# KRTB AILMS1

## Micro SIDELED® 3806

This Micro SIDELED® is a RGB device in an SMT package with side emission. Due to its low package height it is ideal for applications in limited space environments and perfect for coupling into light-guides.

## Applications

- Backlighting (Smartphone, Tablet)
- Electronic Equipment
- Gaming, Amusement, Gambling
- Smart Home, Metering
- White Goods

## Features:

- Package: SMT package, silicone resin
- Chip technology: Thinfilm / InGaN on Sapphire
- Typ. Radiation: 120° (Lambertian emitter)
- Color: $\lambda_{dom}$ = 625 nm (● red); $\lambda_{dom}$ = 520 nm (● green); $\lambda_{dom}$ = 470 nm (● blue)
- Corrosion Robustness Class: 1B
- ESD: 5 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM)
- Binned in white color: Cx = 0.313, Cy = 0.329 acc to CIE 1931
- Typ. Luminous Intensity @20mA: red = 690 mcd; green = 1749 mcd; blue = 488 mcd

## Ordering Information

| Type | Ordering Code |
| --- | --- |
| KRTB AILMS1-5B5C-B1B12 | Q65113A2872 |

## Maximum Ratings

| Parameter | Symbol | | Values ● red | Values ● green | Values ● blue |
|---|---|---|---|---|---|
| Operating Temperature | $T_{op}$ | min.<br>max. | -40 °C<br>85 °C | -40 °C<br>85 °C | -40 °C<br>85 °C |
| Storage Temperature | $T_{stg}$ | min.<br>max. | -40 °C<br>100 °C | -40 °C<br>100 °C | -40 °C<br>100 °C |
| Junction Temperature | $T_j$ | max. | 100 °C | 100 °C | 100 °C |
| Forward Current<br>$T_S$ = 25 °C | $I_F$ | min.<br>max. | 1 mA<br>30 mA | 1 mA<br>30 mA | 1 mA<br>30 mA |
| Surge Current<br>t ≤ 10 µs; D = 0.005 ; $T_S$ = 25 °C | $I_{FS}$ | max. | 100 mA | 100 mA | 100 mA |
| ESD withstand voltage<br>acc. to ANSI/ESDA/JEDEC JS-001 (HBM) | $V_{ESD}$ | | 5 kV | 5 kV | 5 kV |

Notes:
1. The product is not designed for reverse operation.

## Characteristics

$I_F$ = 20 mA; $T_S$ = 25 °C

| Parameter | Symbol | | Values ● red | Values ● green | Values ● blue |
|---|---|---|---|---|---|
| Dominant Wavelength [1] | $\lambda_{dom}$ | typ. | 625 nm | 520 nm | 470 nm |
| Spectral bandwidth at 50% $I_{rel,max}$ | $\Delta\lambda$ | typ. | 15 nm | 26 nm | 20 nm |
| Viewing angle at 50% $I_V$ | $2\varphi$ | typ. | 120 ° | 120 ° | 120 ° |
| Forward Voltage [2]<br>$I_F$ = 20 mA | $V_F$ | min.<br>typ.<br>max. | 1.9 V<br>2.2 V<br>2.5 V | 2.8 V<br>3.0 V<br>3.4 V | 2.9 V<br>3.1 V<br>3.5 V |
| Real thermal resistance junction/solderpoint [3] | $R_{thJS\ real}$ | typ.<br>max. | 160 K / W<br>200 K / W | 190 K / W<br>220 K / W | 210 K / W<br>250 K / W |
| Electrical thermal resistance junction/solderpoint [3]<br>with optical efficiency of each color | $R_{thJS\ elec.}$ | typ.<br>max. | 120 K / W<br>150 K / W | 150 K / W<br>170 K / W | 130 K / W<br>160 K / W |

