Heraeus

Condura®.prime

Active Metal Brazed (AMB) Si_3N_4 Substrates

Silicon nitride offers excellent mechanical properties (high bending strength, high fracture toughness) and high thermal conductivity that makes it an ideal substrate material for high-reliable power electronics modules.

The outstanding mechanical robustness of Si_3N_4 enables brazing with thick Cu layers offering additional thermal capacity to dissipate load peaks. Thus baseplates become obsolete for certain applications.

AMB-Si_3N_4 substrates combine best mechanical robustness with excellent heat dissipation properties featuring very high power densities. Optimal performance and reliability can be achieved by using silver sintering, **Die Top System (DTS®)** and Cu bonding technology. This setup also enables utilizing the full potential of wide bandgap (WBG) semiconductors (SiC, GaN).

For your specific needs, we identify the optimal material combination from our broad product portfolio: metal ceramic substrates with functional surfaces optimized for our sintering, soldering and bonding solutions.

Key features of AMB-Si_3N_4

- Best in class reliability
- Enables thick Cu layers (e.g. 0.8 mm)
- Thinner ceramics vs. AlN achieving same thermal resistance
- Thermal conductivity > 80 W/m·K of Si_3N_4 ceramic

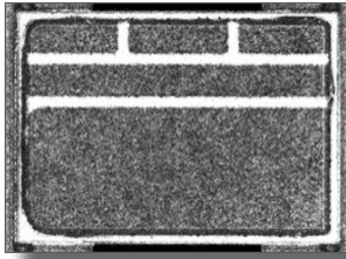
Special features

- Best quality functional surfaces, e.g. Ag finish optimized for silver sintering technology
- Pre-applied sinter / solder

Heraeus offers:

- Reliable IATF 16949 certified supply of Condura®.prime (as well as Condura®.classic & Condura®.extra)
- Engineering Services (Simulation, Prototype Design & Assembly, Testing and Qualification, Material Analysis)
- To be your competent **one-stop materials solutions partner!**

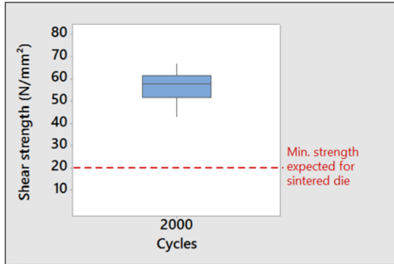
Testing — after 2,000 Thermal Cycles -40°C/+150°C



SAM

No copper delamination observable in ultrasonic testing

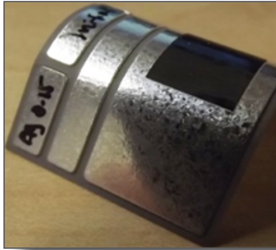
- Sinter paste LTS 338-28P2
- 0.32 mm AMB-Si_3N_4 with 0.3 mm Cu
- AMB functional surface 0.15 µm Ag



Shear strength

High shear strength due to the strong and reliable bonding of the silver sinter layer and optimized Ag finish of AMB-Si_3N_4

- Sinter paste LTS 338-28P2
- 0.32 mm AMB-Si_3N_4 with 0.3 mm Cu
- AMB functional surface 0.15 µm Ag



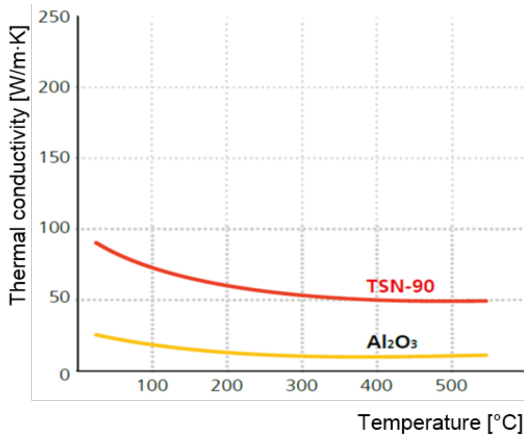
Bending test

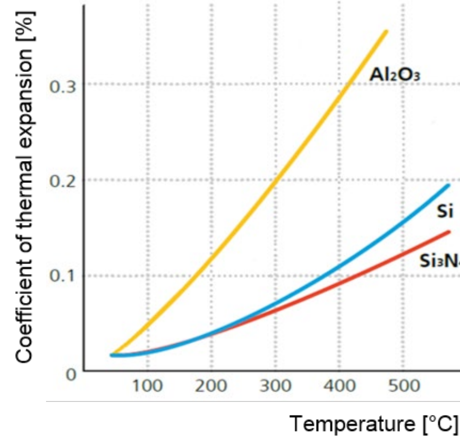
No die delamination, high bending strength

- Sinter paste LTS 338-28P2
- 0.32 mm AMB-Si_3N_4 with 0.3 mm Cu
- AMB functional surface 0.15 µm Ag

Sintering conditions: 10 MPa, 230 °C, 3 min

Physical properties ideal for high-reliable modules using Ag sintering / Die Top System





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The descriptions and engineering data shown here have been compiled by Heraeus using commonly-accepted procedures, in conjunction with modern testing equipment, and have been compiled as according to the latest factual knowledge in our possession. The information was up-to date on the date this document was printed (latest versions can always be supplied upon request). Although the data is considered accurate, we cannot guarantee accuracy, the results obtained from its use, or any patent infringement resulting from its use (unless this is contractually and explicitly agreed in writing, in advance). The data is supplied on the condition that the user shall conduct tests to determine materials suitability for particular application.
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05.2018/ Layout: HET-MarCom_HET61006-0220-3

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