Case Study
March 2020

Power Research Electronics B.V. 10kW Bidirectional Charger Module

Cost-effective UnitedSiC FET solution improves efficiency and power density

OVERVIEW

Standard 10kW bidirectional power concept for EV chargers with 3-phase AC input, powered by UnitedSiC FETs, resulting in higher efficiency, lower cost, and excellent overall performance.

SOLUTIONS

UJ3C120080K3S
UF3C120040K3S

BENEFITS

- Improved efficiency
- Improved power density
- Ease of use due to positive gate drive
- Reduced component count

▶To learn more, go to:
https://unitedsic.com/group/sic-fets/

Since 2009, PRE is a power module supplier to OEM (charger) companies with an installed base of more than 10,000 modules. They are compliant with CCS and CHAdeMO and the latest environmental standards for acoustic noise levels. PRE modules include V2G/V2H and 1000V DC ultra-fast charging capability. The module's 10kW bi-directional ability is perfect for vehicle-to-grid charging, as well as solar powered charging. NewMotion, a leader in powering the e-mobility movement, has selected PRE's charging modules based on their expertise in perfecting rapid charging services.

With the optimum solution for their customer always their central goal, PRE turned to UnitedSiC FET technology to improve the efficiency and power density of their 10kW bidirectional charger module.

© Copyright 2020, UnitedSiC. All rights reserved. UnitedSiC and the UnitedSiC logo are trademarks of UnitedSiC, Inc. in the United States and other jurisdictions throughout the world. All other company names may be trade names or trademarks of their respective owners.

Menno Kardolus

Managing Director, Power Research Electronics B.V.

"We design and produce highly graded and innovative power electronics where the optimum solution for the customer's requirements is always our goal. SiC switching technology from UnitedSiC has helped PRE in achieving this."

SOLUTIONS

PRE employed the two UnitedSiC FETs in their 3-phase bi-directional EV charger design:

- UJ3C120080K3S (x16 per board)
- UF3C120040K3S (x6 per board)

BENEFITS

Using the UnitedSiC 1200V, low RDS(on) SiC FETs, PRE was able to reduce component count and increase the overall efficiency from almost 95%, up to 96% without additional cost. Overall, the UnitedSiC performance was superior to their existing Si and SiC MOSFET-based designs.

Because this type of bidirectional converter often runs at lower power, low switching losses and high efficiency at lower power levels were additional benefits of the UnitedSiC FETs. They were also easier to employ in designs due to having a positive gate drive.

Bringing all these UnitedSiC FET benefits together, PRE was able to maximize and highlight a new level of their system's highly innovative, bidirectional performance.