Notes:
1. Efficiency of each color: Red 24%; Green 22%; Blue 39%

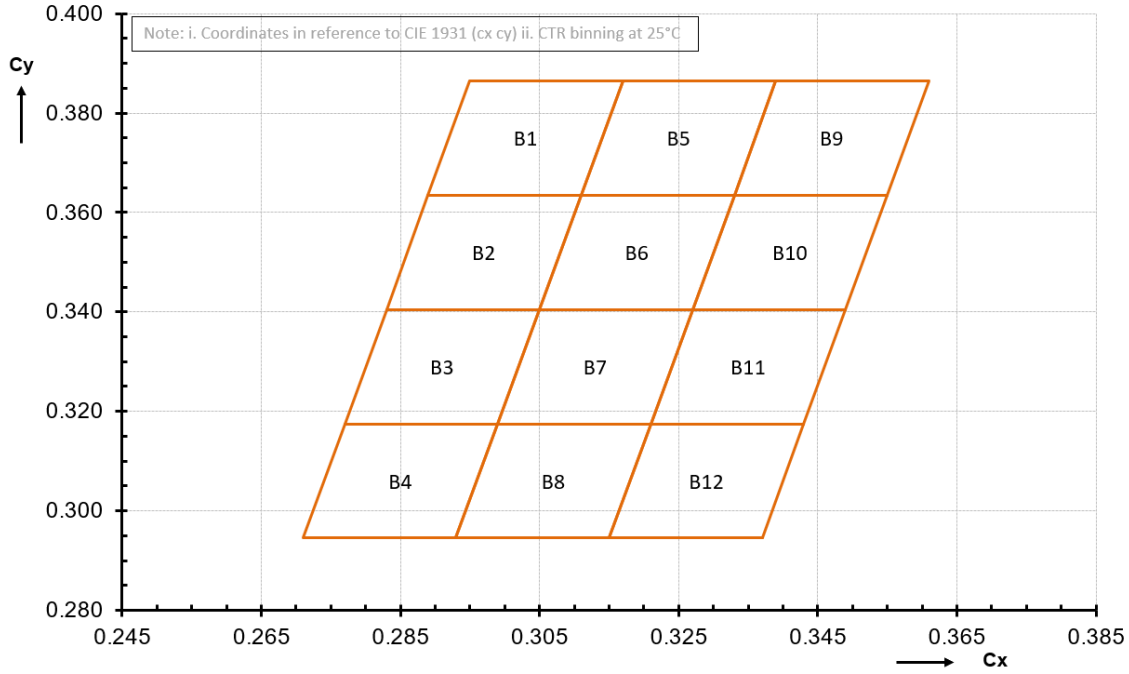
## Brightness Groups

$I_F$(● red) = 20 mA; $I_F$(● green) = 15 mA; $I_F$(● blue) = 7 mA

| Group | Luminous Intensity [4] IF = f(T); all chips on min. $I_v$ | Luminous Intensity [4] IF = f(T); all chips on max. $I_v$ |
|---|---|---|
| 5B | 1800 mcd | 2010 mcd |
| 6B | 2010 mcd | 2240 mcd |
| 7B | 2240 mcd | 2500 mcd |
| 8B | 2500 mcd | 2800 mcd |
| 5C | 2800 mcd | 3150 mcd |

## Chromaticity Coordinate Groups

$I_F$(● red) = 20 mA; $I_F$(● green) = 15 mA; $I_F$(● blue) = 7 mA




## Chromaticity Coordinate Groups

| Group | Cx | Cy | Group | Cx | Cy | Group | Cx | Cy |
|---|---|---|---|---|---|---|---|---|
| B1 | 0.2890 | 0.3635 | B2 | 0.2830 | 0.3405 | B6 | 0.3050 | 0.3405 |
| | 0.2950 | 0.3865 | | 0.2890 | 0.3635 | | 0.3110 | 0.3635 |
| | 0.3170 | 0.3865 | | 0.3110 | 0.3635 | | 0.3330 | 0.3635 |
| | 0.3110 | 0.3635 | | 0.3050 | 0.3405 | | 0.3270 | 0.3405 |
| B10 | 0.3270 | 0.3405 | B3 | 0.2770 | 0.3175 | B7 | 0.2990 | 0.3175 |
| | 0.3330 | 0.3635 | | 0.2830 | 0.3405 | | 0.3050 | 0.3405 |
| | 0.3550 | 0.3635 | | 0.3050 | 0.3405 | | 0.3270 | 0.3405 |
| | 0.3490 | 0.3405 | | 0.2990 | 0.3175 | | 0.3210 | 0.3175 |
| B11 | 0.3210 | 0.3175 | B4 | 0.2710 | 0.2945 | B8 | 0.2930 | 0.2945 |
| | 0.3270 | 0.3405 | | 0.2770 | 0.3175 | | 0.2990 | 0.3175 |
| | 0.3490 | 0.3405 | | 0.2990 | 0.3175 | | 0.3210 | 0.3175 |
| | 0.3430 | 0.3175 | | 0.2930 | 0.2945 | | 0.3150 | 0.2945 |
| B12 | 0.3150 | 0.2945 | B5 | 0.3110 | 0.3635 | B9 | 0.3330 | 0.3635 |
| | 0.3210 | 0.3175 | | 0.3170 | 0.3865 | | 0.3390 | 0.3865 |
| | 0.3430 | 0.3175 | | 0.3390 | 0.3865 | | 0.3610 | 0.3865 |
| | 0.3370 | 0.2945 | | 0.3330 | 0.3635 | | 0.3550 | 0.3635 |

