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	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes
THERMAL					
Resistance ¹ @ 60 PSI @ thickness	°C-inch²/W (mm)	0.60 (0.35)	1.00 (0.65)	1.40 (1.10)	1.70 (1.60)
Resistance ¹ @ 30 PSI @ thickness	°C-inch²/W (mm)	0.70 (0.40)	1.20 (0.75)	1.80 (1.30)	2.10 (1.85)
Resistance ¹ @ 10 PSI @ thickness	°C-inch²/W (mm)	0.80 (0.45)	1.50 (0.85)	2.30 (1.58)	2.80 (2.25)
Thermal Conductivity ¹	W/mK	2.0	2.0	2.0	2.0
Operating Temperature Range	°C	- 60 to + 180			
ELECTRICALLY					
Dielectric Strength	kV / mm	10	10	10	10
Volume Resistivity	0hm - cm	1.0 x 10 ¹¹			
Dielectric Constant	@1kHz	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 heigths 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.



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-JXSXXXX-SI-A1)
- Die cut parts
- RDRAMs Smemory modules
 Flip Chips, DSPs, BGAs, PPGAs
 For use in Automotive applications

APPLICATION EXAMPLES

Thermal link of:

SMD packages

Through-hole vias

- / Laptops / Medicine engineering / Embedded boards
- Kiss cut parts on sheet
- PROPERTY UNIT TGF-JXS0500-TGF-JXS1000-TGF-JXS2000-TGF-JXS3000-TGF-JXS5000-SI-A1 SI-A1 SI-A1 SI-A1 SI-A1 MATERIAL Ceramic filled Ceramic filled Ceramic filled Ceramic filled Ceramic filled silicone silicone silicone silicone silicone Colour Light blue / Grey 5.0 ±0.50 Thickness 0.5 + 0.20 2.0 ±0.20 3.0 ±0.30 mm 1.0 + 0.20 20 20 20 20 20 Hardness Shore 00 No Paint Wetting Impairment Passed Passed Passed Passed Passed Substances (PWIS)¹ UL Flammability UL 94 V0 VO VO VO V0 **RoHS** Conformity 2015 / 863 / EU Yes Yes Yes Yes Yes THERMAL Resistance² @ 60 PSI @ Thickness °C-inch²/W (mm) 0.59 (0.41) 1.03 (0.75) 1.57 (1.25) 1.90 (1.46) 2.26 (1.81) 2.33 (1.87) Resistance² @ 30 PSI @ Thickness °C-inch²/W (mm) 0.64 (0.45) 1.16 (0.86) 1.85 (1.55) 2.98 (2.52) Resistance² @ 10 PSI @ Thickness °C-inch²/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 °C Operating Temperature Range - 40 to + 200 - 40 to+ 200 ELECTRICALLY >10 >10 **Dielectric Strength** kV / mm >10 >10 >10 1.0 x 10¹⁰ 1.0 x 10¹⁰ 1.0 x 10¹⁰ 1.0 x 10¹⁰ Volume Resistivity 0hm - cm 1.0 x 10¹⁰

Measurement technique according to: 'P-VW 3-10.7 57650 Temp. Test, '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 / 6.0 mm / 7.0 mm





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 strengh.



PROPERTIES

- Ultra soft and compliable
- 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-MXSXXXX-SI)
- Tacky on one side by fibreglass reinforced laminate (TGF-MXSXXXX-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 appli-
- cations / 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-MXSXXXX-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	V0	V0	V0	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes
THERMAL					
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.44 (0.25)	1.00 (0.45)	1.49 (0.86)	2.05 (1.50)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.53 (0.32)	1.15 (0.63)	1.79 (1.15)	2.50 (1.73)
Resistance ¹ @ 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	0hm - cm	1.7 x 10 ¹³	1.7 x 10 ¹³	1.7 x 10 ¹³	1.7 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 / 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.



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PROPERTIES

- Extraordinary soft and compliable Sheet 200 x 400 mm
- 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

- Two-side self-tacky (TGF-LSSXXXX-SI)
- With fibreglass mesh inlay
- (TGF-LSSXXXX-SI-GF)

Kiss cut parts on sheet

- With fibreglass reinforced film laminate (TGF-LSSXXXX-SI-LGF)
- With PI film laminate (TGF-LSSXXXX-SI-LPI)
- Die cut parts

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 mo-
- dules / 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				
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	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes	Yes
THERMAL						
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/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-inch²/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-inch²/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			
ELECTRICAL						
Dielectric Strength	kV/mm	> 7.0	>7.0	→ 7.0	→ 7.0	→ 7.0
Volume Resistivity	Ohm - cm	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





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 compliable
- 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-MUSXXXX-SI)
- Tacky on one side
- (TGF-MUSXXXX-SI-A1)
- Die cut parts
- Kiss cut parts on sheet

APPLICATION EXAMPLES

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

PROPERTY	UNIT	TGF-MUS1000-SI	TGF-MUS2000-SI	TGF-MUS3000-SI	
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	VO	VO	VO	
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	
THERMAL					
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.37 (0.52)	0.58 (0.85)	0.74 (1.06)	
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.42 (0.59)	0.70 (1.02)	0.89 (1.32)	
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/W (mm)	0.49 (0.70)	0.89 (1.29)	1.20 (1.70)	
Thermal Conductivity ¹	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	0hm - cm	1.0 x 10 ¹¹	1.0 x 10 ¹¹	1.0 x 10 ¹¹	
Dielectric Constant	la 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.



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PROPERTIES

- Extraordinary soft and compliable Sheet 200 x 400 mm
- 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

- Two-side self-tacky (TGF-RSSXXXX-SI)
- With fibreglass mesh inlay
- (TGF-RSSXXXX-SI-GF)

Kiss cut parts on sheet

- With fibreglass reinforced film laminate (TGF-RSSXXXX-SI-LGF)
- With PI film laminate (TGF-RSSXXXX-SI-LPI)
- Die cut parts

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 mo-
- dules / LED light / LCD and plasma TV

PROPERTY	UNIT	TGF-RSS0500-SI	TGF-RSS1000-SI	TGF-RSS2000-SI	TGF-RSS3000-SI	TGF-RSS4000-SI
MATERIAL		Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone
Colour		Light blue	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	4.0 ±0.40
Hardness	Shore 00	43	43	43	43	43
UL Flammability	UL 94	VO	VO	V0	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes	Yes
THERMAL						
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/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-inch²/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-inch²/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			
ELECTRICAL						
Dielectric Strength	kV / mm	→7.0	>7.0	>7.0	>7.0	→7.0
Volume Resistivity	0hm - cm	1.0 x 10 ¹³	1.0 x 10 ¹³			
Dielectric Constant	@1MHz	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





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 heigths 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 compliable
- 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-TSSXXXX-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

PSI

30

N/cm²

50

60

40

70

80

0,5 mm

1.0 mm

, 2,0 mm

3,0 mm

5,0 mm

50

60

40

30

20

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				
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	VO	VO	V0	V0	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes	Yes
THERMAL						
Resistance ¹ @ 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)
Resistance ¹ @ 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)
Resistance ¹ @ 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 Conductivity ¹	W/mK	3.2	3.2	3.2	3.2	3.2
Operating Temperature Range	°C	- 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 heigths 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.



PROPERTIES

- Ultra soft and compliable
- 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
- (1.0 3.0 mm)
- 🕘 Sheet 200 x 400 mm
- (1.0 3.0 mm)Tacky on one side by
- film laminate
- (TGF-USSXXXX-SI-A1)
- Die cut parts

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 engi-
- neering / Embedded boards
- Kiss cut parts on sheet

PROPERTY UNIT TGF-USS1000-SI-A1 TGF-USS2000-SI-A1 TGF-USS3000-SI-A1 MATERIAL Ceramic filled Ceramic filled Ceramic filled silicone silicone silicone Colour Dark grey / Grey Dark grey / Grey Dark grey / Grey 3.0 ±0.30 Thickness 2.0 ±0.20 1.0 + 0.20 - 0.10 mm 45 Hardness 45 45 Shore 00 No Paint Wetting Impairment Passed Passed Passed Substances (PWIS)¹ UL Flammability (Equivalent) UL 94 V0 VO VO **RoHS** Conformity 2015 / 863 / EU Yes Yes Yes THERMAL Resistance² @ 60 PSI @ Thickness °C-inch²/W (mm) 0.40 (0.87) 0.63 (1.55) 0.75 (1.84) Resistance² @ 30 PSI @ Thickness °C-inch²/W (mm) 0.45 (0.93) 0.70 (1.70) 0.94 (2.30) Resistance² @ 10 PSI @ Thickness °C-inch²/W (mm) 0.51 (0.99) 0.80 (1.85) 1.07 (2.68) Thermal Conductivity¹ W/mK 3.3 3.3 3.3 0° Operating Temperature Range - 40 to + 150 - 40 to + 150 - 40 to + 150 ELECTRICAL Breakdown Voltage >10 >10 kV / mm >10 Volume Resistivity 1.0 x 10¹⁰ 0hm - cm 1.0 x 10¹⁰ 1.0 x 10¹⁰

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

Thicknesses: 1.0 mm / 2.0 mm / 3.0 mm





SILICONE GAP FILLER TGF-VUS-SI

very soft, flexible / Low Volatile Siloxanes (LV)

TGF-VUS-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 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 is one-side tacky through a thermally conductive film layer.

