

# OSRAM KRTTB CRLML1.33

## Datasheet

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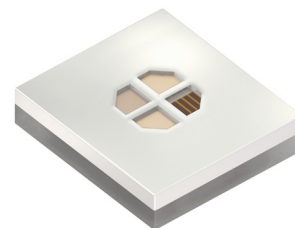
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VEGALED™

# KRTTB CRLML1.33



## Applications

- Projection & Display

## Features

- Package: Ceramic package with integrated glass cover
- Chip technology: Thinfilm / UX:3
- Typ. Radiation: 120°
- Color:  $\lambda_{\text{dom}} = 616 \text{ nm}$  (● red);  $\lambda_{\text{dom}} = 530 \text{ nm}$  (● true green);  $\lambda_{\text{dom}} = 455 \text{ nm}$  (● blue)
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)

Ordering Information

| Type                                   | Brightness <sup>1)</sup>                                         | Ordering Code |
|----------------------------------------|------------------------------------------------------------------|---------------|
| KRTTBCRLML1.33-GXGZ-23+JZKY-24+RHSG-24 |                                                                  | Q65113A9545   |
| ● red                                  | ● $\Phi_V = 18 \dots 28 \text{ lm}$ ( $I_F = 150 \text{ mA}$ )   |               |
| ● true green                           | ● $\Phi_V = 61 \dots 97 \text{ lm}$ ( $I_F = 150 \text{ mA}$ )   |               |
| ● blue                                 | ● $\Phi_E = 130 \dots 210 \text{ mW}$ ( $I_F = 150 \text{ mA}$ ) |               |

2 green chips parallel on

## Maximum Ratings

| Parameter                                                                 | Symbol               |      | Values                                   | Values                                   | Values                                   |
|---------------------------------------------------------------------------|----------------------|------|------------------------------------------|------------------------------------------|------------------------------------------|
|                                                                           |                      |      | ● red                                    | ● true green                             | ● blue                                   |
| Operating Temperature                                                     | $T_{op}$             | min. | -40 °C                                   | -40 °C                                   | -40 °C                                   |
|                                                                           |                      | max. | 85 °C                                    | 85 °C                                    | 85 °C                                    |
| Storage Temperature                                                       | $T_{stg}$            | min. | -40 °C                                   | -40 °C                                   | -40 °C                                   |
|                                                                           |                      | max. | 85 °C                                    | 85 °C                                    | 85 °C                                    |
| Junction Temperature                                                      | $T_j$                | max. | 125 °C                                   | 125 °C                                   | 125 °C                                   |
| Forward Current<br>$T_s = 25\text{ °C}$                                   | $I_F$                | min. | 5 mA                                     | 5 mA                                     | 5 mA                                     |
|                                                                           |                      | max. | 250 mA                                   | 250 mA                                   | 250 mA                                   |
| Forward Current pulsed<br>$D = 0,5; f = 240\text{Hz}; T_j = T_{jmax}$     | $I_{F\text{ pulse}}$ |      | 350 mA                                   | 350 mA                                   | 350 mA                                   |
| ESD withstand voltage<br>acc. to ANSI/ESDA/JEDEC JS-001<br>(HBM, Class 2) | $V_{ESD}$            |      | 2 kV                                     | 2 kV                                     | 2 kV                                     |
| Reverse voltage <sup>2)</sup>                                             | $V_R$                |      | Not designed<br>for reverse<br>operation | Not designed<br>for reverse<br>operation | Not designed<br>for reverse<br>operation |

## Characteristics

$I_F = 150 \text{ mA}$ ;  $T_s = 25 \text{ °C}$

| Parameter                                                                                           | Symbol                  |                      | Values<br>● red                          | Values<br>● true green                   | Values<br>● blue                         |
|-----------------------------------------------------------------------------------------------------|-------------------------|----------------------|------------------------------------------|------------------------------------------|------------------------------------------|
| Peak Wavelength                                                                                     | $\lambda_{\text{peak}}$ | typ.                 | 624 nm                                   | 522 nm                                   | 452 nm                                   |
| Dominant Wavelength <sup>3)</sup>                                                                   | $\lambda_{\text{dom}}$  | min.<br>typ.<br>max. | 610 nm<br>616 nm<br>622 nm               | 518 nm<br>530 nm<br>536 nm               | 450 nm<br>455 nm<br>465 nm               |
| Spectral bandwidth at 50% $I_{\text{rel,max}}$                                                      | $\Delta\lambda$         | typ.                 | 18 nm                                    | 35 nm                                    | 18 nm                                    |
| Viewing angle at 50% $I_v$                                                                          | $2\phi$                 | typ.                 | 110 °                                    | 110 °                                    | 110 °                                    |
| Radiating surface                                                                                   | $A_{\text{color}}$      | typ.                 | 0.5 x 0.5 mm <sup>2</sup>                | 0.5 x 0.5 mm <sup>2</sup>                | 0.5 x 0.5 mm <sup>2</sup>                |
| Partial Flux acc. CIE 127:2007 <sup>4)</sup><br>$\Phi_{E/V, 120^\circ} = x * \Phi_{E/V, 180^\circ}$ | $\Phi_{E/V, 120^\circ}$ | typ.                 | 0.76                                     | 0.76                                     | 0.76                                     |
| Forward Voltage <sup>5)</sup><br>$I_F = 150 \text{ mA}$                                             | $V_F$                   | min.<br>typ.<br>max. | 1.70 V<br>2.20 V<br>2.70 V               | 2.60 V<br>2.80 V<br>3.40 V               | 2.70 V<br>2.90 V<br>3.30 V               |
| Reverse current <sup>2)</sup>                                                                       | $I_R$                   |                      | Not designed<br>for reverse<br>operation | Not designed<br>for reverse<br>operation | Not designed<br>for reverse<br>operation |
| Real thermal resistance junction/sol-<br>derpoint<br>1 Chip on                                      | $R_{\text{thJS real}}$  | typ.                 | 14 K / W                                 | 14 K / W                                 | 14 K / W                                 |

2 green chips parallel on except for Rth values

## Brightness Groups

### • red

| Group | Luminous Flux <sup>1)</sup><br>$I_F = 150 \text{ mA}$<br>min.<br>$\Phi_V$ | Luminous Flux <sup>1)</sup><br>$I_F = 150 \text{ mA}$<br>max.<br>$\Phi_V$ |
|-------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|
| GX    | 18 lm                                                                     | 21 lm                                                                     |
| GY    | 21 lm                                                                     | 24 lm                                                                     |
| GZ    | 24 lm                                                                     | 28 lm                                                                     |

## Brightness Groups

### • true green

| Group | Luminous Flux <sup>1)</sup><br>$I_F = 150 \text{ mA}$<br>min.<br>$\Phi_V$ | Luminous Flux <sup>1)</sup><br>$I_F = 150 \text{ mA}$<br>max.<br>$\Phi_V$ |
|-------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|
| JZ    | 61 lm                                                                     | 71 lm                                                                     |
| KX    | 71 lm                                                                     | 82 lm                                                                     |
| KY    | 82 lm                                                                     | 97 lm                                                                     |