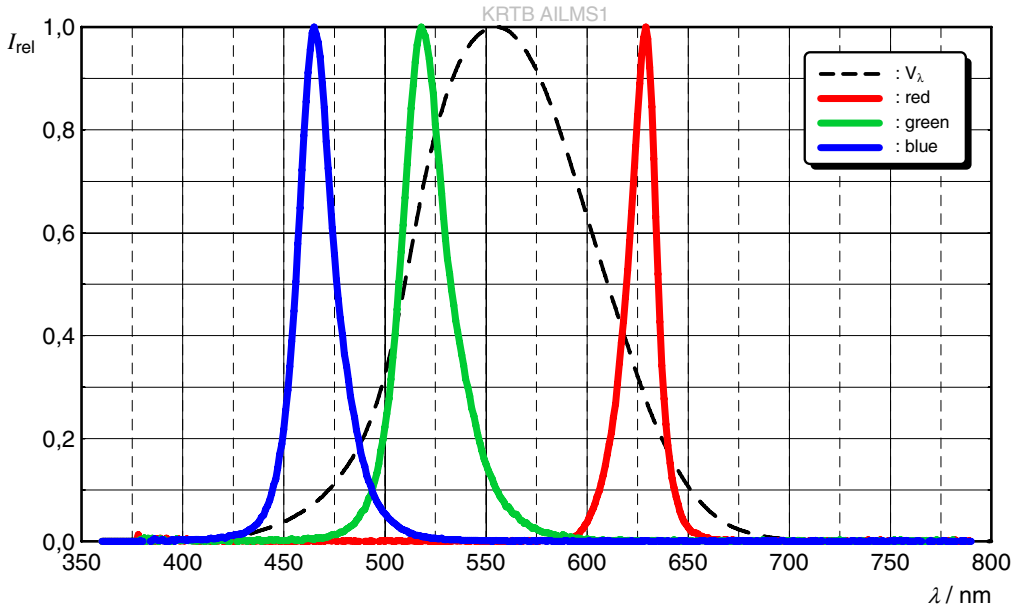
## Group Name on Label

**Example: 5B-B1**

| Brightness | Color Chromaticity |
|---|---|
| 5B | B1 |

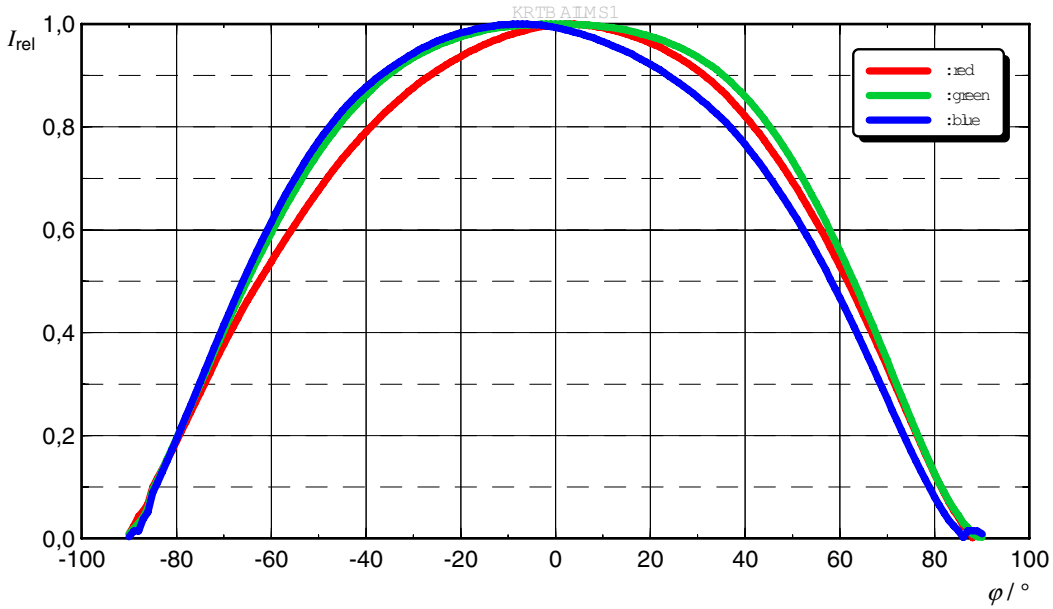
## Relative Spectral Emission [5)]

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



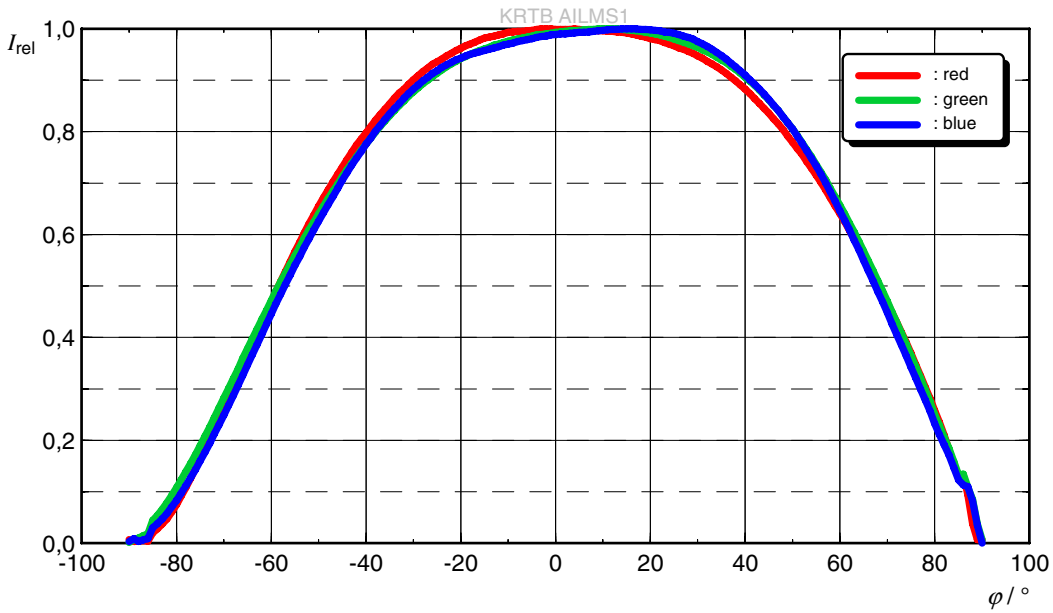
## Radiation Characteristic (horizontal) [5)]

