

High Conductivity *TPG** Thermal Leveler

For Semiconductor Wafer Processing and High Power Electronics

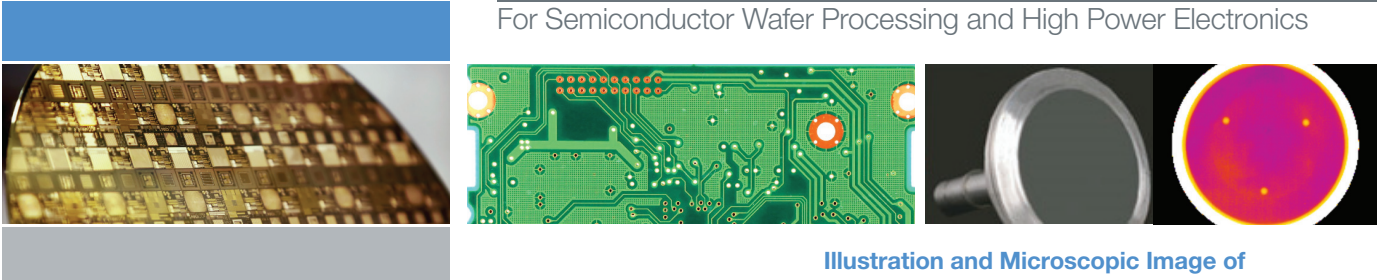
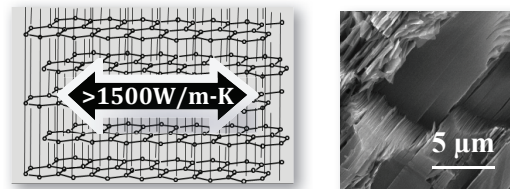
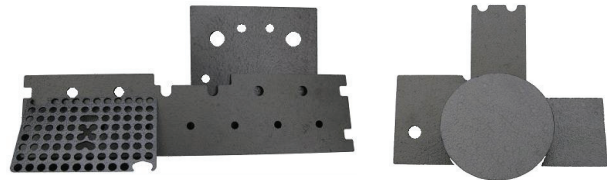


Illustration and Microscopic Image of Highly-Oriented Graphene Layers



Variety of Machined TPG Products



Description

Momentive Performance Materials Inc. offers a unique high crystalline graphite known as Thermal Pyrolytic Graphite (TPG), which exhibits 4x higher thermal conductivity than copper but with 1/4 of copper's weight. TPG is manufactured from thermal decomposition of hydrocarbon gas at an extremely high temperature. The high alignment of the graphene layers gives the product superior thermal conductivity which makes it an excellent thermal management material for:

- Thermal leveler
- Wafer susceptor
- Thermal strap
- Heat sink fin

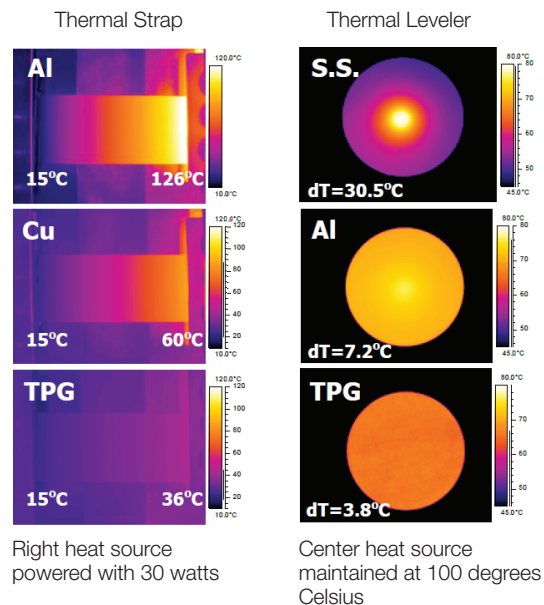
Key Features

- Highly oriented crystals in a layered structure
- In-plane conductivity (1,500~1,700 W/m-K)
- Fully dense ceramic (2.25 gm/cm³)
- Thickness 0.010" (0.25mm) ~ 0.600" (15mm)
- Typical size up to 4" (100mm) x 12" (300mm)
- Can be joined for larger geometries
- Resilient layered structure
- Easily machined, provided as plates or as final shapes
- Compatible with many encapsulating techniques

Potential Applications

- Semiconductor wafer processing
- Microelectronic packaging
- Finned heat sinks

Comparison of Thermal Performance



Typical Physical Properties (at 25 degrees Celsius)

Property	Thermal Conductivity (W/m-K)		Thermal Expansion (10 ⁻⁶ /°C)		Flexural Strength (MPa)		Stiffness (GPa)		Specific Heat (J/gm-°C)	Density (gm/cm ³)
	a-b axis	c axis	a-b axis	c axis	a-b axis	c axis	C ₁₁	C ₃₃		
Measurement	a-b axis	c axis	a-b axis	c axis	a-b axis	c axis	C ₁₁	C ₃₃		
Value	1500~1700	6~10	0	25	36.7	38.5	1050	36	0.70	2.25

Note: Typical properties are average data and are not to be used as or to develop specifications.

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Patent Status

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