PROPERTIES

- Extraordinary soft and compliable
- □ Low Volatile Siloxanes (LV) ≤ 70ppm
- Thermal conductivity: 5.0 W/mK
- Operates at very low pressure
- 🗆 Extraordinary chemical resistance and longterm stability 🛛 🗆 Kiss cut parts on sheet
- Shock absorbing
- Easy mounting through self tackiness
- One-side self-tacky

AVAILABILITY

- Sheet 400 x 200 mm
- Tacky on one side
- (TGF-VUSXXXX-SI-A1)
- Die cut parts

APPLICATION EXAMPLES

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

PROPERTY	UNIT	TGF-VUS1000-SI-A1	TGF-VUS2000-SI-A1	TGF-VUS3000-SI-A1
MATERIAL		Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone
Colour		Reddish Black	Reddish Black	Reddish Black
Thickness	mm	1.0 + 0,2	2.0 ±0.20	3.0 ±0.30
Density	g/cm³	3.1	3.1	3.1
Hardness	Shore 00	50	50	50
UL Flammability (Equivalent)	UL 94	VO	VO	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.40 (0.80)	0.39 (0.98)	0.45 (1.15)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.43 (0.86)	0.54 (1.40)	0.64 (1.82)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/W (mm)	0.52 (0.92)	0.65 (1.71)	0.85 (2.40)
Thermal Conductivity	W/mK	5.0	5.0	5.0
Operating Temperature Range	°C	- 40 to + 150	- 40 to + 150	- 40 to + 150
ELECTRICAL				
Dielectric Strength	kV / mm	>7	>7	>7
Volume Resistivity	0hm - cm	>1 x 10 ¹⁰	>1 x 10 ¹⁰	>1 x 10 ¹⁰
Dielectric Constant	@1kHz	8.3	8.3	8.3

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

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





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 compliable
- 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-WSSXXXX-SI)
- Tacky on one side
- (TGF-WSSXXXX-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

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- For use in Automotive applications / Laptops / Medicine engi-
- neering / 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	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes
THERMAL			
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.30 (0.75)	0.41 (1.32)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.32 (0.85)	0.49 (1.59)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/W (mm)	0.36 (0.93)	0.56 (1.80)
Thermal Conductivity ¹	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	0hm - cm	1.0 x 10 ¹³	1.0 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





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 compliable
- 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 300 mm
- Tacky on one side by fibreglass
- reinforced laminate
- (TGF-AXSXXXX-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		Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone
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/cm³	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 + 0.50 - 0.10	5.0 ±0.50
Hardness (Bulk elastomer) (With fibreglass laminate)	Shore 00 Shore 00	5 45	5 45	5 45	5 45	5 45
Shelf Life (unopened, dry storage conditions @ < 40° C)	Months	24	24	24	24	24
UL Flammability	UL 94	VO	VO	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes	Yes
THERMAL						
Resistance ¹ @ 35 PSI @ Thickness	°C-inch²/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-inch²/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-inch²/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
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 Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
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Thicknesses: 0.5 mm / 1.0 mm / 2.0 mm / 3.2 mm / 4.1 mm / 5.0 mm / 6.0 mm / 7.0 mm / 8.0 mm / 9.0 mm / 10.0 mm






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 compliable
- 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-DXSXXXX-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

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- For use in Automotive appli-
- cations / 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	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	VO	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes
THERMAL					
Resistance ¹ @ 35 PSI @ Thickness	°C-inch²/W (mm)	1.77 (0.94)	2.43 (1.40)	2.80 (1.65)	3.40 (2.10)
Resistance ¹ @ 15 PSI @ Thickness	°C-inch²/W (mm)	1.85 (0.95)	2.70 (1.60)	3.10 (1.95)	3.95 (2.55)
Resistance ¹ @ 7 PSI @ Thickness	°C-inch²/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





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 heigths 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.



- 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 rein forced laminate
- (TGF-EXSXXXX-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		Ceramic filled silicone				
Colour		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	VO	VO	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes	Yes
THERMAL						
Resistance ¹ @ 35 PSI @ Thickness	°C-inch²/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-inch²/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-inch²/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				
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







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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.

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PROPERTIES

- Plastic
- Soft and compliable
- 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-UPXXXX-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/cm³	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	VO	V0	V0	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes
THERMAL					
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.17 (0.41)	0.29 (0.82)	0.44 (1.31)	0.55 (1.66)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.18 (0.44)	0.36 (0.88)	0.52 (1.54)	0.68 (2.20)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/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	@1MHz	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 PAD TGF-VP-SI

soft, flexible

TGF-VP-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 tole-rances or different stack up heigths 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. For an easy and reliable preassembly the interface material can optionally be supplied with an adhesive coating on one side.



PROPERTIES

- Soft and compliable
- Thermal conductivity: 5.5 W/mK
- Operates at low pressure
- Extraordinary chemical resistance and longterm stability
- Shock absorbing
- Easy mounting through self tackiness

AVAILABILITY

- 🗆 Sheet 200 x 300 mm
- (TGF-VPXXXX-SI)
- 💷 One side adhesive
- (TGF-VPXXXX-SI-AD1)
- 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-VP1000-SI	TGF-VP2000-SI	TGF-VP3000-SI
MATERIAL		Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone
Colour		Grey	Grey	Grey
Specific Gravity	g/cm³	3.1	3.1	3.1
Thickness	mm	1.0 ±0.10	2.0 ±0.20	3.0 ±0.25
Hardness	Shore 00	60	60	60
Shelf Life (unopened, dry storage conditions @ < 40°C)	Months	12	12	12
UL Flammability (Equivalent) ¹	UL 94	V0	V0	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ² @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.26 (0.53)	0.34 (0.72)	0.37 (0.84)
Resistance ² @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.33 (0.73)	0.52 (1.26)	0.66 (1.75)
Resistance ² @ 10 PSI @ Thickness	°C-inch²/W (mm)	0.43 (0.90)	0.64 (1.60)	0.91 (2.50)
Thermal Conductivity ²	W/mK	5.5	5.5	5.5
Operating Temperature Range	°C	- 50 to +180	- 50 to + 180	- 50 to + 180
ELECTRICALLY				
Dielectric Strength	kV/mm	5	5	5
Volume Resistivity	Ohm - cm	≥1.0 x 10 ¹³	≥1.0 x 10 ¹³	≥1.0 x 10 ¹³
Dielectric Constant	@ 1 MHz	5.5	5.5	5.5

Measurement technique according to: 'Without adhesive coating, '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





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.



PROPERTIES

- Plastic
- Soft and compliable
- 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-WPXXXX-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/cm³	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	VO	V0	V0	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes
THERMAL					
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.09 (0.40)	0.10 (0.42)	0.11 (0.48)	0.11 (0.49)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.12 (0.45)	0.16 (0.75)	0.20 (1.00)	0.,25 (1.10)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/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.

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PROPERTIES

🗆 Plastic

- Soft and compliable
- 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-YPXXXX-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 appli-
- cations / Laptops / Medicine engineering / Industrial PCs
- PROPERTY UNIT TGF-YP1000-SI TGF-YP2000-SI MATERIAL Ceramic filled Ceramic filled silicone silicone Colour Grey Grey 2.0 ±0. Thickness 1 () ±0.10 mm 55 Hardness Shore 00 55 UL Flammability (Equivalent) VO VO UI 94 **RoHS** Conformity 2015 / 863 / EU Yes Yes THERMAL °C-inch²/W (mm) Resistance¹ @ 60 PSI @ Thickness 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 °C **Operating Temperature Range** - 40 to + 150 - 40 to + 150 ELECTRICALLY **Dielectric Strength** >10 kV/mm >10 > 1.0 x 10 Volume Resistivity 0hm - cm > 1.0 x 10¹² ...7 ...7 Dielectric Constant ld 1 MHz

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.

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PROPERTIES

- Plastic
- Soft and compliable
- 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-YSPXXXX-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

70

50

80

1,0 mm

1.5 mm

2,0 mm

60

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/cm³	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-inch²/W (mm)	0.07 (0.28)	0.07 (0.32)	0.08 (0.35)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.11 (0.51)	0.12 (0.55)	0.13 (0.58)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/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	@1MHz	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



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.