$I_{rel} = f(\phi)$; $T_S = 25$ °C



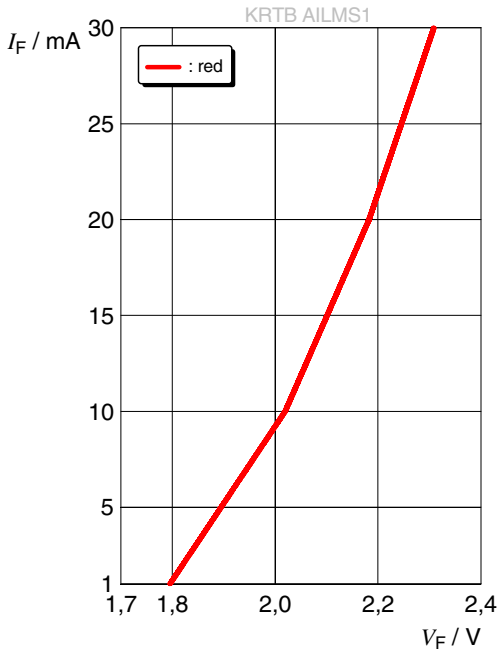

## Radiation Characteristic (vertical) [5)]

$I_{rel} = f(\phi)$; $T_S = 25$ °C



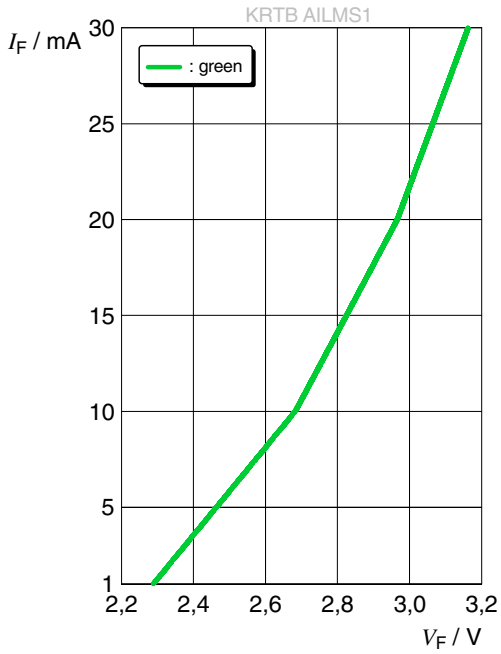
## Forward current [5)]

