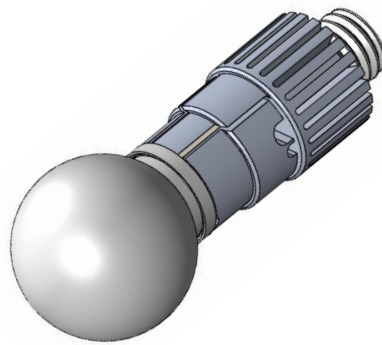


NICHIA CORPORATION

SPECIFICATION FOR STANDARD LED WITH OMNIDIRECTIONAL EMISSION

PART NO. NLSW30S21A

- LED reference standard with temperature control unit
for luminous flux and radiant flux calibration



SPECIFICATIONS

(1) Absolute Maximum Ratings

Item	Symbol	Absolute Maximum Rating	Unit
Forward Current	I_F	200	mA
Allowable Reverse Current	I_R	50	mA
Operating Temperature	T_{opr}	20~30	°C
Storage Temperature	T_{stg}	-30~60	°C
Platinum Resistance Temperature Device (RTD) Current	I_{pt}	1	mA
Peltier Device Current	I_{pel}	-2~2	A
Peltier Device Voltage	V_{pel}	-30~30	V

* Absolute maximum ratings at $T_A=25^{\circ}\text{C}$.

* A Class A Pt100 RTD (reference standard: IEC 60751) is incorporated.

(2) Initial Electrical/Optical Characteristics

Item	Symbol	Condition	Typ	Unit
Forward Voltage	V_F	$T_{pt}=90^{\circ}\text{C}$, $I_F=200\text{mA}$	46.5	V
Luminous Flux	Φ_v	$T_{pt}=90^{\circ}\text{C}$, $I_F=200\text{mA}$	164	lm

* Characteristics at $T_A=25^{\circ}\text{C}$.

* Luminous Flux value as per CIE 127:2007 standard.

* Platinum RTD temperature (T_{pt}) must be controlled between 85°C and 95°C .

* The product seasoned for 200 hours at $T_A=25^{\circ}\text{C}$, $I_F=200\text{mA}$ was characterized.

* The stability of the characteristics during use varies depending on the directions for use.

(3) Lumen Maintenance

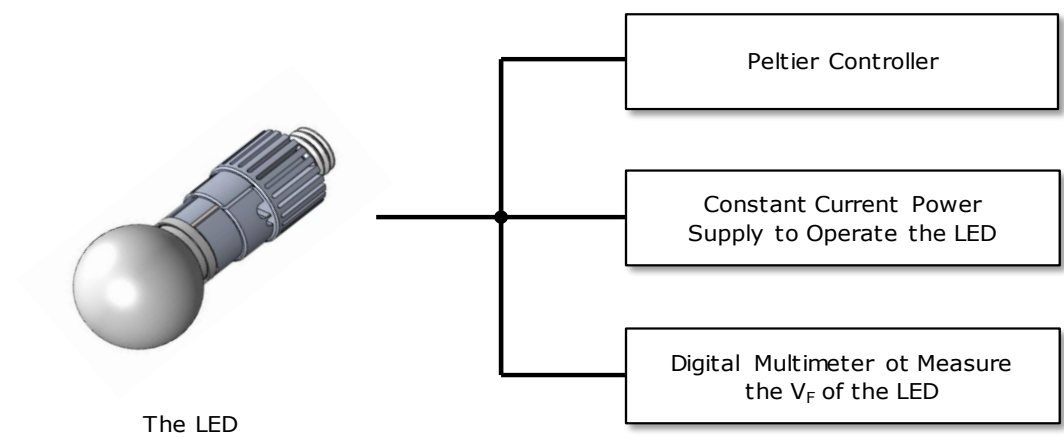
* The change in luminous flux will be $\leq \pm 3\%$ when the LED has been operated for 100 hours in total or when 1 year has passed from the calibration date of the LED, whichever occurs earlier.

