101年大學部國際交流甄選專題成果展

Optical and Electrical Properties of the High-Voltage Light Emitting Diode Array

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➢Abstract

LED is a energy saving illumination. It has higher efficiency and longer life compare to the traditional lighting, but LED is the luminous element that has high heat generation. The heat will severely affects its efficiency

➢Structure

Base on the series array, make several multiple micro chips LED connected

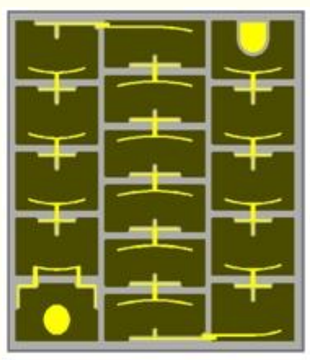

Fig.1 The series structure of the HV LED

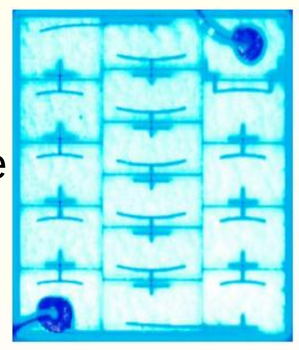

Fig.2 The HV LED after the current conducting

➢Purpose

- Understanding the basic method of the temperature measurement
- Understanding the relationship between the junction temperature and the input power

➢Result and Discussion

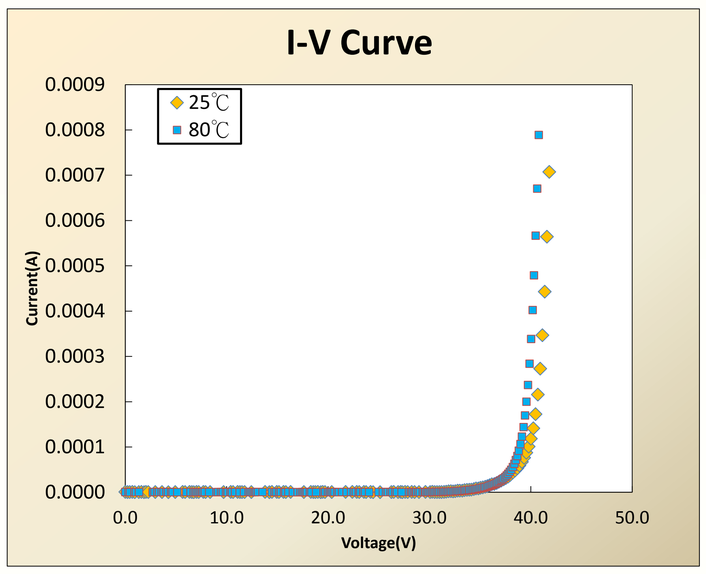

Fig.3 LED only conducts as the voltage being higher than the driving voltages which affected by temperature

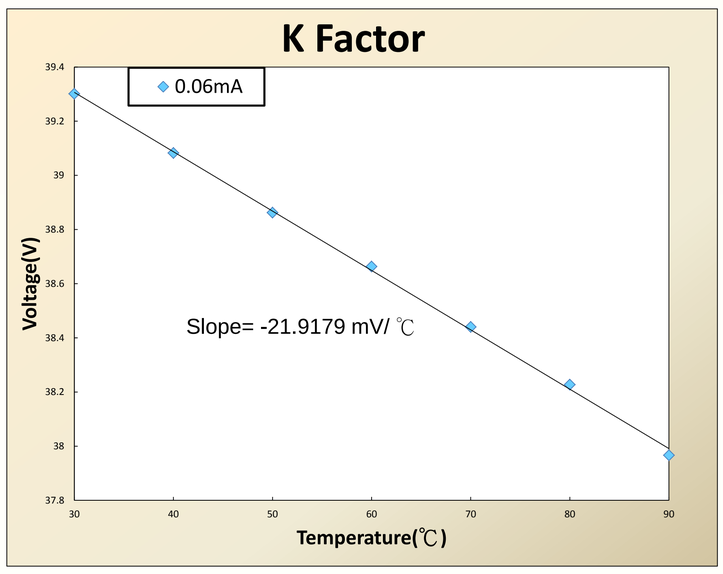

Fig.4 Affected by the temperature effect, the voltage will be different at the same current, and they will be the linear relationship

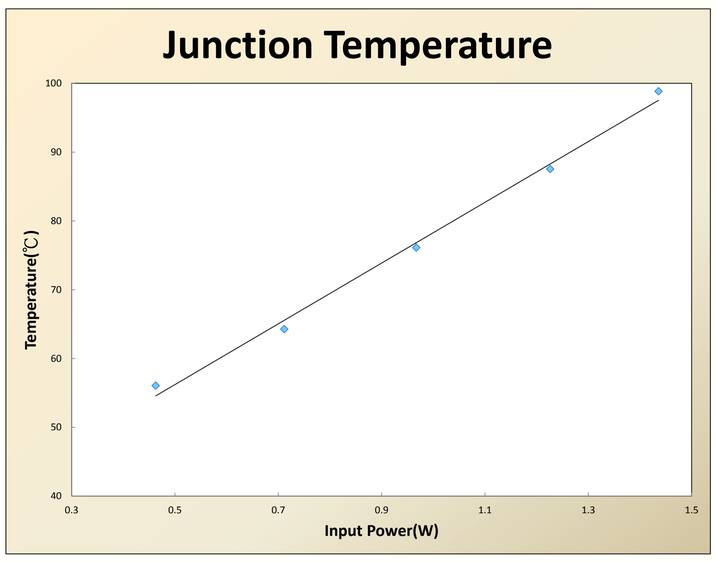

Fig.5 The linear relationship between the junction temperature and the input power at the low power

➢Conclusion

- Forward voltage method is a simple way to find the junction temperature but we must minimize the error, or the data we get are useless. The source of measurement error comes from the ambient temperature, Uncertainty in the voltage and the current measuring and power supply.
- This method can be used to analyze the effects of heat-sinking, environmental and source conditions on the junction.