Virginia Tech

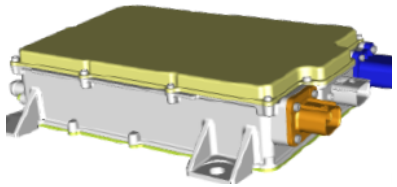
Project Title: **High Voltage Bi-directional On-Board Charger with Integrated PCB Winding Magnetic Components**

Objectives: develop a 11kW bi-directional on-board charger with 550-850V output voltage to achieve 95-96% efficiency and 3.5-4 kW/L power density

Major Milestones: 11kW multi-phase totem-pole PFC with 98% efficiency (M9);
11kW three-phase interleaved CLLC converter with 97-98% efficiency(M12)

Deliverables: Simulation results of 500kHz integrated transformers and inductor (M6)
Test results of a 11kW on-board charger with 95-96% efficiency (M12)

Cost: $200k from PowerAmerica, $100k from cost share



Vin: 85-265 Vac
Vo: 550-850 Vdc
Po(max): 11kW
3.5-4 kW/L

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WBG Technology Impact

1. Integrated magnetic components to greatly improve the manufacturability
2. Increased re-usability across vehicle platforms (easier to package)
3. High voltage operation to enable faster charging (electric range / hour of charging) for electric vehicles
4. Increase efficiency to 95-96%; increase power density from to 3.5-4kW/L

Additional impacts

1. High density integrated converter design will provide opportunity for domestic manufacturing
2. The proposed power distribution architecture is general and could be used for other applications
3. provides WBG devices related education and training to future power electronics engineers
4. Improves US competitiveness in the electric vehicle market