

PWDAS-32

A STABILIZED HBLED CONTROLLER SUITABLE AS CALIBRATION STANDARD

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High brightness LED's [HBLED] are susceptible to light intensity degradation from self-heating which reduces the quantum efficiency of photon production. Thermal management for these HBLED's, especially for calibration standards, is essential. We have developed a modular controller that can be used for HBLED's from several manufacturers. This controller provides a stable current drive to the HBLED and manages LED junction temperature so that the total light intensity output remains constant to less than 0.25% over time. Less than 0.03% variation per degree room temperature change is typically observed. In measurements of intensity vs. time, see Fig 1 & 2, stabilization time in is approximately six minutes and total intensity variation ($|\max-\min|/\text{average}$) during operation is less than 0.2%. Intensity repeatability after cycling on/off multiple times over several days is less than 0.2%.

Light Intensity

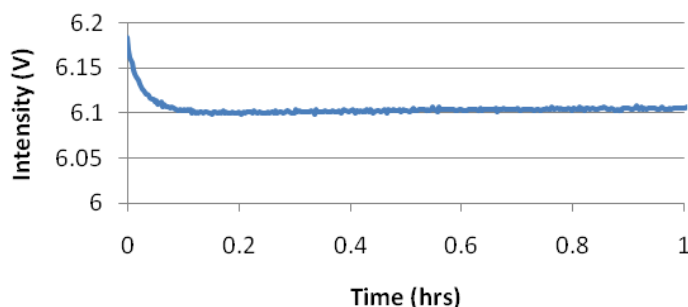


Figure 1: Light intensity as a function of time.

Junction Voltage

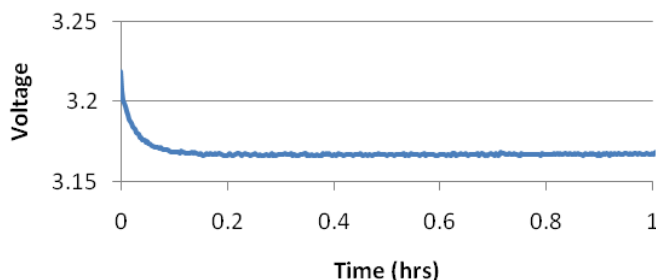


Figure 2: HBLED junction voltage vs. time during operation

In this presentation, we will show further experimental results of Intensity variation vs. time, spectral change vs. time, ambient temperature sensitivity, junction voltage correlation to intensity, and long term repeatability results.