2 green chips parallel on

## Brightness Groups

### • blue

| Group | Radiant Flux <sup>1)</sup><br>$I_F = 150 \text{ mA}$<br>min.<br>$\Phi_E$ | Radiant Flux <sup>1)</sup><br>$I_F = 150 \text{ mA}$<br>max.<br>$\Phi_E$ |
|-------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|
| RH    | 130 mW                                                                   | 150 mW                                                                   |
| RI    | 150 mW                                                                   | 180 mW                                                                   |
| SG    | 180 mW                                                                   | 210 mW                                                                   |

## Wavelength Groups

- red

| Group | Dominant Wavelength <sup>3)</sup><br>min.<br>$\lambda_{\text{dom}}$ | Dominant Wavelength <sup>3)</sup><br>max.<br>$\lambda_{\text{dom}}$ |
|-------|---------------------------------------------------------------------|---------------------------------------------------------------------|
| 2     | 610 nm                                                              | 616 nm                                                              |
| 3     | 616 nm                                                              | 622 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>$\lambda_{\text{dom}}$ |
|-------|---------------------------------------------------------------------|---------------------------------------------------------------------|
| 2     | 518 nm                                                              | 524 nm                                                              |
| 3     | 524 nm                                                              | 530 nm                                                              |
| 4     | 530 nm                                                              | 536 nm                                                              |

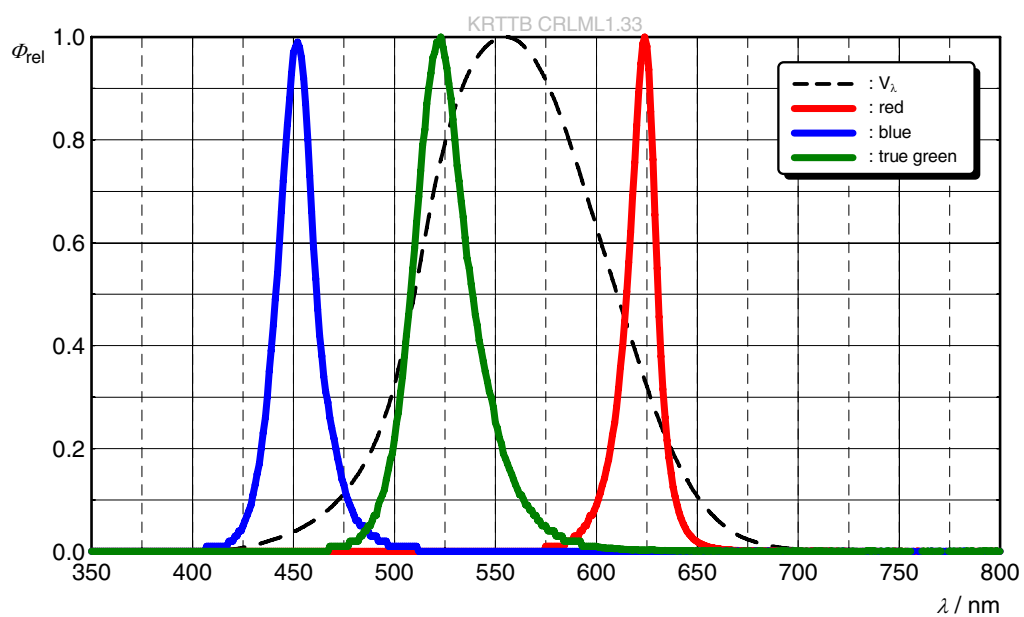
## Wavelength Groups

- blue

| Group | Dominant Wavelength <sup>3)</sup><br>min.<br>$\lambda_{\text{dom}}$ | Dominant Wavelength <sup>3)</sup><br>max.<br>$\lambda_{\text{dom}}$ |
|-------|---------------------------------------------------------------------|---------------------------------------------------------------------|
| 2     | 450 nm                                                              | 455 nm                                                              |
| 3     | 455 nm                                                              | 460 nm                                                              |
| 4     | 460 nm                                                              | 465 nm                                                              |

## Relative Spectral Emission <sup>4)</sup>

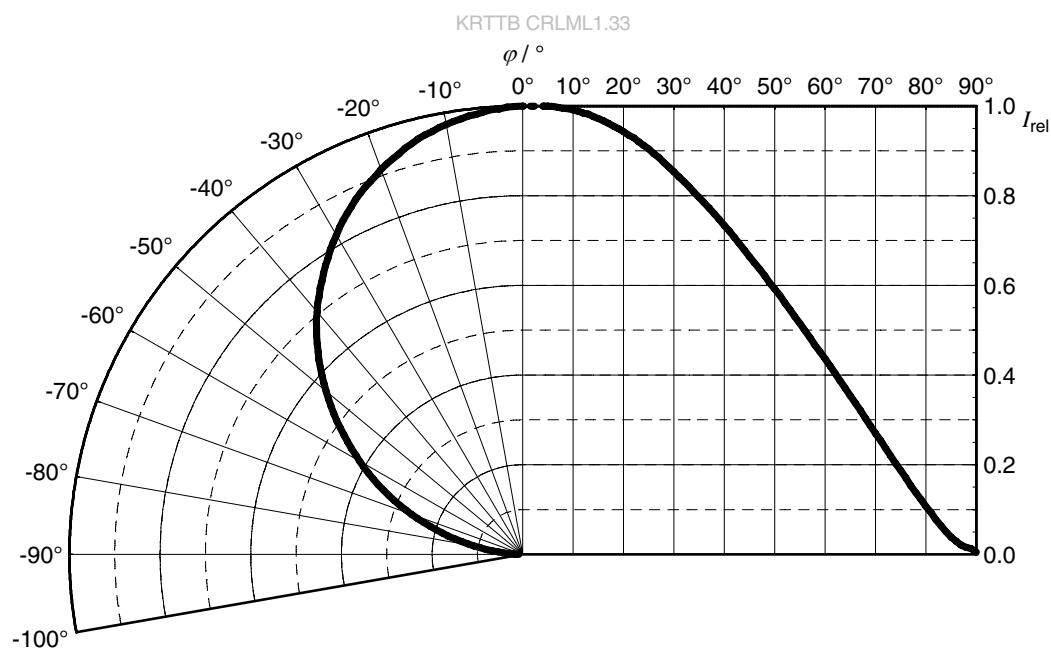
$\Phi_{\text{rel}} = f(\lambda)$ ;  $I_F = 150 \text{ mA}$ ;  $T_J = 25 \text{ }^\circ\text{C}$





