Advanced Power Electronics Thermal Management

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Advanced Power Electronics Thermal Management

Power Electronics Thermal Management
Power Electronics Thermal Management Gilbert Moreno National Renewable Energy Laboratory USDOE Vehicle Technologies Office Annual Merit Review and Peer Evaluation, Washington, D C, June 6, 2017 EDT078 This presentation does not contain any proprietary, confidential, or otherwise restricted information NREL/PR-5400-68077

Power Electronics Thermal Management R&D
Power Electronics Thermal Management R&D Application Thermal Research Thermal and Fluid Measurement Research WBG Power Electronics Thermal Management Advanced Cooling Technologies for John Deere Inverter (cooperative research and development agreement [CRADA]) Fluids/coolants Advanced Materials Approach/Strategy Interactions with

Thermal Management of Power Electronics and Electric ...
Importance of Thermal Management •Excessive temperature degrades the performance, life, and reliability of power electronics and electric motors •Advanced thermal management technologies enable – keeping temperature within limits – improved reliability – higher power densities – lower cost materials, configurations and system 2

Power Electronics Thermal Management R&D
thermal management for WBG and high -temperature device use in vehicular power electronics and assemblies •Approach is to travel along thermal and electrical path to identify and generate solutions to thermal bottlenecks •Modeling will be used – experiments may validate models or concepts

THERMAL MANAGEMENT CONCEPTS FOR POWER ...

motor-controllers to power electronics in electric power steering, electrical braking, advanced fan drives, electrical turbo generators, piezoelectric valve controllers and of course starter generator designs A three dimensional thermal finite element (3DFE) simulator and a thermal camera have been used to investigate the thermal heat

IEEE CPMT Webinar Power Electronics Packaging, Reliability ...

Power Electronics Packaging, Reliability, and Thermal Management IEEE CPMT Webinar 2 Center for Advanced Life Cycle Engineering wwwcalceumdedu Innovation Award Winner 2 A James Clark School of Engineering Thermal Management for Power Electronics hA R coldplate 1 = IGBT Chip AlN Cu Cu Base Plate Solder

Thermal Management in Electronic Equipment

guided innovation-driven thermal management in electronic devices Thermal management is essential in electronics, as it improves reliability and enhances performance by removing heat generated by the devices This paper highlights the development and challenges faced in the thermal management of electronic equipment in various domains

Advanced Thermal Management Solutions on PCBs for High ...

In another approach advanced thermal management solutions will be presented on the board level, exploring different buildup concepts (eg cavities) Advantages of cavity solutions in the board will be shown, which not only decrease the thermal path leading from the high power component through the board to the heat sink, but

Advanced Power Electronics and Electric Motors (APEEM) R&D ...

Advanced Power Electronics and Electric Motors (APEEM) R&D 2011 DOE Hydrogen and Fuel Cells Develop Advanced Power Electronics and Electric Motor technologies current source inverter + motor + thermal management If Current Portfolio Meets All …

Automotive thermal management technology

thermal management is different, and value stems from improving electric powertrain range, reduced charging times, and enabling reductions in size, mass, and cost of the powertrain subsystem (eg motor, power electronics or battery) Benefits of thermal management are not limited to energy savings, but also have a positive consumer impact

Integrated nanomaterials for extreme thermal management: a ...

constraints and approach the limits of performance in complex aerospace electronics Keywords: thermal management, aerospace, materials by design (Some figures may appear in colour only in the online journal) Introduction Aerospace vehicles contain advanced high power electronics that create some of the most aggressive thermal management

Progress Report for Propulsion Materials

vehicle electronics (thermal management) The components necessary for the high-fuel-economy, low-emission PNGV vehicles require high-power electronics to be smaller and lighter in weight This R&D in electronics materials is enabling the Advanced Integrated Power Module program to address new

Thermal Management Systems - Parker Hannifin

integrating Parker’s advanced cooling systems capability with its acquisition of SprayCool™ in 2010 Proven solutions Aerospace and defense electronics are driving significant increases in power densities, resulting in thermal management challenges across a wide range of applications Our TMS team delivers advanced solutions with

Air Cooling Technology for Power Electronic Thermal Control

• Air cooling has the potential to improve thermal management system cost, weight, volume, and reliability, helping to meet Advanced Power Electronics and Electric Motors (APEEM) technical targets • Air is a poor heat -transfer fluid – low specific heat – low density – low conductivity • Parasitic power • Perception and novelty

Two-Dimensional Materials for Thermal Management ...

Review Two-Dimensional Materials for Thermal Management Applications Houfu Song, 1 ,6Jiaman Liu, Bilu Liu, 1Junqiao Wu, 2 Hui-Ming Cheng, 3 * and Feiyu Kang ,4 5 * With the advances of the electronics industry, the continuing trend of miniatur-

DOUBLE-SIDED LIQUID COOLING FOR POWER ...

DOUBLE-SIDED LIQUID COOLING FOR POWER SEMICONDUCTOR DEVICES USING EMBEDDED POWER TECHNOLOGY Bryan Charles Charboneau ABSTRACT Power electronics is a constantly growing and demanding technical field Consumer demand and developing technologies have made the improvement of power density a primary emphasis of research for this area

Key Performance Parameter Driven Technology Goals for ...

Jul 02, 2015 · Key Performance Parameter Driven Technology Goals for Electric Machines and Power Systems Dr Cheryl Bowman, Ralph Jansen • Sophisticated thermal management • Advanced devices Advanced device packaging for volume and thermal control Ship …

Passive Thermal Management Using Phase Change Materials ...

integration of advanced feature s leading to increased performance and compactness, especially for smartphones Thi s has resulted in significant increase in power density, in turn leading to higher temperatures inside the device The need for an efficient thermal management system is two-fold – (1) thermal limits such as the