AVAILABILITY

🗆 Die cut parts

Sheet 150 x 150 mm

🗆 Sheet 140 x 140 mm

 Double-side self tacky (TEL-RXXXX-SI)

Kiss cut parts on sheet

(Thickness 0.5 – 1.5 mm)

(Thickness 2.0 – 3.0 mm)

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		Silicone with highly thermally conductive fillers	Silicone with highly thermally conductive fillers	Silicone with highly thermally conductive fillers
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	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ¹ @ 90 PSI Thickness	°C-inch²/W (mm)	0.15 (0.30)	0.27 (0.60)	0.47 (1.20)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.16 (0.41)	0.28 (0.81)	0.50 (1.61)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/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	0hm - 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) / Rth vs. N/cm² (PSI)



PROPERTIES

Low dielectric

longterm stability

Shock absorbing

□ High surface compliance and extremely soft

Thermal conductivity:15 W/mK (anisotropic)

Extraordinary chemical resistance and

Low volatile siloxane content (LV)

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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		Graphite filled silicone elastomere	Graphite filled silicone elastomere	Graphite filled silicone elastomere
Colour		Black	Black	Black
Thickness	mm	0.2 ±0.05	0.5 ±0.05	1.0 ±0.10
Hardness	Shore 00	75	75	75
No Paint Wetting Impairment Substances (PWIS) ¹		Passed	Passed	Passed
Flammability	UL 94	V0	V0	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ² @ 90 PSI @ Thickness	°C-inch²/W (mm)	0.020 (0.16)	0.060 (0.33)	0.09 (0.70)
Resistance ² @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.027 (0.18)	0.075 (0.48)	0.11 (0.91)
Resistance ² @ 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	0hm - 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)





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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.

PROPERTIES

- $\hfill \square$ 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-YSSXXXX-SI)
- Die cut parts
 Optional with adhesive
- stripes or dots (TEL-YSSXXXX-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		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	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ¹ @ 7.5 PSI @ Thickness	°C-inch²/W (mm)	0.083 (0.42)	0.124 (0.700)	0.180 (0.954)
Resistance ¹ @ 3.5 PSI @ Thickness	°C-inch²/W (mm)	0.089 (0.45)	0.129 (0.785)	0.205 (1.550)
Resistance ¹ @ 1.5 PSI @ Thickness	°C-inch²/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	0hm - 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





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

- $\hfill \square$ 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		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	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes
THERMAL			
Resistance ¹ @ 35 PSI @ Thickness	°C-inch²/W (mm)	0.007 (0.17)	0.018 (0.44)
Resistance ¹ @ 15 PSI @ Thickness	°C-inch²/W (mm)	0.017 (0.18)	0.027 (0.48)
Resistance ¹ @ 7 PSI @ Thickness	°C-inch²/W (mm)	0.030 (0.19)	0.042 (0.49)
Thermal Conductivity ¹	W/mK	20	20
Operating Temperature Range	°C	- 40 to + 150	- 40 to + 150
ELECTRICAL			
Volume Resistivity	0hm - cm	< 50,000	< 50,000

Test Methods: '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: 0.2 mm / 0.3 mm / 0.5 mm





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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

- 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
- 0 m m m m m m m
- 🗆 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		Yellow	White
Density ଢ 25 °C	g/cm³	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, ເd < 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	0hm - 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 Silicone Silicone Colour Blue White 2.75 2.75 Density @ 25 °C g/cm³ Mixing Ratio 1:1 1:1 Weight or Volume 55 Hardness Shore 00 55 Viscosity Pas 290 260 (Brookfield @ 10 rpm, 25 °C) Viscosity (mixed) (Brookfield @ 10 rpm, 25 °C) Pas 275 275 Pot Life @ 25 °C and 65 % RH > 120 > 120 min (Time for viscosity to double) Curing Time @ 25 °C / 100 °C < 15h / 15 - 30 min < 15h / 15 - 30 min Shelf Life (from Date of Manufacturing, Months 6 6 unopened, @ < 35 °C) 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 VO VO Flammability UL 94 **RoHS** Conformity 2015 / 863 / EU Yes Yes TECHNICAL Thermal Conductivity W/mK 3.0 3.0 °C **Operating Temperature** 50 to + 150 - 50 to + 150 > 10 > 10 **Dielectric Strength** kV/mm Volume Resistivity 0hm - cm 1 x 10¹⁰ 1 x 10

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 informati 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.



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		Silicone	Silicone
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
/olume Resistivity	0hm - cm	1 x 10 ¹⁰	1 x 10 ¹⁰



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

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 /

Shock absorbing

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 Manu- facturing, unopened, @ < 35 °C)	Months	6	6
No Paint Wetting Impairment Substances (PWIS)'		Passed	Passed
Flammability	UL 94	V0 (≥0.15 mm)	V0 (≥0.15 mm)
RoHS Conformity	2015 / 863 / EU	Yes	Yes
TECHNICAL			
Thermal Conductivity ²	W/mK	4.5	4.5
Operating Temperature	°C	- 40 to + 150	- 40 to + 150
Dielectric Strength	kV/mm	> 10	> 10
Volume Resistivity	0hm - cm	> 1 x 10 ¹⁰	> 1 x 10 ¹⁰

Measurement technique according to: 'P-VW 3-10.7 57650 Temp. Test, '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-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.



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	240	230
Viscosity (mixed) (Brookfield @ 10 rpm, 25 °C)	Pas	235	235
Pot Life @ 25 °C and 65 % RH (Time for viscosity to double)	Hours	≥ 2	≥ 2
Curing Time ଢ 25 °C	Hours	< 24 h	< 24 h
Shelf Life (from Date of Manu- facturing, unopened, @ < 35 °C)	Months	6	6
RoHS Conformity	2015 / 863 / EU	Yes	Yes
TECHNICAL			
Thermal Conductivity'	W/mK	6	6
Operating Temperature	°C	- 40 to + 150	- 40 to + 150
Dielectric Strength	kV/mm	≥ 10	≥ 10
Volume Resistivity	0hm - 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 viscuous 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.



PROPERTIESEN

- 🗆 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		Ceramic filled silicone compound
Colour		Grey
Density	g/cm³	3.1
Viscosity (@ 10 ¹/min, 25 °C)	Pas	500
Penetration	mm/10	290
RoHS Conformity	2015 / 863 / EU	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	0hm - cm	1.1 x 10 ¹⁴

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

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SILICONE GAP FILLER / PUTTY TGL-X-SI

dispensable

TGL-X-SI is an electrically insulating thermally conductive, highly viscuous 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 extremly 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.



PROPERTIESEN

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		Ceramic filled silicone compound
Colour		Orange
Density	g/cm³	3.4
Flow rate	g/s g/min	≥30 ¹ 3~4 ²
Penetration	mm	170
Shelf Life (from Date of Manu- facturing, unopened, dry storage conditions @ < 40° C)	Months	6
Flammability (Equivalent)	UL 94	VO
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	0hm - cm	1.0 x 10 ¹⁴

Measurement technique according to: 1 ISO 9048, 2 50 cc / 14#0 0.42 MPa, 3ASTM D 5470, 4ASTM 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 preassembly.



PROPERTIES

- Silicone-free acrylate
- No emission of volatile siloxanes
- Soft and compliable
- 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 / Lap-
- tops / 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				
Colour		White	White	White	White	White
Specific Gravity	g/cm³	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	VO	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes	Yes
THERMAL						
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/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-inch²/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-inch²/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				
ELECTRICAL						
Dielectric Strength	kV/mm	7.8	7.8	7.8	7.8	7.8
Volume Resistivity	0hm - cm	1 x 10 ¹³	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





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 compliable
- 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 / Lap-
- tops / Medicine engineering / Industrial PCs

PROPERTY	UNIT	TGF-V1000-NS	TGF-V2000-NS	TGF-V3000-NS	TGF-V4000-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
Colour		Light green	Light green	Light green	Light green
Specific Gravity	g/cm³	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	VO	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes
THERMAL					
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.42 (0.89)	0.73 (1.89)	0.93 (2.57)	1.25 (3.50)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.45 (0.93)	0.77 (1.93)	1.01 (2.72)	1.33 (3.70)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/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			
ELECTRICAL					
Dielectric Strength	kV/mm	1.2	1.2	1.2	1.2
Volume Resistivity	0hm - cm	1 x 10 ¹¹			
Dielectric Constant	la 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





SILICONE-FREE GAP FILLER PAD TGF-W-NS

siloxane-free, soft acrylate

PROPERTIES

Silicone-free acrylate

Soft and compliable

Shock absorbing

No emission of volatile siloxanes

Thermal conductivity: 6.0 W/mK

Easy mounting through self-tackiness

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.

