Annals of the Academy of Romanian Scientists
Series on Science and Technology of Information
ISSN 2066 - 8562 Volume **5**, Number **2**/**2012**

SILICON CARBIDE DEVICES CHARACTERISATION SYSTEM

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Abstract. *The measuring results of some commercial wide band gap semiconductor devices by using a characterisation system which may work between* 50-80ºC *are presented in this paper. There are described the system blocks and the control software. The temperature characterisation system has a DC power supply furnace and a semiconductor device characterisation system as main components. The obtained data files may be easily processed, being in .xls format, and device characterisation may be done with proprietary measuring software.*

Keywords: silicon carbide devices, temperature characterization system, wide band semiconductors measurement

1. Introduction

Wide band semiconductors are produced today to be used in high temperature environment to fulfil special tasks in a wide area of research and industry applications. In the last time we may observe a high interest to obtain devices working at high temperatures in aerospace and military industries, nuclear power plants, cement factories, siderurgy [1]. The purpose of this paper is the study of some commercial low cost silicon carbide Schottky diodes [2-5] using an own designed temperature characterization system. The main properties of this system are:

- I/V device characteristic is automatically done;
- voltage bias range: –200 V … +200 V;
- current limits: –1 A …+1 A;
- device temperature set range: 50^{o}C and 800^{o}C;
- absolute temperature set precision: better than 0.5^{o}C;
- relative temperature measuring precision is 0.1^{o}C;
- measured data is in .xls format;
- maximum time for device temperature stabilisation with a maximum 0.5^{o}C deviation is 150 minutes for any temperature value;
- typical time for device temperature stabilisation with a maximum 0.5^{o}C deviation is 90 minutes under 200^{o}C.

We should notice that the maximum temperatures of the current silicon systems are lower than the working temperatures of the designed system. A main problem comes when we talk about encapsulating high temperature semiconductor devices.

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