

# OSRAM KRTBLSLPS1.32

## Datasheet

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DISPLIX® P3333

# KRTB LSLPS1.32

This device is especially designed for full color RGB applications. The 6-lead technology allows for an additive mixture of color stimuli by independent driving of each chip.



## Applications

- Entertainment
- Indoor Lighting
- Projection & Display

## Features

- Package: white PLCC-6 package, diffused silicone resin, black surface
- Chip technology: Thinfilm / UX:3 / InGaN on Sapphire
- Typ. Radiation: 120° (Lambertian emitter)
- Color:  $\lambda_{\text{dom}} = 621 \text{ nm}$  (● red);  $\lambda_{\text{dom}} = 532 \text{ nm}$  (● true green);  $\lambda_{\text{dom}} = 467 \text{ nm}$  (● blue)
- ESD: 500 V acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 1B)

Ordering Information

| Type                                    | Brightness <sup>1)</sup>                                        | Ordering Code |
|-----------------------------------------|-----------------------------------------------------------------|---------------|
| KRTBLSLPS1.32-VUVY-EQ+BTBV-D8+TXUV-L1-B |                                                                 | Q65113A7710   |
| • red                                   | • $I_v = 800 \dots 1323 \text{ mcd}$ ( $I_F = 20 \text{ mA}$ )  |               |
| • true green                            | • $I_v = 1902 \dots 2800 \text{ mcd}$ ( $I_F = 20 \text{ mA}$ ) |               |
| • blue                                  | • $I_v = 377 \dots 710 \text{ mcd}$ ( $I_F = 20 \text{ mA}$ )   |               |

Maximum Ratings

| Parameter                                                                                    | Symbol               |      | Values | Values       | Values |
|----------------------------------------------------------------------------------------------|----------------------|------|--------|--------------|--------|
|                                                                                              |                      |      | ● red  | ● true green | ● blue |
| Operating Temperature                                                                        | $T_{op}$             | min. | -40 °C | -40 °C       | -40 °C |
|                                                                                              |                      | max. | 100 °C | 100 °C       | 100 °C |
| Storage Temperature                                                                          | $T_{stg}$            | min. | -40 °C | -40 °C       | -40 °C |
|                                                                                              |                      | max. | 100 °C | 100 °C       | 100 °C |
| Junction Temperature                                                                         | $T_j$                | max. | 125 °C | 125 °C       | 125 °C |
| Forward Current<br>$T_A = 25\text{ °C}$                                                      | $I_F$                | min. | 1 mA   | 1 mA         | 1 mA   |
|                                                                                              |                      | max. | 40 mA  | 50 mA        | 30 mA  |
| Forward Current pulsed<br>$t_p = 10\text{ }\mu\text{s}$ , $D = 0.005$ , $T_A = 25\text{ °C}$ | $I_{F\text{ pulse}}$ |      | 100 mA | 100 mA       | 100 mA |
| Reverse voltage <sup>2)</sup><br>$T_A = 25\text{ °C}$                                        | $V_R$                | max. | 12 V   | 5 V          | 5 V    |
| ESD withstand voltage<br>acc. to ANSI/ESDA/JEDEC JS-001<br>(HBM, Class 1B)                   | $V_{ESD}$            |      | 500 V  | 500 V        | 500 V  |

## Characteristics

$T_A = 25\text{ °C}$

| Parameter                                                                          | Symbol                  |                      | Values<br>● red                        | Values<br>● true green                 | Values<br>● blue                       |
|------------------------------------------------------------------------------------|-------------------------|----------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Peak Wavelength<br>$I_F = 20\text{ mA}$                                            | $\lambda_{\text{peak}}$ | typ.                 | 634 nm                                 | 526 nm                                 | 462 nm                                 |
| Dominant Wavelength <sup>3)</sup><br>$I_F = 20\text{ mA}$                          | $\lambda_{\text{dom}}$  | min.<br>typ.<br>max. | 616 nm<br>621 nm<br>626 nm             | 519 nm<br>532 nm<br>546 nm             | 464 nm<br>467 nm<br>477 nm             |
| Spectral bandwidth at 50% $I_{\text{rel,max}}$<br>$I_F = 20\text{ mA}$             | $\Delta\lambda$         | typ.                 | 16 nm                                  | 30 nm                                  | 20 nm                                  |
| Viewing angle at 50% $I_V$                                                         | $2\phi$                 | typ.                 | 120 °                                  | 120 °                                  | 120 °                                  |
| Forward Voltage <sup>4)</sup><br>$I_F = 20\text{ mA}$                              | $V_F$                   | min.<br>typ.<br>max. | 1.80 V<br>2.15 V<br>2.40 V             | 2.20 V<br>2.65 V<br>3.10 V             | 2.70 V<br>2.85 V<br>3.40 V             |
| Reverse current <sup>2)</sup><br>$V_R = 12\text{V (red) / 5V (true green / blue)}$ | $I_R$                   | typ.<br>max.         | 0.02 $\mu\text{A}$<br>10 $\mu\text{A}$ | 0.01 $\mu\text{A}$<br>10 $\mu\text{A}$ | 0.01 $\mu\text{A}$<br>10 $\mu\text{A}$ |
| Real thermal resistance junction/solderpoint <sup>5)</sup>                         | $R_{\text{thJS real}}$  | typ.<br>max.         | 120 K / W<br>220 K / W                 | 100 K / W<br>130 K / W                 | 120 K / W<br>160 K / W                 |

## Brightness Groups

• red

| Group | Luminous Intensity <sup>1)</sup><br>$I_F = 20 \text{ mA}$<br>min.<br>$I_v$ | Luminous Intensity <sup>1)</sup><br>$I_F = 20 \text{ mA}$<br>max.<br>$I_v$ |
|-------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|
| VU    | 800 mcd                                                                    | 1058 mcd                                                                   |
| VV    | 849 mcd                                                                    | 1120 mcd                                                                   |
| VW    | 900 mcd                                                                    | 1183 mcd                                                                   |
| VX    | 949 mcd                                                                    | 1250 mcd                                                                   |
| VY    | 1000 mcd                                                                   | 1323 mcd                                                                   |

## Brightness Groups

• true green

| Group | Luminous Intensity <sup>1)</sup><br>$I_F = 20 \text{ mA}$<br>min.<br>$I_v$ | Luminous Intensity <sup>1)</sup><br>$I_F = 20 \text{ mA}$<br>max.<br>$I_v$ |
|-------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|
| BT    | 1902 mcd                                                                   | 2500 mcd                                                                   |
| BU    | 2010 mcd                                                                   | 2646 mcd                                                                   |
| BV    | 2122 mcd                                                                   | 2800 mcd                                                                   |

## Brightness Groups

• blue

| Group | Luminous Intensity <sup>1)</sup><br>$I_F = 20 \text{ mA}$<br>min.<br>$I_v$ | Luminous Intensity <sup>1)</sup><br>$I_F = 20 \text{ mA}$<br>max.<br>$I_v$ |
|-------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|
| TX    | 377 mcd                                                                    | 500 mcd                                                                    |
| TY    | 400 mcd                                                                    | 529 mcd                                                                    |
| TZ    | 424 mcd                                                                    | 560 mcd                                                                    |
| US    | 450 mcd                                                                    | 594 mcd                                                                    |
| UT    | 474 mcd                                                                    | 630 mcd                                                                    |
| UU    | 500 mcd                                                                    | 669 mcd                                                                    |
| UV    | 529 mcd                                                                    | 710 mcd                                                                    |

## Wavelength Groups

• red

| Group | Dominant Wavelength <sup>3)</sup><br>min.<br>$\lambda_{\text{dom}}$ | Dominant Wavelength <sup>3)</sup><br>max.<br>$\lambda_{\text{dom}}$ |
|-------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|       |                                                                     |                                                                     |
| EQ    | 616 nm                                                              | 626 nm                                                              |

