The Study of Junction Temperature of High Power GaN Light Emitting Diodes

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ABSTRACT

LED (Light Emitting Diode) is one of the photo-electronic devices for P-N semiconductor materials of associative. There are many good selling points for LED such as small size, long lifetime, low consume electric, response fast. Therefore, LED products are getting more and more popular. Except for traffic sights and outdoor-boards, high-power LEDs gain territory in the applications of the back-lighting systems and solid-state illumination. High-power LEDs requiring high currents drive generate much heat, relatively the temperature of active region control extremely important, because the heat generated in the active layer region would increase more and more, leading to degradation in illumination efficiency and reliability. Therefore, representing the high power of light emitting diodes and high efficiency at the same time, the temperature of active region must be paid attention to too. To evaluate the heat management system, a precise measurement system for junction temperatures of light emitting diodes is highly desirable. We applied the forward voltage method to measure the junction temperature of light emitting diodes and developed an automatic measurement system for the junction temperature of light emitting diodes. So, this thesis depicts importance for the junction temperature of high-power LEDs, and demonstrated that advantages of characterization of junction temperature by using the forward voltage method.

Keywords : Junction Temperature ; Forward Voltage Method ; Light-Emitting Diode

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