

# The Ohio State University, John Deere, and Wolfspeed

**Project Title:** Studies of Short-circuit Behavior and Protection Strategies of the Next Generation **1.2 kV** SiC Modules and Devices

**Objectives:** Test up to **40** SiC modules and **100** TO247 SiC devices. Develop a three-step fast and reliable short circuit protection method.

## Major Milestones:

- OSU validated the new protection circuit design
- OSU and John Deere finished tests of power 1200 V rated modules and devices at five temperature points ranging from -45°C to 105°C.

## Deliverables:

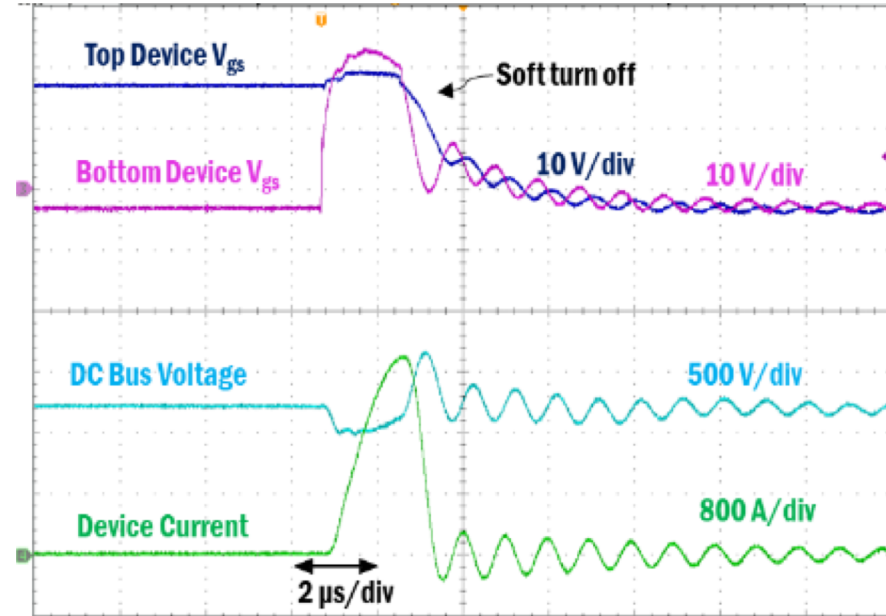
- Gate drive circuit design with the three-step short-circuit protection strategy
- Short circuit test results from OSU and John Deere

## Budget:

PowerAmerica funding: OSU \$60k, John Deere \$45k, Wolfspeed \$45k

Cost share: OSU \$26k, John Deere \$19k, Wolfspeed \$20k

PowerAmerica Fund Total: \$150k; Cost Share Total: \$65k



**PI:** Jin Wang  
**Email:** wang.1248@osu.edu  
**Phone:** 614-688-4041



THE OHIO STATE  
UNIVERSITY



JOHN DEERE



A CREE COMPANY

## WBG Technology Impact

- Understand the short circuit capabilities of the new generation of 1200 V SiC power modules and discrete devices.
- Enable more reliable implementations of these devices with fast and reliable short circuit detection and protection.

## Additional impacts

- Improve the reliability of SiC based circuits, thus reduce operation cost.
- Help John Deere in future product design and maintain competitive edge.
- Train a group of students in gate drive designs and testing of SiC devices.
- Help US SiC manufacturers to maintain competitiveness.