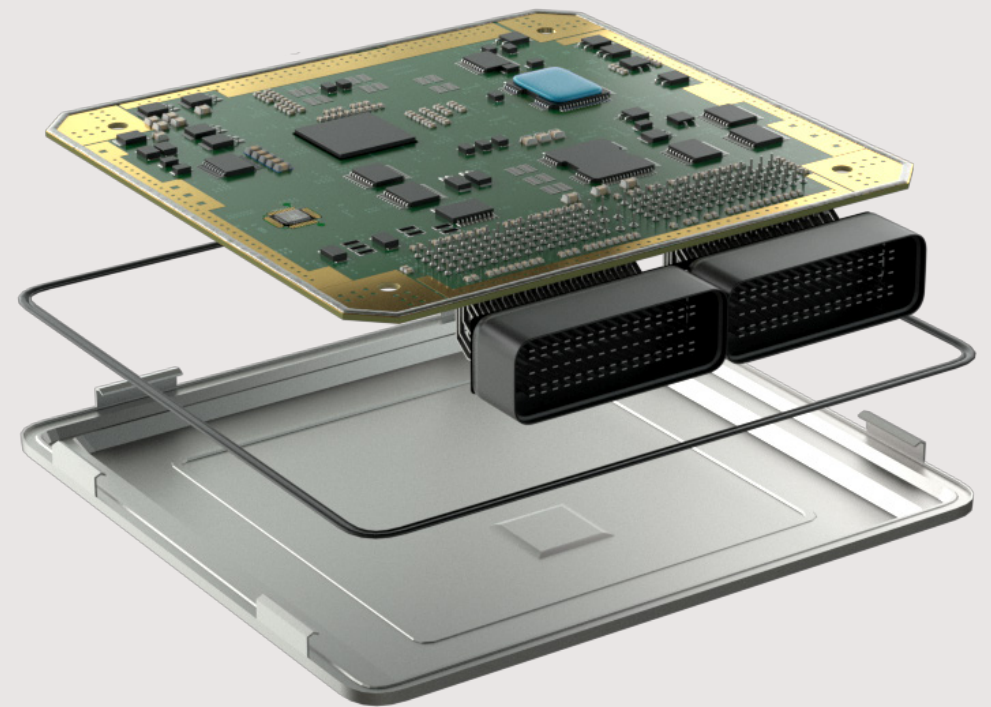




# CASE STUDY

**BERGQUIST GAP PAD TGP HC3000  
Optimizes Thermal Performance,  
Reduces Cost for an Industrial  
Autonomous Guided Vehicle (AGV) ECU**





## Customer Challenges

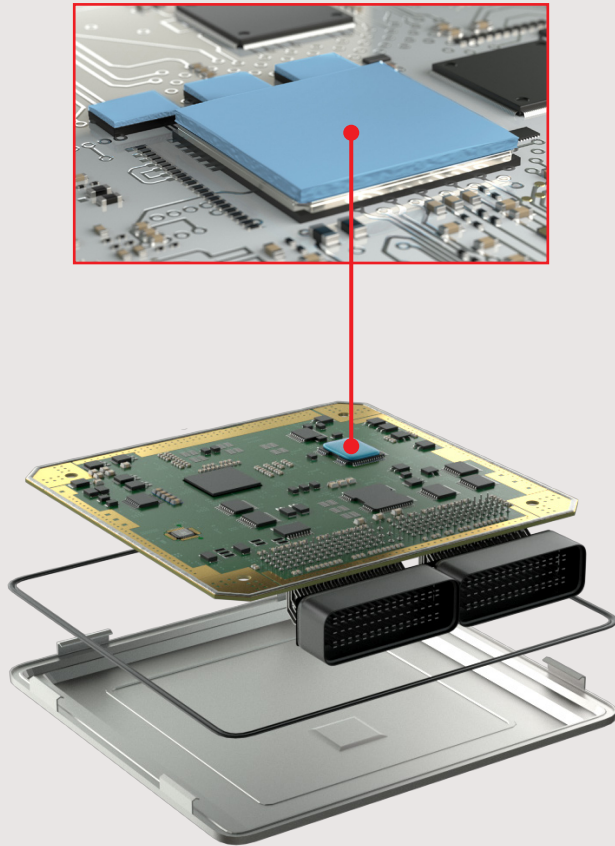
- A new electronic control unit (ECU) design incorporates a large processor IC that requires excellent heat dissipation for optimized function.
- The system is sensitive and outgassing minimization is necessary to avoid interference with other components.

## Customer Requirements

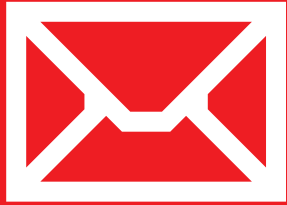
- The gap between the processor IC and housing requires a thermal interface material (TIM) that can adequately fill the space, but is soft and compliant so that no stress is induced on the IC. Additionally, easy handling of the material in a production setting is necessary.
- Collected Volatile Condensable Materials (CVCM) must be kept below 0.1% as outgassing residues can interfere with sensitive components and operational sensors, which could impact control functionality.
- Relatively high thermal performance of close to 3.0 W/m-K and dielectric breakdown voltage of greater than 5kV are necessary.
- Because the operational life expectancy of the ECU is approximately 25 years and it provides functional control of unmanned industrial vehicles, robust and long-term thermal performance for high reliability is critical.

## Henkel Solution

- Balancing all of the customer requirements and cost objectives, Henkel's ***BERGQUIST GAP PAD TGP HC3000*** was selected for this application. The material aligns with the application objectives, delivering:
  - Exceptional high compliance and softness for very low assembly stress and thorough gap filling for optimized thermal transfer with a thermal conductivity of 3.0 W/m-K.
  - Easy handling for production efficiency.
  - Low outgassing formulation reduces concerns of contamination exposure and protects sensitive components from residue interference.
- With this material, which is also cost-competitive, the customer is able to meet the performance objectives of the processor IC and successfully deploy close to 50,000 ECUs to market annually.



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