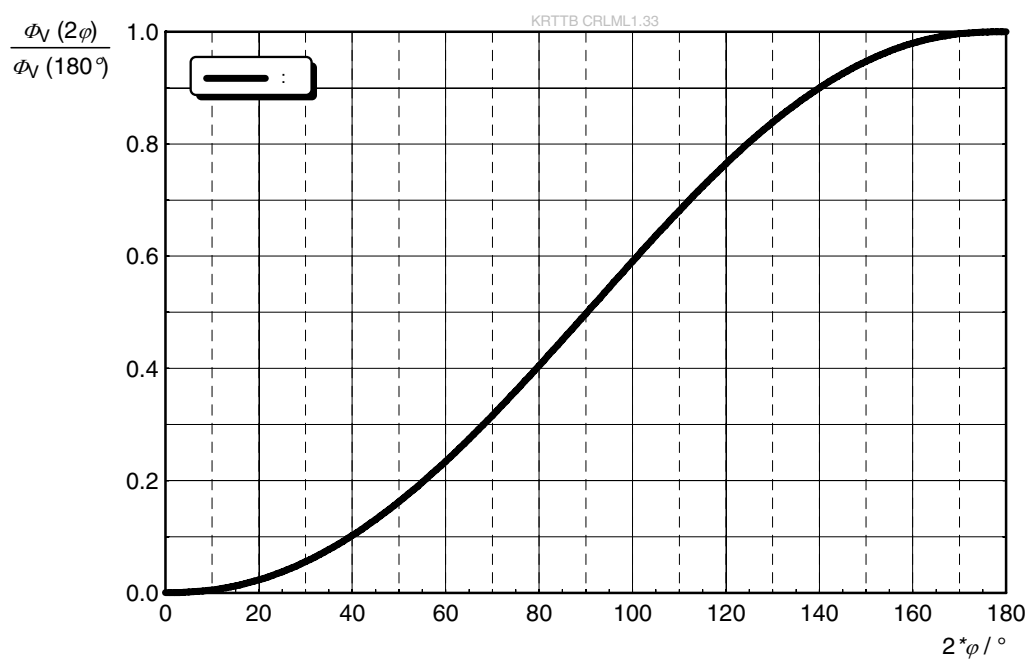
## Radiation Characteristics <sup>4)</sup>