## Wavelength Groups

• true green

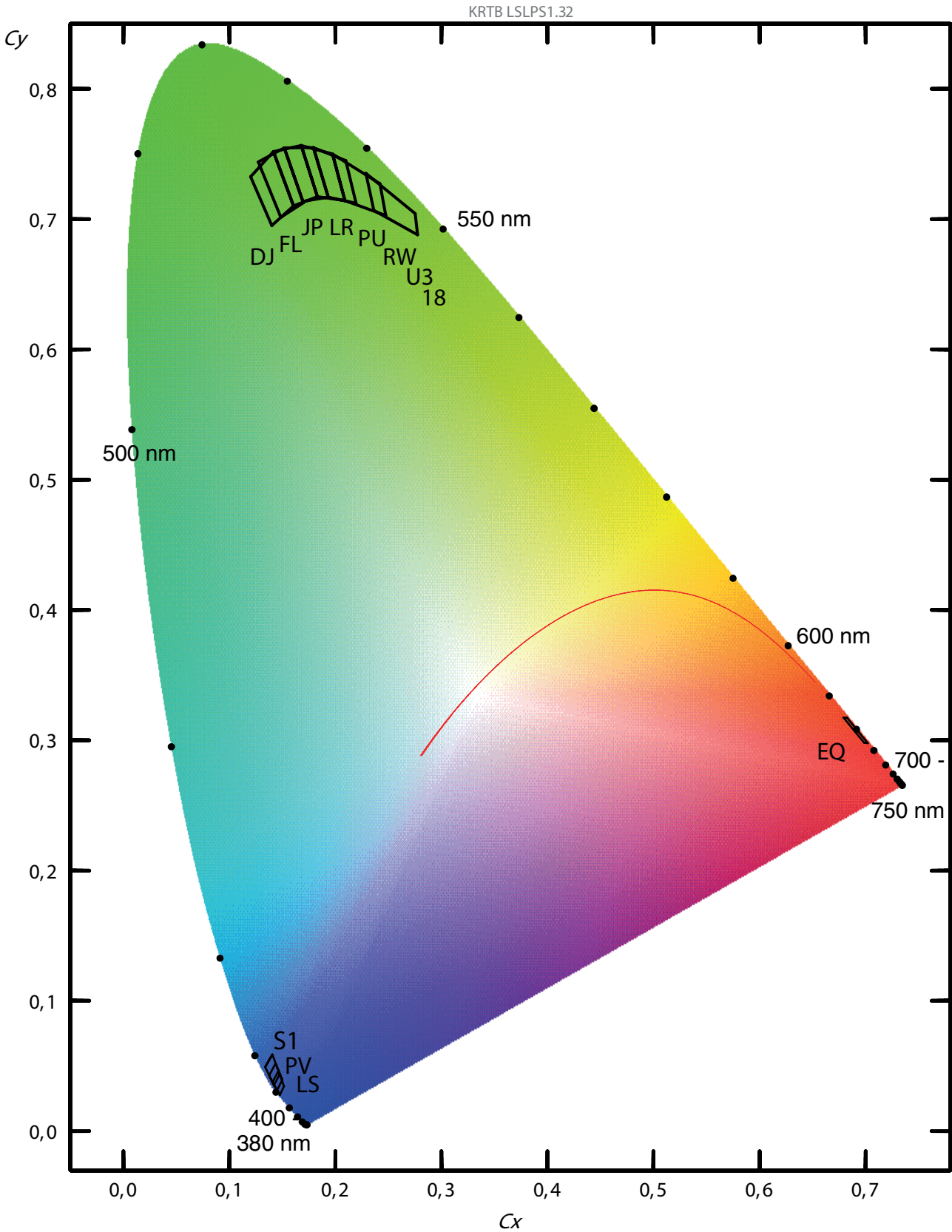
| Group | Dominant Wavelength <sup>3)</sup><br>min.<br>$\lambda_{\text{dom}}$ | Dominant Wavelength <sup>3)</sup><br>max.<br>$\lambda_{\text{dom}}$ |
|-------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|       |                                                                     |                                                                     |
| DJ    | 519 nm                                                              | 524 nm                                                              |
| FL    | 521 nm                                                              | 526 nm                                                              |
| JP    | 524 nm                                                              | 529 nm                                                              |
| LR    | 526 nm                                                              | 531 nm                                                              |
| PU    | 529 nm                                                              | 534 nm                                                              |
| RW    | 531 nm                                                              | 536 nm                                                              |
| U3    | 534 nm                                                              | 541 nm                                                              |
| 18    | 539 nm                                                              | 546 nm                                                              |

## Wavelength Groups

• blue

| Group | Dominant Wavelength <sup>3)</sup><br>min.<br>$\lambda_{\text{dom}}$ | Dominant Wavelength <sup>3)</sup><br>max.<br>$\lambda_{\text{dom}}$ |
|-------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|       |                                                                     |                                                                     |
| LS    | 464 nm                                                              | 470 nm                                                              |
| PV    | 467 nm                                                              | 473 nm                                                              |
| S1    | 470 nm                                                              | 477 nm                                                              |

Chromaticity Coordinate Groups



Chromaticity Coordinate Groups

● red

| Group | Cx     | Cy     |
|-------|--------|--------|
| EQ    | 0.6791 | 0.3174 |
|       | 0.6826 | 0.3172 |
|       | 0.7022 | 0.2977 |
|       | 0.6985 | 0.2981 |

Chromaticity Coordinate Groups

● true green

| Group | Cx     | Cy     |
|-------|--------|--------|
| 18    | 0.2362 | 0.7067 |
|       | 0.2288 | 0.7353 |
|       | 0.2752 | 0.7042 |
|       | 0.2776 | 0.6881 |
| DJ    | 0.1401 | 0.6951 |
|       | 0.1201 | 0.7325 |
|       | 0.1415 | 0.7518 |
|       | 0.1606 | 0.7102 |
| FL    | 0.1486 | 0.7014 |
|       | 0.1273 | 0.7439 |
|       | 0.1517 | 0.7547 |
|       | 0.1698 | 0.7127 |
| JP    | 0.1606 | 0.7102 |
|       | 0.1415 | 0.7518 |
|       | 0.1679 | 0.7565 |
|       | 0.1831 | 0.7174 |
| LR    | 0.1694 | 0.7136 |
|       | 0.1517 | 0.7547 |
|       | 0.1794 | 0.7549 |
|       | 0.1933 | 0.7170 |
| PU    | 0.1831 | 0.7174 |
|       | 0.1678 | 0.7565 |
|       | 0.1973 | 0.7500 |
|       | 0.2091 | 0.7142 |

Chromaticity Coordinate Groups

● true green

| Group | Cx     | Cy     |
|-------|--------|--------|
| RW    | 0.1932 | 0.7170 |
|       | 0.1794 | 0.7549 |
|       | 0.2098 | 0.7449 |
|       | 0.2196 | 0.7122 |
| U3    | 0.2091 | 0.7142 |
|       | 0.1974 | 0.7500 |
|       | 0.2419 | 0.7273 |
|       | 0.2474 | 0.7029 |

