

# □ NANOTIM TGS

## High Performance Thermal Grease Solutions

- **TGS series troubleshooting the electronic heat**

TGS series are the superior thermal interface material with NANO-dispersion technology to mix the silicon fluid and high performance NANO powder, which can help the thermal dissipating of electric components.

TGS thermal compound is a silicone-based thermal grease made from a silicone fluid with thermally conductive material and metal oxide fillers. The product offers high thermal conductivity, virtually no wide operating bleed or evaporation over temperature range.

TGS series has low viscosity and easy handling properties to comparable grease. So it easily coats the surface of the component. Especially it has superior wetting properties and so completely fills the microscopic surface of the component, resulting in very low thermal resistance. TGS series is an efficient thermal coupler, effective and positive heat sink sealers and heat transfer agent.

TGS series is very stable at elevated temperature. It does not dry out, settle or harden. So it is superior reliable properties at temperature range. TGS series also meet all environmental requirement including RoHS.



- **Application Fields**

- CPU (Notebooks, Desktops, Servers)
- Custom ASICS Chips
- GPUs (Graphics Chips)
- North & Southbridge Chipsets
- FBDIMM, UDIMM (Memory Module)
- Hi-power Module



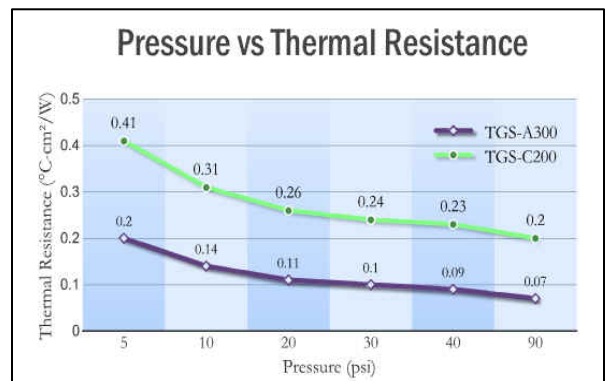
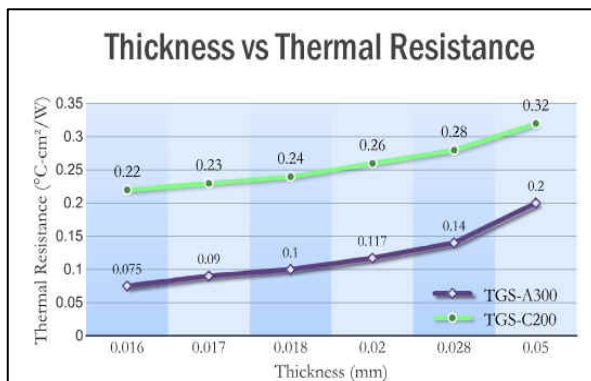
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### • General Specification

ITEM	Unit	Condition	Test method	TGS-A300	TGS-C200
Appearance	-	-	Visual	Gray	White
Specific gravity	-	25°C	ASTM D70	2.6	2.4
Viscosity	Pa • s	5rpm, 25°C	Brookfield	95.4	60.2
Thermal conductivity	W/mK	25°C	Laser flash	4.0	1.7
Thermal Resistance	°C-cm <sup>2</sup> /W	10 psi	Modified ASTM D5470	0.12	0.31
		20 psi		0.10	0.26
		50 psi		0.09	0.23
		90 psi		0.75	0.22
Operating temperature	°C	-	-	0 ~ 150	0 ~ 150
Volume resistivity	Ω • cm	-	ASTM D257	1X10 <sup>14</sup>	2.1X10 <sup>13</sup>
Breakdown voltage	kV/mm	-	ASTM D149	4.5	4.0
Oil separation	%	-	-	0.01	0.01
Evaporation rate	wt%	150°C, 24hr	-	0.02	0.02
Low molecular weight silicon content	ppm	ΣD <sup>3</sup> ~D <sup>10</sup>	-	>100	>100
RoHS	-	-	-	N/D	N/D

### • Thermal Performance Curve



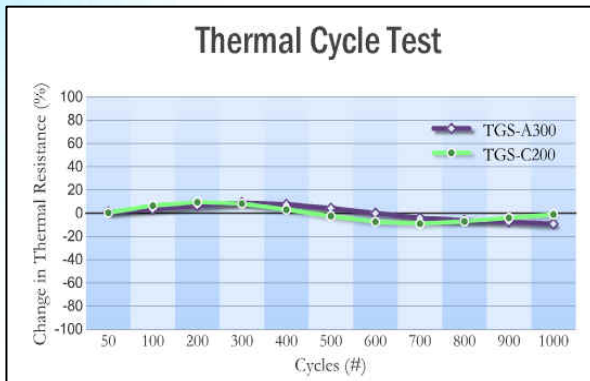
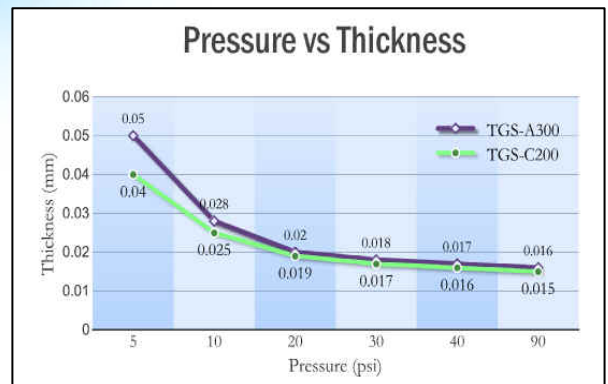
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## High Performance Thermal Grease Solutions

