

Electrical and Thermal Considerations for Wide Bandgap Power Electronics

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Modern electronic systems for mobile applications have seen steadily increasing demands for power density. A key barrier to higher power density is the thermal limits for current semiconductor devices. Wide bandgap devices promise higher operating temperatures and greater efficiencies. However, these promises can be achieved only by optimal integration of the power electronic design considerations with the thermal management and materials considerations. Optimization in the design phase should be matched by optimization in the operation of these systems as well. This talk will give an overview of several such activities underway within the National Science Foundation Engineering Research Center on Power Optimization of Electro-Thermal Systems (POETS) that seek to integrate the management of power and energy flow in both the electrical and thermal domains. The topics will cover design and integration from the component and module level up to the overall system level. POETS is a multi-disciplinary center, founded in 2015, that seeks to bring together multiple technical fields with the primary goal of increasing power density.