$$I_{\text{rel}} = f(\varphi); T_J = 25^\circ\text{C}$$



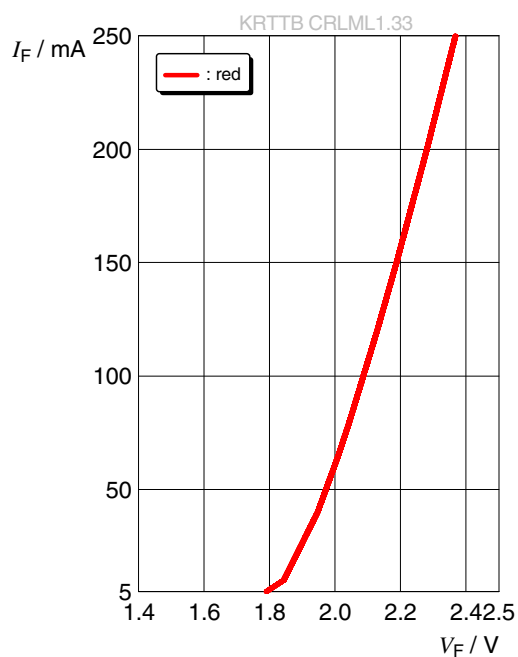
## Relative Partial Flux <sup>4)</sup>

$$\Phi_V(2\varphi)/\Phi_V(180^\circ) = f(\varphi); T_J = 25^\circ\text{C}$$



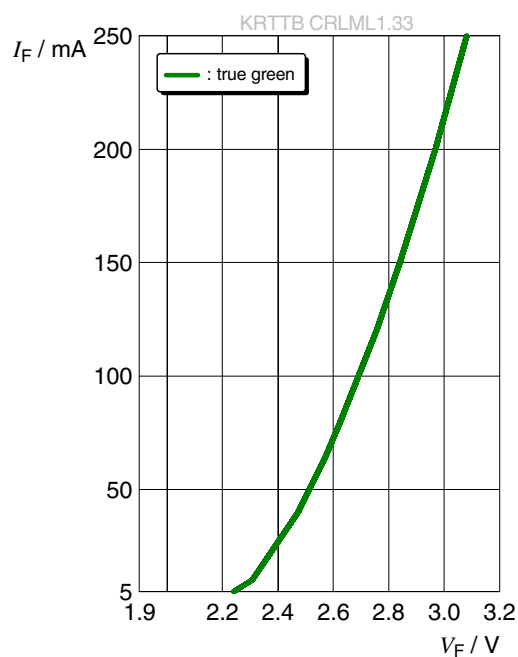
### Forward current <sup>4)</sup>

$$I_F = f(V_F); T_J = 25\text{ °C}$$



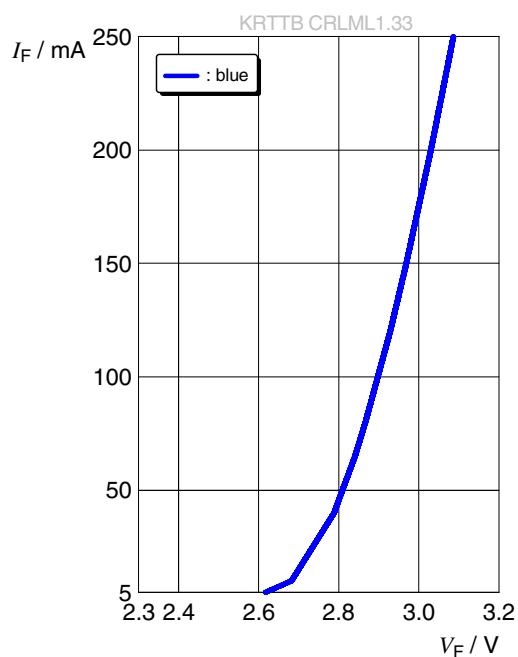
### Forward current <sup>4)</sup>

$$I_F = f(V_F); T_J = 25\text{ °C}$$



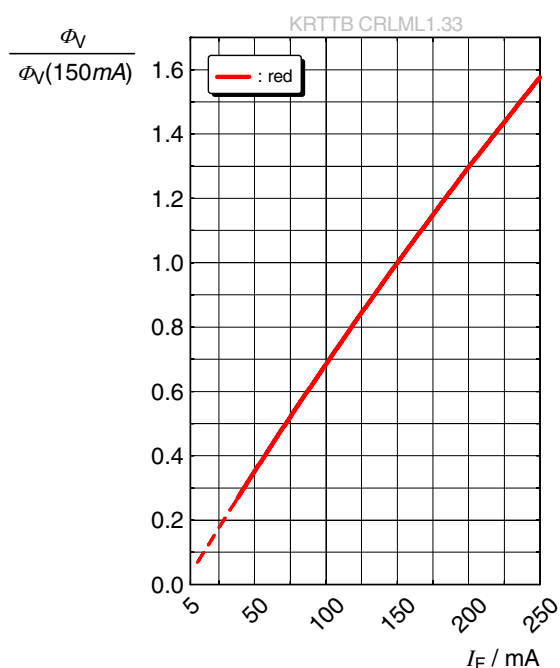
### Forward current <sup>4)</sup>

$$I_F = f(V_F); T_J = 25\text{ °C}$$

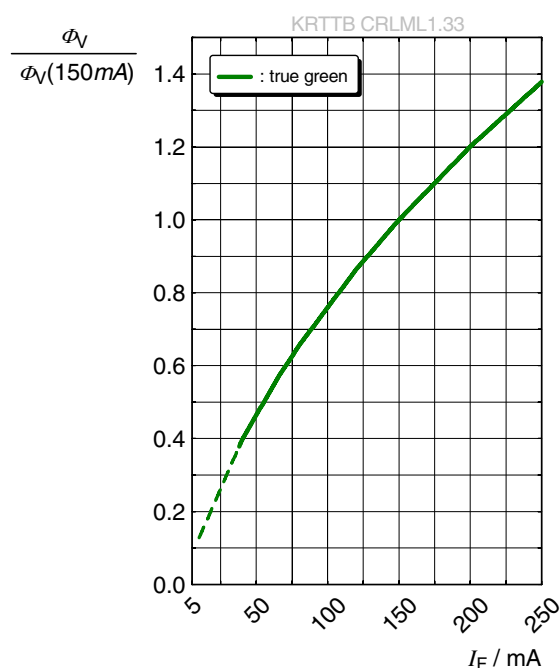


**Relative Luminous Flux** <sup>4), 6)</sup>

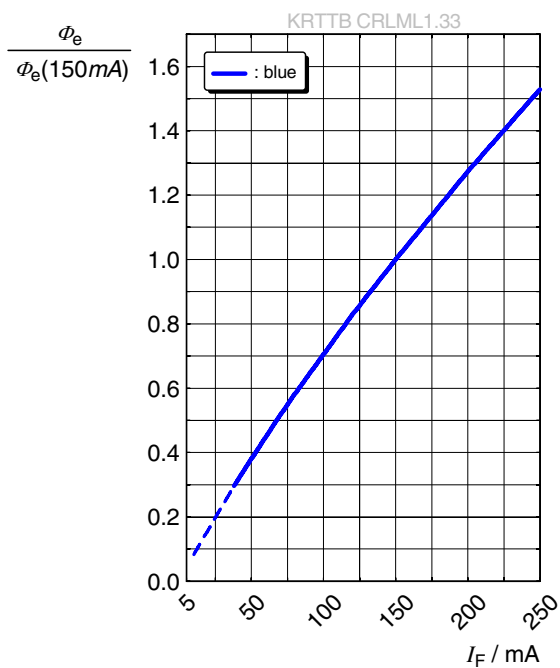
$$\Phi_V / \Phi_V(150 \text{ mA}) = f(I_F); T_J = 25^\circ \text{C}$$

**Relative Luminous Flux** <sup>4), 6)</sup>

$$\Phi_V / \Phi_V(150 \text{ mA}) = f(I_F); T_J = 25^\circ \text{C}$$

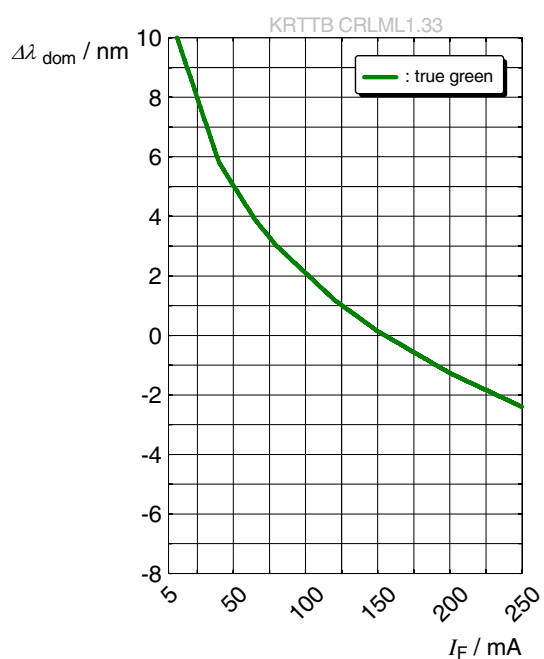
**Relative Radiant Power** <sup>4), 6)</sup>