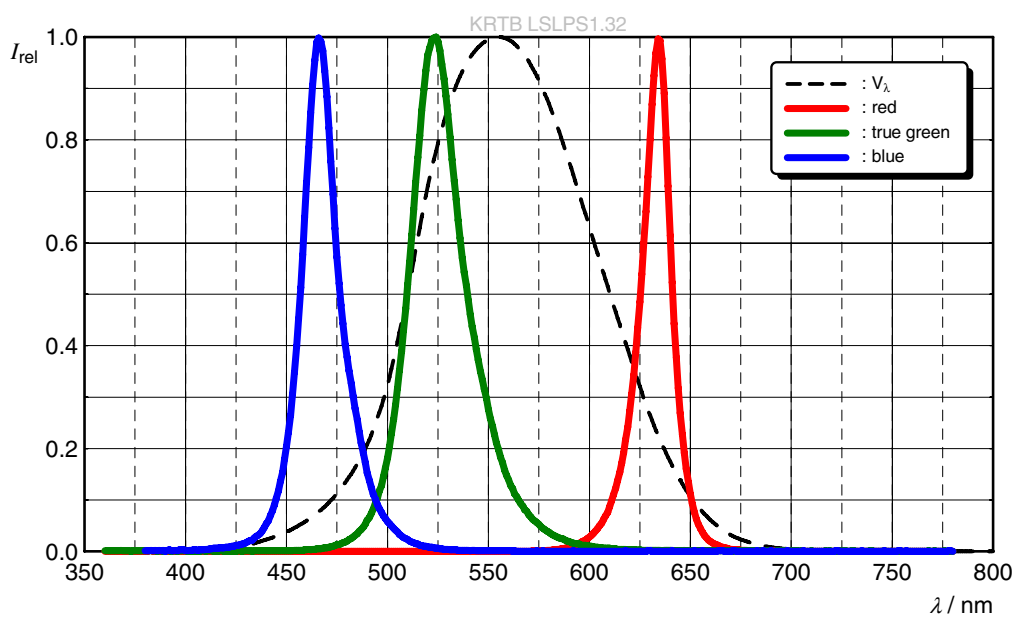
Chromaticity Coordinate Groups

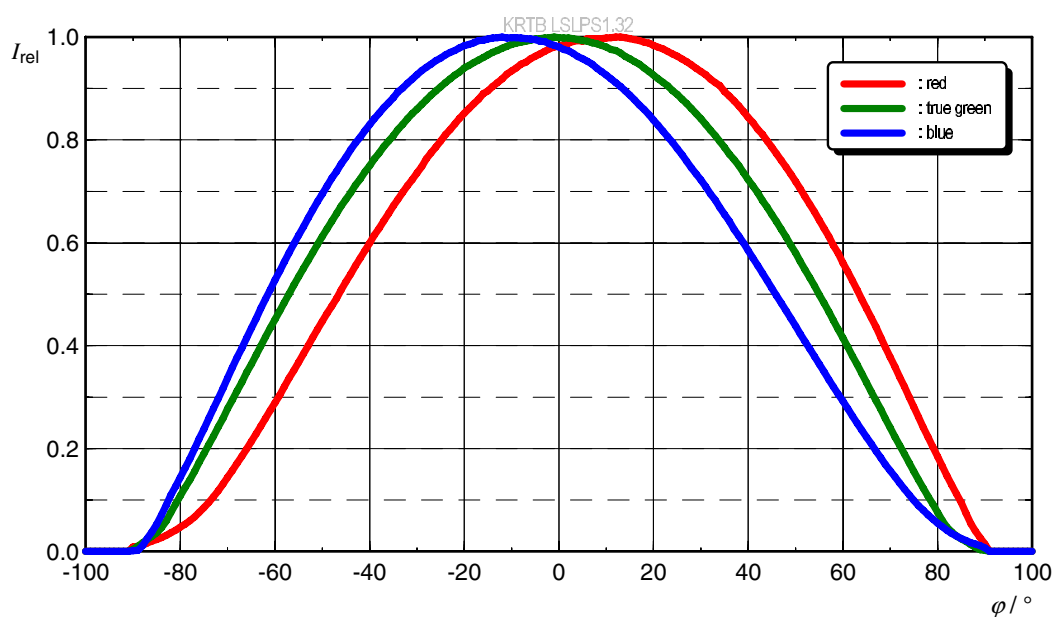
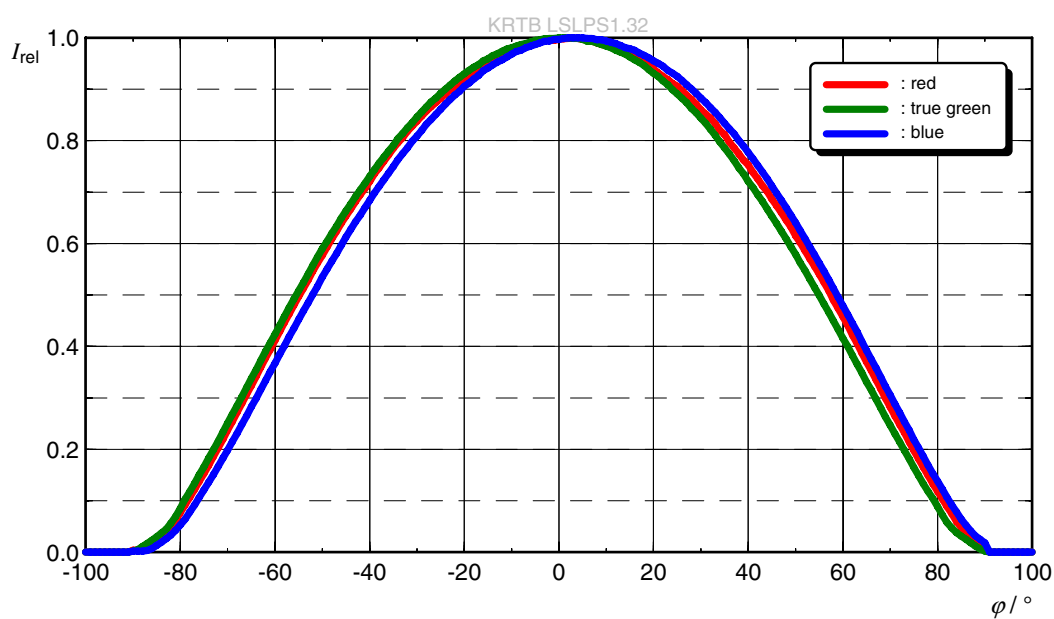
● blue

| Group | Cx     | Cy     |
|-------|--------|--------|
| LS    | 0.1452 | 0.0492 |
|       | 0.1391 | 0.0401 |
|       | 0.1273 | 0.0619 |
|       | 0.1354 | 0.0727 |
| PV    | 0.1405 | 0.0588 |
|       | 0.1338 | 0.0493 |
|       | 0.1199 | 0.0785 |
|       | 0.1295 | 0.0899 |
| S1    | 0.1354 | 0.0727 |
|       | 0.1273 | 0.0619 |
|       | 0.1085 | 0.1086 |
|       | 0.1203 | 0.1204 |

## Relative Spectral Emission <sup>6)</sup>

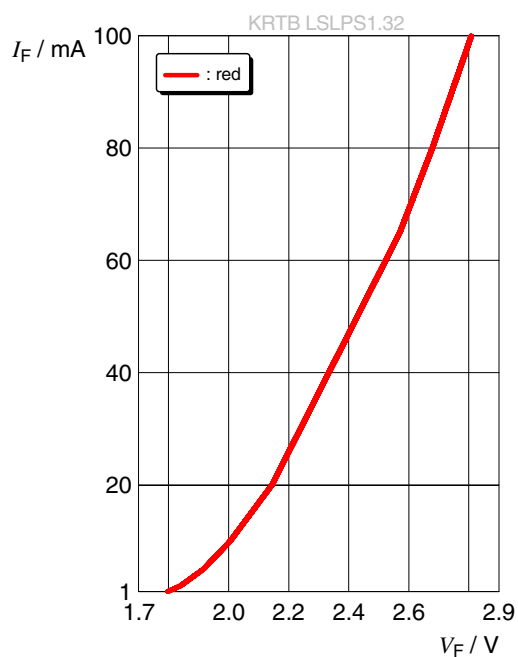
$I_{\text{rel}} = f(\lambda)$ ;  $I_F = 20 \text{ mA}$ ;  $T_S = 25 \text{ °C}$



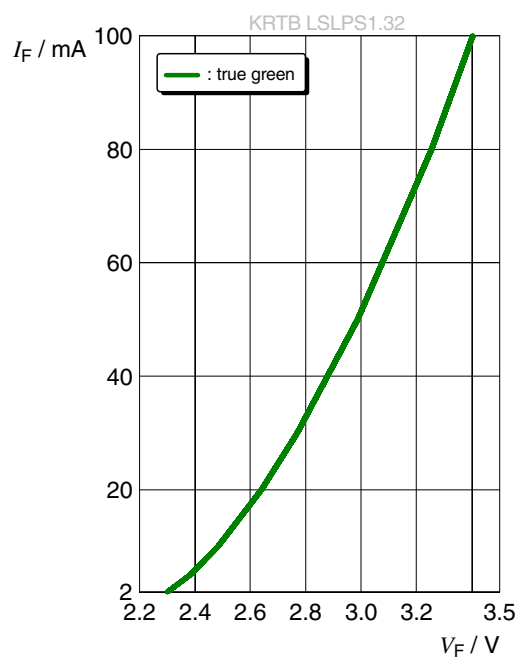
**Radiation Characteristic (horizontal) <sup>6)</sup>** $I_{\text{rel}} = f(\lambda); I_F = 20 \text{ mA}; T_S = 25 \text{ }^{\circ}\text{C}$ **Radiation Characteristic (vertical) <sup>6)</sup>** $I_{\text{rel}} = f(\lambda); I_F = 20 \text{ mA}; T_S = 25 \text{ }^{\circ}\text{C}$ 

