HPL Dielectric

Method

MET 5.4-01-

40000

ASTM D5470

ASTM D5470

MET 5.4-01-

40000

ASTM D150

ASTM D150

Value

7.5

3.0

0.13 (0.02)

0.17 (0.026)

0.20 (0.031)

0.25 (0.39)

0.30

0.40

0.47

0.58

6.6 0.003/0.005

TBD

TBD

TBD

140 (925)



Features & Benefits

- Thermal resistance 38μm, 0.13°C-cm²/W (0.02°C-in²/W)
 - (38µm thickness)
- Product Thermal conductivity of 7.5 W/m-K
 - o (2oz Cu x 38μm HPL x 1.6 Al)
- · High Voltage Strength
- High temperature applications
- Lead-free solder compatible
- Eutectic AuSn compatible
- · RoHS compliant and environmentally green
- Available on aluminum and copper base substrates
 - Other substrates materials may be available.

Thermal Clad Metal Core PCB's (MCPCB's) minimize thermal impedance and conducts heat more efficiently than standard printed wiring boards (PWB's). These substrates are more mechanically robust than Direct Bond Copper (DBC) construction.

The differentiating technology of Thermal Clad resides in the dielectric. This datasheet highlights the performance characteristics of Thermal Clad HT dielectric.

Applications

- High power density applications where achieving low thermal resistance is
- Automotive high voltage power modules
- Power conversion
- LED headlight & foglamps
- High power LED architectural lighting and UV LED
- Motor drives
- Solid state relays

Configurations

Base Metal

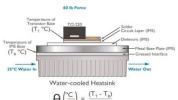
Thickness mm (mil)

- 5052 Aluminum 0.8 (32), 1.0 (40)*, 1.5 (59)*, 2.0 (80), 3.2 (125)
- 6061 Aluminum 0.8 (32), 1.0 (40)*, 1.5 (59)*, 2.0 (80), 3.2 (125), 4.8 (190)
- 4045 Aluminum 1.5 (59), 2.0 (80)
- Copper C1100 0.5 (20), 0.8 (32), 1.0 (40)*, 1.58 (62)*, 3.2 (125)

Copper Foil

Weight oz (thickness µm)

- ED Copper 1oz (35), 2oz (70), 3oz (105), 4oz (140), 6oz (210)
- RA 8oz (280), 10oz (350)
- Most common thicknesses.
- Other thicknesses and alloys may be available. Please contact TCLAD sales. department for more information.
- *** 38µm HPL is available directly from TCLAD Prescott and selected PCB shops.



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50µm (2mil) 71 (452) Capacitance ASTM D150 100µm (4mil) 90 (560) (pF/in²) 150µm (6mil) 33 (204) Volume Resistivity Ω -m 1014 ASTM D257 1013 ASTM D257 Surface Resistivity Ω/sq 5.0 38µm (1.5mil) 50µm (2mil) 7.7 Breakdown **KVAC** ASTM D149 Voltage 100µm (4mil) 12.2 150µm (6mil) 17.4 **Mechanical Properties** Color Off-white Visual Peel Strength @ 25°C ASTM D2861 N/mm ((lb/in) 0.9(5)°C 185 ASTM E1356 Glass Transition (Tg) µm/m°C **ASTM D3386** CTE in X,Y/Z Axis <Tg 35 CTE in X,Y/Z Axis >Tg µm/m°C 85 **ASTM D3386** 17/12 Storage Modulus **GPa ASTM D4065** Chemical Properties Water Vapor Retention % Wt. 0.11 ASTM E595 **ASTM** Out-Gassing Total Mass Loss % Wt. 0.15 E595 Collect Volatile Condensable % Wt. < 0.01 ASTM E595 **Agency Ratings & Durability** UL Maximum Operating °C 140 UI 746 Temperature (MOT) **UL Flammability** V-0 UL 94 **UL Comparative Tracking Index** (CTI) 0 / 600 D3638/ IEC 60112 °C Solder Limit Rating 325 UL 746 All statements, technical information and recommendations herein are based on tests we believe to be reliable, and THE FOLLOWING IS MADE IN LUEU OF ALL WARRANTIES OR IMPLIED, INCLUDING THE IMPLIED WARRENTIES OF MARKET ABILITY AND FITNESS FOR PURPOSE. Sellers' and Made in the USA at our Prescott Wisconsin factory manufacturers only obligation shall be to replace such quantity of the product proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and the user assumes all risk and liability whatsoever in connection therewith. NEITHER SELLER NOR MANUFACTURER SHALL BE LIABLE EITHER IN TOR OR OR OR TOR IN CONTRACT FOR ANY LOSS OR DAMAGE DIRECT, INCEDENTAL, OR CONSEQUENCIAL, INCLUDING LOSS OF PROPITS OR REVENUE ARISING OUT OF THE USE OR THE INABILITY TO USE THE PRODUCT. No statement, purchase order or recommendation by seller or purchaser not contained herein shall have any force or effect unless in an agreement signed by the officers of the seller and manufacturer. All marks used above are trademarks and/or registered trademarks of TCLAD Inc and its affiliates in the U.S., Germany and elsewhere. © 2021 TCLAD Inc. All rights reserved. US Rev 2023 D01-015

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Item

Thermal

Thermal

Impedance

Dissipation

Factor

Resistance

Thermal Properties

Product Thermal Conductivity

Dielectric Thermal Conductivity

Electrical Properties

Dielectric Constant

Thickness

38µm (1.5mil)

50µm (2mil)

100µm (4mil)

150µm (6mil)

38µm (1.5mil)

50µm (2mil)

100µm (4mil)

150µm (6mil)

38µm (1.5mil)

50µm (2mil)

100µm (4mil)

150µm (6mil)

38µm (1.5mil)

Unit

W/m-K

W/m-K

 $(^{\circ}C-in^2/W)$

°C/W

1KHz/1MHz

pF/cm²

* * *C-cm²/W