AVAILABILITY

Die cut parts

Sheet 400 x 200 mm

(TGF-WXXXX-NS)

Kiss cut parts on sheet

Double-side tacky

APPLICATION EXAMPLES

- Thermal link of:
- SMD packages
- Through-hole vias
- RDRAMs memory modules
- Electronic parts to heat pipes
- For use in Automotive applications / Lap-
- tops / Medicine engineering / Industrial PCs

PROPERTY	UNIT	TGF-W0500-NS	TGF-W1000-NS	TGF-W2000-NS	TGF-W3000-NS	TGF-W4000-NS
MATERIAL		Ceramic filled silicone-free acrylic elastomer				
Colour		White	White	White	White	White
Specific Gravity	g/cm³	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	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes	Yes
THERMAL						
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/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-inch²/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-inch²/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				
ELECTRICAL						
Dielectric Strength	kV/mm	7.8	7.8	7.8	7.8	7.8
Volume Resistivity	Ohm - cm	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





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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.



PROPERTIES

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

AVAILABILITY

- Sheet 400 x 200 mm
- Double-side tacky
- (TGF-YXXXX-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 / Lap-
- tops / Medicine engineering / Industrial PCs

PROPERTY	UNIT	TGF-Y1000-NS	TGF-Y2000-NS	TGF-Y3000-NS
MATERIAL		Ceramic filled silicone-free acrylic elastomer	Ceramic filled silicone-free acrylic elastomer	Ceramic filled silicone-free acrylic elastomer
Colour		White	White	White
Specific Gravity	g/cm³	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	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.13 (0.55)	0.18 (0.75)	0.25 (1.13)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.17 (0.72)	0.28 (1.30)	0.37 (1.80)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/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	0hm - 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 compliable
- 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-GUSXXXX-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 appli-
- cations / Laptops / Medicine engineering / Industrial PCs
- PROPERTY UNIT TGF-GUS0500-NS TGF-GUS1000-NS TGF-GUS2000-NS MATERIAL Ceramic filled Ceramic filled . Ceramic filled silicone-free silicone-free silicone-free TPE elastome TPE elastome TPE elastomer Colour Black Black Black 2.0 ±0.20 Thickness mm 0.5 + 0.20 1.0 + 0.20 1.7 1.7, 1.7 Specific Gravity g/cm³ 25 25 Hardness Shore 00 25 UL Flammability (Equivalent) UL 94 VO VO VO RoHS Conformity 2015 / 863 / EU Yes Yes Yes THERMAL Resistance¹ @ 15 PSI @ Thickness °C-inch²/W (mm) 0.42 (0.32) 0.74 (0.63) 1.30 (1.11) Resistance¹ @ 7 PSI @ Thickness °C-inch²/W (mm) 0.54 (0.39) 0.98 (0.78) 1.70 (1.44) Resistance¹ @ 3 PSI @ Thickness °C-inch²/W (mm) 0.64 (0.45) 1.19 (0.90) 2.20 (1.72) 1.5 1.5 Thermal Conductivity W/mK 15 °C Operating Temperature Range - 40 to + 120 - 40 to + 120 - 40 to + 120 ELECTRICAL Dielectric Strength > 10 > 10 > 10 kV/mm Volume Resistivity 1.0 x 10¹⁰ 0hm - cm 1.0 x 10¹⁰ > 1.0 x 10¹⁰

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





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.



PROPERTIES

- Multilayer silicone-free acrylate: Soft-Ultrasoft-Film
- No emission of volatile siloxanes
- Extremely soft and compliable
- 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-IXSXXXX-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 appli-
- cations / 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-inch²/W (mm)	1.07 (0.70)	1.60 (1.25)	1.70 (1.52)
Resistance ¹ @ 7 PSI @ Thickness	°C-inch²/W (mm)	1.22 (0.74)	1.78 (1.40)	2.20 (1.85)
Resistance ¹ @ 3 PSI @ Thickness	°C-inch²/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	0hm - 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.



GAP FILLE

PROPERTIES

- Silicone-free acrylate
- No emission of volatile siloxanes
- Extremely soft and compliable
- 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-NSSXXXX-NS) ≥ 2.0 mm
- Tacky on one side by film laminate (TGF-NSSXXXX-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 appli-
- cations / Laptops / Medicine
- engineering / Industrial PCs

PROPERTY	UNIT	TGF-NSS1000-NS-F	TGF-NSS2000-NS	TGF-NSS3000-NS	TGF-NSS4000-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
Colour		Brown	Brown	Brown	Brown
Thickness	mm	1.0 ^{±0.10}	2.0 ±0.20	3.0 ±0.30	4.0 ^{±0.40}
Specific Gravity	g/cm³	2.33	2.33	2.33	2.33
Hardness	Shore 00	47	47	47	47
UL Flammability	UL 94	VO	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes
THERMAL					
Resistance ¹ @ 60 PSI @ Thickness	°C-inch²/W (mm)	0.60 (0.62)	0.92 (0.99)	1.19 (1.32)	1.41 (1.64)
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.67 (0.80)	1.05 (1.33)	1.51 (1.90)	1.81 (2.41)
Resistance ¹ @ 10 PSI @ Thickness	°C-inch²/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			
ELECTRICAL					
Dielectric Strength	kV / mm	2.1	1.9	1.9	1.9
Volume Resistivity	0hm - cm	1.0 x 10 ¹¹			
Dielectric Constant	ାର 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) PSI 20 30 40 60 10 50 70 80 4,0 • 1,0 mm 2.0 mm 3,0 mm 3,0 4.0 mm - - - - (-F) E 2,0 1,0 0,0 0 10 20 30 40 50 60 N/cm²



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

dispensable

TGL-U-NS is an electrically insulating thermally conductive, highly viscuous dispensable siliconefree 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: 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		Ceramic filled silicone-free compound
Colour		White
Density	g/cm³	2.9
Viscosity (@ 0,5 ¹/s) (@ 1,0 ¹/s)	Pas	3,400 2,500
Shelf Life (unopened, dry storage conditions @ 5–30°C)	Months	6
UL Flammability (Equivalent)	UL 94	VO
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	5.9 x 10 ¹¹
Dielectric Constant	@ 500 MHz / @ 1 GHz	8.98 / 8.88

Measurement technique according to: 1 ASTM 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

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
- Extraordinary chemical resistance and longterm stability
- Residue-free removal after use

- 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 / Automo-
- tive engine management systems / UPS units / Solar systems

PROPERTIES	UNIT	TF0-D230-SI	TFO-D300-SI	TFO-D450-SI
MATERIAL		Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone
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-inch²/W	0.55	0.75	1.25
Resistance² ര 30 PSI	°C-inch²/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	0hm - 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: '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: 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.



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
- (TFO-GXXX-SI) 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 applica-
- tions / PS units / Solar systems

PROPERTY	UNIT	TF0-G230-SI
MATERIAL		Ceramic filled silicone
Colour		Pink
Reinforcement		Fibreglass
Thickness	mm	0.23 ±0.023
Tensile Strength ¹	kpsi	2.9
UL Flammability	UL 94	VO
RoHS Conformity	2015 / 863 / EU	Yes
THERMAL		
Resistance ² @ 150 PSI	°C-inch²/W	0.49
Resistance ² @ 30 PSI	°C-inch²/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	0hm - cm	1.0 x 10 ¹¹

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: 0.23 mm

Rth vs. N/cm² (PSI)



FOILS & FILMS

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

UNIT	TFO-J200-SI	TFO-J300-SI	TFO-J450-SI
	Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone
	Dark Brown	Dark Brown	Dark Brown
	Fibreglass	Fibreglass	Fibreglass
mm	0.20 ±0.05	0.30 ±0.05	0.45 ^{±0.05}
kpsi	5.8	4.0	2.9
UL 94	VO	VO	VO
2015 / 863 / EU	Yes	Yes	Yes
°C-inch²/W	0.31	0.45	0.63
°C-inch²/W	0.61	0.74	0.96
W/mK	2.0	2.0	2.0
°C	-40 to + 180	-40 to +180	-40 to + 180
kV AC	5.0	7.0	10.0
0hm - cm	4.2 x 10 ¹⁴	3.5 x 10 ¹⁴	3.8 x 10 ¹⁴
@ 1 MHz	3.8	4.2	4.3
	UNIT mm kpsi UL 94 2015 / 863 / EU °C-inch ² /W °C-inch ² /W W/mK °C kV AC Ohm - cm @ 1 MHz	UNIT TF0-J200-SI Ceramic filled silicone Dark Brown Dark Brown Fibreglass mm 0.20 ±0.05 kpsi 5.8 UL 94 V0 2015 / 863 / EU Yes °C-inch²/W 0.31 °C-inch²/W 0.61 W/mK 2.0 °C -40 to + 180 kV AC 5.0 Ohm - cm 4.2 x 10 ¹⁴ @ 1 MHz 3.8	UNIT TFO-J200-SI TFO-J300-SI Ceramic filled silicone Ceramic filled silicone Dark Brown Dark Brown Dark Brown Dark Brown Fibreglass Fibreglass Fibreglass mm 0.20 **** 0.30 ***** VL 94 V0 V0 2015 / 863 / EU Yes Yes °C-inch?/W 0.31 0.45 °C-inch?/W 0.61 0.74 W/mK 2.0 -40 to + 180 °C -40 to + 180 -40 to + 180 kV AC 5.0 7.0 Ohm - cm 4.2 x 10 ¹⁴ 3.5 x 10 ¹⁴ [0 1 MHz 3.8 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: 0.20 mm / 0.30 mm / 0.45 mm / 0.80 mm



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 preassembly 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	TF0-K200-SI
MATERIAL		Ceramic filled silicone
Colour	••••••	Grey
Reinforcement		Fibreglass
Thickness	mm	0.23 ±0.05
Tensile Strength ¹	kpsi	2.9
UL Flammability	UL 94	VO
RoHS Conformity	2015 / 863 / EU	Yes
THERMAL		
Resistance ² @ 150 PSI	°C-inch²/W	0.24
Resistance ² @ 30 PSI	°C-inch²/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	0hm - cm	2.0 x 10 ¹⁴
Dielectric Constant	@1MHz	4.0

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.

