

## HIGH TEMPERATURE AUTOMATIC CHARACTERIZATION SYSTEM FOR SEMICONDUCTOR DEVICES

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**Abstract.** *An automatic temperature characterization system for the wide band gap semiconductor devices is presented. The system works in a large temperatures range (40-450 °C) which is much more than the range of the present silicon temperature testing system. The paper describes the parts of the system and control software. The main hardware components of the system are a PC controlled oven and a picoammeter. The software component of the system is written in TestPoint and performs an automatic I-V characterization of the semiconductor samples. The obtained data files are in Excel format but it can be easily displayed with other graphical dedicated software. In the end of the paper there were presented measurements realized with the system on the few metal-glass cases that will be used to encapsulate SiC temperature sensor.*

**Keywords:** temperature testing, devices on wide band semiconductors, SiC temperature sensor

### 1. Introduction

The high temperature power devices and sensors developed on wide band semiconductor materials have been in a permanent development. Over ten years ago first SiC devices (Schottky diodes) started to be available on the market.

Most of the semiconductor manufacturer companies are making researches in producing materials and devices technologies to decrease the price of SiC devices. In the same time, strong researches are focused on devices on diamond.

After the laboratory phase, the manufacturing of the device needs additional simulation, not only to test them in an environment which is similar to their operational conditions, but also to check the resistance of the devices to the stress test. These additional tests are needed in order to identify potentially weak devices before they are used in the field.

In our opinion, temperature behavior testing is the most important, difficult and time consuming phase for semiconductor devices characterization.

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