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Module light decay is large



Overview

How to Solve LED Module Light Decay Issues Now that you understand the causes, let's explore some practical solutions to prevent and solve light decay issu.

Key Takeaways

Large module light decay occurs when an LED's brightness gradually diminishes over time due to heat, material degradation, and driver or environmental factors.What is Light Decay?

Light decay, also called lumen depreciation, is the gradual reduction in luminous flux (brightness) of an LED module over time. Unlike traditional bulbs that fail suddenly, LEDs typically dim slowly until their output becomes insufficient for practical use . This decay is a key factor in determining the effective lifespan of LED modules and luminaires .

Causes of Large Light Decay
• Heat Build-up: Excessive heat accelerates degradation of LED chips, phosphors, and circuit boards. DOB (driver-on-board) modules are particularly susceptible because the driver is integrated, concentrating heat .

• Chip and Phosphor Degradation: Semiconductor materials in LED chips (e.g., GaN) deteriorate under high temperatures, reducing electroluminescence efficiency. White LEDs also experience phosphor aging, which can cause color shifts and reduced brightness .

• Encapsulation Material Aging: Epoxy or silicone encapsulants can yellow or develop micropores over time, blocking light or altering color temperature .

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• Driver Circuit Issues: Voltage spikes or overcurrent can overheat chips, accelerating decay .

• Environmental Factors: High humidity, corrosive substances, or sulfide exposure can damage LED components, further reducing light output .

• Component Quality: Lower-quality LEDs and drivers degrade faster, leading to more noticeable light decay .

Measuring Light Decay

The L70 standard is commonly used, indicating the number of hours until an LED's brightness drops to 70% of its initial value. High-quality LED modules can reach 50,000–100,000 hours before reaching L70, depending on design and operating conditions . Other metrics like L80 or L90 are also used to define service life and maintenance planning .

Mitigation Strategies

• Effective Heat Management: Use heat sinks, thermal pads, or improved module design to reduce operating temperature .

• High-Quality Components: Select LEDs and drivers with certifications (ETL, JA8) to ensure longevity .

• Constant Lumen Output (CLO): Adjust current or power over time to maintain consistent brightness despite natural decay .

• Regular Maintenance: Inspect and clean modules to prevent dust, corrosion, or thermal buildup .

Practical Implications

Large module light decay affects lighting uniformity, energy efficiency, and visual comfort. For applications like street lighting, sports fields, or industrial facilities, controlling decay is critical to maintain illumination standards and reduce maintenance costs . By understanding the causes and implementing mitigation strategies, the impact of large module light decay can be minimized, extending the effective lifespan and performance of LED installations.

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High-power LEDs also have luminous decay, which is directly related to temperature. It is determined by the chip, phosphor and

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Analysis of the causes of light decay of Jinko Solar modules

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Ultimate Light Intensity Models Decay

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This article explores light intensity decay, starting from its basic conceptual framework and progressing into the

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The influence of chip on the light decay of white LED According to the current experimental results, the influence of

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What Is Light Decay in Street Lights and How to Judge LED ...

When we talk about the performance and longevity of LED street lights, one term often comes up: light decay. But

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What factors contribute to LED degradation over time?

LED suffer from lumen depreciation and color shift over time. Such can be speed up by external factors; like VoCs. In

Reliability and Lifetime of LEDs

Introduction With the increasing complexity of technical equipment, modules or even individual components, the aspects of reliability

LED Brightness Degradation: Do LED Lights Dim With Age?

The loss of brightness is mainly due to the structure of the light emitting diode. Minimal impurities in the semiconductor

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