* Operating conditions: $T_A=25^{\circ}\text{C}$, $T_{pt}=90^{\circ}\text{C}$ ($\pm 0.03^{\circ}\text{C}$), $I_F=200\text{mA}$ ($\pm 0.1\%$)

DIRECTIONS FOR USE

(1) Recommended Peripheral Equipment to Connect to the LED

- The following describes examples of recommended peripheral equipment to connect to the LED.



Recommended Specifications for Peripheral Equipment

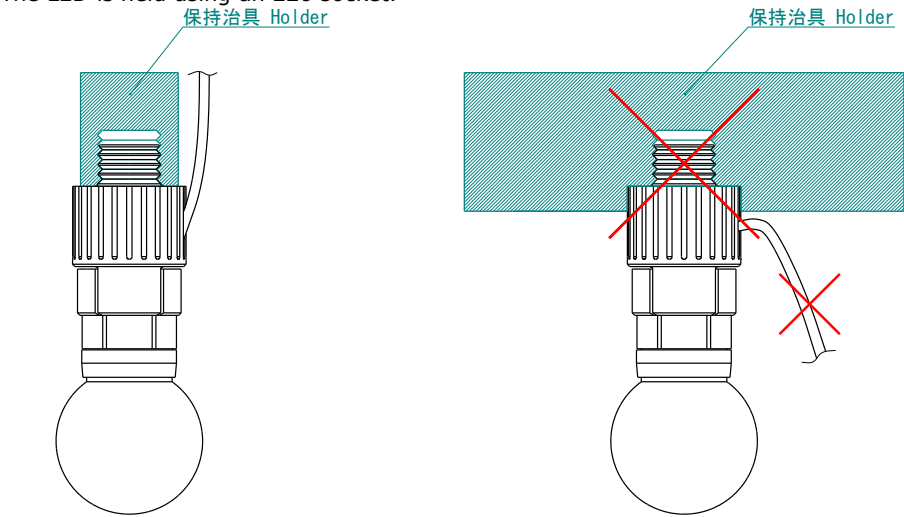
Peltier Controller	PID controllable. Temperature measurement accuracy: $\pm 0.03^{\circ}\text{C}$
Constant Current Power Supply to Operate the LED	Drive current accuracy: $\leq 0.1\%$ of the set current
Digital Multimeter to Measure the V _F of the LED	Input impedance: $\geq 1\text{G}\Omega$

(2) How to Hold the LED

- The following figures show examples for how to hold the LED.

Example:

The LED is held using an E26 socket.



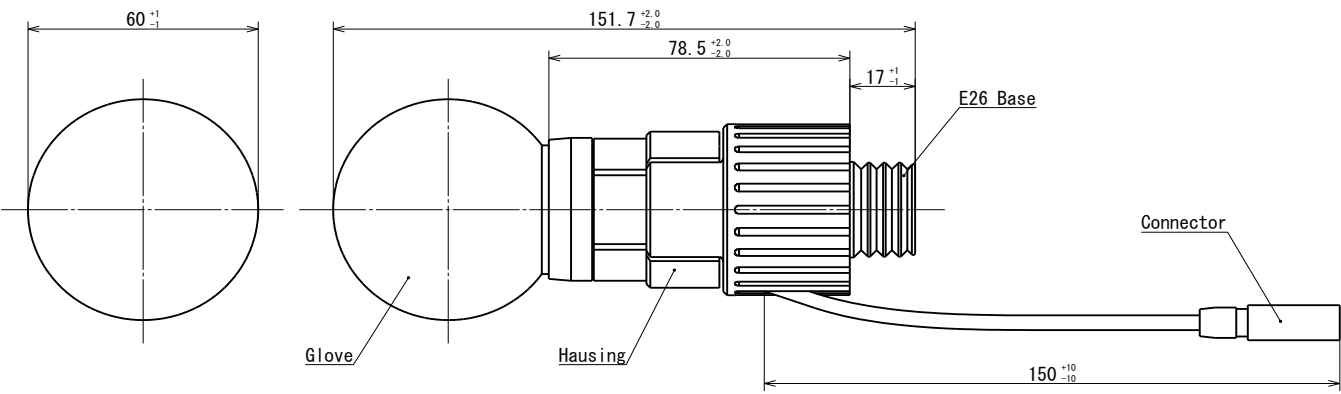
- As much as possible, ensure that the light from the LED is not obstructed by the holder and/or the wiring in any direction. Otherwise, the measurement values will be affected.