$I_F = f(V_F)$; $T_S$ = 25 °C



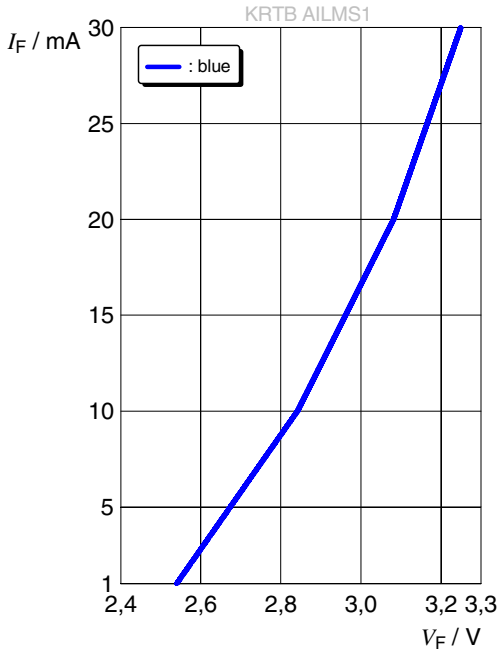

## Forward current [5)]

$I_F = f(V_F)$; $T_S$ = 25 °C



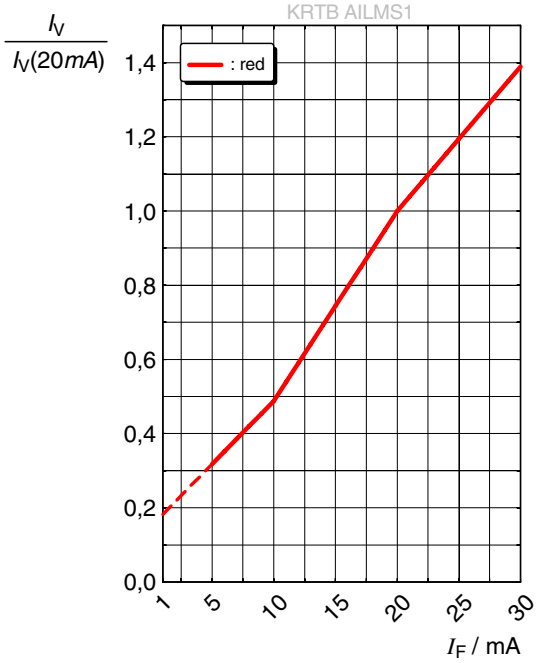

## Forward current [5)]

$I_F = f(V_F)$; $T_S$ = 25 °C



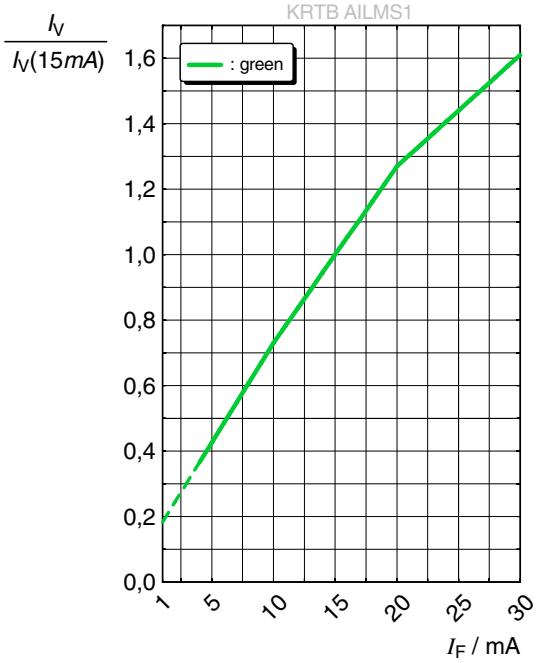
## Relative Luminous Intensity 5), 6)