- **Reliability Certification**

- **Pressure vs Thickness**

- A key factor in selecting a thermal interface material is the relationship between bond line thickness and thermal resistance.
- The chart on the left shows the thickness of TGS series dependent on the pressure.
- The advantage of these chart allows for tighter control in the use and screen printing of the grease.

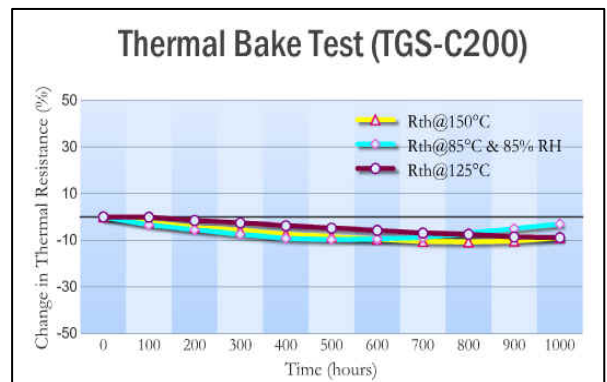
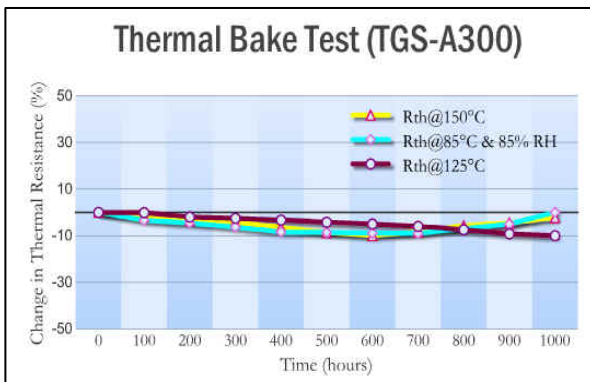


- **Thermal Cycle Test**

- These reliability graph shows TGS-A300 & TGS-C200 confirm not to degrade the thermal resistance after thermal cycling, High temperature baking, baking in a high humidity environment.
- During testing, samples of TGS were maintained between two round aluminum disks. Constant pressure was done through clamps.

- **Thermal Bake Test**

- Thermal cycle were tested 0 to 1000 cycles after the measurement of the thermal resistance.
- The graph on the upper illustrates the stability of the thermal resistance during the thermal cycling
- Thermal bake were tested 125°C, 150°C and HAST condition after the measurement of the thermal resistance.



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### • Application Note

- Organic phase change sheet
- Easy Handling/Re-workability
- Low viscosity
- Highly wetting interface Material
- Handling/Application Note

### 1. Description

TGS series are a thermal interface material to meet the need solving the heat from the electronic component. TGS series are a silicon based thermally conductive compound. This material is able to achieve less than thickness of 2 mils to minimize the thermal pathway and maximize heat-flow. TGS series is effectively mixed with thermal metal filler and metal oxide, resulting in highly packing factor. TGS series inhibits evaporation, separation and pump-out so to be thermally stable.

TGS series have a low viscosity and easily handling property like traditional screen printing Material. This product is able to use high speed dispensing or printing equipment area.

### 2. Dispense Information

Dispense settings will vary for the type of unit employed. A base line setup when using time/pressure type valve should employ a pressure set at 35psi at a head speed of 5 cm / second with a 16 gage taper tip.

A small backtrack may have to be employed to reduce tailing at the end of the dispense pattern.

### 3. Assembly Information

Depending on the size of the die, both an X and a kiss pattern have proven effective in covering the die. 20 to 40 psi of pressure is sufficient to achieve minimal bond line thickness of less than 1mm.

### 4. Cure Information

TGS series should be cured in a typical forced air convection oven with the material at temperature for the specified time. Typically a 125 °C temperature will produce the thermal compound consistency in 1 hour.

### 5. Handling and Storage

#### Handling :

- Avoid contact with eyes.
- Avoid prolonged temperature.
- Minimize exposure by inhalation.
- Avoid exposure to vapors at elevated temp.
- Wash thoroughly after handling, and before eating, drinking or smoking.
- Use with adequate ventilation.

#### Storage :

- Store in a cool dry location with adequate ventilation.
- Store in tightly closed-container.
- Keep away from open flame and heat sources.
- Prevent contact and storage with incompatible materials.