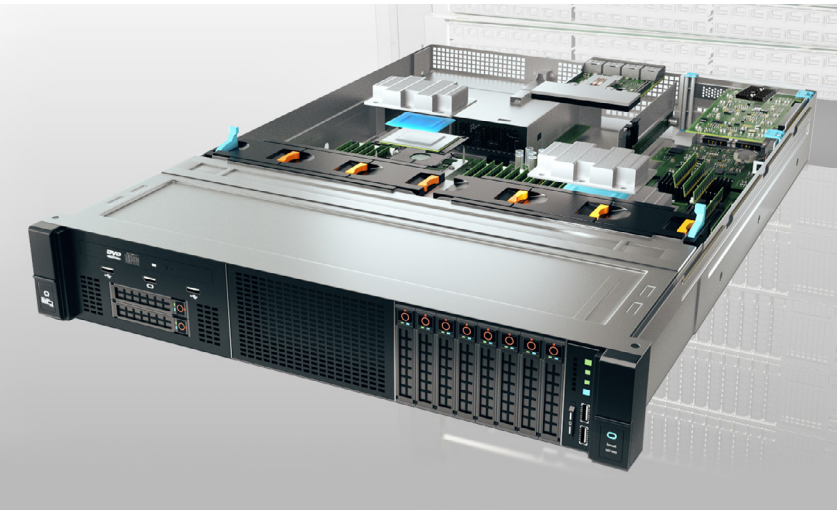
LOW-PRESSURE, LOW THERMAL IMPEDANCE PHASE CHANGE THERMAL INTERFACE MATERIAL PROVIDES MUCH-NEEDED SOLUTION *FOR NEXT-GEN DATA CENTER ICS*

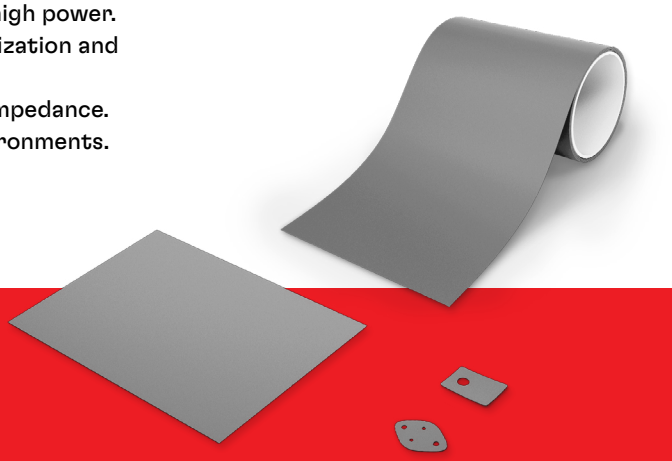
Application Challenges and Objectives

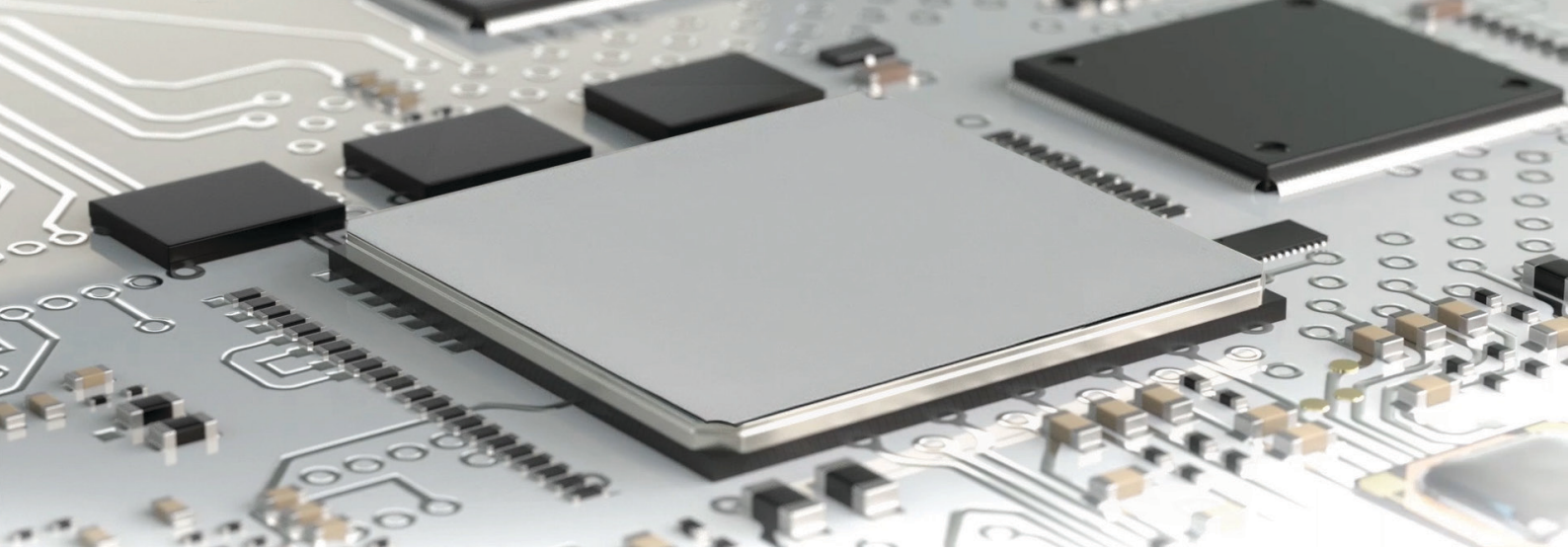


- Data center switches, routers, and servers are incorporating larger, more powerful CPUs/GPUs to manage increasing data processing and bandwidth demands.
- The new semiconductor packages, many containing multiple large dies, are seeing higher power concentrations, resulting in elevated operational temperatures.
- At the same time, new generations of switch, router, and server designs are becoming more compact, which limits the thermal material types that are effective with very thin bond lines.

