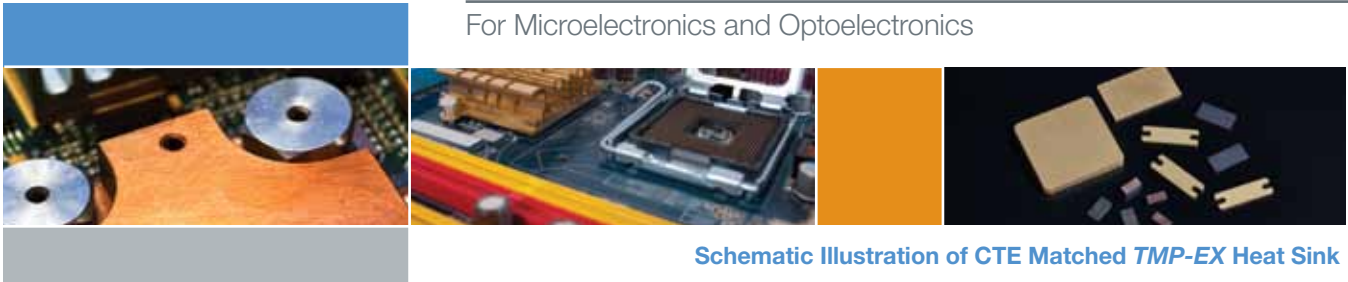


## CTE Matched *TMP-EX* Composite Heat Sink

For Microelectronics and Optoelectronics



Schematic Illustration of CTE Matched *TMP-EX* Heat Sink

### Description

Momentive Performance Materials Inc. offers a unique heat sink product that contains a TPG\* core (>1500 W/m-K) and a coefficient of thermal expansion (CTE) matched enclosure for superior thermal management performance. The *TMP-EX* composite heat sink provides:

- High thermal conductivity
- CTE matching to semiconductors
- Light weight

### Typical Physical Properties

- Parallelism: 0.0005" (0.01mm)
- Flatness: 0.001"/1" (1µm/1mm)
- Surface Finish: Ra 16 µin (0.4 µm)
- Plating: Ni 160-250 µin (4-6 µm) / Au 40-80 µin (1-2 µm)

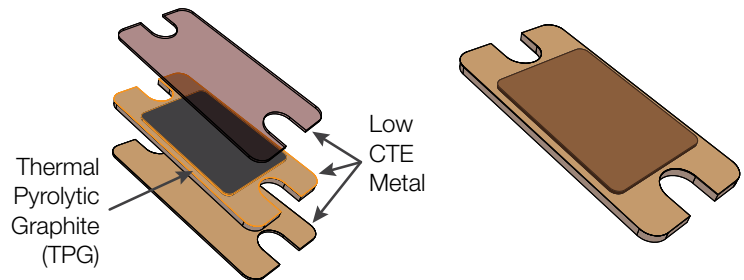
### Potential Applications

- Power electronic package
- RF & microwave package
- Laser diode
- High power LED

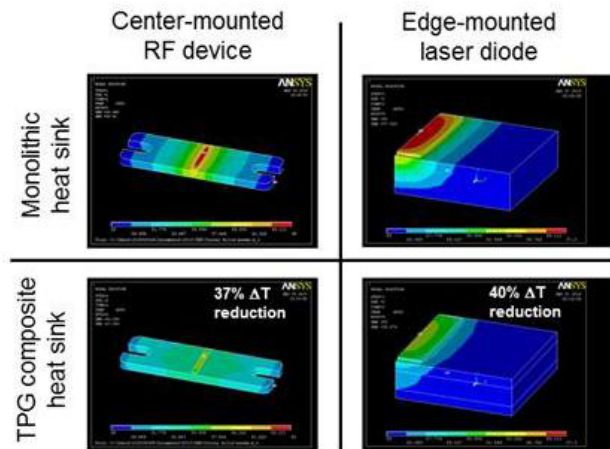
### Reliability

Packaging standards (MIL-STD-883H) qualified:

- Hermeticity
- Thermal cycling
- Shock & vibration resistances

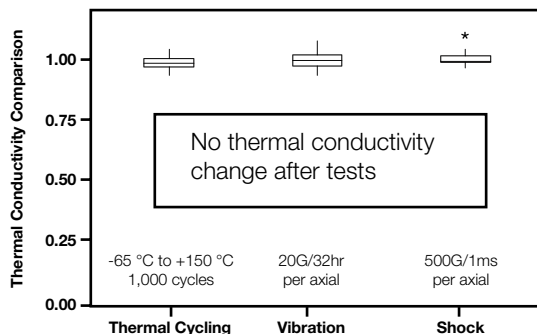


### Comparison of Simulated Thermal Performance



### Comparison of Measured Thermal Conductivity

Before and After Reliability Tests



Note: Test data. Actual results may vary.

### Typical Material Properties

Material	In-Plane TC (W/m·K)	Thru-Plane TC (W/m·K)	In-Plane CTE (ppm/°C)	Density (gm/cm <sup>3</sup> )
Aluminum	218	218	23	2.7
Copper	400	400	17	8.9
AlSiC12	180	180	11	2.9
<b>TMP-EX (AlSiC12)<sup>(1)</sup></b>	<b>1060</b>	<b>435</b>	<b>11</b>	<b>2.5</b>
W85Cu	190	190	7.0	15.6
<b>TMP-EX (W85Cu)<sup>(1)</sup></b>	<b>1063</b>	<b>455</b>	<b>7.0</b>	<b>6.7</b>
Mo70Cu	170	170	9.1	9.8
<b>TMP-EX (Mo70Cu)<sup>(1)</sup></b>	<b>1057</b>	<b>416</b>	<b>9.1</b>	<b>4.8</b>

(1) Estimation is based on 67% TPG loading.

Standard off-the-shelf parts are available upon request.

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

## Customer Service Centers

### North America

cs-na.ceramics@momentive.com

T +1 440 878 5700

F +1 440 878 5928

### Europe

cs-eur.ceramics@momentive.com

T +49 4152 9380

F +49 4152 938 136

### Pacific

cs-asia.ceramics@momentive.com

T +81 3 5114 3769

F +81 3 5114 3777

### Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

### Product Safety, Handling and Storage

Customers should review the latest Material Safety Data Sheet (MSDS) and label for product safety information, safe handling instructions, personal protective equipment if necessary, emergency service contact information, and any special storage conditions required for safety. Momentive Performance Materials (MPM) maintains an around-the-clock emergency service for its products. MSDS are available at [www.momentive.com](http://www.momentive.com) or, upon request, from any MPM representative. For product storage and handling procedures to maintain the product quality within our stated specifications, please review Certificates of Analysis, which are available in the Order Center. Use of other materials in conjunction with MPM products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

### Limitations

Customers must evaluate Momentive Performance Materials products and make their own determination as to fitness of use in their particular applications.

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22557 West Lunn Road  
Strongsville, OH 44149  
[momentive.com](http://momentive.com)