(3) How to Prepare the LED for Calibration

- Turn on the temperature control system and apply a constant current to the LED. Ensure that the LED is operated for a sufficient period (i.e. usually for approximately 3-5 minutes) in order to stabilize the luminous flux before it is measured for calibration purposes. For the characteristics for ten minutes from the start of operation, see the graphs for the operation time characteristics provided in OPERATION TIME CHARACTERISTICS/TEMPERATURE CHARACTERISTICS.

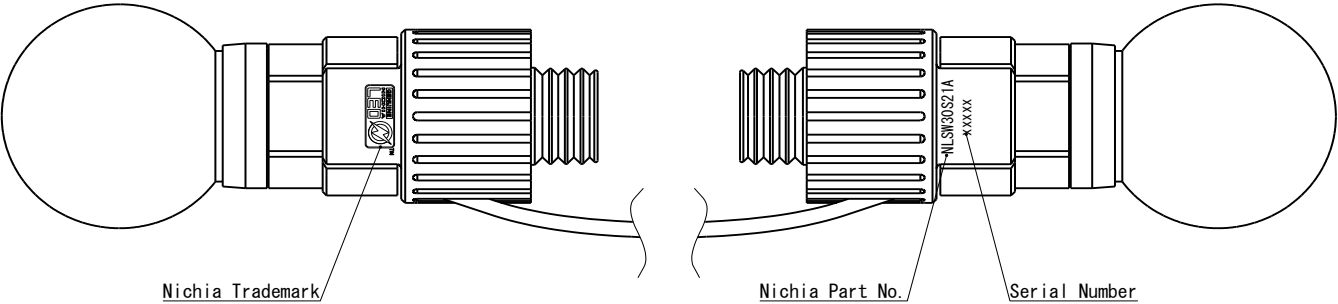
OUTLINE DIMENSIONS

Part No. NLSW30S21A
No. SQST-DA6-0016



単位 Unit:mm

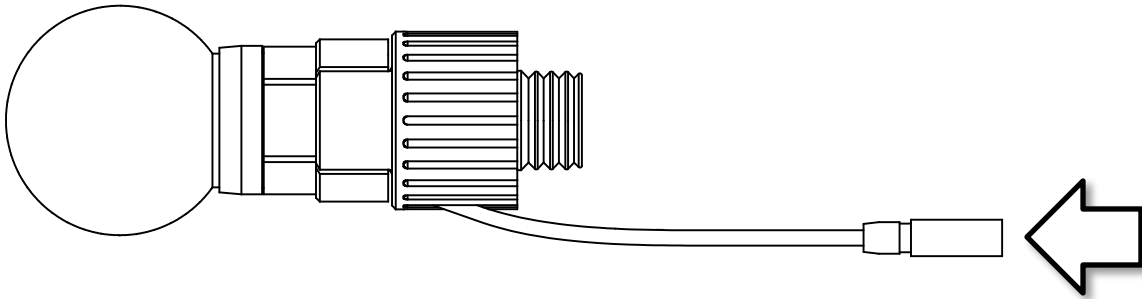
項目 Item	内容 Description	数量 Quantity
コネクタ Connector	PHJ.0B.309.GLAD56 manufactured by LEMO Japan Ltd.	1
筐体 Housing	材質: アルミニウム Material: Aluminum	1
グローブ Glove	材質: 樹脂 Material: Resin	1