**Forward current** <sup>6)</sup>

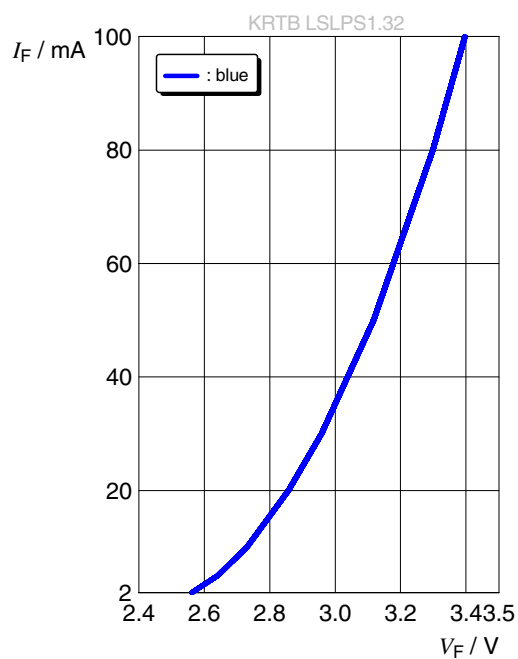
$$I_F = f(V_F); T_S = 25\text{ °C}$$

**Forward current** <sup>6), 7)</sup>

$$I_F = f(V_F); T_S = 25\text{ °C}$$

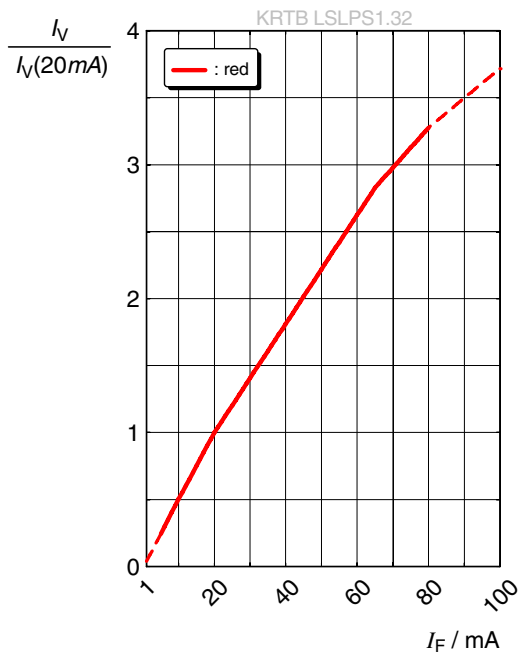
**Forward current** <sup>6), 7)</sup>

$$I_F = f(V_F); T_S = 25\text{ °C}$$



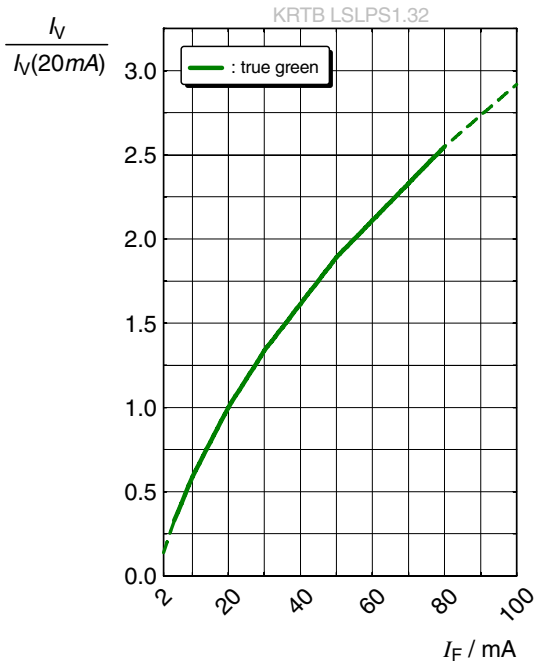
Relative Luminous Intensity <sup>6), 7)</sup>

$I_V/I_V(20\text{ mA}) = f(I_F); T_s = 25\text{ °C}$



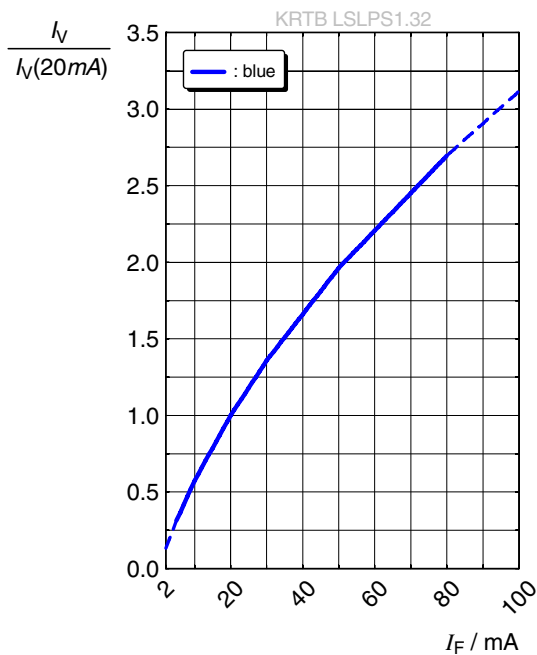
Relative Luminous Intensity <sup>6), 7)</sup>

$I_V/I_V(20\text{ mA}) = f(I_F); T_s = 25\text{ °C}$



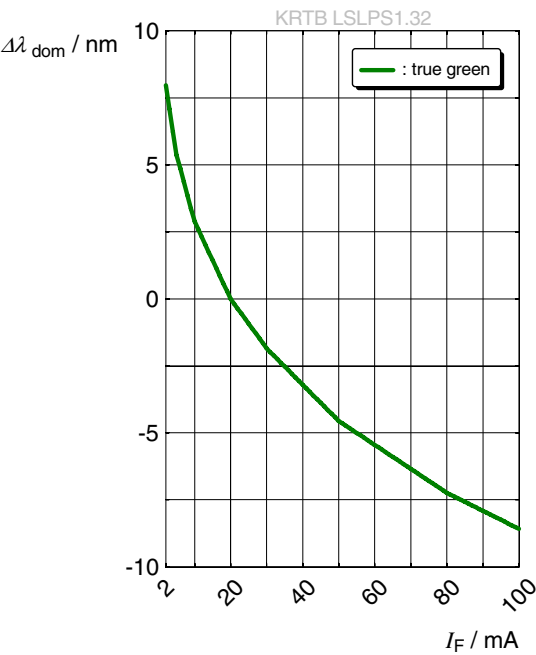
Relative Luminous Intensity <sup>6), 7)</sup>

$I_V/I_V(20\text{ mA}) = f(I_F); T_s = 25\text{ °C}$



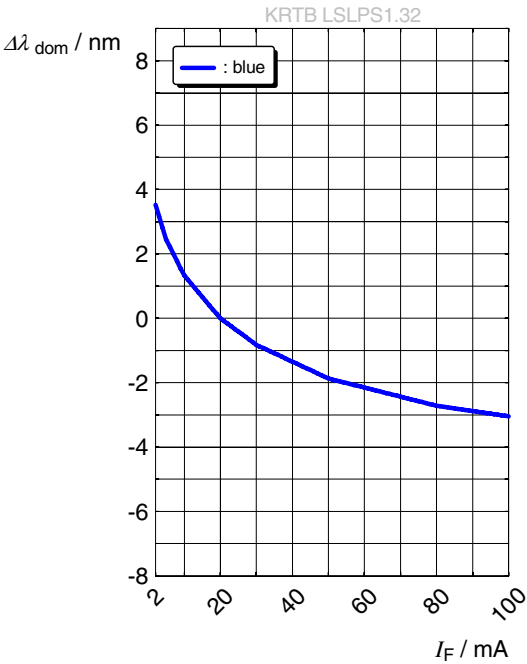
Dominant Wavelength <sup>6)</sup>

$\lambda_{\text{dom}} = f(I_F); T_S = 25\text{ °C}$



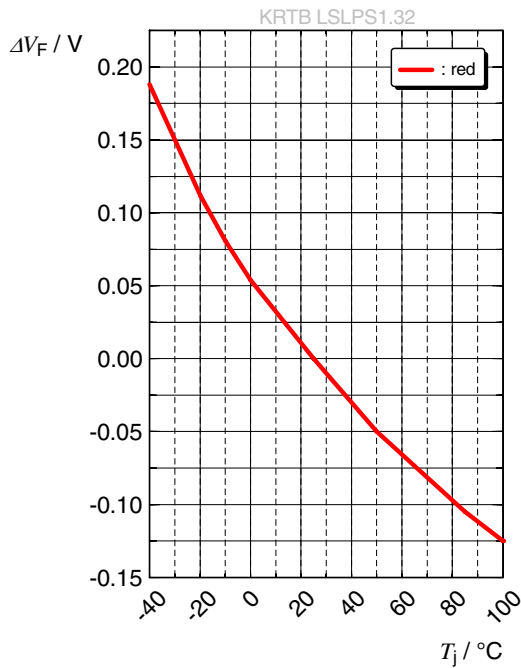
Dominant Wavelength <sup>6)</sup>

$\lambda_{\text{dom}} = f(I_F); T_S = 25\text{ °C}$



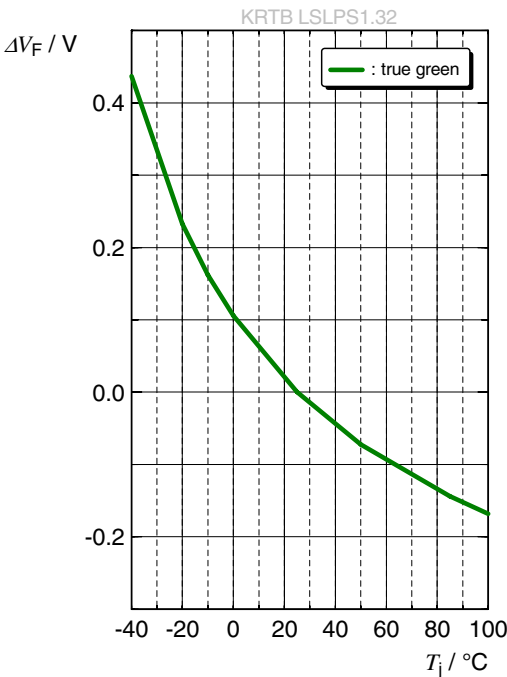
Forward Voltage <sup>6)</sup>

$\Delta V_F = V_F - V_F(25\text{ }^{\circ}\text{C}) = f(T_j); I_F = 20\text{ mA}$