Thickness: 0.23 mm

Rth vs. N/cm² (PSI)



FOILS & FILMS

SILICONE FOIL TFO-O-SI

fibreglass reinforced, highly dielectric

TFO-O-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 (TF0-0XXX-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 appli-
- cations / PS units / Solar systems

PROPERTY	UNIT	TF0-0200-SI	TF0-0300-SI	TF0-0450-SI
MATERIAL		Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone
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	VO	VO	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ² @ 150 PSI	°C-inch²/W	0.22	0.30	0.38
Resistance ² @ 30 PSI	°C-inch²/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	@1MHz	4.8	5.6	6.2

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: 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	TF0-Q300-SI	TF0-Q450-SI
MATERIAL		Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone
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	VO	VO	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ² @ 150 PSI	°C-inch²/W	0.20	0.23	0.28
Resistance ² @ 30 PSI	°C-inch²/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	0hm - cm	4.8 x 10 ¹⁴	6.4 x 10 ¹⁴	1.1 x 10 ¹⁵
Dielectric Constant	@1MHz	3.3	2.9	3.1

Test Methods: '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.

Thicknesses: 0.20 mm / 0.30 mm / 0.45 mm



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 me-chanic 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

UNIT	TFO-R250-SI	TFO-R380-SI
	Ceramic filled silicone	Ceramic filled silicone
	White	White
	Fibreglass	Fibreglass
mm	0.25 ±0,03	0.38 ±0,03
kpsi	> 2.18	> 2.18
Months	12	12
UL 94	V0	VO
2015 / 863 / EU	Yes	Yes
°C-inch²/W	0.16	0.26
°C-inch²/W	0.41	0.55
W/mK	3.5	3.5
°C	- 40 to + 150	- 40 to + 150
kV AC	3.0	4.0
0hm - cm	1 x 10 ¹⁴	1 x 10 ¹⁴
@1MHz	2.4	2.4
	UNIT mm kpsi Months UL 94 2015 / 863 / EU °C-inch²/W °C-inch²/W °C-inch²/W W/mK °C kV AC Ohm - cm @ 1 MHz	UNIT TFO-R250-SI Ceramic filled silicone Silicone White White Fibreglass 0.25 ±0.03 kpsi > 2.18 Months 12 UL 94 V0 2015 / 863 / EU Yes °C-inch²/W 0.16 °C-inch²/W 0.41 W/mK 3.5 °C - 40 to + 150 KV AC 3.0 Ohm - cm 1 x 10 ¹⁴ [6 1 MHz 2.4

Test Methods: '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.

Thicknesses: 0.25 mm / 0.38 mm



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		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 - 0.05
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-inch²/W	0.16	0.21	0.24	0.36
Resistance ² @ 30 PSI	°C-inch²/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			
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: '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: 0.20 mm / 0.30 mm / 0.45 mm / 0.80 mm

Rth vs. N/cm² (PSI)



FOILS & FILMS

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	TF0-X200-SI	TFO-X300-SI	TFO-X450-SI	TF0-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 + 0.20 - 0.05
Tensile Strength ¹	kpsi	1.3	1.2	0.7	0.6
UL Flammability	UL 94	VO	VO	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes	Yes
Thermal					
Resistance ² @ 150 PSI	°C-inch²/W	0.11	0.15	0.17	0.27
Resistance ² @ 30 PSI	°C-inch²/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	0hm - cm	1.7 x 10 ¹⁵	7.9 x 10 ¹⁵	9.2 x 10 ¹⁵	8.9 x 10 ¹⁵
Dielectric Constant	@1MHz	3.3	3.3	3.3	3.3

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: 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	TF0-ZS0450-SI
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'	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-inch²/W	0.10	0.13	0.17
Resistance ² @ 30 PSI	°C-inch²/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 Voltage³	kV AC	3.6	4.5	5.0

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.

Thicknesses: 0.20 mm / 0.30 mm / 0.45 mm



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FOILS & FILMS

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		Insulating film coated with ceramic filled silicone	Insulating film coated with ceramic filled silicone
Colour		Light brown	Light brown
Reinforcement		Polyimide film	Polyimide film
Thickness	mm	0.11 ±0.02	0.15 ±0.02
UL Flammability	UL 94	VO	V0
RoHS Conformity	2015/863/EU	Yes	Yes
THERMAL			
Resistance ¹ @ 150 PSI	°C-inch²/W	0.29	0.40
Resistance ¹ @ 30 PSI	°C-inch²/W	0.55	0.75
Operating Temperature Range	°C	- 40 to + 180	- 40 to + 180
ELECTRICAL			
Breakdown Voltage ²	kV AC	6	> 6

Measurement technique according to: 1 ASTM D 5470, 1 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





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		Ceramic filled silicone	Ceramic filled silicone
Colour		Grey	Grey
Thickness	mm	0.50	0.80
Tensile Strength'	kpsi	0.5	0.5
Tear Strength	kN/m	6.0	6.0
UL Flammability	UL 94	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes
THERMAL			
Resistance @ 30 PSI	°C-inch²/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	@1MHz	4.85	4.85

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

SIZES IN MM	А	В	С	D
TCP-C150-SI	16.0 ±0.8	11.5 ±0.5	5.9 ±0.3	0.5 + 0.15
TCP-C250-SI	21.5 ±0.8	11.5 ±0.5	5.9 ±0.3	0.5 + 0.15
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
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	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance (@ TO-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	0hm - cm	3.2 x 10 ¹⁴	3.2 x 10 ¹⁴	3.2 x 10 ¹⁴
Dielectric Constant	@1MHz	6.0	6.0	6.0

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

SIZES IN MM	Α	В	С	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 TO-3P)	28.5 ± 1.0	17.5 ±0.5	5.8 ±0.3	0.30 +0.15 /-0.00
TCP-J450-SI (für TO-220)	21.5 ± 1.0	11.4 ±0.5	5.8 ±0.3	0.45 +0.10 /-0.05
TCP-J450-SI (für TO-3P)	28.5 ± 1.0	17.5 ±0.5	5.9 ±0.3	0.45 +0.10 /-0.05
TCP-J800-SI (für TO-220)	21.8 ± 1.0	12.1 ±0.5	6.5 ±0.3	0.80 +0.15 /-0.00
TCP-J800-SI (for TO-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		Ceramic filled silicone	Ceramic filled silicone	Ceramic filled silicone
Colour		Brown	Brown	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	VO	VO
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance (@ TO-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	0hm - 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: 'ASTM E 1530. All data without warranty and subject to change. Please contact us for further data and information.

SIZES IN MM	Α	В	С	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 TO-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 TO-3P)	28.5 ±1.0	17.5 ±0.5	5.9 ±0.3	0.45 +0.10 /-0.05
TCP-L800-SI (für TO-220)	21.8 ±1.0	12.1 ±0.5	6.5 ±0.3	0.80 +0.15 /-0.00
TCP-L800-SI (for TO-3P)	28.8 ±1.0	18.2 ±0.5	6.6 ±0.3	0.80 +0.15 /-0.00



PHASE CHANGE MATERIAL

/ POLYIMIDE FILM COATED / ALUMINUM FILM COATED / FILM

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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 con-
- trol units / Power supplies / Trac-
- tion 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 film with phase change coating 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	VO	VO	VO
RoHS Conformity	2015/863/EU	Yes	Yes	Yes
THERMAL				
Resistance ¹ @ 150 PSI	°C-inch²/W	0.126	0.215	0.311
Resistance¹ ര 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	ାର 25°C	4.0	4.0	4.0

Measurement technique according to: 1 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 μm / 51 μm / 76 μm. Total Thicknessess: 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 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	UL 94	VO	VO	VO
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 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
- appliances, meroeceeronie

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				
Resistance ¹ @ 150 PSI	°C-inch²/W	0.0056	0.0061	0.0067
Resistance¹ ଉ 30 PSI	°C-inch²/W	0.0097	0.0103	0.0111
Resistance ¹ @ 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



PHASE CHANGE TPC-Y-PC

as stand alone or with substrate

PROPERTIES

Silicone-free

reworkability

Optimal thermal contact

messy thermal grease

□ Thermal conductivity: 5.0 W/mK

Ideal alternative and replacement of

Different optional substrates allow for

one-side residue-freeness and improved

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 unevenesses 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.



