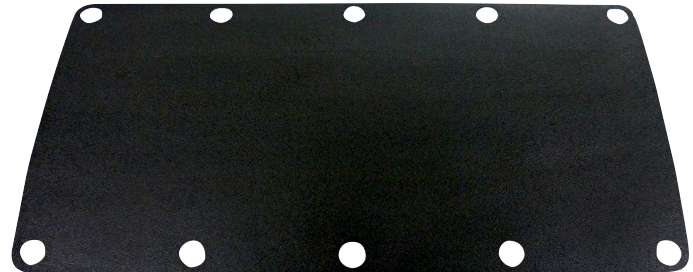


# New “Soft PGS” Compressible Type From Panasonic

*A New PGS Graphite Sheet Thermal Interface Material Solution Designed Specifically For Use With IGBT Modules!*



Panasonic’s new Thermal Management material, “Soft PGS”, is an ideal Thermal Interface Material (TIM) solution designed with high compressibility characteristics to reduce contact thermal resistance between rough surfaces in extremely thin spaces. Custom cut to IGBT Module footprints, Soft PGS contributes to long life and increased performance of power modules by providing high thermostability and reliability in thermally sensitive areas. Soft PGS is easy to install with a one-to-two-step process that requires much lower labor and installation costs than thermal grease.

Soft PGS is a Graphite Sheet that is dedicated for use as a Thermal Interface Material. Soft PGS has very high compressibility compared to standard PGS, which reduces thermal resistance by following gap, warpage and distortion of targets/substrates. Excellent heat resistance and reliability of Soft PGS allows longer service life and higher performance of various components, such as Semiconductors. Soft PGS is cost-saving, because it allows the reduction of existing Thermal Management processes. Unlike grease, Soft PGS eliminates the need for the printing process, since it is a sheet-type product.

\* Please contact Panasonic for custom-made Soft PGS products as well.

### Soft PGS Features:

- Low Thermal Resistance: 0.2°C•cm<sup>2</sup>/W (600 kPa)
- Compressibility: 40% (600 kPa)
- Operating Temperature Range: -55°C to 400°C
- High Thermostability Up To 400°C And High Reliability Against Intense Heat Cycles (-55°C~150°C)
- RoHS Compliant

### Soft PGS Benefits:

- Custom Cut Footprints For IGBT Modules From Major IGBT Manufacturers
- Available In Standard Sized Sheets
- Increased Heat Transfer Due To Better Fitting On Uneven Surfaces
- Simple and Low Cost Procedure For Installation
- Low Maintenance
- Increases The Lifetime and Reliability Of The IGBT Module

Table 1: Soft PGS Characteristics

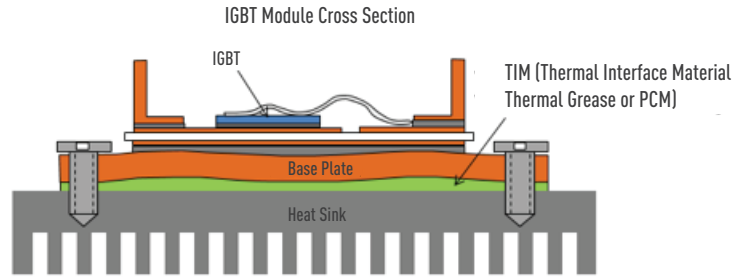
Typical Characteristics			
Items	Test Method	Condition	Data
Thickness (μm)		TIM Tester	200
Thermal Resistance (°C•cm <sup>2</sup> /W)	TIM Tester	600 kPa	0.2
Compressibility (%)	TIM Tester	600 kPa	40
Thermal Conductivity (W/m•K)	Laser PIT	X-Y	400 (300 to 600)
		Z	(30)
Operating Temperature Range (°C)			-55 to 400

## Figure 1: Soft PGS Replaces Traditional Thermal Management For IGBT Modules

An IGBT Module Is Typically Mounted To A Heat Sink To Maintain Relatively Low Operating Temperatures For Optimal Performance

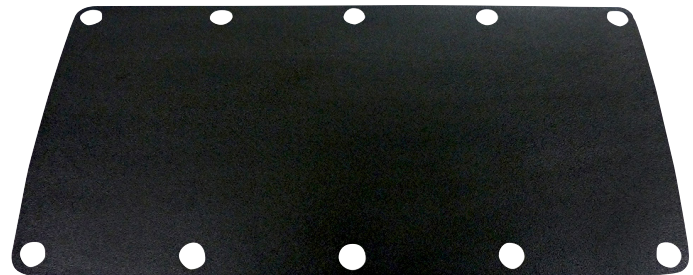
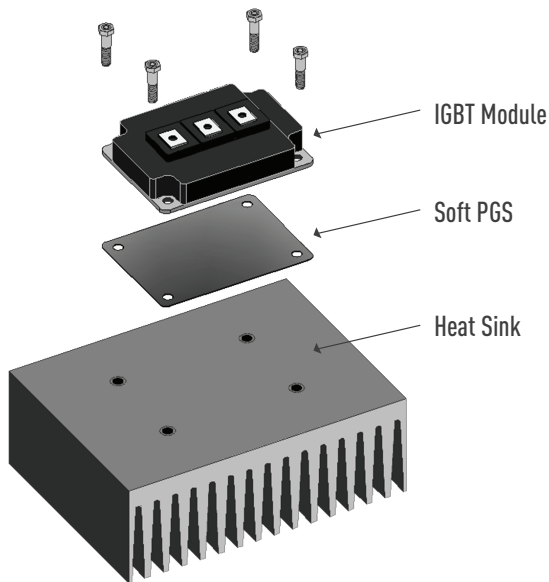