$$\Phi_E / \Phi_E(150 \text{ mA}) = f(I_F); T_J = 25^\circ \text{C}$$



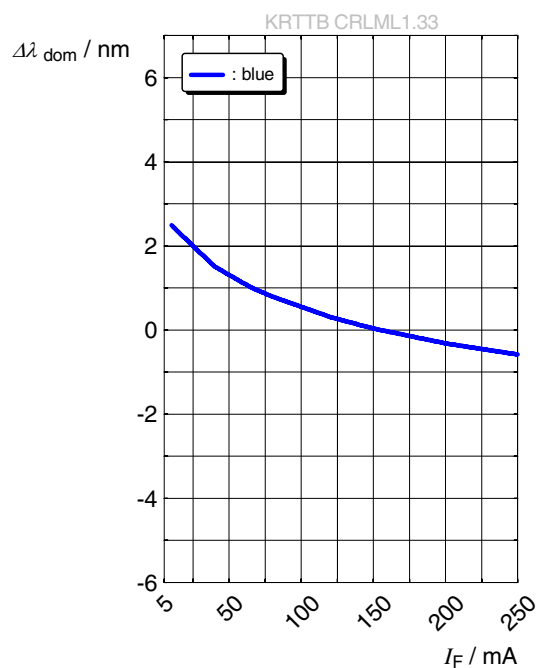
## Dominant Wavelength <sup>4)</sup>

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



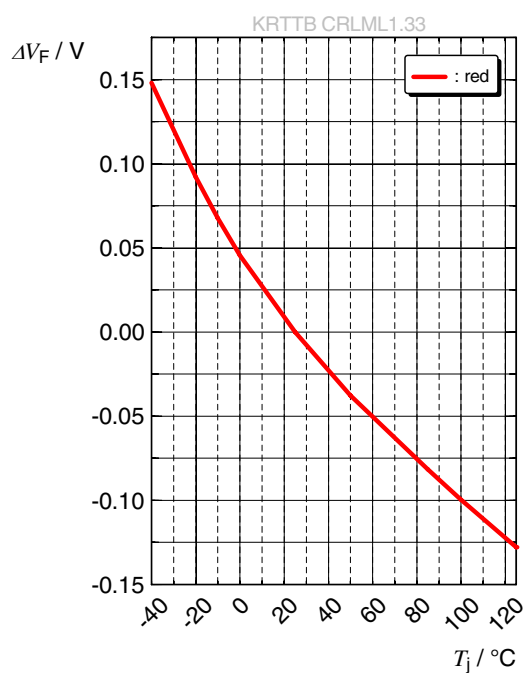
## Dominant Wavelength <sup>4)</sup>

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

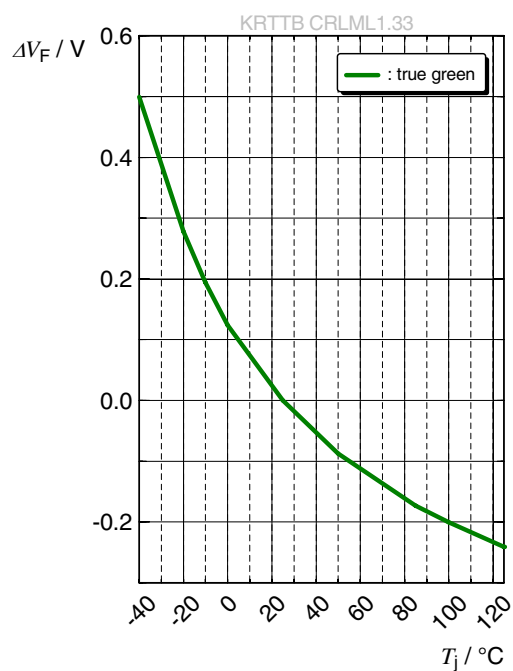


**Forward Voltage** <sup>4)</sup>

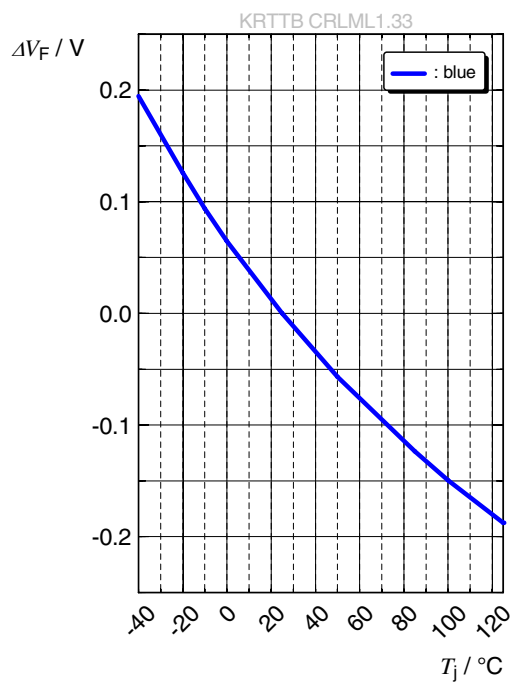
$$\Delta V_F = V_F - V_F(25\text{ °C}) = f(T_j); I_F = 150\text{ mA}$$

**Forward Voltage** <sup>4)</sup>

$$\Delta V_F = V_F - V_F(25\text{ °C}) = f(T_j); I_F = 150\text{ mA}$$

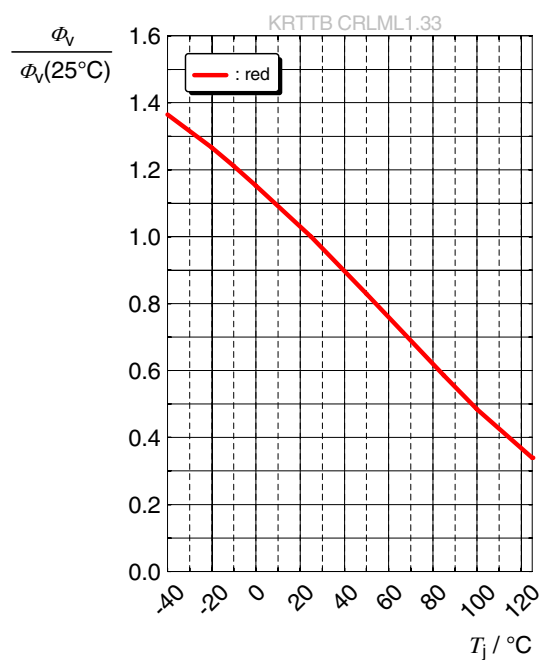
**Forward Voltage** <sup>4)</sup>

$$\Delta V_F = V_F - V_F(25\text{ °C}) = f(T_j); I_F = 150\text{ mA}$$

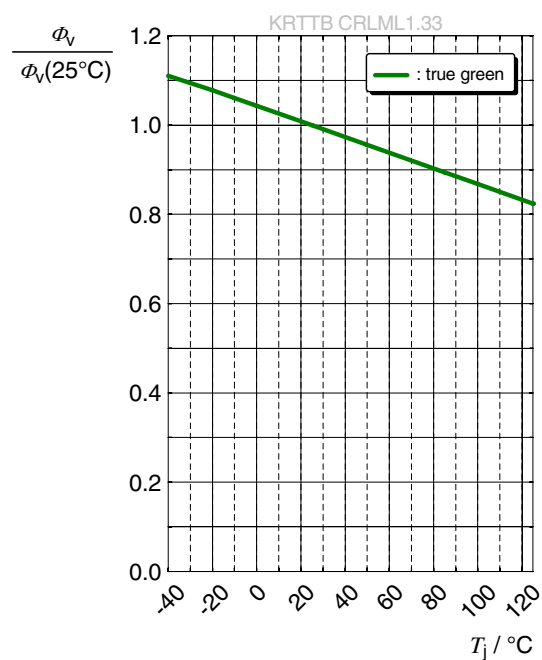


**Relative Luminous Flux** <sup>4)</sup>

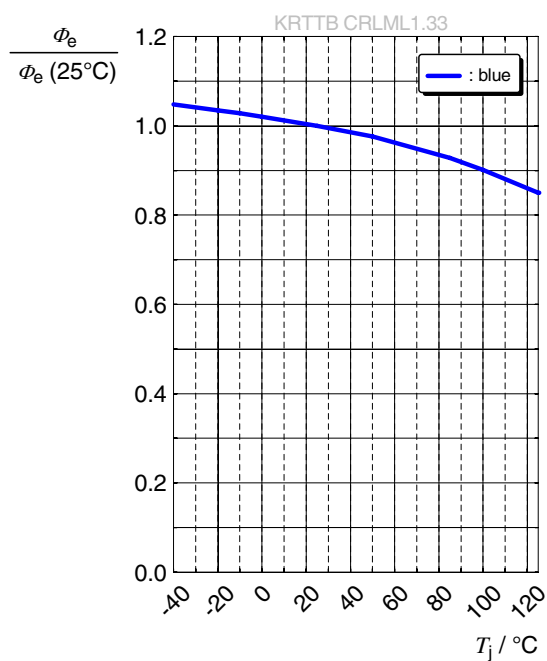
$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j); I_F = 150\text{ mA}$$