- 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-inch²/W	0.0056	0.0060	0.0066
Resistance¹ ଉ 30 PSI	°C-inch²/W	0.0095	0.0102	0.0110
Resistance ¹ @ 10 PSI	°C-inch²/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





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 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			
Resistance ¹ @ 150 PSI	°C-inch²/W	0.019	0.034
Resistance ¹ @ 30 PSI	°C-inch²/W	0.026	0.047
Resistance ¹ @ 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.

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 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 aluminum carrier effects high mechanical stability and easy handling.



PROPERTIES

Optimal thermal contact

messy thermal grease

Process reliable coating thickness

Ideal alternative and replacement of

Silicone-free

- **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 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			
Resistance ¹ @ 150 PSI	°C-inch²/W	0.009	0.011
Resistance ¹ @ 30 PSI	°C-inch²/W	0.013	0.019
Resistance ¹ @ 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 Thicknessess: 76 µm / 102 µm





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)
- IGBTs For use in Power inverters / Laptops / Automotive power supplies / Industrial PCs

APPLICATION EXAMPLES

Thermal link of:

Power modules

Semiconductors

CPUs to heat sinks

PROPERTY	UNIT	TF0-S130-CB	TFO-S250-CB	TF0-S500-CB
MATERIAL		Natural Graphite 98%	Natural Graphite 98%	Natural Graphite 98%
Colour	••••••	Grey	Grey	Grey
Thickness	mm	0.13 ±0.03	0.25 ±0.03	0.5 ±0.05
Hardness	Shore A	85	85	85
UL Flammability	UL 94	V0	VO	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ¹ @ 150 PSI	°C-inch²/W	0.06	0.10	0.16
Resistance ¹ @ 30 PSI	°C-inch²/W	0.09	0.16	0.23
Resistance ¹ @ 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	0hm - 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-Y-PG

highly anisotropic conductive

TFO-Y-PG consists of pure pyroltytic 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 VO

AVAILABILITY

Sheet 180 x 230 mm (TFO-YXXX-PG)

🔲 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	TF0-Y100-PG
MATERIAL		Pyrolytic Graphite	Pyrolytic Graphite
Colour	••••••	Grey	Grey
Thickness	mm	0.07 ±0.015	0.10 ±0.030
Density	g/cm³	1.21	0.85
UL Flammability	UL 94	VO	V0)
RoHS Conformity	2015 / 863 / EU	Yes	Yes
THERMAL			
Resistance ¹ @ 150 PSI	°C-inch²/W	0.04	0,045
Resistance ¹ @ 30 PSI	°C-inch²/W	0.07	0,078
Resistance ¹ @ 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: '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: 0.07 mm / 0.10 mm



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PYROLYTIC GRAPHITE FOIL TFO-ZS-PG

soft, anistotropic 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		Soft Pyrolytic Graphite	
Colour		Grey	
Thickness	mm	0.2 ±0.05	
Density	g/cm³	0.5	
Flammability	UL 94	VO	
RoHS Conformity	2015 / 863 / EU	Yes	
THERMAL			
Resistance ¹ @ 90 PSI @ Thickness	°C-inch²/W (mm)	0.015 (0.09)	
Resistance ¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.055 (0.18)	
Resistance ¹ @ 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		Thermally conductive acrylate PSA tape with polyester film
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	VO
RoHS Conformity	2015 / 863 / EU	Yes
THERMAL		
Thermal Conductivity	W/mK	0.7
Resistance ¹ @ 7 PSI	°C-inch²/W	0.73
Resistance ¹ @ 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: ' 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/cm²	> 200	> 200
RoHS Conformity	2015 / 863 / EU	Yes	Yes
UL Flammability	UL 94	VO	VO
THERMAL			
Thermal Conductivity	W/mK	1.0	1.0
Resistance ¹	°C-inch²/W	0.28	0.49
ELECTRICAL			
Breakdown Voltage² (@ Initial Thickness, 25 °C)	kV AC	2.0	5.0

Measurement technique according to: 'ASTM 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





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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		Ceramic filled thermal grease
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



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		Ceramic filled thermal grease
Colour		White
Density	g /cm³	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





8 ADHESIVES

ADDITIONAL CURING / CONDENSATIONAL CURING



0

100

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
- Self levelling
- 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
Physical state	•••••	Flowable
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/120°C/150°C/175°C) ¹	min	20-30/15-20/10-15/1-5
Shelf Life (from Date of Manufacturing, unopened, @ -5 - 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	0hm - cm	7.7 x 10 ¹⁵
Surface Resistivity	0hm - cm	1.3 x 10 ¹⁵
Dielectric Constant		6
· · · · · · · · · · · · · · · · · · ·		

Improved adhesion is achieved by post-curing a 120 – 150 °C for 1 – 2 hours. All data without warranty and subject to change. All data without warranty and subject to change. Please contact us for further data and information.

SILICONE ADHESIVE TAD-0-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-0-SI-1C
MATERIAL		Silicone
Colour	•••••	Grey
Physical state		Paste
Specific Gravity	g/cm³	2.18
Viscosity	Pas	140
Hardness	Shore A	56
Tensile Strength	MPa	2.20
Elongation at Break	%	105
Overlap Shear Strength (Al)	kg/cm²	7.68
Curing Time (3 mm @ 125°C / @ 100°C)1	min	10 / 16
Shelf Life (from Date of Manufacturing, unopened, @ -5 – 10°C)	Months	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

¹ Improved adhesion is achieved by post-curing a 120 – 150°C for 1 – 2 hours. All data without warranty and subject to change. 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 0.2 mm (TAD-P-SI-1C-GF)

APPLICATION EXAMPLES

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

PROPERTY	UNIT	TAD-P-SI-1C
MATERIAL		Silicone
Colour	••••••	Grey
Physical state	••••••	Paste
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/Skin Formation (@ 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
Storage Temperature	°C	5 – 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	0hm - cm	> 1 x 10 ¹⁴
Dielectric Constant	@1MHz	4.9

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 alcoxic 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.



- 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



- □ 156 ml cartridges
- Bulk packaging

beads

- options on request
- Optional with glass

APPLICATION EXAMPLES

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

PROPERTY	UNIT	TAD-U-SI-1C
MATERIAL		Silicone
Colour	••••••	Grey
Physical state	••••••	Paste
Specific Gravity	g/cm³	2.95
Extrusion Rate	g/min	104
Hardness	Shore A	84
Tensile Strength	psi	264
Elongation at Break	%	11
Tack Free Time/Skin Formation (@ 23 °C)	min	10
Curing Time (3 mm @ 23 °C, 50 % rel. H.)	h	48
Overlap Shear Strength (Al)	kg/cm²	13.1
Young Modulus	psi	3,330
Shelf Life (from Date of Manufacturing, unopened, ଢ < 5 °C)	Months	12
Max. Storage Temperature	°C	40
Flammability	UL 94	VO
RoHS Conformity	2015 / 863 / EU	Yes
Thermal		
Thermal Conductivity	W/mK	3.27
Operating Temperature Range	°C	- 65 to + 230
Electrical		
Volume Resistivity	0hm - cm	1.26 x 10 ¹⁴

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-inplace 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	320 / 280	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	Volume	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	VO	
RoHS Conformity	2015 / 863 / EU		Yes
THERMAL			
Thermal Conductivity ¹	W/mK	2.0	
Operating Temperature Range	°C	- 40 to + 85	
ELECTRICAL			
Dielectric Strength	kV/mm	•••••••••••••••••••••••••••••••••••••••	13.5
Volume Resistivity	0hm - cm		4.55 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.









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 transformators, 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	•••••
Physical state	•••	Liquid	Liquid	•••••
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	
Tear strength	ppi	45	45	
Coefficient of Thermal Expansion (cured elastomer after 7 minutes @ 150 °C) Volumetric Linear	1 x 10⁻ᡠ /K 1 x 10⁻ᡠ /K	650 217	650 217	
Pot Life @ 23 °C	min	ca.100	ca. 100	
Curing Time @ 150 °C	min	15	15	
Full Cure @ 23 °C	h	24	24	
Shelf Life (from Date of Manufacturing, unopened, @ < 30 °C)	Months	24	24	
Flammability	UL 94	VO	VO	
RoHS Conformity	2015 / 863 / EU	Yes	Yes	•••••
TECHNICAL				
Thermal Conductivity	W/mK	0.68	0.68	•••••
Operating Temperature	°C	- 55 to + 240	- 55 to + 240	••••••
Dielectric Strength	kV/mm	19,7	19,7	••••••
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	•••••
• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	•• ••••••••••••••••••••••••••••••••••••		

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 transformators, 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.



