

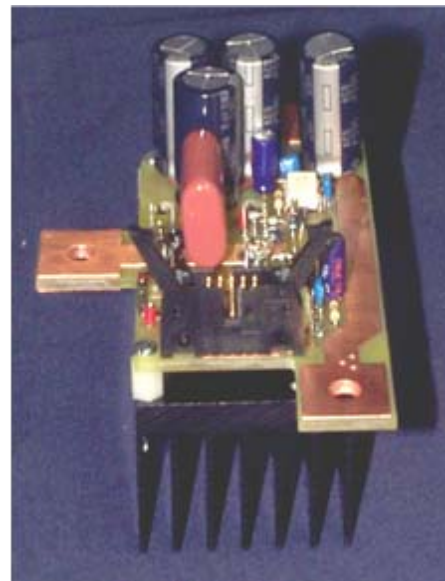
Multilevel DC/DC Converter for Dual-Voltage Systems

Goal

Develop a compact, reliable, low-cost dc-dc converter for future automotive electrical systems that have both 12 V and 42 V systems.

Background

The next generation automotive electrical systems will likely require a higher voltage electrical system (42 V) because of the tremendous increase in electrical demands in future vehicles. At the same time, some legacy 12-V components will likely remain a part of the vehicle.



A 140A/60V (2kW) Multilevel Cell prototype with a self-powered gate drive.

Advantages of ORNL's Dual-Voltage Approach

- No bulky magnetics (transformers or inductors) are used
- Multilevel cells can be easily manufactured in large quantities like IC chips
- Design has inherent redundancies and is highly reliable
- The multilevel converter design has a high efficiency (>99%)
- Multilevel converter has much lower EMI than conventional converters
- Low cost components (low voltage MOSFETs) can be used
- Design is modular, compact, and lightweight

Points of Contact:

Power Electronics and Electric Machinery Research Center
Oak Ridge National Laboratory
2360 Cherahala Boulevard
Knoxville, TN 37932

Don Adams
Director
Phone: 865-946-1321
FAX: 865-946-1262
E-mail: adamsdj@ornl.gov

Laura Marlino
Technical Project Manager
Phone: 865-946-1245
FAX: 865-946-1262
E-mail: marlinold@ornl.gov

Website: peemrc.ornl.gov