**Relative Luminous Flux** <sup>4)</sup>

$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j); I_F = 150\text{ mA}$$

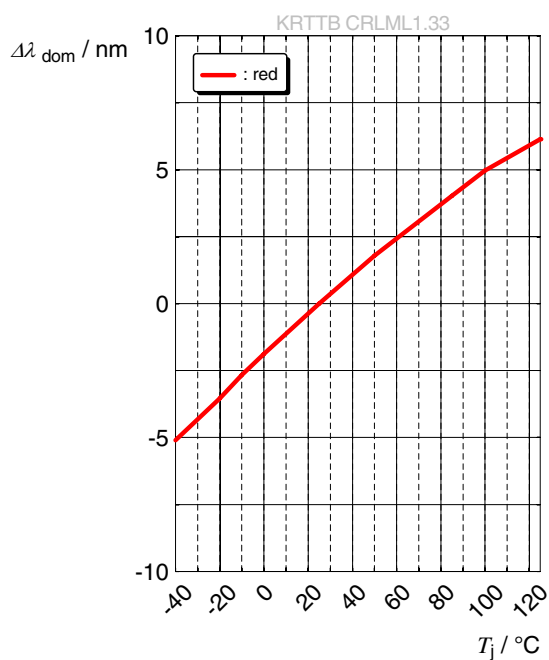
**Relative Radiant Power** <sup>4)</sup>

$$\Phi_E / \Phi_E(25^\circ\text{C}) = f(T_j); I_F = 150\text{ mA}$$

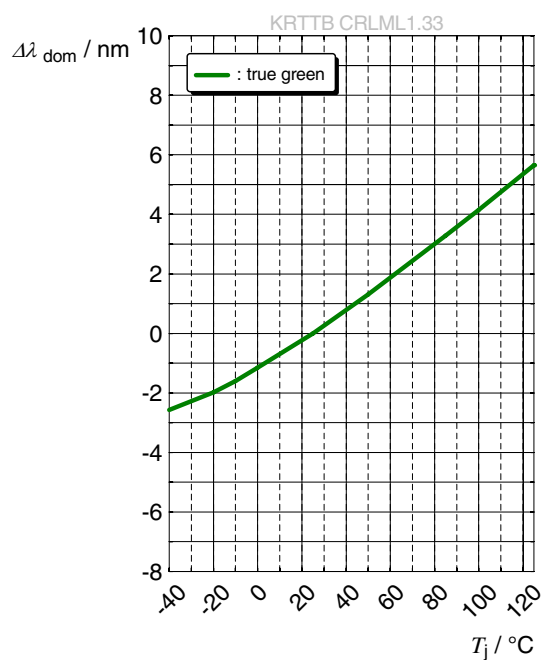


**Dominant Wavelength** <sup>4)</sup>

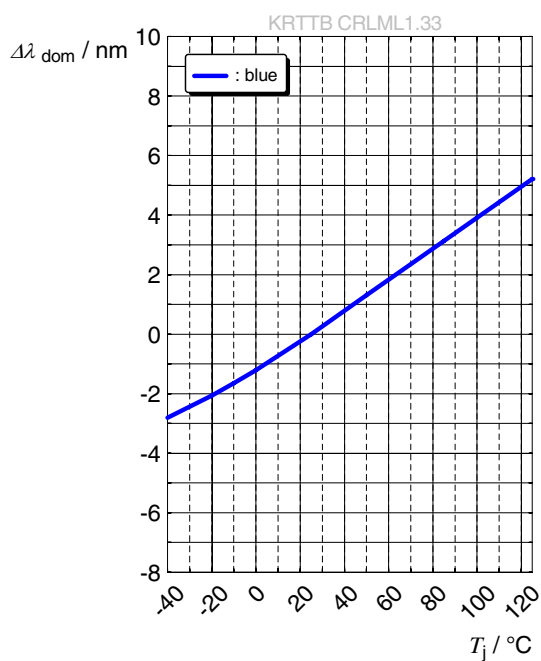
$$\Delta\lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25\text{ °C}) = f(T_j); I_F = 150\text{ mA}$$

**Dominant Wavelength** <sup>4)</sup>

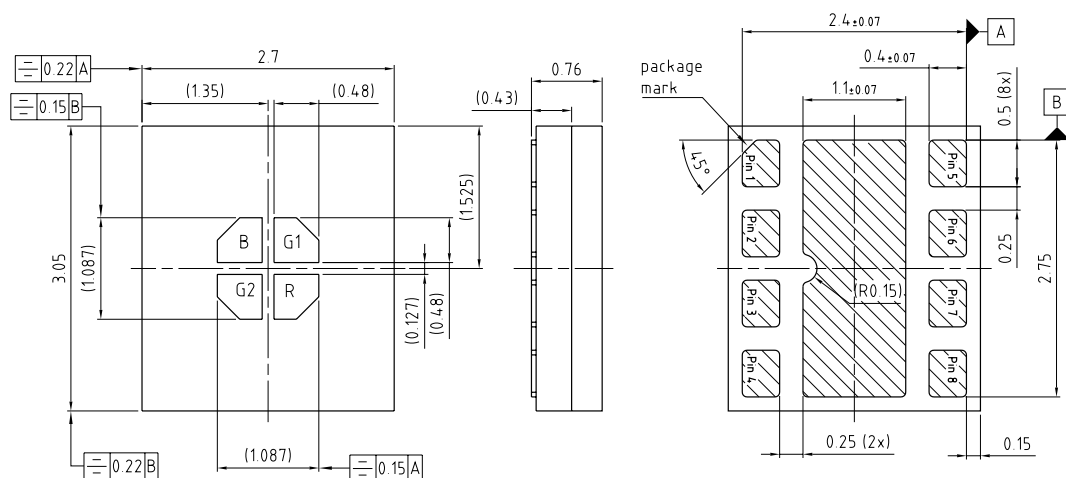
$$\Delta\lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25\text{ °C}) = f(T_j); I_F = 150\text{ mA}$$

**Dominant Wavelength** <sup>4)</sup>

$$\Delta\lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25\text{ °C}) = f(T_j); I_F = 150\text{ mA}$$



