Wolfspeed
A CREE COMPANY

CREE

Full Member

Project Title: **Development of Manufacturable 10kV/300mOhm SiC MOSFETs on 150mm 4HN-SiC Wafers and HTRB, HTGB, BDOL, TS, ESD & TDDB Qualification**

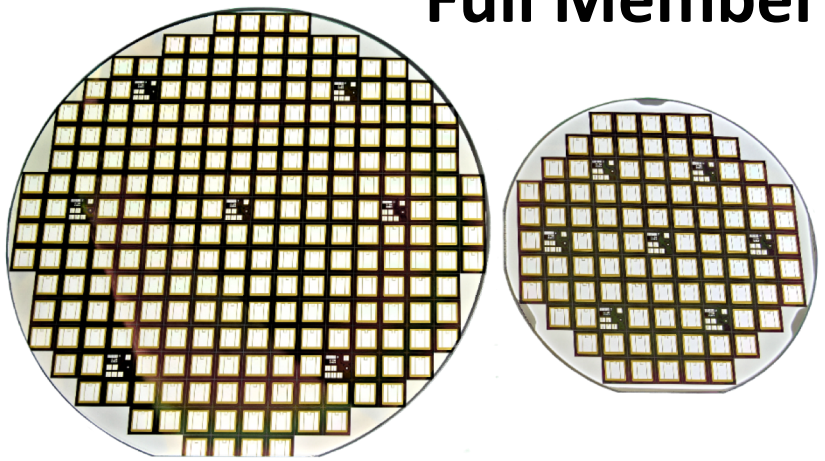
Objectives: **Manufacturable Fabrication of 10kV/300mOhm SiC MOSFETS on 150mm 4HN-SiC Wafers and HTRB, HTGB, BDOL, TS, ESD & TDDB Qualification**

Major Milestones: **Complete HTRB, HTGB, BDOL, ESD & TDDB Qualification of Manufacturable 10kV/300mOhm SiC MOSFETs Fabricated On 150mm 4HN-SiC Wafers**

Significant Equipment Acquisition: **None**

Deliverables:
- **10kV/300mOhm SiC MOSFET Preliminary Datasheet and HTRB, HTGB, BDOL, TS, ESD & TDDB Qualification Test Results**
- **175x 10kV/300mOhm SiC MOSFET Die for PowerAmerica Die Bank**

Over 2x Number of 10kV/300mΩ SiC MOSFETs Fabricated on 150mm 4HN-SiC Wafers



SOPO Task No.: **BP5-2.3**
TPOC: **David Grider**
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DOE funds: **$800K**
Cost-share: **$800K**
Total budget: **$1.6M**

WBG Technology Impact

1. **10 kV SiC MOSFET Technology Provides Improved Efficiency, Increased Switching Frequency, and Lower Conduction Loss for Medium Voltage Power Applications**
2. **Potential Applications: Rail Transport Including Traction Drive and Auxiliary Power Systems, MV Motor Drive, Grid-Tied Inverters for PV Systems**
3. **Commercialization Timeframe: ~ 2 to 5 years**
4. **Establish Manufacturable Fabrication Process of 10kV/300mOhm SiC MOSFETs on 150mm 4HN-SiC Wafers & Complete HTRB, HTGB, BDOL, TS, ESD & TDDB Qualification of These 10kV/300mOhm SiC MOSFETs Using the 150 mm 4HN-SiC Wafer Fabrication Platform at Wolfspeed/Cree ⇒ Critical Transition for Commercial Production of 10 kV SiC Power Technology for Improved Efficiency & Higher Switching Frequency for MV Power Applications**

Additional Impacts

1. **Considerations for Cost of 10kV SiC MOSFET Power Technology Compared to Competing 6.5kV Si IGBT Power Technology**
   - **Higher Switching Frequency Operation**
   - **Higher Efficiency Through Reduced Conduction and Switching Losses**
   - **Reduced Balance of System Costs Resulting in Lower Total System Costs**
   - **Reduced System Size/Weight**
   - **Simplified/Reduced Cooling Requirements**
2. **Wolfspeed Is World Leader in 10 kV SiC MOSFET Power Device and Module Technology Development**
   ⇒ Early Supplier of 10 kV SiC MOSFETs For MV Power Systems
   ⇒ Address > $500M/Yr 10 kV MV Power Market