Process and Performance Requirements

- State-of-the-art high bandwidth ASICs and CPUs, and high-performance GPUs for data processing in AI and MI applications are becoming larger and more complex, integrating multiple chips to achieve extraordinary data throughput. Heat must be effectively dissipated to meet the functional criteria, but mechanical pressure has to be controlled to avoid damage to the large, delicate die that range in size from 25 mm sq. to 75 mm sq.
- The higher power concentrations of advanced processor packages dictate using a thin, low thermal impedance thermal interface material (TIM) to effectively manage the thermal loads, providing the most efficient heat transfer and enabling long-term reliability.
- For next-generation server, router, and switch processor devices, a TIM solution should meet multiple requirements, including:
  - Efficient heat reduction/dissipation for the application's high power.
  - Bond line thickness that is thin enough to enable miniaturization and provide a streamlined heat path.
  - Good thermal performance that prioritizes low thermal impedance.
  - Thermal stability in high temperature /high humidity environments.
  - Easy handling and reworkability.





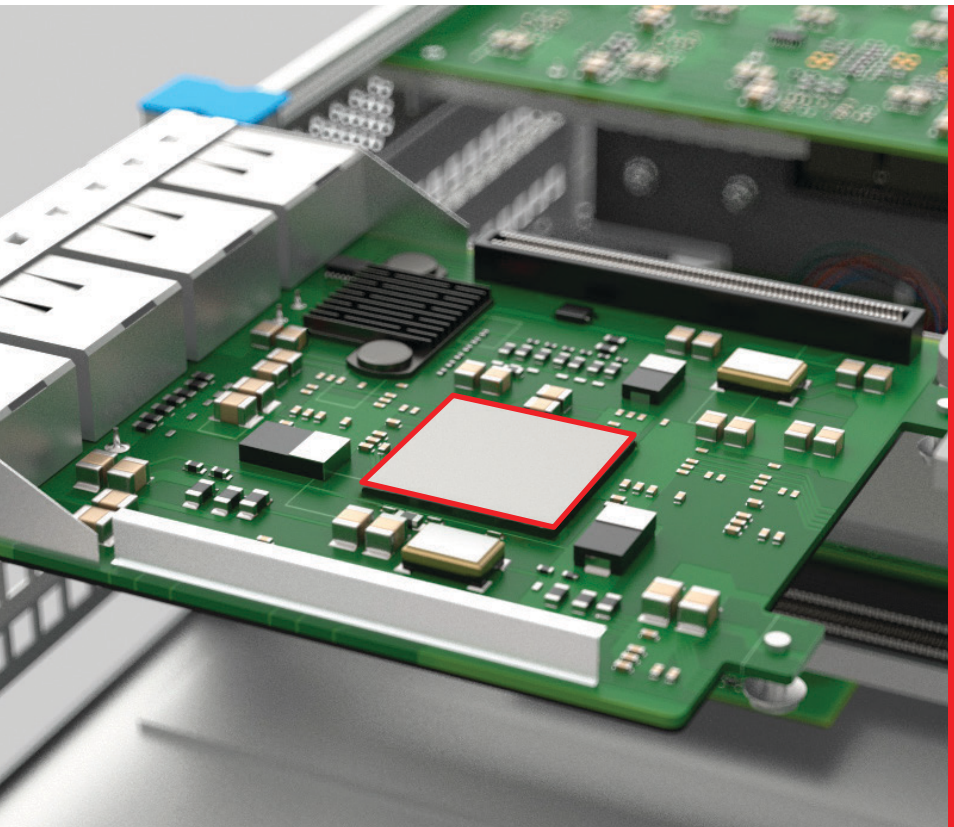
Henkel Solution and Results

- A new silicone-free, phase change TIM has been developed by Henkel that delivers thin bond line capability with low-pressure and low thermal impedance for large die processors and high-power applications. The material has been tested and validated for a wide power range of up to 800 W.

  Henkel's BERGQUIST® HI FLOW THF 5000UT delivers:

  - Market-leading low thermal impedance at low mechanical pressure (at 10 psi) and equivalent good thermal performance at higher pressure (>20 psi). Thermal impedance value is 0.04°C-cm2/W at 35 psi, 0.06°C-cm2/W at 10 psi.
  - High thermal conductivity of 8.5 W/m-K.
  - Pre-burn is not required, reducing process time by as much as 2 hr.
  - Good reliability, passed 1,000 hours test for these conditions:
    - Power cycling from -40°C to 125°C
    - High temperature and high humidity 85°C/85% RH
    - High temperature including 125°C and 150°C

- The superb performance for next-generation data center processors has resulted in BERGQUIST® HI FLOW THF 5000UT's qualification by several leading network innovators. In addition to data center applications, the material is an excellent option for any high-power, thin bond line TIM system where low-stress low thermal impedance is required.



Discover more about Henkel's phase change TIM solutions *here*.

Contact:
Tho Quang Nguyen
Lead Application Engineer, Thermal
thoquang.nguyen@henkel.com
Phone: 612-355-9615