- 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

MATERIAL Silicone Silicone Colour Light grey Orange Physical state Liquid Liquid Density (B -23 °C) g/cm² 2.2 2.2 Mixing Ratio Weight or Volume 1.1 1.1 Hardness (7 days (B -23 °C and 50 % rel. H.) Shore A 40 40 Viscosity (Brookfield) Pas 2 1.9 Viscosity (Mixed) (Brookfield) Pas 1.95 1.95 Tear Strength (7 days (B -23 °C and 50 % rel. H.) % 30 30 Tear Strength (7 days (B -23 °C and 50 % rel. H.) % 30 30 Tear Strength (7 days (B -23 °C and 50 % rel. H.) % 30 30 Tear Strength (7 days (B -23 °C and 50 % rel. H.) % 30 30 Tear Strength (7 days (B -23 °C and 50 % rel. H.) % 30 30 Voung Modulus (7 days (B -23 °C and 50 % rel. H.) psi 722 722 Ovelficient of Thermal Expansion 1x 10+1/K 402 402 Ulser A 40 30 0.03 0.03 Pot Life min ca.50 ca.50 Curing Time (B 25 °C / 100 °C Months 12 12 Flammability 2015 / 863 / EU Yes	PROPERTY	UNIT	A PART	B PART
ColourLight greyOrangePhysical stateLiquidLiquidLiquidDensity G ~23°Cg/cm²2.22.2Mixing RatioWeight or Volume1:11:1Hardness [7 days G ~23°C and 50% reL H.]Shore A4040Viscosity [Mixed] [Brookfield]Pas21.9Viscosity [Mixed] [Brookfield]Pas1.751.95Tensile Strength [7 days G ~23°C and 50% reL H.]psi117117Elongation at Break [7 days G ~23°C and 50% reL, H.]%3030Tear Strength [7 days G ~23°C and 50% reL, H.]kN/m4.564.56Young Modulus [7 days G ~23°C and 50% reL, H.]psi722722Coefficient of Thermal Expansionysi3030(7 days G ~23°C and 50% reL, H.]psi72722Voung Modulus [7 days G ~23°C and 50% reL, H.]psi7272(7 days G ~23°C and 50% reL, H.]psi7272Voung Modulus [7 days G ~23°C and 50% reL, H.]psi7272(7 days G ~23°C and 50% reL, H.]psi12134Linear1 x 10°1/K402402402LinearI x 10°1/K402402402LinearI x 10°1/K134134Linear Shrinking [7 days G ~23°C and 50% reL, H.]%0.030.03Curing Time G 25°C / 100°CMonths1212FlamabilityUL 94V0 [5.6 mm]V0 [5.6 mm]ReHS Conformity2015 / 863 / EU	MATERIAL		Silicone	Silicone
Physical state Liquid Liquid Density @ -23 °C g/cm² 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 (Mixed) (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 Ters 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 134 134 134 Linear Snrikking (7 days @ -23 °C and 50 % rel. H.) % 0.03 0.03 Volumetric Inter Strength (7 days @ -23 °C and 50 % rel. H.) % 0.03 0.03 Linear Snrikking (7 days @ -23 °C and 50 % rel. H.) % 0.03 0.03 Volumetric Ine	Colour		Light grey	Orange
Density få - 23 °C g/cm' 2.2 2.,2 Mixing Ratio Weight or Volume 1:1 1:1 Hardness (7 days Ø - 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 Ø - 23 °C and 50 % rel. H.) % 30 30 Tear Strength (7 days Ø - 23 °C and 50 % rel. H.) KN/m 4.56 4.56 Young Modulus (7 days Ø - 23 °C and 50 % rel. H.) psi 722 722 Coefficient of Thermal Expansion (7 days Ø - 23 °C and 50 % rel. H.) psi 722 722 Coefficient of Thermal Expansion (7 days Ø - 23 °C and 50 % rel. H.) % 0.03 0.03 Pot Life min ca. 50 ca. 50 Curing Time Ø 25 °C / 100 °C 4 hrs. / 6 min 4 hrs. / 6 min Sheft Life (Irom Date of Manufacturing, unopened, dry, Ø < 30 °C)	Physical state		Liquid	Liquid
Mixing Ratio Weight or Volume 1 : 1 1 : 1 Hardness [7 days [0 -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 [0 -23 °C and 50 % rel. H.] psi 117 117 Elongation at Break [7 days [0 -23 °C and 50 % rel. H.] % 30 30 Tear Strength [7 days [0 -23 °C and 50 % rel. H.] KN/m 4.56 4.56 Young Modulus [7 days [0 -23 °C and 50 % rel. H.] psi 722 722 Coefficient of Thermal Expansion regrassion 4002 402 Inear 1 x 10°+/K 134 134 Linear Shrinking [7 days [0 -23 °C and 50 % rel. H.] % 0.03 0.03 Pot Life min ca.50 ca.50 Curing Time fig 25°C / 100 °C 4 hrs. / 6 min 4 hrs. / 6 min Shelf Life [from Date of Manufacturing, unopened, dry, [0 < 30°C]	Density	g/cm³	2.2	2.,2
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 O Thermal Expansion r 722 722 (7 days @ -23 °C and 50 % rel. H.) psi 72 722 Volumetric 1 x 10 ⁺ /K 134 134 Linear 1 x 10 ⁺ /K 134 134 Linear Shrinking 17 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 (Irom Date of Manufacturing, unopened, dry, @ < 30 °C)	Mixing Ratio	Weight or Volume	1:1	1:1
Viscosity (Brookfield) Pas 2 1.9 Viscosity (Mixed) (Brookfield) Pas 1.95 1.95 Tensile Strength (7 days (G -23 °C and 50 % rel. H.) psi 117 117 Elongation at Break (7 days (G -23 °C and 50 % rel. H.) % 30 30 Tear Strength (7 days (G -23 °C and 50 % rel. H.) % 30 30 Tear Strength (7 days (G -23 °C and 50 % rel. H.) % 4.56 4.56 Young Modulus (7 days (G -23 °C and 50 % rel. H.) % 30 30 Coefficient of Thermal Expansion (7 days G -23 °C and 50 % rel. H.) psi 722 722 Volumetric Linear 1 x 10-4/K 402 402 402 Linear Shrinking (7 days (G -23 °C and 50 % rel. H.) % 0.03 0.03 Pot Life min ca. 50 ca. 50 ca. 50 Curing Time (G 25 °C / 100 °C Months 12 12 Flammability UL 94 V0 [5.6 mm] V0 [5.6 mm] RoHS Conformity 2015 / 863 / EU Yes Yes TECHNICAL T 1.2 1.2 1.2 Operating Temperature	Hardness (7 days @ ~23 °C and 50 % rel. H.)	Shore A	40	40
Viscosity (Mixed) (Brookfield) Pas 1.95 1.95 Tensile Strength (7 days (a -23 °C and 50 % rel. H.) psi 117 117 Elongation at Break (7 days (a -23 °C and 50 % rel. H.) % 30 30 Tear Strength (7 days (a -23 °C and 50 % rel. H.) kN/m 4.56 4.56 Young Modulus (7 days (a -23 °C and 50 % rel. H.) psi 722 722 Coefficient of Thermal Expansion (7 days (a -23 °C and 50 % rel. H.) psi 722 402 Volumetric Linear 1 x 10 ⁻⁴ /K 402 402 Linear Strinking (7 days (a -23 °C and 50 % rel. H.) % 0.03 0.03 Volumetric Linear Shrinking (7 days (a -23 °C and 50 % rel. H.) % 0.03 0.03 Volumetric Linear Shrinking (7 days (a -23 °C and 50 % rel. H.) % 0.03 0.03 Volumetric Linear Shrinking (7 days (a -23 °C and 50 % rel. H.) % 0.03 0.03 Volumetric Linear Shrinking (7 days (a -23 °C and 50 % rel. H.) % 0.03 0.03 Volume B 25 °C / 100 °C Minths 12 12 Fearmability UL 94 V0 (5.6 mm] V0 (5.6 mm] RoHS Conformity Zu	Viscosity (Brookfield)	Pas	2	1.9
Tensile Strength (7 days (a -23 °C and 50 % rel. H.) psi 117 117 Elongation at Break (7 days (a -23 °C and 50 % rel. H.) % 30 30 Tear Strength (7 days (a -23 °C and 50 % rel. H.) kN/m 4.56 4.56 Young Modulus (7 days (a -23 °C and 50 % rel. H.) psi 722 722 Coefficient of Thermal Expansion (7 days (a -23 °C and 50 % rel. H.) psi 722 402 Linear 1 x 10*/K 402 402 402 Linear 1 x 10*/K 402 402 402 Linear Shrinking (7 days (a -23 °C and 50 % rel. H.) % 0.03 0.03 Pot Life nin ca. 50 ca. 50 Curing Time (a 25°C / 100°C Months 12 12 Flammability UL 94 V0 [5.6 mm] V0 [5.6 mm] RoHS Conformity 2015 / 863 / EU Yes Yes TECHNICAL ** 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 <	Viscosity (Mixed) (Brookfield)	Pas	1.95	1.95
Elongation at Break (7 days (a -23 °C and 50 % rel. H.) % 30 30 Tear Strength (7 days (a -23 °C and 50 % rel. H.) kN/m 4.56 4.56 Young Modulus (7 days (a -23 °C and 50 % rel. H.) psi 722 722 Coefficient of Thermal Expansion (7 days (a -23 °C and 50 % rel. H.) psi 722 402 Volumetric 1 x 10 ⁻⁴ /K 402 402 Linear 1 x 10 ⁻⁴ /K 134 134 Linear Shrinking (7 days (a -23 °C and 50 % rel. H.) % 0.03 0.03 Pot Life min ca.50 ca.50 Curing Time (a 25 °C / 100 °C Months 12 12 Flammability UL 94 V0 (5.6 mm) V0 (5.6 mm) RoHS Conformity 2015 / 863 / EU Yes Yes TECHNICAL ************************************	Tensile Strength (7 days @ ~23 °C and 50 % rel. H.)	psi	117	117
Tear Strength (7 days (a -23 °C and 50 % rel. H.) KN/m 4.56 4.56 Young Modulus (7 days (a -23 °C and 50 % rel. H.) psi 722 722 Coefficient of Thermal Expansion (7 days (a -23 °C and 50 % rel. H.) rel. H.) 402 402 Volumetric 1 x 10-4/K 402 402 Linear 1 x 10-4/K 134 134 Linear Shrinking (7 days (a -23 °C and 50 % rel. H.) % 0.03 0.03 Pot Life min ca. 50 ca. 50 Curing Time (a 25 °C / 100 °C Months 12 12 Flammability UL 94 V0 (5.6 mm) V0 (5.6 mm) RoHS Conformity 2015 / 863 / EU Yes Yes TECHNICAL T 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	Elongation at Break (7 days @ ~23 °C and 50 % rel. H.)	%	30	30
Young Modulus (7 days @ -23 °C and 50 % rel. H.) psi 722 722 Coefficient of Thermal Expansion 1 x 10-4/K 402 402 Inear 1 x 10-4/K 134 134 Linear 1 x 10-4/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, dry, @ < 30°C)	Tear Strength (7 days @ ~23 °C and 50 % rel. H.)	kN/m	4.56	4.56
Coefficient of Thermal Expansion [7 days @ ~23 °C and 50 % rel. H.] 1 x 10 °4 /K 402 402 Linear 1 x 10 °4 /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, dry, @ < 30 °C)	Young Modulus (7 days @ ~23 °C and 50 % rel. H.)	psi	722	722
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, dry, @ < 30 °C)	Coefficient of Thermal Expansion (7 days @ ~23 °C and 50 % rel. H.) Volumetric Linear	1 x 10⁻⁰/K 1 x 10⁻⁰/K	402 134	402 134
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, dry, @ < 30°C]	Linear Shrinking (7 days @ ~23 °C and 50 % rel. H.)	%	0.03	0.03
Curing Time @ 25°C / 100°C 4 hrs. / 6 min 4 hrs. / 6 min Shelf Life (from Date of Manufacturing, unopened, dry, @ < 30°C)	Pot Life	min	ca. 50	ca. 50
Shelf Life (from Date of Manufacturing, unopened, dry, @ < 30 °C)	Curing Time ଢ 25°C / 100°C		4 hrs. / 6 min	4 hrs. / 6 min
Flammability UL 94 V0 (5.6 mm) V0 (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 G 1 kHz 4.53 4.53	Shelf Life (from Date of Manufacturing, unopened, dry, @ < 30 °C)	Months	12	12
RoHS Conformity 2015 / 863 / EU Yes Yes TECHNICAL <	Flammability	UL 94	VO (5.6 mm)	VO (5.6 mm)
TECHNICAL W/mK 1.2 1.2 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 Gl 1 kHz 4.53 4.53	RoHS Conformity	2015 / 863 / EU	Yes	Yes
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 0hm - cm 1.8 x 10 ¹⁴ 1.8 x 10 ¹⁴ Dielectric Constant @1 kHz 4.53 4.53	TECHNICAL			
Operating Temperature °C - 70 bis + 250 - 70 bis + 250 Dielectric Strength kV/mm 14 14 Volume Resistivity 0hm - cm 1.8 x 10 ¹⁴ 1.8 x 10 ¹⁴ Dielectric Constant 61 kHz 4.53 4.53	Thermal Conductivity	W/mK	1.2	1.2
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	Operating Temperature	°C	- 70 bis + 250	- 70 bis + 250
Volume Resistivity Ohm - cm 1.8 x 10 ¹⁴ 1.8 x 10 ¹⁴ Dielectric Constant @ 1 kHz 4.53 4.53	Dielectric Strength	kV/mm	14	14
Dielectric Constant G 1 kHz 4.53 4.53	Volume Resistivity	0hm - cm	1.8 x 10 ¹⁴	1.8 x 10 ¹⁴
	Dielectric Constant	@1kHz	4.53	4.53