WIRING CONNECTION

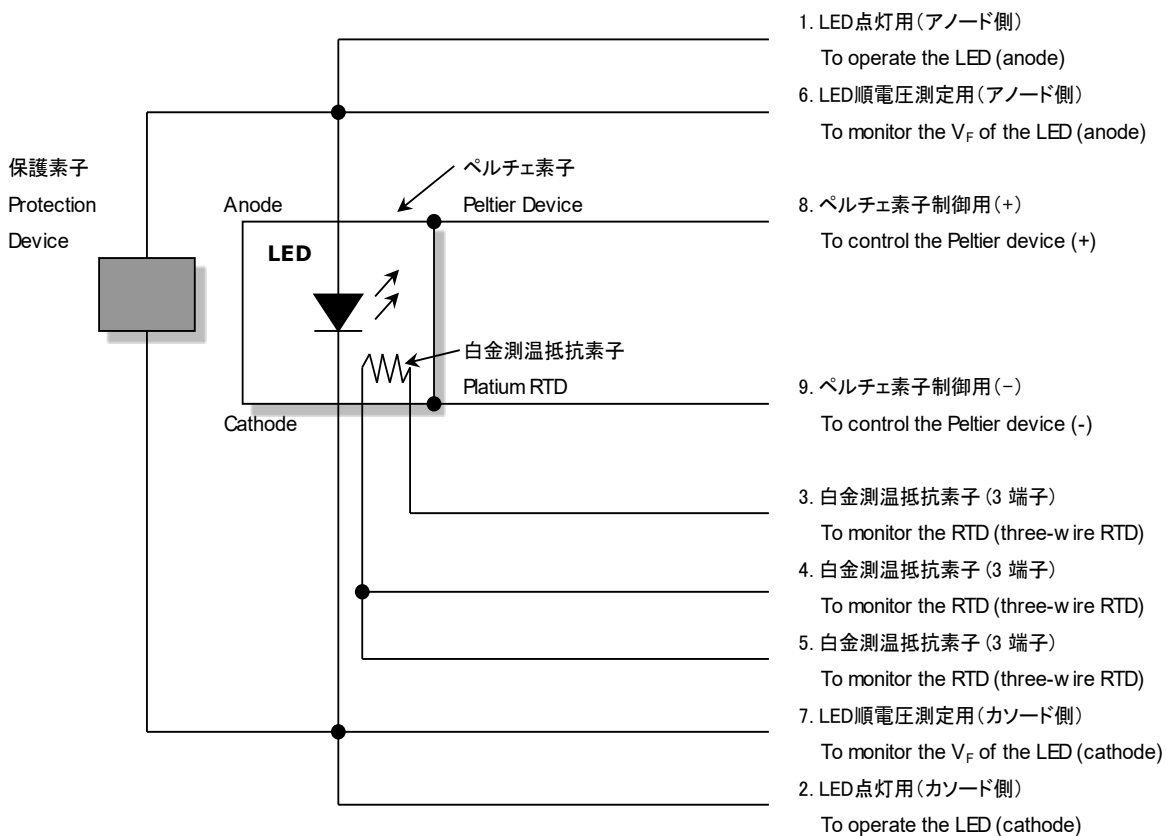
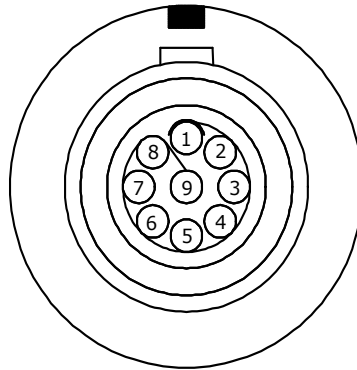
Part No. NLSW30S21A

No. SQST-DA6-0015



下の図は、配線先端のコネクタです(矢印の方向から見た図)

The following picture shows the connector at the end of wiring (i.e. viewed from the direction of the arrow).



PACKAGING

Part No. NLSW30S21A

No. SQST-DA6-0017



* フォーム材を装着したLED1個を、段ボール箱に入れます。

One LED fitted with foam padding is placed in a cardboard box.

*ダンボール箱とシリカゲル乾燥剤を、一緒に防湿アルミ袋に入れます。その後、防湿アルミ袋を熱シールします。

The cardboard box is placed in a moisture-proof aluminum bag with silica gel desiccants.