To Minimize The Thermal Resistance Between The Baseplate And The Heat Sink, Engineers Traditionally Apply A Thermal Interface Material (TIM).



## Figure 2: What Is "Soft PGS"?

Soft PGS Is A Thicker, Less Dense And More Soft Version Of Panasonic's Standard PGS Material That Replaces Traditional Thermal Interface Materials Such As Thermal Grease In IGBT Applications



Soft PGS for the IGBT Module

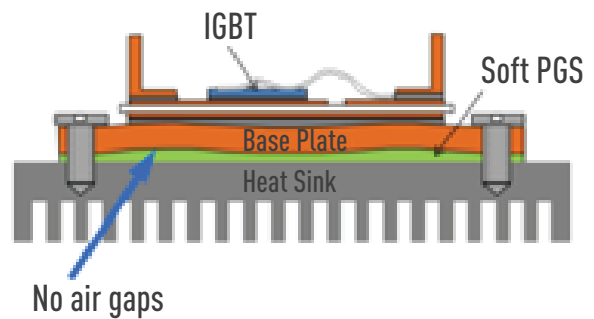


Figure 3: Soft PGS Structure - A High Sintering Process Creates The Large Layer Void In The Soft PGS That Makes Higher Compressibility Possible

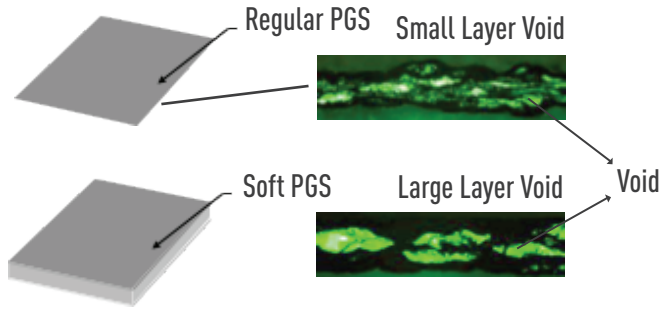


Figure 4: Comparison With Grease (Ref.)

Pump-Out Test Heat Cycle (-40 - 100°C)

Material	Initial	120 Times	Deterioration (Thermal Resistance)
Grease			Significantly Deteriorated
Soft-PGS			Slightly Deteriorated

Figure 5: Thermal Resistance Depending On Pressure

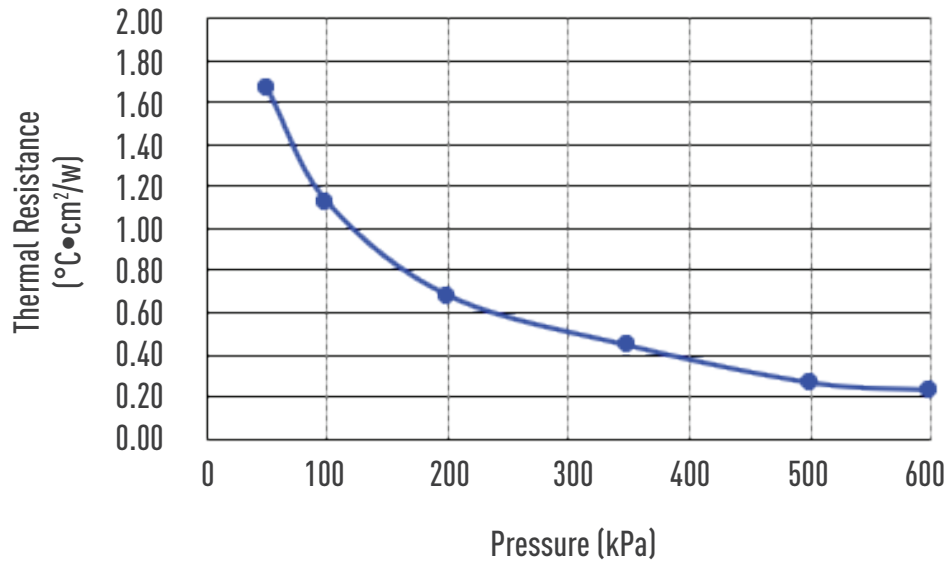


Figure 6: Compressibility Depending On Pressure