$I_v/I_v(20\ mA) = f(I_F);\ T_S = 25\ °C$



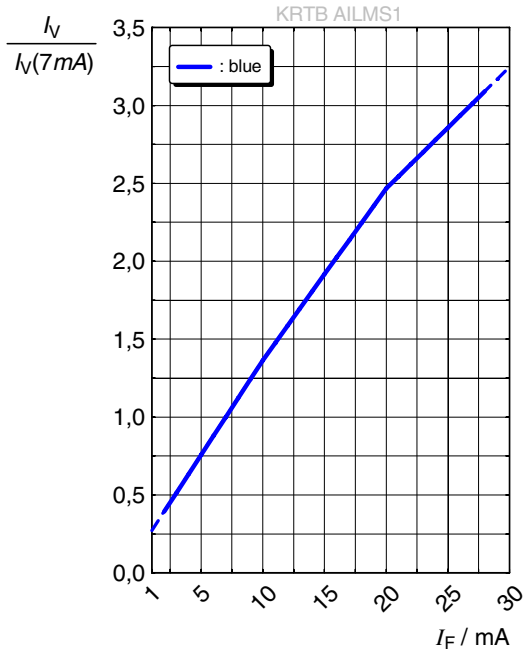

## Relative Luminous Intensity 5), 6)

$I_v/I_v(15\ mA) = f(I_F);\ T_S = 25\ °C$



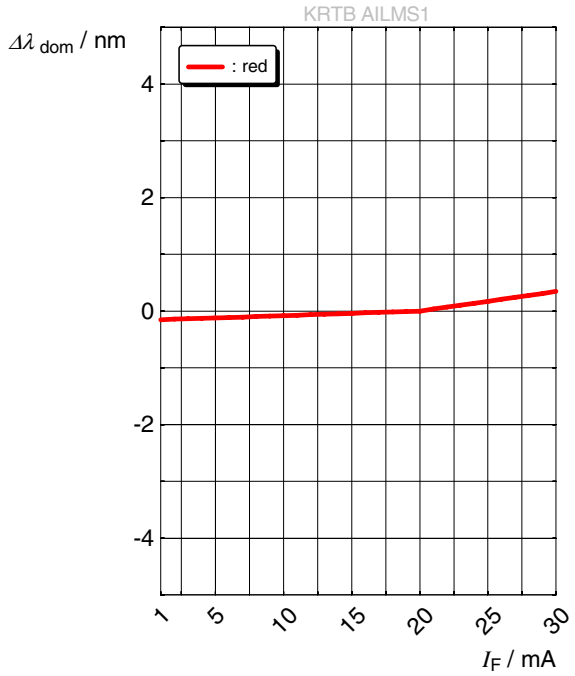

## Relative Luminous Intensity 5), 6)

$I_v/I_v(7\ mA) = f(I_F);\ T_S = 25\ °C$



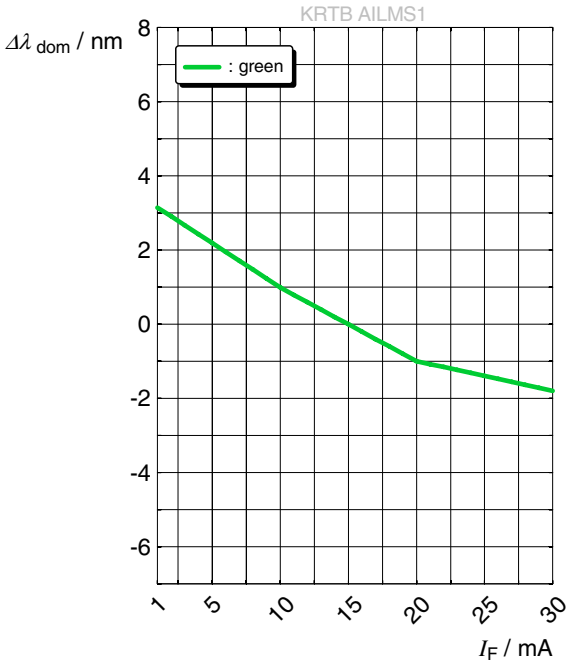
## Dominant Wavelength 5)

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



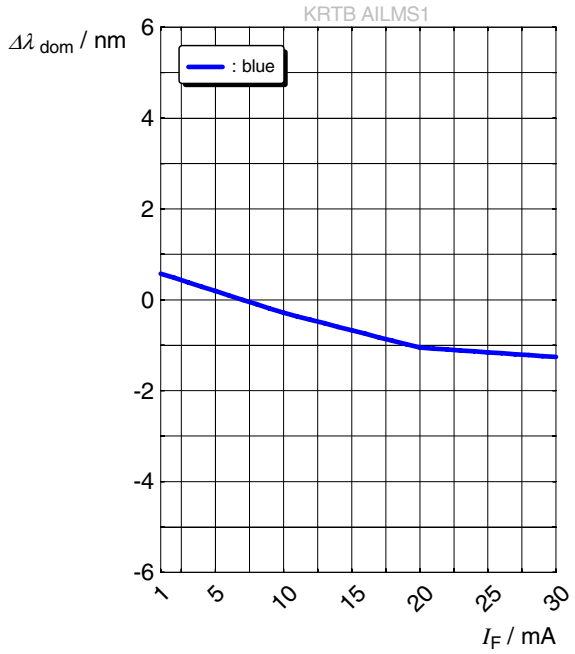

## Dominant Wavelength 5)

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



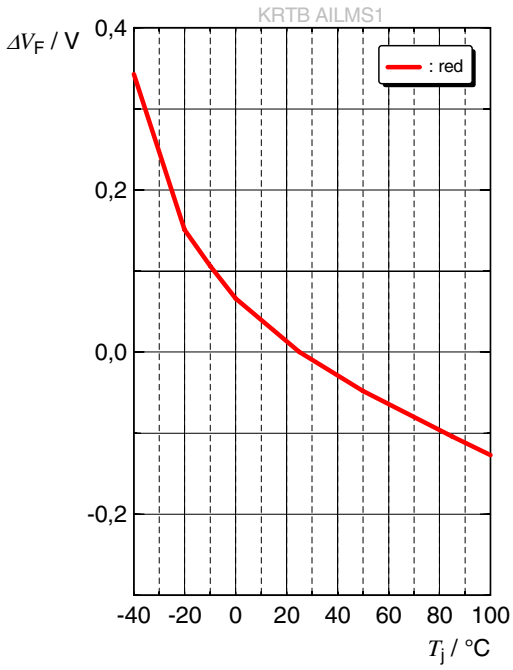

## Dominant Wavelength 5)

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



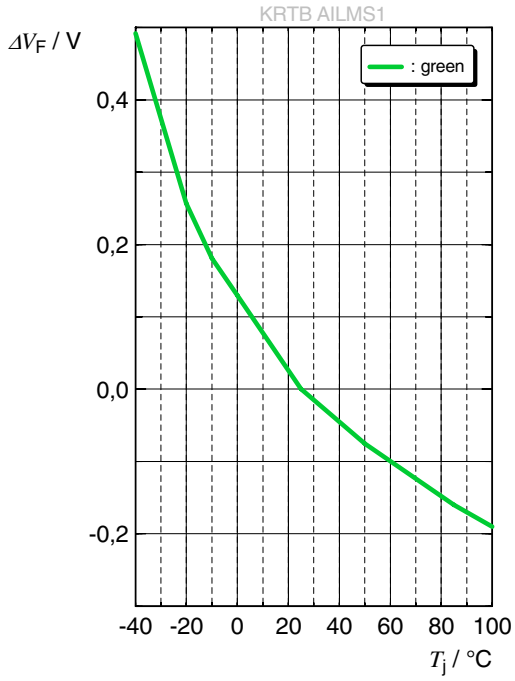
## Forward Voltage [5)]