The moisture-proof aluminum bag is then heat-sealed.

* 防湿アルミ袋を、緩衝材と一緒に段ボール箱に入れます。

The moisture-proof aluminum bag is packed in a cardboard box with cushioning material.

* 梱包テープで段ボール箱に封をします。

The cardboard box is sealed with packing tape.

* 段ボール箱には、顧客名、日亜型番、数量、シリアル番号などを記載したラベルが貼付されます。

The cardboard box have a label that provides

the Customer name, Nichia part number, quantity, serial number, etc.

OPTICAL CHARACTERISTICS

* 本特性は参考です。

All characteristics shown are for reference only and are not guaranteed.

Part No. NLSW30S21A

No. SQST-DA6-0018

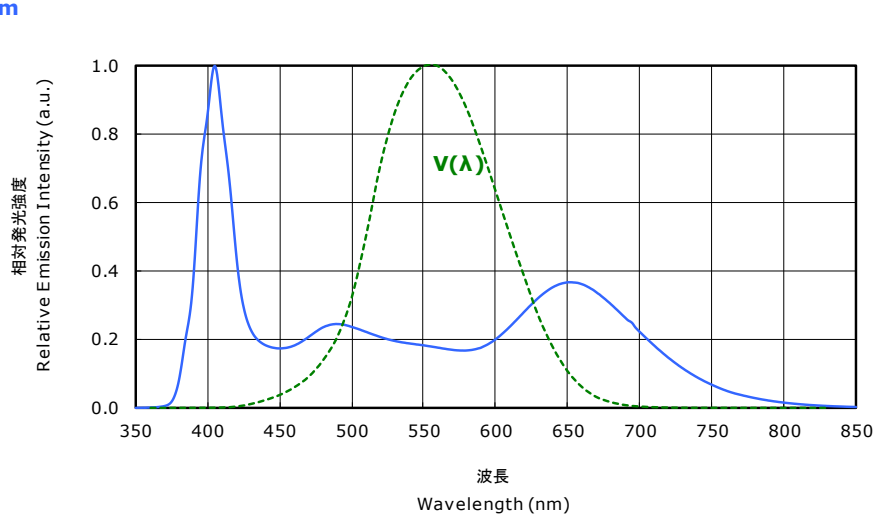
* グラフの特性は、白金測温抵抗素子の温度を90 °Cに制御し、 $I_F=200$ mAで測定した特性です。

The characteristics shown in the graphs are the characteristics measured while the temperature of the incorporated RTD is controlled to be 90 °C and at $I_F=200$ mA.

* 特性測定に使用した外付け温度コントローラの温度制御精度は ± 0.03 °C (温度コントローラ製造業者が提示する仕様値)です。

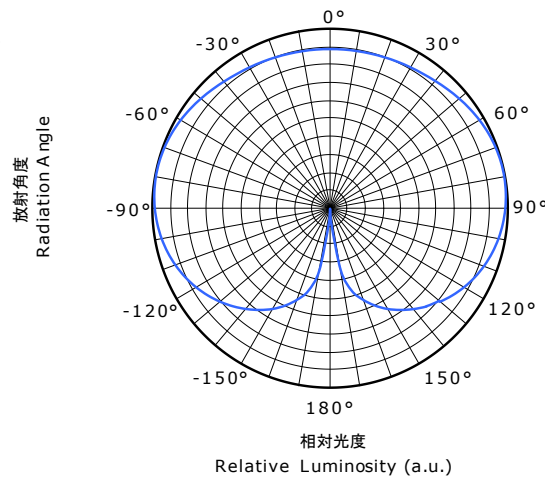
The temperature control accuracy of the external temperature controller used for the characteristics measurements is ± 0.03 °C (i.e. the specification value provided by the manufacturer of the temperature controller).

