

TIMbber™ ULT-436

High Performance TIM

Preliminary Data Sheet

Description

Arieica’s ULT series of Liquid Metal Embedded Elastomer (LMEE) Thermal Interface Materials (TIM) are specifically designed to provide thermal design engineers the performance benefits of liquid metal, with the manufacturing ease of thermal grease materials. The ULT series achieve extremely low thermal resistance by forming a low bond line connection to the system’s heat exchange device. The softness, high strain at break, and high adhesion properties of ULT’s polymer matrix maintain structural integrity under temperature cycling. The result is optimized system thermal performance without the need of sophisticated manufacturing processes required to apply liquid metal or solid-TIMs. The ULT-436 targets large silicon die (>20mmx20mm) that require excellent thermal performance and extremely high elongation to maintain reliability.

Through Arieica’s patented LMEE technology, highly thermally conductive liquid metal is embedded in a protective polymer matrix. The result is an easy to dispense, extremely conformable, high reliability thermal connection that is protected from excessive oxidation and resistant to pump-out.

Key Features

- Extremely low thermal resistance
- High adhesion
- Low BLT
- Extreme elongation
- High reliability (HTS, HAST, shock and vibration, pump out)
- High operating temperature stability
- Single component, thermally curable
- Snap Cure compatible
- Solvent free
- Electrical isolation
- Auger Dispense Compatible

Nominal Properties¹

Thermal Conductivity ² (W/mK)	7.9
Thermal Resistance ³ (mm ² K/W) @ BLT < 30 μm	< 4.5
Complex Viscosity ⁴ (Pa.s) @ f=10 rad/sec, ε=5%	64
Strain at Break (%)	430
Outgassing, Mass Loss 1 hour @ 175 °C ⁵	0.03 wt%
Operating Temperature Range (°C)	-55 ⇔ 200
Working Time (hours)	> 8

¹ The ULT series are currently available in pre-production, and intended for evaluation and proof of concept (PoC) samples. All specifications are nominal and have not been statistically validated.

² Single point effective thermal conductivity calculated by dividing BLT by R_{th} at 30μm and 30psi pressure, measured using TIMA test apparatus <https://nanotest.eu/tima>

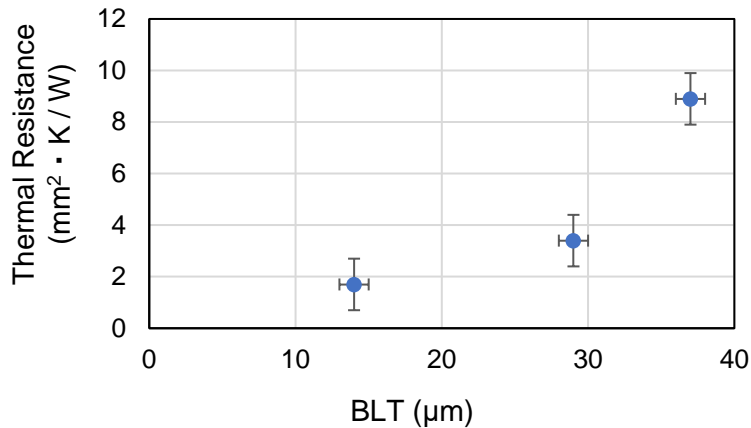
³ Measured using TIMA test apparatus <https://nanotest.eu/tima>

⁴ Measured using TA HR10 Rheometer <https://www.tainstruments.com/hr-10/>

⁵ Measured using TA TGA550 <https://www.tainstruments.com/tga-550/>

Thermal Resistance Dependence on BLT

Thermal architects design systems to meet thermal resistance targets across expected manufacturing tolerances. Therefore, the thermal resistance as a function of bond line thickness (BLT) is an important parameter. Below is a table of thermal resistance for different target BLT.



Curing Profile

The ULT-436 series use a purified polymer targeting snap cure compatibility, requiring cure temperatures of 150°C or higher. For exact curing profiles required by your application, please contact your Arieca representative.

Auger Dispense Method

The ULT-436 series is designed to be compatible with a wide range auger dispense tools. Arieca engineering team has tested the formulation on Arieca’s internal auger dispense tools⁶ and would be happy to optimize the customer’s auger dispense parameters for the best dispense quality.

Product Storage

To maximize product quality, this product should be stored in its original packaging in a -30 °C to -40 °C freezer.

Safety Data Sheets (SDS) and Application Note for the ULT series are available in multiple languages. Please email Arieca at partner@arieca.com to obtain a copy.

Warranty

The information and data contained herein are believed to be accurate and reliable; however, this product is still under engineering validation. Quantities may be limited, and design specifications may change as the product is prepared for release to production. This product is currently provided for proof of concept (PoC) evaluation, and Arieca makes no warranties concerning the fitness or suitability of its products for a particular use or purpose.

⁶ Nordson 794, Nordson 797 PCP