2018 IEEE International Power Modulator and High Voltage Conference



Contribution ID: 142

Type: Poster Presentation

Surge Current Analysis of COTS 1200V Silicon Carbide JBS Diodes

Tuesday 5 June 2018 13:30 (1h 30m)

As an increasing number of Silicon Carbide (SiC) devices become commercially available, and as Silicon devices have reached their theoretical power density limits, SiC devices are being utilized in an increasing number of power electronics applications. It is necessary to conduct further reliability testing and analysis on SiC devices, to encourage further adoption of these devices. One parameter that is important to study is the surge current capabilities of SiC diodes, especially for high power converters and high current pulse applications such as Marx generators. In this research, a diode surge current testbed was designed and built to test commercially available 1200 V / 10 A SiC JBS diodes from various manufacturers. The testbed is designed to generate a half sine wave pulse (typical period of 10 ms) with a peak current of 150 A. The testbed current rating can be scaled up as necessary to test higher power devices. The testbed uses an RLC ring down circuit to generate a sine wave with the desired period, and a thyristor as the switch to isolate the device under test following the application of the positive half sine wave pulse. The purpose of this research is to independently verify manufacturer datasheet claims regarding the surge current capabilities of their diodes. JBS diodes from ROHM, STMicro, and CREE/Wolfspeed are tested. The test results are analyzed, and the surge current capabilities compared.

Author: FORBES, Jonathan (Texas Tech University)

Co-authors: Dr BAYNE, Stephen (Texas Tech University); Dr GALE, Richard (Texas Tech University); SAL-CEDO, Fernando (TTU); TCHOUPE-NONO, Cedrick (TTU)

Presenter: Dr BAYNE, Stephen (Texas Tech University)

Session Classification: Poster 2 - High Voltage Design and Power Modulator Components