発光スペクトル Spectrum

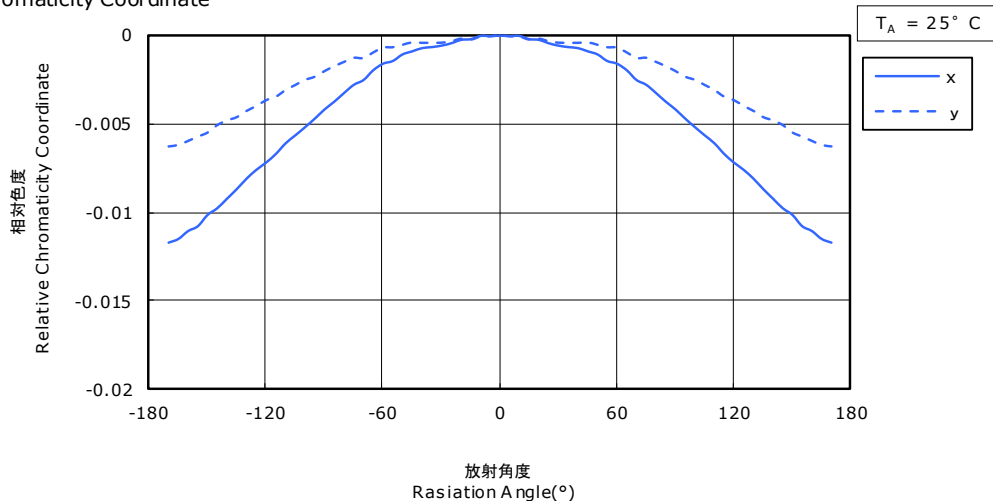


指向特性 Directivity

光度
Luminous Intensity



色度
Chromaticity Coordinate



OPERATION TIME CHARACTERISTICS/TEMPERATURE CHARACTERISTICS

* 本特性は参考です。

Part No. NLSW30S21A

All characteristics shown are for reference only and are not guaranteed.

No. SQST-DA6-0019

* グラフの特性は、白金測温抵抗素子の温度を90 °Cに制御し、 $I_F=200$ mAで測定した特性です。

The characteristics shown in the graphs are the characteristics measured while the temperature of the incorporated RTD is controlled to be 90 °C and at $I_F=200$ mA.

* 特性測定に使用した外付け温度コントローラの温度制御精度は ± 0.03 °C (温度コントローラ製造業者が提示する仕様値)です。

The temperature control accuracy of the external temperature controller used for the characteristics measurements is ± 0.03 °C (i.e. the specification value provided by the manufacturer of the temperature controller).

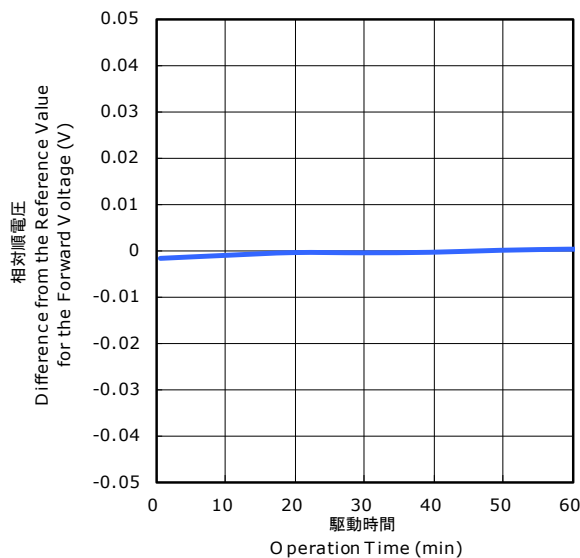
* グラフの基準値は、 $T_A=25$ °Cで駆動時間60分での測定値です。

The reference values for the graphs are the values measured at the operation time of 60 minutes at $T_A=25$ °C.