$\Delta V_F = V_F - V_F(25\ °C) = f(T_j)$; $I_F = 20$ mA



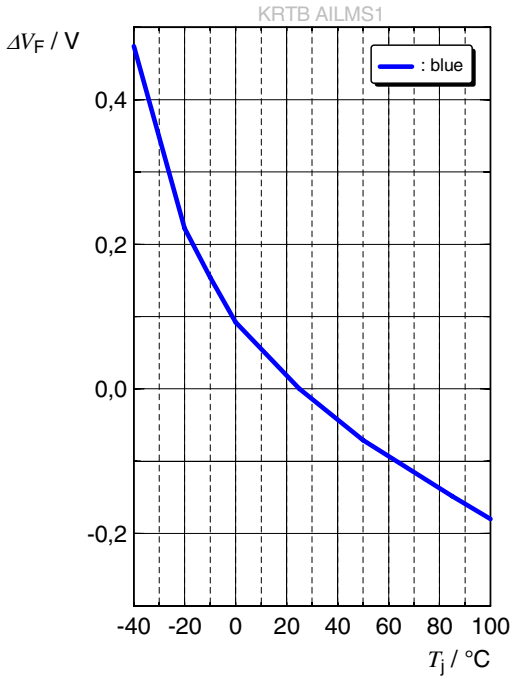

## Forward Voltage [5)]

$\Delta V_F = V_F - V_F(25\ °C) = f(T_j)$; $I_F = 15$ mA



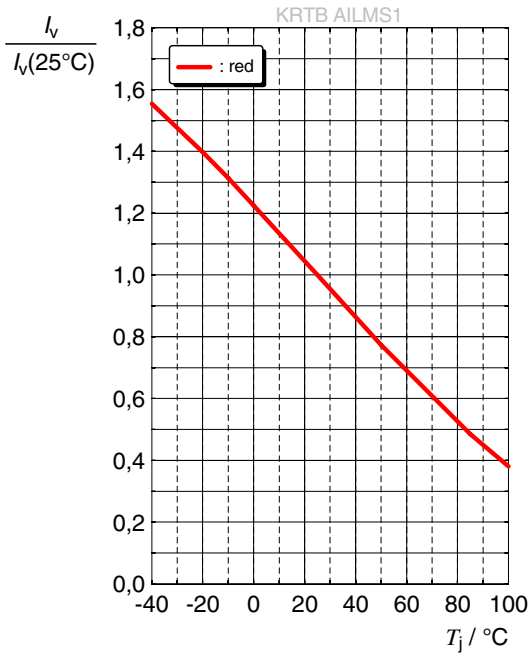

## Forward Voltage [5)]

$\Delta V_F = V_F - V_F(25\ °C) = f(T_j)$; $I_F = 7$ mA



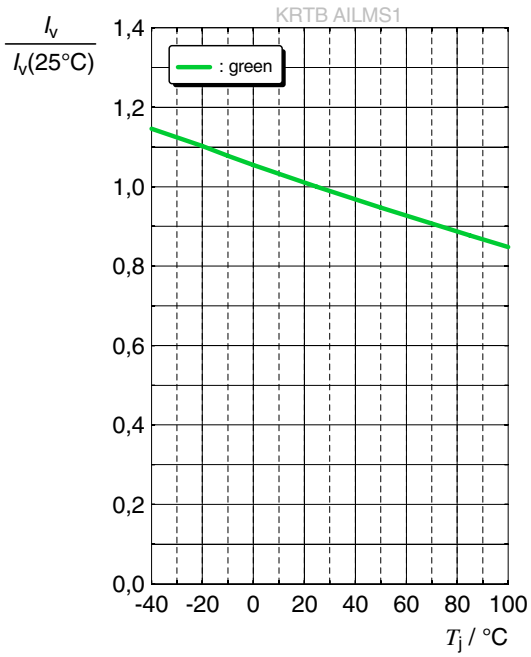
## Relative Luminous Intensity [5]

