Bergquist introduces a new high thermal performance dielectric into its comprehensive Thermal Clad metal core PCB (MCPCB's) line. HPL is a dielectric specifically formulated for high power lighting LED applications with demanding thermal performance requirements. This thin dielectric at 0.0015" (38µm) has an ability to withstand high temperatures with a glass transition of 185°C and phenomenal thermal performance of 0.30°C/W.

Bergquist Thermal Clad Metal Core PCB’s minimize thermal impedance and conduct heat more effectively and efficiently than standard printed wiring boards (PWB’s). The low thermal impedance of Thermal Clad dielectrics outperforms other PCB materials and offers a cost effective solution eliminating additional LEDs for simplified designs and an overall less complicated production process. Use of Thermal Clad results in lower operating temperatures substantially extending LED lifetimes and offers better durability for high power lighting applications.
Applications

- High watt-density applications where achieving low thermal resistance is required
- Backlighting
- Headlamps
- LED applications

MET-4.5-01-40000 Test Thermal Performance of Insulated Metal Substrates (IMS) TO-220 Set-up

HPL Typical Values

<table>
<thead>
<tr>
<th>HPL-03015</th>
<th>VALUE</th>
<th>TEST METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THERMAL PROPERTIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product Thermal Conductivity</td>
<td>7.5 W/m-K</td>
<td>MET 5.4-01-40000</td>
</tr>
<tr>
<td>Dielectric Thermal Conductivity</td>
<td>3.0 W/m-K</td>
<td>ASTM D5470</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>0.02°C-in²/W (0.13°C-cm²/W)</td>
<td>ASTM D5470</td>
</tr>
<tr>
<td>Thermal Impedance</td>
<td>0.30°C/W</td>
<td>MET-5.0-01-40000</td>
</tr>
<tr>
<td>Glass Transition</td>
<td>185°C</td>
<td>ASTM E1356</td>
</tr>
<tr>
<td>Max Operating Temp.</td>
<td>140°C</td>
<td>U.L. 796</td>
</tr>
<tr>
<td>Max Soldering Temp.</td>
<td>325°C</td>
<td>U.L. 796</td>
</tr>
</tbody>
</table>

**ELECTRICAL PROPERTIES**

- Dielectric Constant: 6.6 (ASTM D150)
- Dissipation Factor: 0.0030.005 (@1KHz/1MHz) (ASTM D150)
- Capacitance: 925 pF/in² (140pF/cm²) (ASTM D150)
- Volume Resistivity: 1*10^9 Ω-m (ASTM D257)
- Surface Resistivity: 1*10^9 Ω-sq (ASTM D257)
- Breakdown Voltage: 5.0 kVAC (ASTM D149)

**MECHANICAL PROPERTIES**

- Color: Off-white (Visual)
- Dielectric Thickness: 0.0015" (38 µm) (Visual)
- Peel Strength@25C: 5 lb/in (0.9 N/mm) (ASTM D2861)
- CTE in XY/Z Axis <Tg: 35 µm/m°C (ASTM D3386)
- CTE in XY/Z Axis >Tg: 85 µm/m°C (ASTM D3386)
- Storage Modulus: 18/12 GPa (@25°C/150°C) (ASTM 4065)

**CHEMICAL PROPERTIES**

- Water Vapor Retention: 0.11% wt. (ASTM E595)
- Out-Gassing Total Mass Loss: 0.15% wt. (ASTM E595)
- Collect Volatile Condensable Material: < 0.01% wt. (ASTM E595)

**AGENCY RATINGS & DURABILITY**

- U.L. Maximum Operating Temperature: 140°C (U.L. 796)
- U.L. Flammability: V-0 (U.L. 94)
- Comparative Tracking Index (CTI): 0/600 (ASTM D3638/IEC60112)
- Solder Limit Rating: 325°C/60 seconds (U.L. 796)

Please test this material in your application. Bergquist provides this engineering data for design guidance only. Depending upon your application, the observed material performance may vary.