## Dimensional Drawing <sup>7)</sup>



general tolerance  $\pm 0.1$   
lead finish Au

C67062-A0459-A2 -04

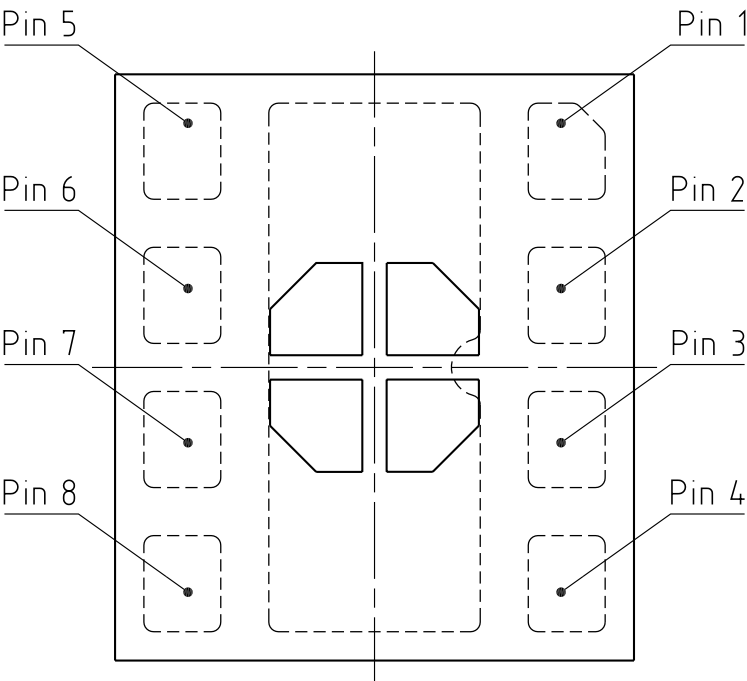
## Further Information:

**Approximate Weight:** 0.6 mg

**Corrosion test:** Class: 1B  
Test condition: 25°C / 75 % RH / 200ppb SO<sub>2</sub>, 200ppb NO<sub>2</sub>, 10ppb H<sub>2</sub>S,  
10ppb Cl<sub>2</sub> / 21 days (EN 60068-2-60 (Method 4))



Electrical Internal Circuit

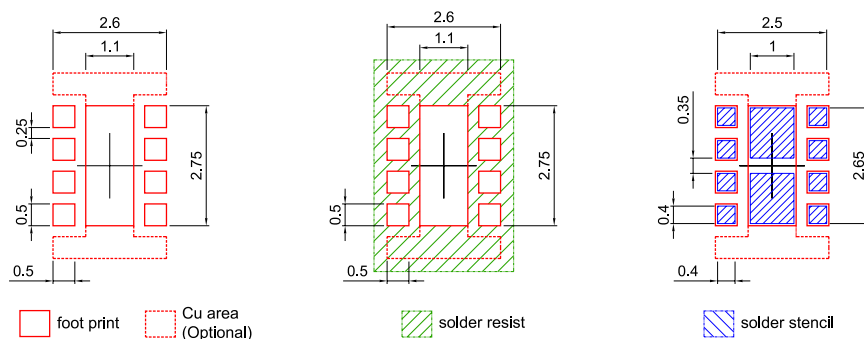


| Pin Description |                  |
|-----------------|------------------|
| 1               | Green1 (Cathode) |
| 2               | Green1 (Anode)   |
| 3               | Red (Cathode)    |
| 4               | Red (Anode)      |
| 5               | Blue (Cathode)   |
| 6               | Blue (Anode)     |
| 7               | Green2 (Anode)   |
| 8               | Green2 (Cathode) |

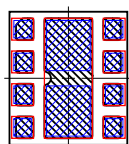
| Pin   | Description            |
|-------|------------------------|
| Pin 1 | true green 1 (Cathode) |
| Pin 2 | true green 1 (Anode)   |
| Pin 3 | red (Cathode)          |
| Pin 4 | red (Anode)            |
| Pin 5 | blue (Cathode)         |
| Pin 6 | blue (Anode)           |
| Pin 7 | true green 2 (Anode)   |
| Pin 8 | true green 2 (Cathode) |

## Recommended Solder Pad <sup>7)</sup>

### SOLDER PAD & STENCIL



### SOLDER PAD & STENCIL with COMPONENT

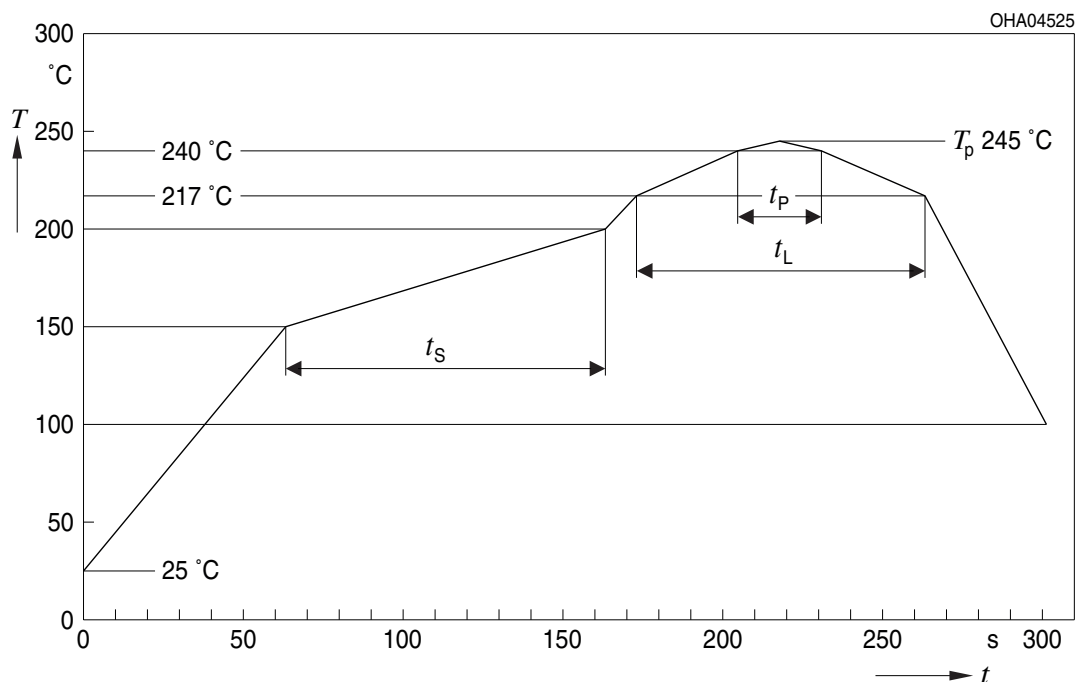


E067.0346.29 -01

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for any kind of wet cleaning or ultrasonic cleaning. To ensure a high solder joint reliability and to minimize the risk of solder joint cracks, the customer is responsible to evaluate the combination of PCB board and solder paste material for his application.