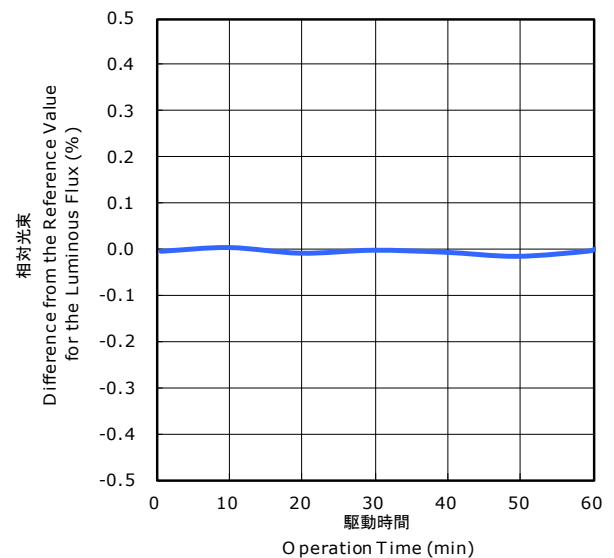
* 基準値との差は、LEDが使用される条件/環境によって異なる場合があります。

The difference from the reference values may change depending on the conditions/environment in which the LED is used.

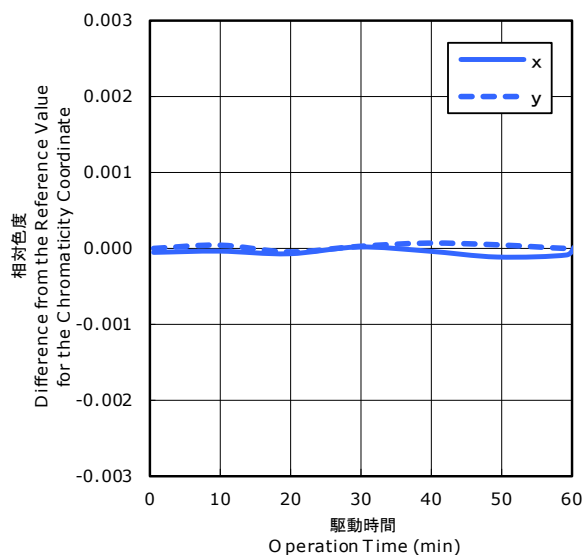
駆動時間 vs 順電圧
Operation Time vs
Forward Voltage



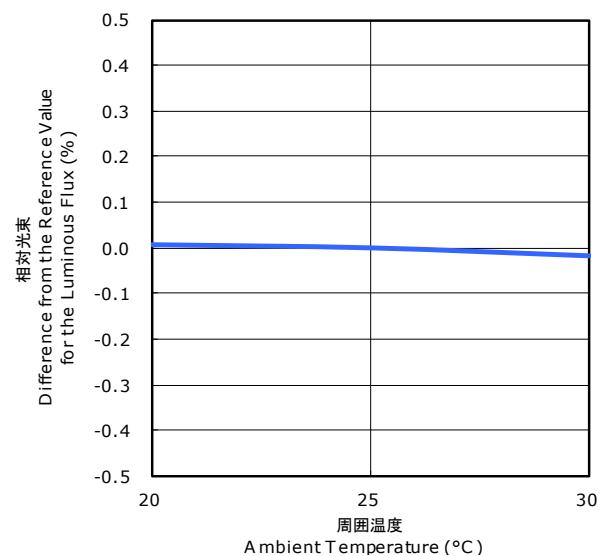
駆動時間 vs 光束
Operation Time vs
Luminous Flux



駆動時間 vs 色度
Operation Time vs
Chromaticity Coordinate



周囲温度 vs 光束
Ambient Temperature vs
Luminous Flux



CAUTIONS

(1) Storage

- The LED should be stored at $\leq 30^{\circ}\text{C}$ and $\leq 70\%$ RH in a hermetically-sealed container with silica gel desiccants.
- To avoid condensation, the LED must not be stored in areas where temperature and humidity fluctuate greatly.

(2) Handling Precautions

- The LED used in this product employs silicone as encapsulating resin. Do not touch the encapsulant as the encapsulant is soft and easy to attract dirt. Failure to comply might have adverse effects on characteristics, and, in the worst-case scenario, lead to catastrophic failure.
- Ensure that the LED is not dropped/exposed to any impact; that may affect the characteristics.

