



February 2022

APPLICATION USE CASE

LOCTITE



Controlling Thermal Conditions for DC Fast Charging Reliability



Market Situation

- ▶ Consumers are embracing electric vehicles (EVs) as a proactive investment in environmental responsibility and CO₂ emission reduction.
- ▶ Though EV sales are on the rise, significant infrastructure hurdles remain.
- ▶ While single-phase charging is readily available, continued EV sales growth and consumer confidence (driven by convenience and reliability) will require broad access to fast DC charging stations.



Application Challenges

- ▶ Building out a fast-charging EV infrastructure demands a return on investment via reliable systems that prioritize durability, performance and safety.
- ▶ A major concern with DC fast and ultra-fast chargers is their voltage levels that range from 400 V to over 1000 V and power that can be in excess of 350 kW.
- ▶ To control the heat generated by such high power transfer, system designers must employ highly-effective thermal management strategies to maintain consistent and reliable power delivery, both for the charger and the battery pack.
- ▶ Controlling the temperature rise of key converter board components integrated into power modules and discrete systems requires high performance thermal interface materials (TIM) to ensure reliability and safety.

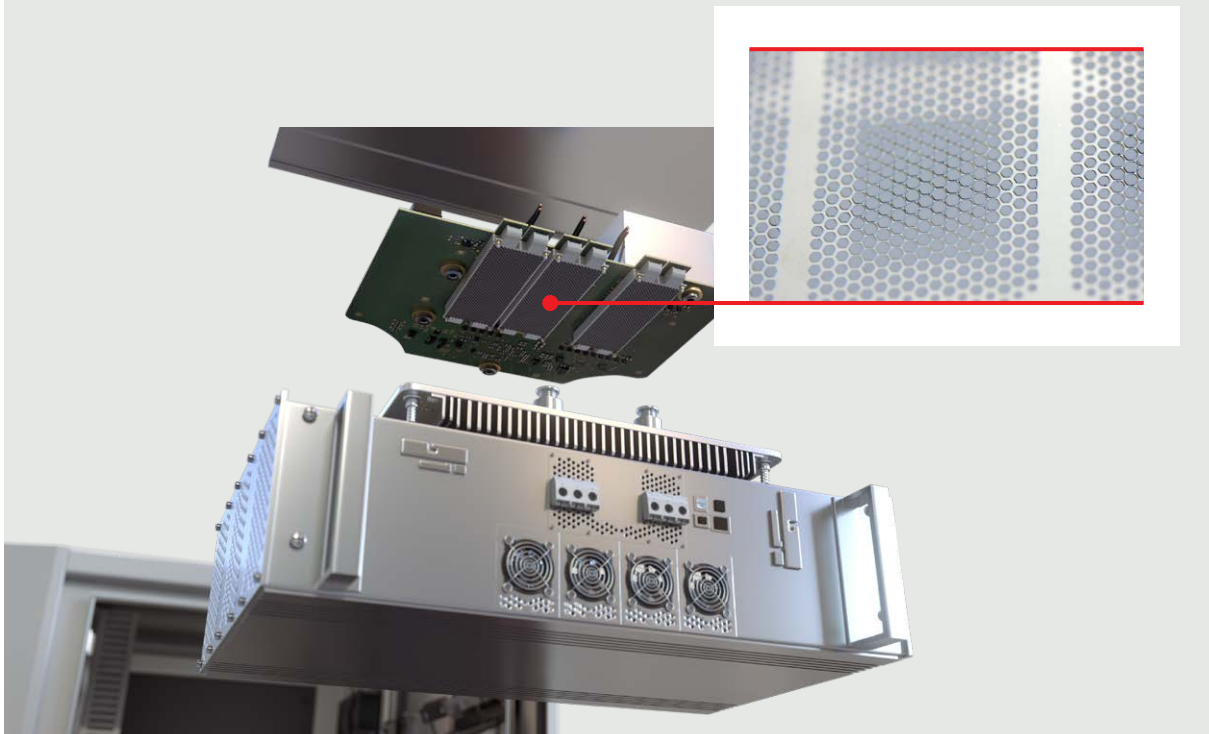


Solutions

- ▶ For thermal control within the power module, a thin bond line TIM that provides very low thermal impedance for maximized thermal transfer is ideal and helps deliver performance stability over the life expectancy of the module, which can be as long as 10 years.
- ▶ Phase change TIMs, which 'melt' and flow only at designated phase change temperatures, are the most effective thermal management solution for power module systems. They are easily processed, provide thin bond lines for optimized thermal transfer and do not suffer from material migration like greases.