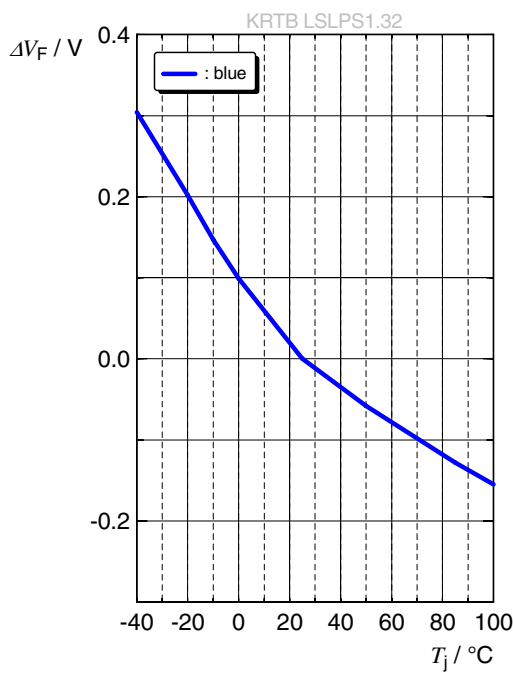
Forward Voltage <sup>6)</sup>

$\Delta V_F = V_F - V_F(25\text{ }^{\circ}\text{C}) = f(T_j); I_F = 20\text{ mA}$



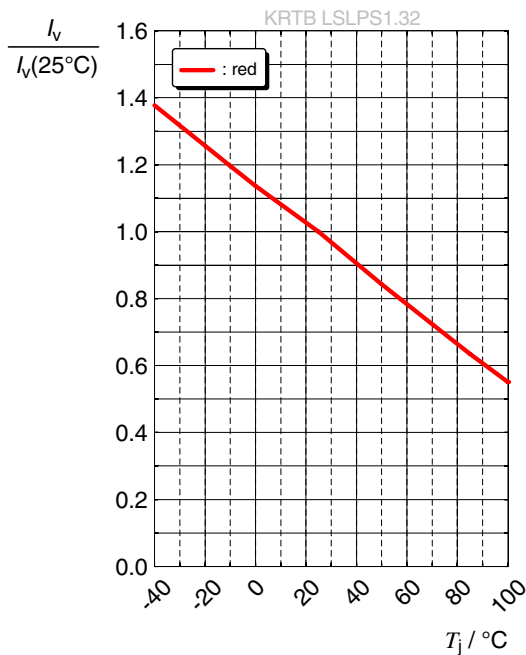
Forward Voltage <sup>6)</sup>

$\Delta V_F = V_F - V_F(25\text{ }^{\circ}\text{C}) = f(T_j); I_F = 20\text{ mA}$



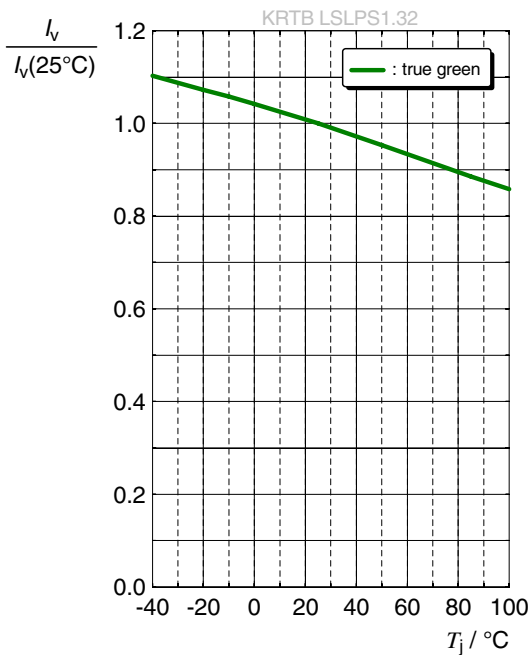
Relative Luminous Intensity <sup>6)</sup>

$I_v/I_v(25\text{ °C}) = f(T_j); I_F = 20\text{ mA}$



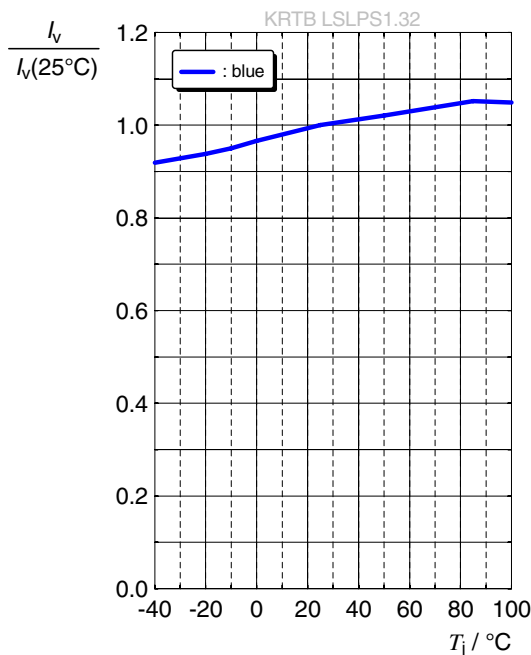
Relative Luminous Intensity <sup>6)</sup>

$I_v/I_v(25\text{ °C}) = f(T_j); I_F = 20\text{ mA}$



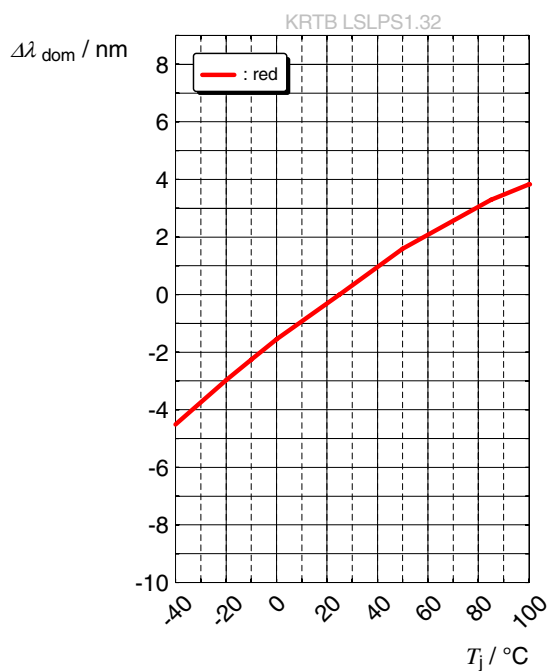
Relative Luminous Intensity <sup>6)</sup>

$I_v/I_v(25\text{ °C}) = f(T_j); I_F = 20\text{ mA}$

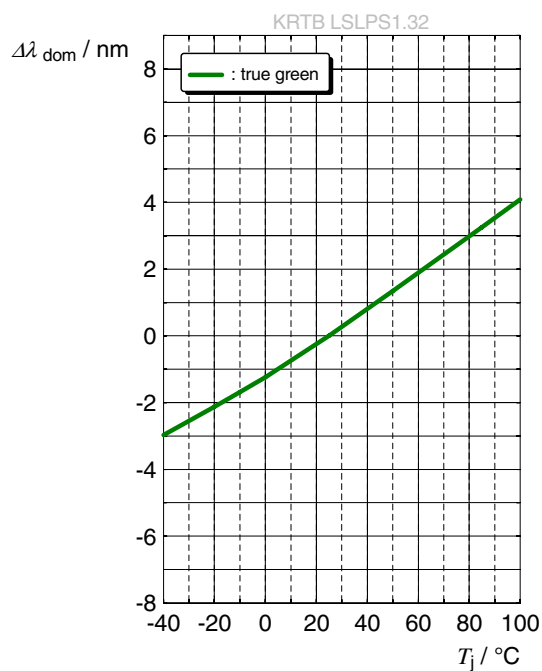


**Dominant Wavelength** <sup>6)</sup>

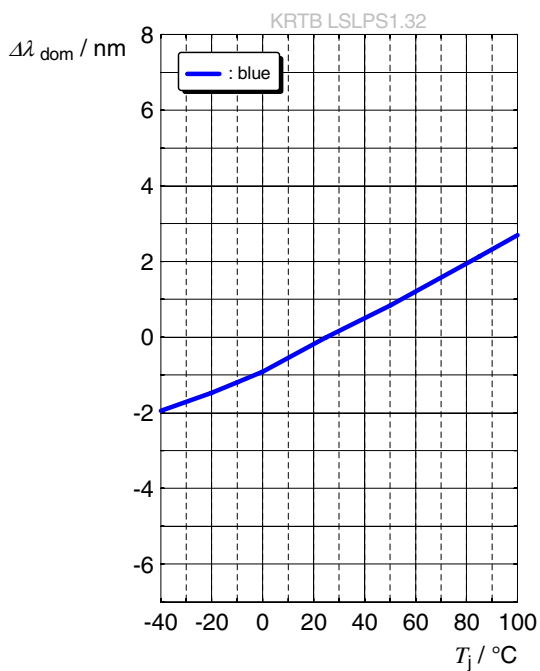
$$\Delta\lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25\text{ °C}) = f(T_j); I_F = 20\text{ mA}$$