(3) Design Consideration

- Volatile organic compounds that have been released from materials present around the LEDs (e.g. housing, gasket/seal, adhesive, secondary lens, lens cover, etc.) may penetrate the LED lens and/or encapsulating resin. If the LEDs are being used in a hermetically sealed environment, these volatile compounds can discolor after being exposed to heat and/or photon energy and it may greatly reduce the LED light output and/or color shift. In this case, ventilating the environment may improve the reduction in light output and/or color shift. Perform a light-up test of the chosen application for optical evaluation to ensure that there are no issues, especially if the LEDs are planned to be used in a hermetically sealed environment.

(4) Electrostatic Discharge (ESD)

- This LED is sensitive to transient excessive voltages (e.g. ESD, lightning surge). If this excessive voltage occurs in the circuit, it may cause the LED to be damaged causing issues (e.g. an effect on the characteristics). Ensure that when handling the LED, necessary measures are taken to protect it from an ESD discharge. The following examples are recommended measures to eliminate the charge:
 - Grounded wrist strap, ESD footwear, clothes, and floors
 - Grounded workstation equipment and tools
 - ESD table/shelf mat made of conductive materials

(5) Eye Safety

- There may be two important international specifications that should be noted for safe use of the LEDs: IEC 62471:2006 Photobiological safety of lamps and lamp systems and IEC 60825-1:2001 (i.e. Edition 1.2) Safety of Laser Products - Part 1: Equipment Classification and Requirements. Ensure that when using the LEDs, there are no issues with the following points:
 - LEDs have been removed from the scope of IEC 60825-1 since IEC 60825-1:2007 (i.e. Edition 2.0) was published. However, depending on the country/region, there are cases where the requirements of the IEC 60825-1:2001 specifications or equivalent must be adhered to.
 - LEDs have been included in the scope of IEC 62471:2006 since the release of the specification in 2006.
 - Most Nichia LEDs will be classified as the Exempt Group or Risk Group 1 according to IEC 62471:2006. However, in the case of high-power LEDs containing blue wavelengths in the emission spectrum, there are LEDs that will be classified as Risk Group 2 depending on the characteristics (e.g. radiation flux, emission spectrum, directivity, etc.)
 - If the LED is used in a manner that produces an increased output or with an optic to collimate the light from the LED, it may cause damage to the human eye.
- If an LED is operated in a manner that emits a flashing light, it may cause health issues (e.g. visual stimuli causing eye discomfort). The system should be designed to ensure that there are no harmful effects on the human body.

(6) Others

- The applicable warranty period is one year from the date that the LED is delivered. In the case of any incident that appears to be in breach of this warranty, the local Nichia sales representative should be notified to discuss instructions on how to proceed while ensuring that the LED in question is not disassembled. If a breach of this warranty is proved, Nichia will provide the replacement for the non-conforming LED at Nichia's discretion. FOREGOING ARE THE EXCLUSIVE REMEDIES AVAILABLE TO THE CUSTOMER IN RESPECT OF THE BREACH OF THE WARRANTY CONTAINED HEREIN, AND IN NO EVENT SHALL NICHIA BE RESPONSIBLE FOR ANY INDIRECT, INCIDENTAL OR CONSEQUENTIAL LOSSES AND/OR EXPENSES (INCLUDING LOSS OF PROFIT) THAT MAY BE SUFFERED BY THE CUSTOMER ARISING OUT OF A BREACH OF THE WARRANTY.
- This LED is intended to be used for calibration only. Do not use it for other purposes.
- The customer will not reverse engineer, disassemble or otherwise attempt to extract knowledge/design information from the LED.
- All copyrights and other intellectual property rights in this specification in any form are reserved by Nichia or the right holders who have granted Nichia permission to use the content. Without prior written permission from Nichia, no part of this specification may be reproduced in any form or by any means.
- Both the customer and Nichia will agree on the official specifications for the supplied LED before any programs are officially launched. Without this agreement in writing (i.e. Customer Specific Specification), changes to the content of this specification may occur without notice (e.g. changes to the foregoing specifications and appearance, discontinuation of the LED, etc.).