Automatic Measuring System for Junction Temperature of Power Light-Emitting Diodes

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ABSTRACT

Following the improvement in luminous of light emitting diodes (LEDs) ,LEDs favoredand minded by the lighting market. There are many advantages for LEDs, such as small size, long life time, highly luminescent efficiency, saving power, environment protection and reaction speed is fast. This project would be planned design a measurement system for LEDs junction temperature ( ), and use the LabVIEW as PC-based control interface, through a Data Acquisition Card (DAQ Card) and connection box to connect outside signals. Use the automatic measurement system and windows-based environmental monitoring, include temperature, current, forward voltage and data saving files etc, all writing in this LabVIEW software, shorten and decrease people measurement ’ s time and error, increase measurement ’ s precision and efficiency for highly power LED. This project research important include : (1) to design a circuit board for LED drive current, (2) to design a human-machine interface program for measuring LED junction temperature,and (3) to integrate a circuit board for LED drive current and a human-machine interface program for LED junction temperature, achieve fully automatic measurement system architecture.

Keywords : Light Emitting Diode(LED) ; Junction Temperature ; Diode Forward Voltage Method ; Data Acquisition card (DAQ) Card

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REFERENCES

[1]史光國(民93)現代半導體發光及雷射二極體材料技術，頁1-1~3，全華科技圖書有限公司，民國九十三年八月，台北。

[2]S.G.Johns and J.A.Simmons, ” Materials for Solid State Light ” ,Proc Materials research Society Spring Meeting,April 1-5,2002 in Francisco,California.

[3]胡振國，半導體元件物理與技術，頁14-16，全華科技圖書有限公司，民國七十九年六月，台北。

[4]劉如熹、王健源，白光發光二極體製作技術，頁1-7~9，1-10~11，4-1~3，全華科技圖書有限公司，民國九十年十月，台北。

[5]資策會MIC產業報告。

[6]林昭穎，「發光二極體導光機構之研究」，國立中央大學光電科學研究所，碩士論文，民國九十一年六月。

[7]劉如熹、林益山，人類未來照明的夢想。科學發展，390，57-59，2004年。
[8]白光發光二極體(LED)及照明產業，中鼎月刊，331.11~13。
[9]廖豐標、李承銘、溫坤禮、孫健仁，白光發光二極體的發光效率，第四屆為電子技術與應用研討會，頁58-59，民國九十五年五月。
[10] Y. Xi and E. F. Schubert, Junction-temperature measurement in GaN ultraviolet light-emitting diodes using diode forward voltage method, Applied Physics Letters, Volume 85, Number 12,pp.2163-2165,2004.
[11] Lumileds, Application notes 1149-4 Thermal Management Considerations for Super Flux LEDs.
[12] Kelvin Shin.(2004) LED Junction Temperature Measurement and its Applications to Automotive Lamp Design,2004 SAE World Congress Detroiy, Michign, March 8-11.
[13] E. Hong and N. Narendran, “ A method for projecting usful life of LED lighting system ”, 3rd Conference on Solid State Lighting, Proc. of SPIE 5187:93-99(2004).
[14] N.Narendra, Y, Gu, and R. Hosseinzadeh, “ Estimating junction temperature of high-flux white LEDs, ” Light-emitting Diodes: Research, Manufacturing, and application VIII, Proc. of SPIE 5366:158-160(2004).
[15] Y. Gu and N. Narendra, ” A non-contact method for determining junction temperature of phosphor-converted white LEDs, ” 3rd Conference on Solid State Lighting, Proc. of SPIE 5187:107-114(2004).
[16] 惠汝生，LabVIEW 7.1 Express圖控程式應用含自動量測及硬體應用，頁1-2~3，全華科技圖書有限公司，民國九十四年十月，台北。
[17] 美商國家儀器公司(National Instrument ; NI) DAQ Card PCI6221操作手冊，頁27-35.
[18] 美商國家儀器公司(National Instrument ; NI) SCB-68 68-Pin Shielded Connector Block User Manual.