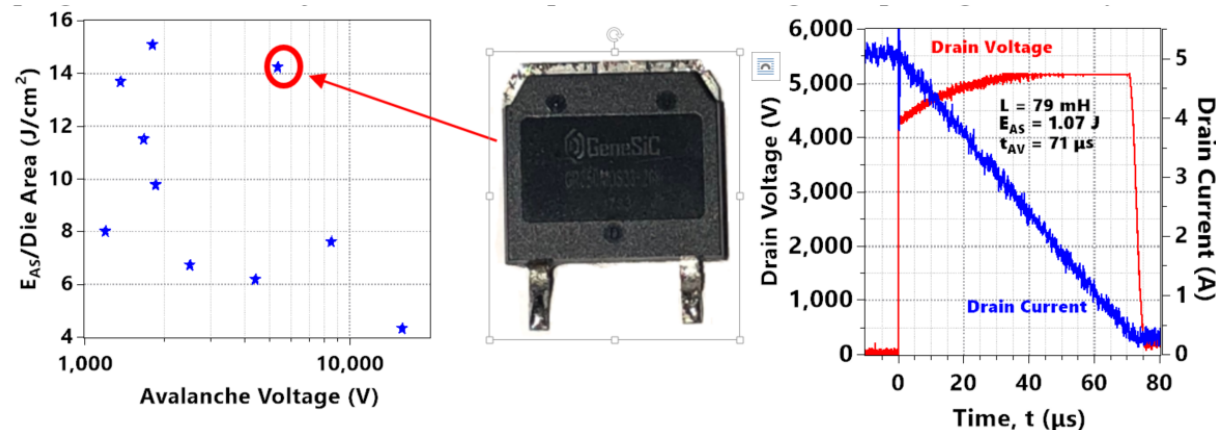


Project Title: 3.3 kV SiC Power MOSFET and Diode Commercialization

Objectives: Achieve commercial-scale costs, reliability, ruggedness, and yields to enable successful commercialization of 3300 V SiC MOSFETs and Diodes at relevant ratings

Major Milestones: Realization of 3.3 kV/>50A DMOSFETs and Diodes with >75% yields; achieving >10us t_{SC} ; and <1mA/cm² lkg.

Deliverables: Packaged 3.3 kV/40 mΩ & 350 mΩ SiC DMOSFETs, and 3.3kV/50 A Diode chips fabricated on 150 mm wafers, with 1000 unit volume pricing.



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Technology Impact

1. Reduced switching losses (100-1000X), Better over-temperature margins, Lower conduction losses; and higher circuit efficiencies.
2. Application sectors: Rail Traction, Vehicle Extra-fast charging, Utility grid
3. Timeframe for commercialization: June 2020
4. State-of-the-art IGBT modules rated >3.3kV suffer from extremely poor switching characteristics and poor thermal behavior preventing the realization of advanced power electronics hardware suitable for next generation vehicle fast chargers, rail traction and Smart Grid elements.

Additional impacts

1. Utilization of commercial foundry improves cost structure for 3.3kV SiC MOSFETs and Diodes. Realization of economies of scale for successful commercialization of such devices.
2. GeneSiC will hire additional engineering personnel and enable reasonably high SiC volumes at 150mm foundry to achieve the critical mass towards commercialization success of 3.3kV SiC MOSFETs and Diodes
3. Qualification Testing equipment will be developed and utilized at a scale that allows MIL-750 or equivalent reliability testing that engenders confidence in the customer base to rapidly adopt >3.3kV SiC devices. Adoption of designs with inherently superior robustness will be used.