VICOR

Case study: Powering 400V accessory loads



Supporting legacy accessories in new 800V architectures

Customer's challenge

As the 800V traction battery becomes more common among EVs, loads that were powered directly from a 400V battery are now incompatible. The investment in cost and time frames to engineer 800V versions is prohibitive. Yet converting voltage for these high power loads – compressors, pumps for cooling and HVAC, etc. – needs to be as efficient and lightweight as possible to continue to maximize the driving range of EVs. The key challenges were:

- Avoiding the cost penalty of adding a discrete based 800 to 400V converter
- Do not add substantial weight to the vehicle
- Find a relatively inexpensive, quick to market solution to power 400V loads

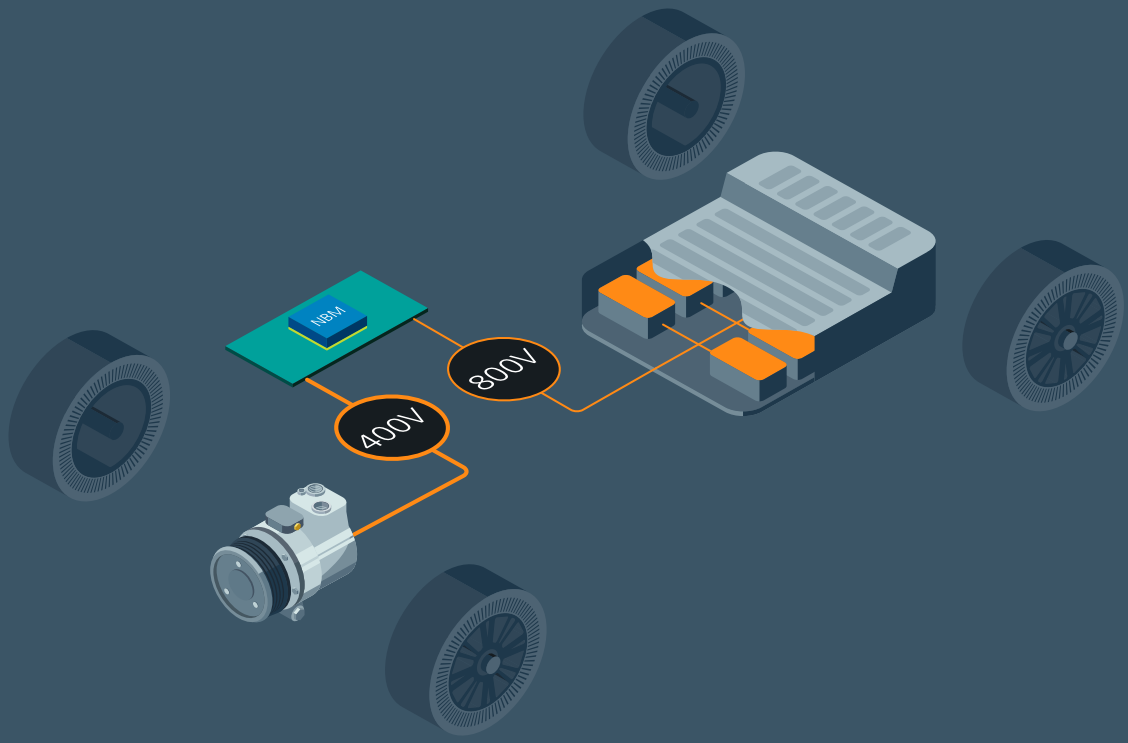
The Vicor solution

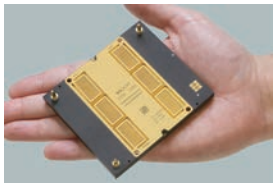
High density power conversion using a single Vicor power module provides the solution with the smallest volume, lightest weight, and highest efficiency. Power modules are already tested, often only require passive cooling, and are easy to package virtually anywhere in the power system compartment. With this modular approach, it's easy to adapt the solution to meet specifications for use in different vehicle platform. Key benefits were:

- A single power module provides up to 37kW
- A very compact, lightweight solution
- High power output can support up to 17kW with passive cooling

Lightweight, power-dense module provides a high power rail

A single, compact NBM9280 can power a 37kW, 400V rail to power accessories from the 800V battery. With a peak efficiency of 99.0%, the NBM is a high-density power converter that weighs only 200g. It can be packaged for flexible placement within tight spaces in the vehicle engine compartment where a bulky, heavy discrete power supply simply would not fit.





Automotive NBM™ bus converter

Non-isolated fixed-ratio

Input: 200 – 460V (boost)
400 – 920V (buck)

Output: 400 – 920V (boost)
200 – 460V (buck)

Current: Up to 75A

Peak efficiency: 99%

92 x 80 x 7.4mm

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