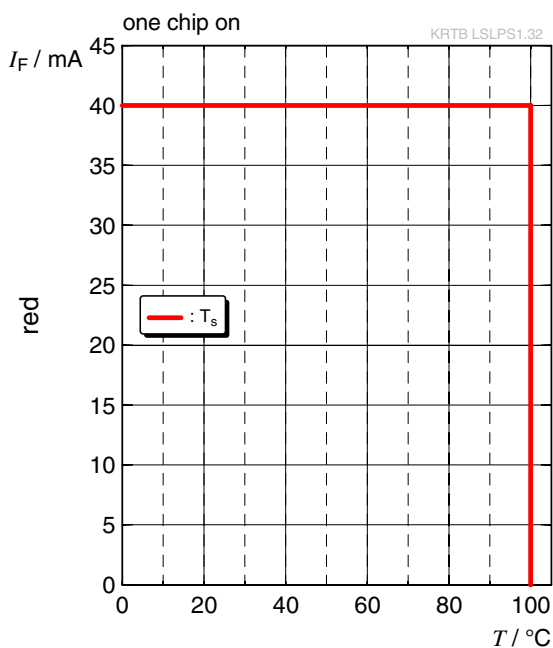
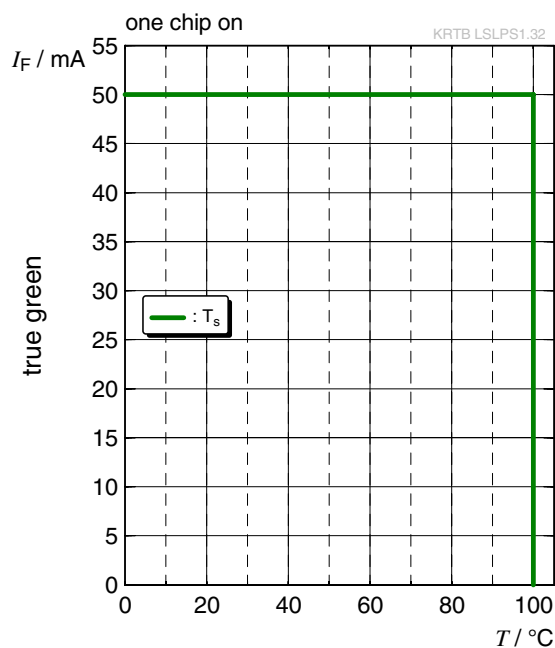
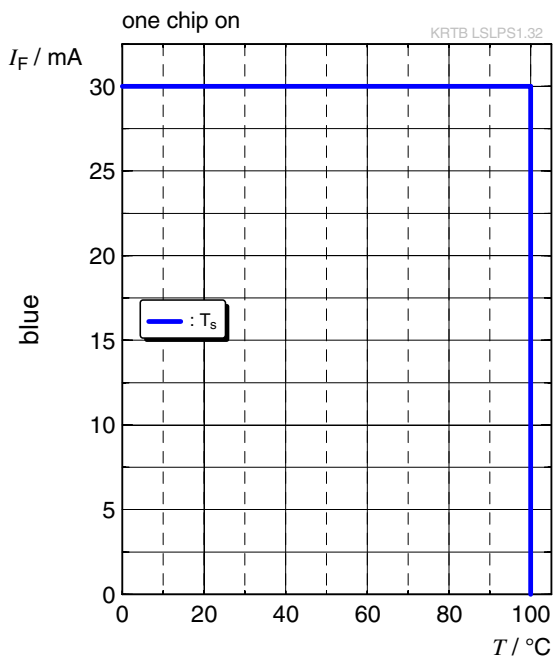
**Dominant Wavelength** <sup>6)</sup>

$$\Delta\lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25\text{ °C}) = f(T_j); I_F = 20\text{ mA}$$

**Dominant Wavelength** <sup>6)</sup>

$$\Delta\lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25\text{ °C}) = f(T_j); I_F = 20\text{ mA}$$

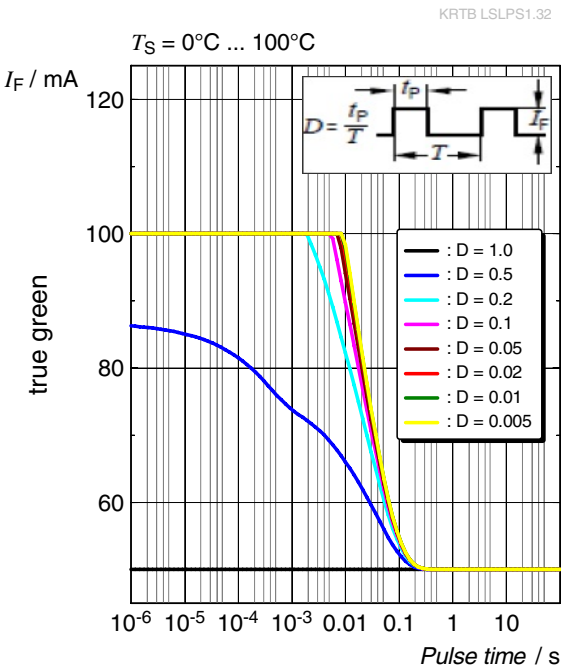
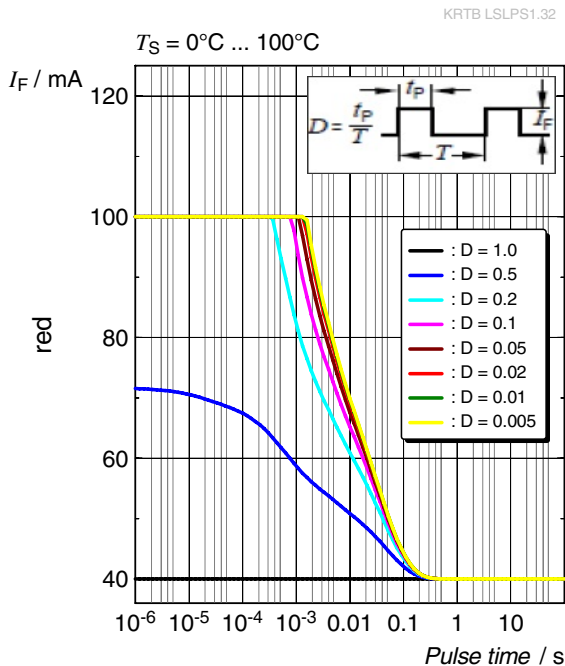


**Max. Permissible Forward Current** <sup>5)</sup> $I_F = f(T)$ ; • red**Max. Permissible Forward Current** <sup>5)</sup> $I_F = f(T)$ ; • true green**Max. Permissible Forward Current** <sup>5)</sup> $I_F = f(T)$ ; • blue

Permissible Pulse Handling Capability <sup>5)</sup> Permissible Pulse Handling Capability <sup>5)</sup>