## Reflow Soldering Profile

Product complies to MSL Level 2 acc. to JEDEC J-STD-020E

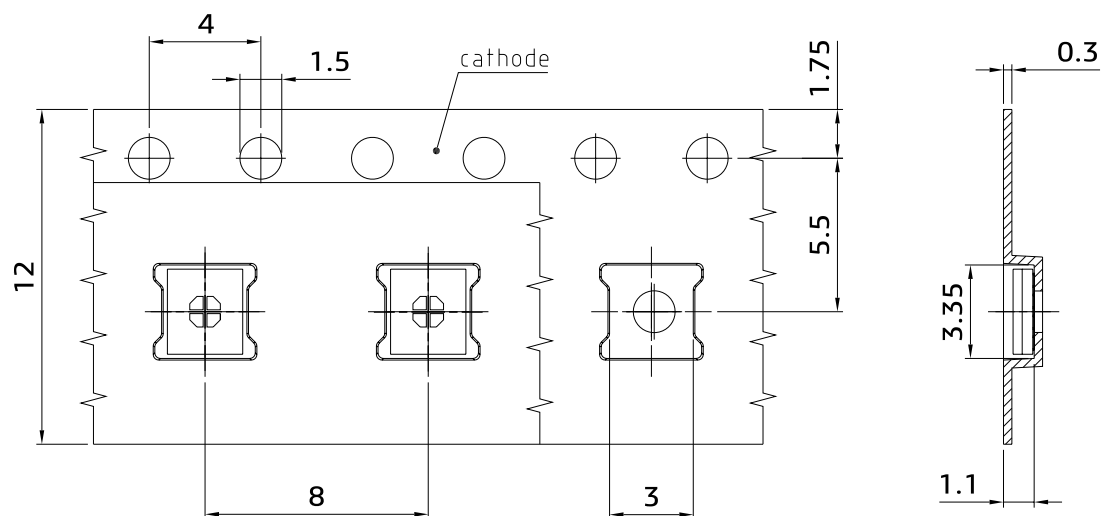


| Profile Feature                                                                        | Symbol | Pb-Free (SnAgCu) Assembly |                |         | Unit               |
|----------------------------------------------------------------------------------------|--------|---------------------------|----------------|---------|--------------------|
|                                                                                        |        | Minimum                   | Recommendation | Maximum |                    |
| Ramp-up rate to preheat <sup>*)</sup><br>$25^{\circ}\text{C}$ to $150^{\circ}\text{C}$ |        |                           | 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 $5^{\circ}\text{C}$ of the specified peak temperature $T_p - 5\text{ K}$   | $t_p$  | 10                        | 20             | 30      | s                  |
| Ramp-down rate*<br>$T_p$ to $100^{\circ}\text{C}$                                      |        |                           | 3              | 6       | K/s                |
| Time<br>$25^{\circ}\text{C}$ to $T_p$                                                  |        |                           |                | 480     | s                  |

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

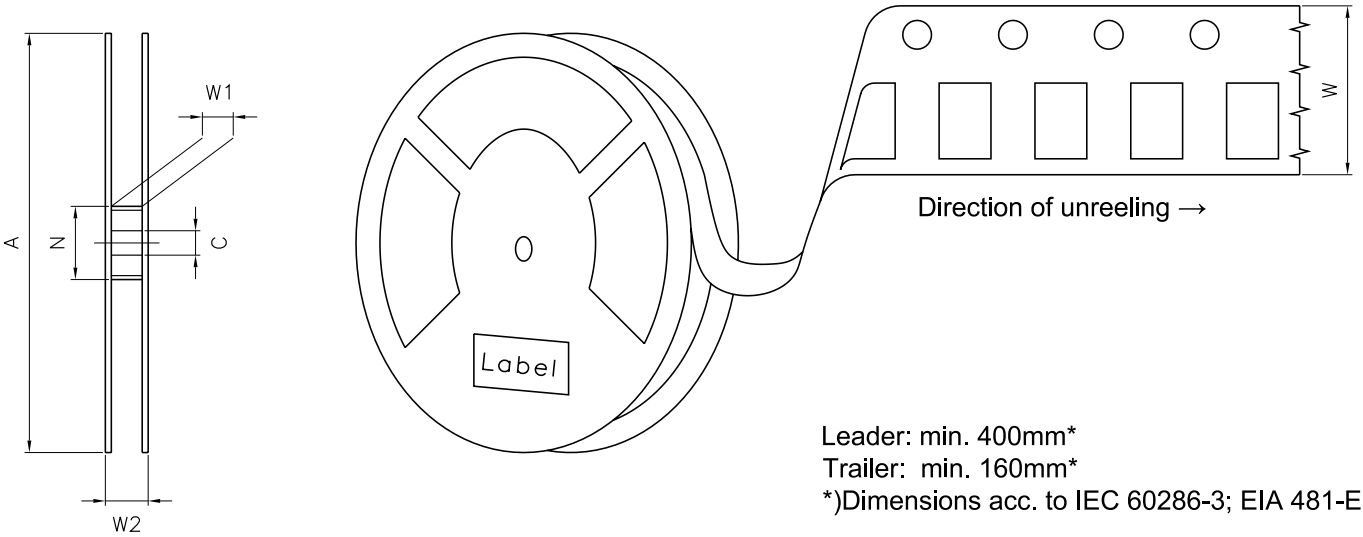
\* slope calculation  $DT/Dt$ :  $Dt$  max. 5 s; fulfillment for the whole T-range

## Taping <sup>7)</sup>



C67062-A0459-B22 -01

Tape and Reel <sup>8)</sup>



Reel Dimensions

| A      | W                   | N <sub>min</sub> | W <sub>1</sub> | W <sub>2max</sub> | Pieces per PU |
|--------|---------------------|------------------|----------------|-------------------|---------------|
| 180 mm | 12 + 0.3 / - 0.1 mm | 60 mm            | 12.4 + 2 mm    | 18.4 mm           | 1000          |

## 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

The diagram shows a perspective view of a rectangular package and a top-down view of a circular wafer. The rectangular package has a label with a 'CAUTION' warning, a 'Moisture-sensitive label or print' (a small square), and a 'Barcode label' (a series of vertical bars). The wafer has a 'Humidity indicator' (a small square) and a 'Barcode label' (a series of vertical bars). Two small, rectangular 'Desiccant' packets are shown near the package and wafer.

Moisture-sensitive label or print

Barcode label

Humidity indicator

Barcode label

Desiccant

OSRAM

CAUTION

OH00530

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

## 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 **moderate risk (exposure time 0.25 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>

## 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:** Not designed for reverse operation. Continuous reverse operation can cause migration and damage of the device.
- 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) **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.
- 5) **Forward Voltage:** The forward voltage is measured during a current pulse of typically 8 ms, with an internal reproducibility of  $\pm 0.05$  V and an expanded uncertainty of  $\pm 0.1$  V (acc. to GUM with a coverage factor of  $k = 3$ ).
- 6) **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.
- 7) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with  $\pm 0.1$  and dimensions are specified in mm.
- 8) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.



Revision History

| Version | Date       | Change          |
|---------|------------|-----------------|
| 1.0     | 2025-10-29 | Initial Version |
| 1.1     | 2025-12-12 | Brand           |



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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