Henkel's **LOCTITE® TCP 7000** and **LOCTITE® TCP 4000** are proven TIM solutions for power modules used in high voltage DC fast charging systems.

Phase change material
on a power module system converter board

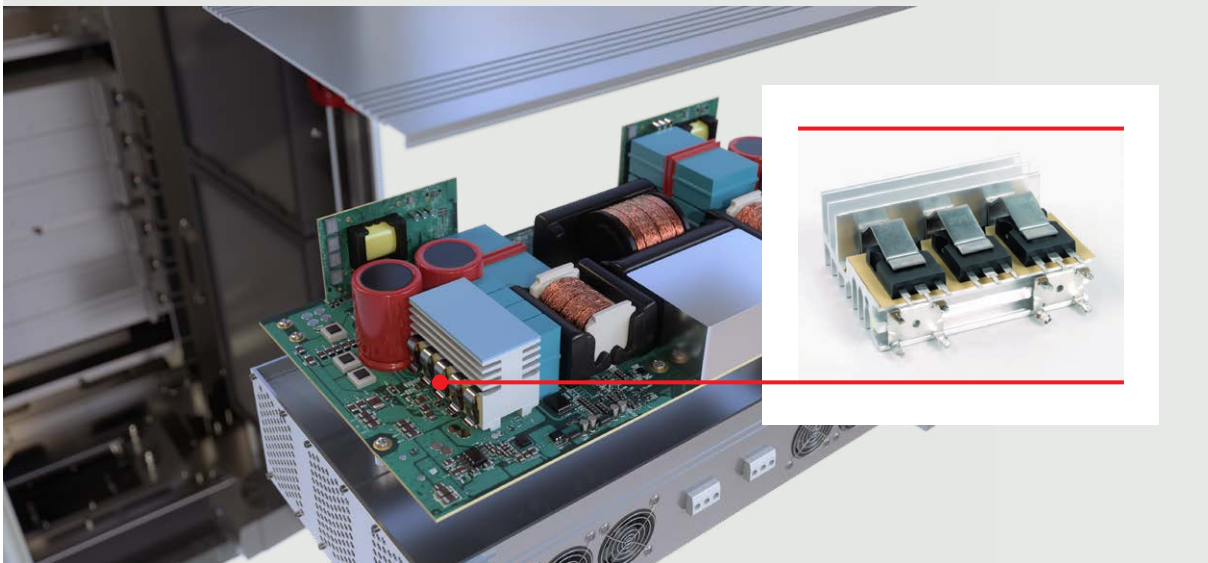


Solutions

- ▶ Managing heat generated from the converter board in the DC charger's discrete component system can be achieved with a variety of TIMs, depending on the specific design and the processing requirements. BERGQUIST® brand **GAP PAD** and **SIL PAD TIMs** are custom-cut, easy-to-apply pad-based options, some with electrical isolation features as well. If the design architecture is complex or high automation is a consideration, liquid Gap Filler materials are most effective.

SIL PAD material

on a discrete component system converter board



- ▶ As EV charging infrastructure device development accelerates, there is no better partner than Henkel for thermal management materials engineering and consultation. Global leaders in TIM innovation, collaboration with Henkel delivers access to broad lab testing and analytics, training, equipment partnerships, prototyping, on-site support and best-in-class customer service.



Relevant Links

[Learn more](#) about Henkel's solution portfolio for EV Charging Infrastructure.

[Watch a video](#) – EV Charging Infrastructure – Solutions Overview.

[Explore](#) our thermal management material solutions.

[Read an article](#) – Gearing Up for the EV Road Ahead.

Contact

APAC

Andy Hou
andy.hou@henkel.com

EIMEA

Mahmoud Awwad
mahmoud.awwad@henkel.com

AMERICAS

Rich Beck
rich.beck@henkel.com