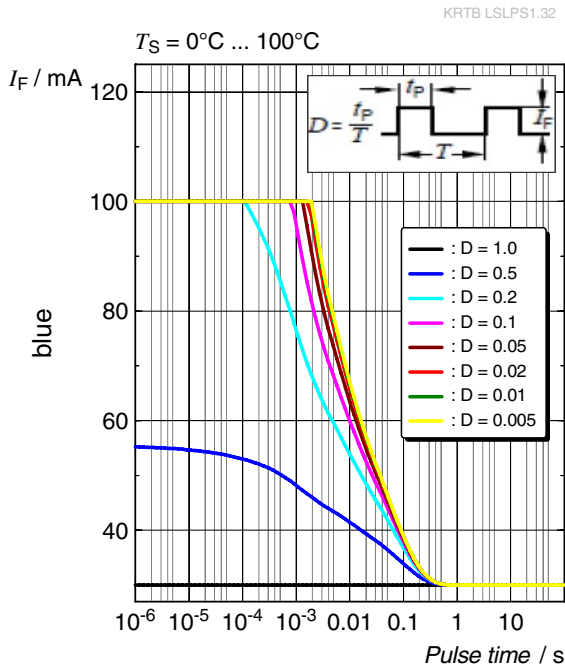
$I_F = f(T)$ ; ● red

$I_F = f(T)$ ; ● true green

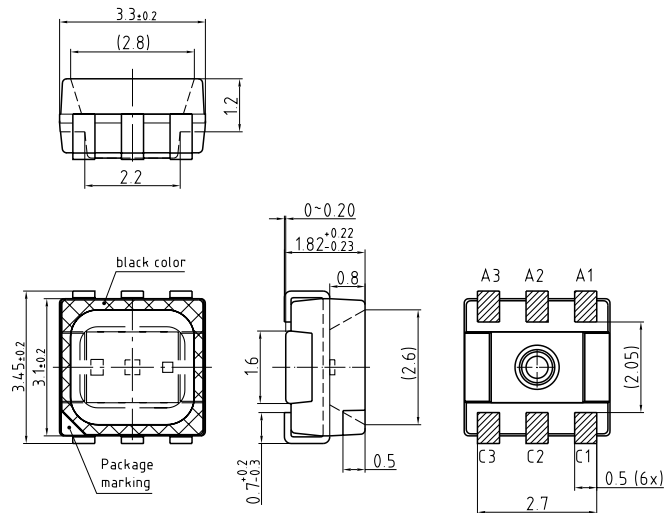


Permissible Pulse Handling Capability

$I_F = f(t_p)$ ; D: Duty cycle;  $T_S = 25^\circ\text{C}$ ; ● blue



Dimensional Drawing 8)



General tolerance  $\pm 0.1$   
Lead finished Ag

C67062-A0226-A2-03

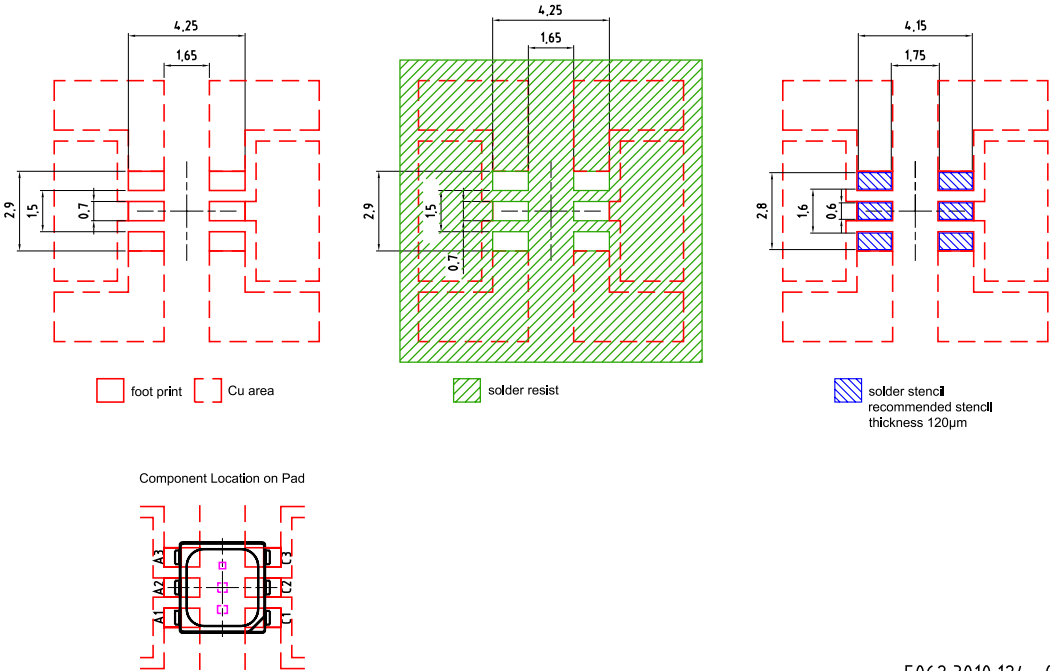
Further Information:

Approximate Weight: 34.0 mg

Notes: Package not suitable for ultra sonic cleaning.

| Pin | Description          |
|-----|----------------------|
| C1  | Cathode (Blue)       |
| A1  | Anode (Blue)         |
| C2  | Cathode (True Green) |
| A2  | Anode (True Green)   |
| C3  | Cathode (Red)        |
| A3  | Anode (Red)          |

Recommended Solder Pad <sup>8)</sup>

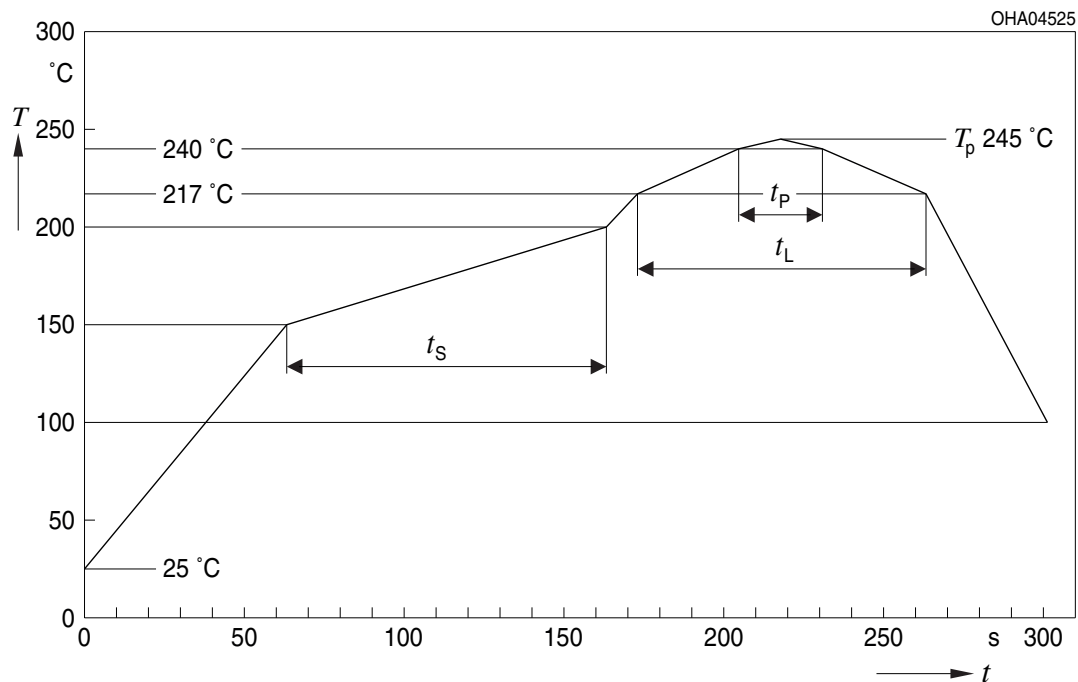


E062.3010.124 -04

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere.

## Reflow Soldering Profile

Product complies to MSL Level 4 acc. to JEDEC J-STD-020E

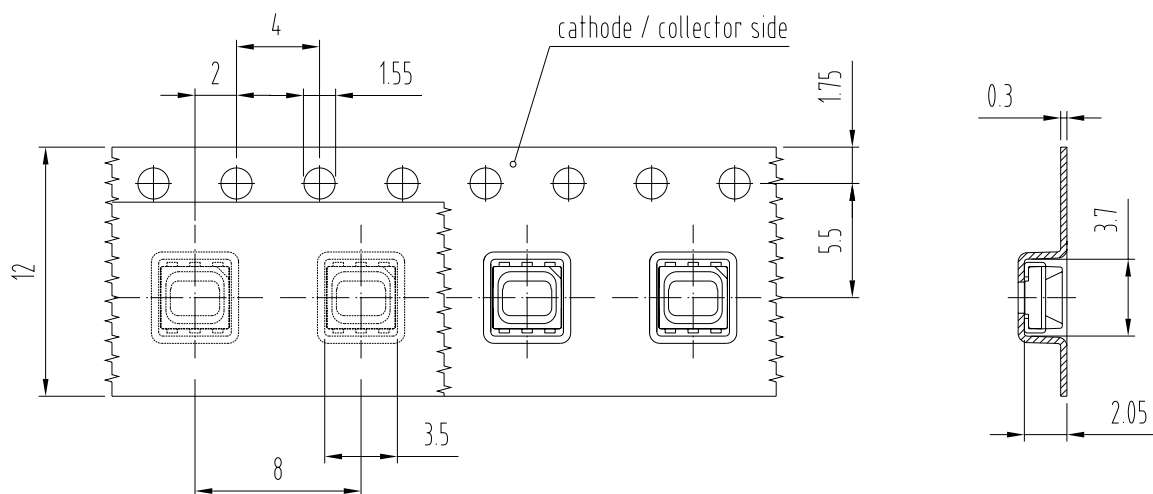


| Profile Feature                                                          | Symbol | Pb-Free (SnAgCu) Assembly |                |         | Unit               |
|--------------------------------------------------------------------------|--------|---------------------------|----------------|---------|--------------------|
|                                                                          |        | Minimum                   | Recommendation | Maximum |                    |
| Ramp-up rate to preheat <sup>*)</sup><br>25 °C to 150 °C                 |        |                           | 2              | 3       | K/s                |
| Time $t_s$<br>$T_{Smin}$ to $T_{Smax}$                                   | $t_s$  | 60                        | 100            | 120     | s                  |
| Ramp-up rate to peak <sup>*)</sup><br>$T_{Smax}$ to $T_p$                |        |                           | 2              | 3       | K/s                |
| Liquidus temperature                                                     | $T_L$  |                           | 217            |         | $^{\circ}\text{C}$ |
| Time above liquidus temperature                                          | $t_L$  |                           | 80             | 100     | s                  |
| Peak temperature                                                         | $T_p$  |                           | 245            | 260     | $^{\circ}\text{C}$ |
| Time within 5 °C of the specified peak<br>temperature $T_p - 5\text{ K}$ | $t_p$  | 10                        | 20             | 30      | s                  |
| Ramp-down rate <sup>*</sup><br>$T_p$ to 100 °C                           |        |                           | 3              | 6       | K/s                |
| Time<br>25 °C to $T_p$                                                   |        |                           |                | 480     | s                  |