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 transformators, 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.

AVAILABILITY

Tinplate container



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

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	10	0:8
Viscosity (@ 22 °C, 10 rpm)	mPas	45,000 - 50,000	160 – 240
Viscosity (Mixed, @ 22 °C, 10 rpm)	mPas	5,8	800 – 6,500
Hardness	Shore D	40	- 50
Tensile Strength	psi	58	0
Elongation at Break	%	25	
Water absorption (30 days @ 23 °C)	%	0.2	2
Young Modulus	kpsi	9.4	
Coefficient of Thermal Expansion < Tg, TMA > Tg, TMA	1 x 10⁻⁴/K 1 x 10⁻⁴/K	72 14	.5 1.7
Curing Shrinkage	%	<1	
Pot Life (100 g @ 22 °C / adjustable)	min	25	- 35
Curing Time ଢ 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	5
Operating Temperature	°C	- 5	0 to + 160
Dielectric Strength	kV/mm	28	•••••••••••••••••••••••••••••••••••••••
Volume Resistivity (@ 23 °C, 50 % rel. H.)	Ohm - cm	1>	: 10 ¹⁵
Dielectric Constant (Er)	@ 50 Hz /1 kHz /1 MHz @ 23°C	5.6	5 / 4.5 / 3.9
Dielectric Loss Factor (tan δ)	@ 50 Hz @ 23°C	0.0)9
Comparative Tracking Index (CTI)	••••	60	0
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 transformators, 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.

AVAILABILITY

Tinplate container



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

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	15,0	15,000 – 35,000	
Hardness	Shore D	40 – 50		
Water absorption (30 days @ 23 °C)	%	0.4		
Coefficient of Thermal Expansion < Tg, TMA > Tg, TMA	1 x 10⁻⁴/K 1 x 10⁻⁴/K	91.4 129.1		
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	V0 (4.0 mm)		
RoHS Conformity	2015 / 863 / EU	Yes	Yes	
Class of Insulation		В		
TECHNICAL				
Thermal Conductivity	W/mK	2.6	2.6	
Operating Temperature	°C	- 40	- 40 to + 130	
Dielectric Strength	kV/mm	31	31	
Volume Resistivity (@ 23 °C, 50 % rel. H.)	0hm - cm	1 x ⁻	1 x 10 ¹⁵	
Dielectric Constant (Er)	@ 50 Hz/1 kHz/1 MHz @ 23°C	5.8	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 transformators, 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.

AVAILABILITY

Tinplate container



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

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 > Tg, TMA	1 x 10- ⁶ /K 1 x 10- ⁶ /K	131.5 157.4	
Curing Shrinkage	%	<1	
Pot Life (100 g @ 22 °C / adjustable)	min	10 – 30	
Curing Time ଢ 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		В	
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 (Er)	@ 50 Hz /1 kHz /1 MHz @ 23°C	5.5 / 4.5 / 3.9	
Dielectric Loss Factor (tan δ)	ର 50 Hz ର 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



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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 treament
- 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
- T0220 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



Force vs. Deflection





Dimensions



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 T0247 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 treament
- 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 T0247 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



Force vs. Deflection

-



Max. + 0.3 mm

Min. - 0.3 mm

Dimensions





LEGAL INFORMATION

CONTACT

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