International Journal of Research in Engineering, Science and Management
Volume-3, Issue-1, January-2020
www.ijresm.com | ISSN (Online): 2581-5792

Automatic Mechanism for LED Parameters Testing and Checking

Saurabh Kuhikar[1], Animesh Gupta[2], Lalit Gohane[3], P. D. Khandait[4]
[1,2,3]*Student, Department of Electronics Engineering, KDK College of Engineering, Nagpur, India*
[4]*Professor, Department of Electronics Engineering, KDK College of Engineering, Nagpur, India*

***Abstract*: Since from 90's sodium high power lamps are used. This lamp consumes more power and voltage, and they cause great loss of energy. In current environment of encouraging clean energy development, which can meet the demand of lighting and achieve energy saving at same time, convert electrical energy into light energy, green environment protection, long life service and less required voltage. Therefore, LED lights have been used widely in all fields, especially in lighting of homes and public places. But as per the market availability it has two type of LED i.e. Branded or Non-Branded LED, so it is difficult to choose from them which is best one.**

***Keywords*: LED, LED Driver, Parameters, Sensor.**

1. Introduction

LED is one of the electronic components that is used for many purposes in day to day life of human being such as decoration purpose for wedding, organizing events, Festivals decoration etc. Working principle of the LED is same as simple ordinary diode and it is fabricated by the various types of semiconductor (i.e. GaAs). The parameters of LED are brightness, voltage, current, power rating, color etc. The problem regarded to LED's is that it gets fused or exploded in case of abrupt changes in environment and temperature or the variation of input voltage and current also damage the LED. To protect the LED, it need to design LED driver that provide constant current to LED and save the life of LED [1]. Another parameter is highlighted i.e. brightness to calculate it can require a wide range light sensor to sense the brightness [2]. Even when the LED if not fabricated in standard ways; can affect the performance of LED. So our aims to check all parameters of LED that can be done by manual testing [3] [5]. But may have human errors. It also need major component that handle all task that work like a controller and give the suitable output [9]. To overcome this problem, it is necessary to design mechanisms that find all variables.

2. Literature review

- *A Wide Range Constant Current LED Driver with Improved Power Quality and nil Standby (March 2018). Aman Jha and Manoj Kumar,* during this research paper they create LED driver circuit for big selection constant current with improve power quality. They work on schemes which are predicated on constant current mode single stage single switch. It can analyzed to style LED driver like Input Filter Selection, High Frequency QRASW Mode Transformer Selection, QRASM PFC Converter Design, Design of Smart Features this are propose method which are accustomed achieve good power quality, high efficiency for LED driver to urge constant current. By the help of this paper the LED driver is use for streetlight for regulating the LED current with high efficiency and single driver rather than multi-driver scheme are used [1].
- *Immunity Test of LED Lamps Based on IEC 61000-4-19 and Unexpected Consequence (May 2018). Selcuk Sakar, Sarah Ronnberg and Math H. J. Bollen,* the proposed paper describe this project consist of Immunity Test of LED Lamps based on IEC6100-4-19 and dynamic changes in LED performance. In order to identify flickers as intermodulation or non-synchronization and deviation of the mains frequency with the help of immunity standard. In this paper it creates an algorithm to examine the light intensity variation while 24 LEDs are tested. The super harmonics components bring the light intensity variations hence immunity test is essential [2].
- *Estimation of Luminous Flux and Luminous Efficacy of Low-Power SMD LED as a Function of Injection Current and Ambient Temperature (May 2016). Muna E. Raypah, Bashiru K. Sodipo, Mutharasu Devarajan and Fauziah Sulaiman,* this paper is based on how to estimate luminous flux and luminous efficiency of Low power SMD LED as a function of ambient temperature. As the title shows paper describe about the SMD LED how it will be efficient or operate when deviation occurs in ambient temperature at constant injection current and normalized injection current at constant ambient temperature. So these all can observed with help of mathematical equation and finally result found that it is much affected by ambient temperature as compare with injection current [5].
- *Analysis and Simulation of one Stage Power Supply for LED Lighting (Dec 2013). Sreedevi V T,* the aim of the paper is that to realize the LED driver operation in less power. For designing the LED driver it can assume ideal component like (capacitor, inductor, MOSFET, transformer, diode, etc.) and verify by mathematical equations. Hence it can refers as

a fly back converter as current regulator. It can provide a relentless current to the LED with high efficiency and low run power [8].