All temperatures refer to the center of the package, measured on the top of the component

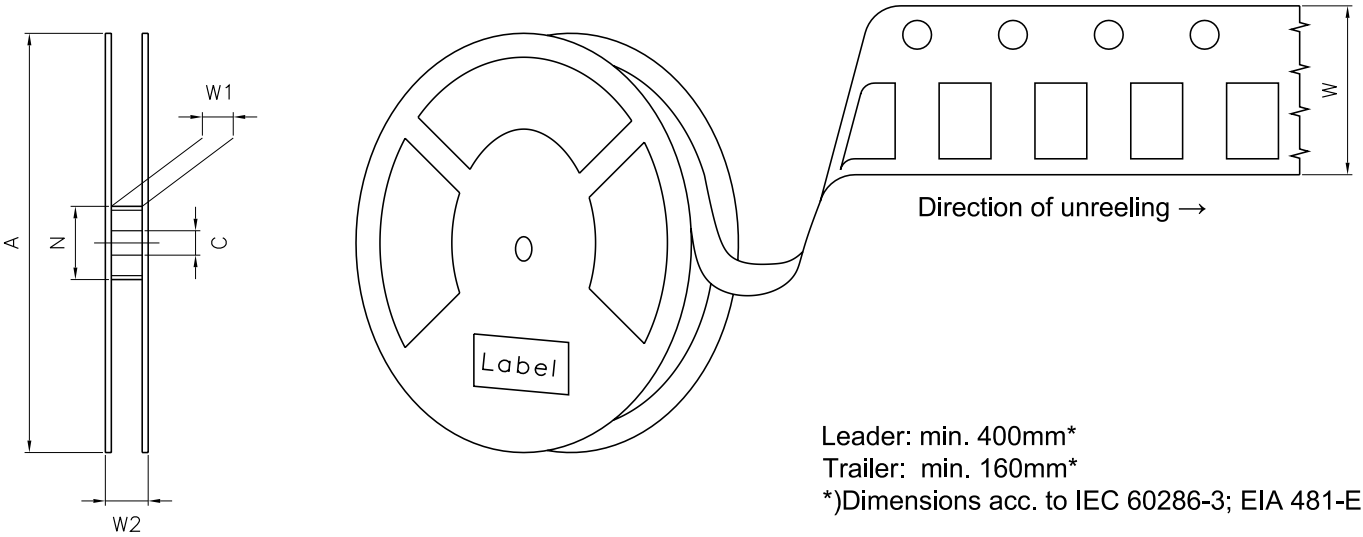
\* slope calculation  $DT/Dt$ :  $Dt$  max. 5 s; fulfillment for the whole T-range

## Taping <sup>8)</sup>



C67062-A0226-B9-01

Tape and Reel <sup>9)</sup>



Reel Dimensions

| A      | W                   | N <sub>min</sub> | W <sub>1</sub> | W <sub>2max</sub> | Pieces per PU |
|--------|---------------------|------------------|----------------|-------------------|---------------|
| 330 mm | 12 + 0.3 / - 0.1 mm | 60 mm            | 12.4 + 2 mm    | 18.4 mm           | 4000          |

**OSRAM**

BIN1: XX-XX-X-XXX-X

RoHS Compliant

(6P) BATCH NO: 1234567890



(1T) LOT NO: 1234567890

(9D) D/C: 1234



ML Temp ST  
X XXX °C X



Pack: RXX

DEMY XXX

X X123 1234.1234 X

(X) PROD NO: 123456789 (Q) QTY: 9999 (G) GROUP: XX-XX-X-X



OHA04563

Moisture-sensitive label or print

Barcode label

Humidity indicator

Barcode label

Desiccant

OSRAM

QHA00530

Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card according JEDEC-STD-033.

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## Notes

The evaluation of eye safety occurs according to the standard IEC 62471:2006 (photo biological safety of lamps and lamp systems). Within the risk grouping system of this IEC standard, the device specified in this data sheet fall into the class **exempt group (exposure time 10000 s)**. Under real circumstances (for exposure time, conditions of the eye pupils, observation distance), it is assumed that no endangerment to the eye exists from these devices. As a matter of principle, however, it should be mentioned that intense light sources have a high secondary exposure potential due to their blinding effect. When looking at bright light sources (e.g. headlights), temporary reduction in visual acuity and afterimages can occur, leading to irritation, annoyance, visual impairment, and even accidents, depending on the situation.

Subcomponents of this device contain, in addition to other substances, metal filled materials including silver. Metal filled materials can be affected by environments that contain traces of aggressive substances. Therefore, we recommend that customers minimize device exposure to aggressive substances during storage, production, and use. Devices that showed visible discoloration when tested using the described tests above did show no performance deviations within failure limits during the stated test duration. Respective failure limits are described in the IEC60810.

For further application related information please visit <https://ams-osram.com/support/application-notes>

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## Disclaimer

### Attention please!

The information describes the type of component and shall not be considered as assured characteristics. Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances.

For information on the types in question please contact our Sales Organization.

If printed or downloaded, please find the latest version on our website.

### Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

### Product and functional safety devices/applications or medical devices/applications

Our components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.

Our products are not qualified at module and system level for such application.

In case buyer – or customer supplied by buyer – considers using our components in product safety devices/ applications or medical devices/applications, buyer and/or customer has to inform our local sales partner immediately and we and buyer and /or customer will analyze and coordinate the customer-specific request between us and buyer and/or customer.

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## Glossary

- 1) **Brightness:** Brightness values are measured during a current pulse of typically 25 ms, with an internal reproducibility of  $\pm 8\%$  and an expanded uncertainty of  $\pm 11\%$  (acc. to GUM with a coverage factor of  $k = 3$ ).
- 2) **Reverse Operation:** This product is intended to be operated applying a forward current within the specified range. Applying any continuous reverse bias or forward bias below the voltage range of light emission shall be avoided because it may cause migration which can change the electro-optical characteristics or damage the LED.
- 3) **Wavelength:** The wavelength is measured at a current pulse of typically 25 ms, with an internal reproducibility of  $\pm 0.5$  nm and an expanded uncertainty of  $\pm 1$  nm (acc. to GUM with a coverage factor of  $k = 3$ ).
- 4) **Forward Voltage:** Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.05$  V and an expanded uncertainty of  $\pm 0.1$  V (acc. to GUM with a coverage factor of  $k = 3$ ).
- 5) **Thermal Resistance:**  $R_{th\ max}$  is based on statistic values ( $6\sigma$ ) used for Derating.
- 6) **Typical Values:** Due to the special conditions of the manufacturing processes of semiconductor devices, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.
- 7) **Characteristic curve:** In the range where the line of the graph is broken, you must expect higher differences between single devices within one packing unit.
- 8) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with  $\pm 0.1$  and dimensions are specified in mm.
- 9) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

Revision History

| Version | Date       | Change                                                          |
|---------|------------|-----------------------------------------------------------------|
| 1.0     | 2019-03-11 | Initial Version                                                 |
| 1.1     | 2019-04-18 | Brightness Groups                                               |
| 1.2     | 2020-08-18 | Maximum Ratings                                                 |
| 1.3     | 2021-04-09 | New Layout<br>Brightness Groups<br>Reel Dimensions              |
| 1.4     | 2022-06-22 | Dimensional Drawing<br>New Layout                               |
| 1.5     | 2022-09-28 | Applications                                                    |
| 1.6     | 2024-01-29 | Characteristics<br>Electro - Optical Characteristics (Diagrams) |



EU RoHS and China RoHS compliant product

此产品符合欧盟 RoHS 指令的要求；  
按照中国的相关法规和标准，  
不含有毒有害物质或元素。

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