- *Brightness control of LED lamp using Fuzzy Logic Controller (June 2010), Yueh-Ru Yang,* this paper represents how to control the brightness of LED lamp used in fuzzy logic controller. Its use 8-bit PI microcontroller to control the brightness of LED lamp. There are many controllers to control the brightness of LED like look-up table fuzzy logic controller, Proportional integral controller, and real-time calculation fuzzy logic controller. It used photosensitive sensor to sense the brightness of LED it convert analog value to digital. This algorithm is programmed in C language. To drive the LED lamp PWM current source is used to avoid the changes in brightness error. The main purpose of this paper is to select proper controller with respect to program run time step response time, ROM and RAM, run time and response time to calculate brightness [9].

3. Methodology

First of all, we select anyone LED that ought to be branded or non-branded and place into the LED Driver circuit and spending the various current through the LED. Because the quality LED fabricating companies (i.e. Osram, Bajaj, Eveready, Havells, and Bosch etc.). Follow the quality fabrication rules. Passing the various currents like 150 mA,300mA & 500mA through the LED and find the reading across the LED by the assistance of Arduino microcontroller at mega 328 Here Arduino is that the CPU of the mechanism it program in such way that finds the all the fundamental parameters of LED which is shown on the displays. The LCD display is employed to display voltage and power with their S.I units and Nokia display is employed to point out brightness or intensity in lumen per meter. To calculate the brightness of the LED it requires a sensor which might sense the brightness of LED and provides the result to the Arduino. There are differing kinds of sensors like LDR, photodiode, IR sensors, but as per the efficiency in term of ranges BH1750 brightness sensor is more efficient and more sensitive. LED requires the almost 3 volts to operate normally. We using the 12 v dc power supply that given to LED driver circuit to flow sufficient voltage to indicate on the LED. The voltage across LED is find with help of analog pin of Arduino is connected to the anode terminal of LED to sense the voltage reading and process them. Power is calculated by formula of ohms' law which is in built in Arduino code by using the programming language C and give facility to display the power in LCD display. This technique is referring to calculate the all parameters of LED.

4. Conclusion

From Literature survey, it's observed that there's a provision to distinguish between branded LED and native LED with the assistance of basic parameters analysis of LED. If it's automatic systems, then it can avoid the human error in parameter calculation and it can save the time. In day to day life customer buy cheap products most of the times which are local products in order that they don't seem to be long life products. Hence by making this project customer can check whether it should be branded to Non-branded. It also helpful for LED development industries to satisfy the customer requirement to test and check LED easily. It doesn't require used bulkier and high power equipment to check the LED.

References

[1] Aman Jha and Manoj Kumar, "A Wide Range Constant Current LED Driver with Improved Power Quality and Zero Standby," IEEE IEEMA Engineer Infinite Conference (eTechNxT), 13-14 march 2018.
[2] Selcuk Sakar, Sarah Ronnberg and Math H. J. Bollen, "Immunity Test of LED Lamps Based on IEC 61000-4-19 and Unexpected Consequence," IEEE 18th International Conference on Harmonics and Quality of Power (ICHQP), 13-16 May 2018.
[3] Yao Bin, Xu Huawei, Zhou Zhenwei, Lu Guoguang, Lai Canxiong and Li Ruguan, "The Study of Natural Exposure Testing for LED Lighting System," 18th International Conference on Electronic Packaging Technology, 16-19 Aug 2017.
[4] Xiaohui Qu, Huai Wang and Xiaoqing Zhan, "A Lifetime Prediction Method for LEDs Considering Mission Profiles," IEEE Applied Power Electronics Conference and Exposition (APEC), 20-24 march 2016.
[5] Muna E. Raypah, Bashiru K. Sodipo, Mutharasu Devarajan, and Fauziah Sulaiman, "Estimation of Luminous Flux and Luminous Efficacy of Low-Power SMD LED as a Function of Injection Current and Ambient Temperature," IEEE Transaction on Electron devices, vol. 63, no.7, July 2016.
[6] A. Jha and B. Singh, "Power quality improvement using bridgeless-Landsman converter for LED driver," IET Power Electro, vol. 9, no. 13, pp. 2591-2601, Oct. 2016.
[7] A. Jha and B. Singh, "Modified bridgeless landsman PRC converter for LED driver," 7th India Inter. Confer. On Power Electro. (IICPE), Patiala, 2016, pp.1-6, 17-19 Nov 2016.
[8] Sreedevi V. T, "Analysis and Simulation of a Single Stage Power Supply for LED Lighting," International Conference on Green Computing, Communication and Conservation of Energy (ICGCE), 12-14 Dec. 2013
[9] Yueh-Ru Yang, "Brightness control of LED lamp using Fuzzy Logic Controller," 5th IEEE Conference on Industrial Electronic and Application, 15-17 June 2010.
[10] Do Hung Nguyen, Jaber Hasan, and Simon S. Ang, "A Built-In Self-Test High-Current LED Driver," IEEE 8th International Conference on ASIC, 20-23 Oct 2009.