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



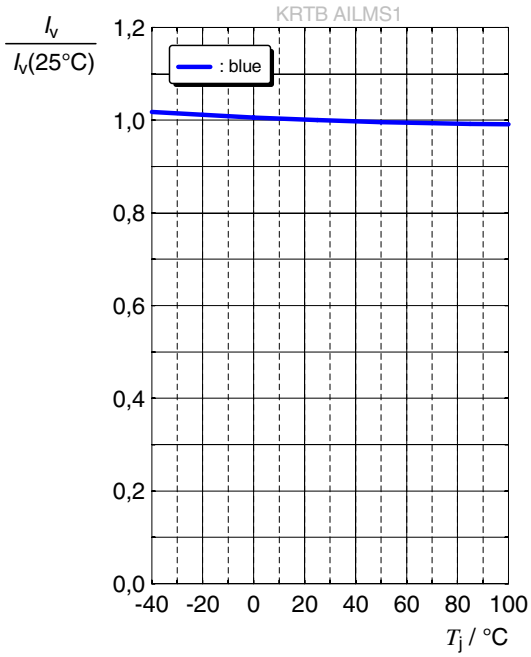

## Relative Luminous Intensity [5]

$I_v/I_v(25\ °C) = f(T_j)$; $I_F$ = 15 mA



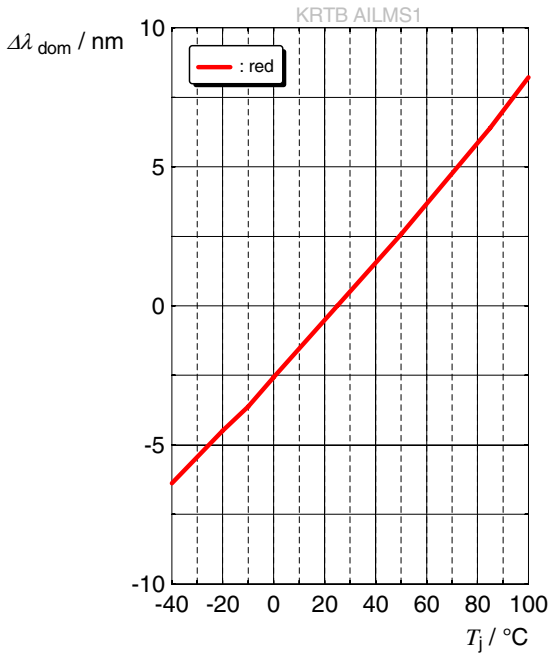

## Relative Luminous Intensity [5]

$I_v/I_v(25\ °C) = f(T_j)$; $I_F$ = 7 mA



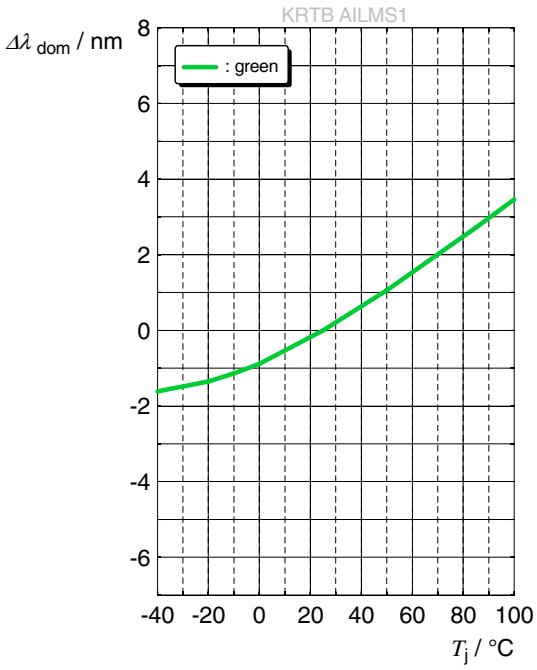
## Dominant Wavelength [5)]

$\lambda_{dom} = f(T_j)$; $I_F$ = 20 mA



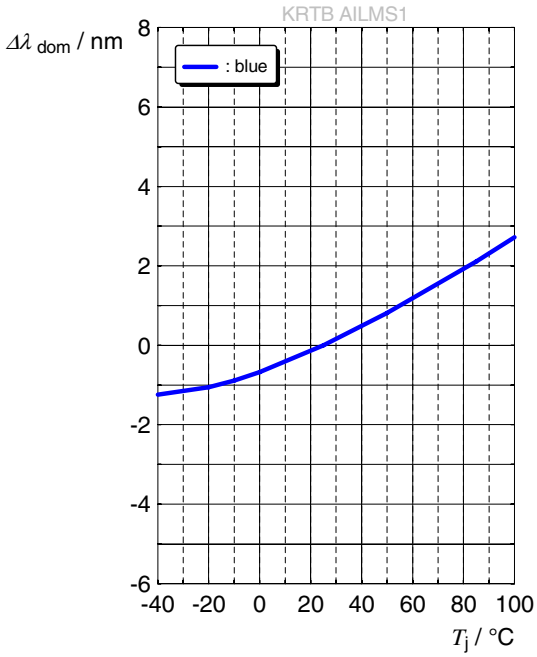

## Dominant Wavelength [5)]

$\lambda_{dom} = f(T_j)$; $I_F$ = 15 mA



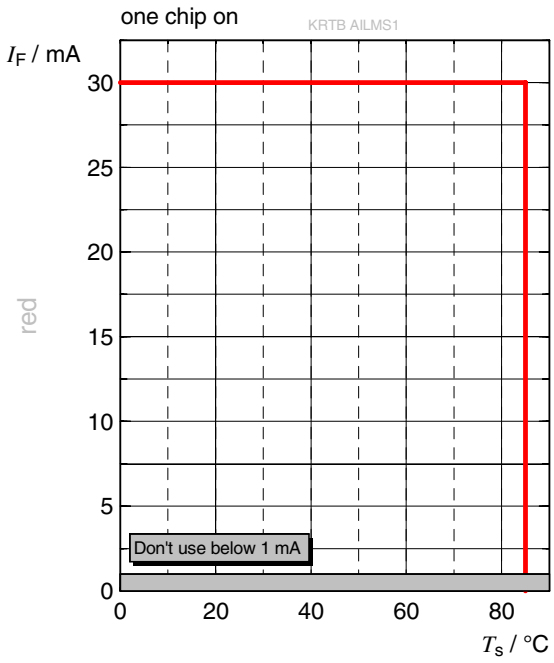

## Dominant Wavelength [5)]

$\lambda_{dom} = f(T_j)$; $I_F$ = 7 mA



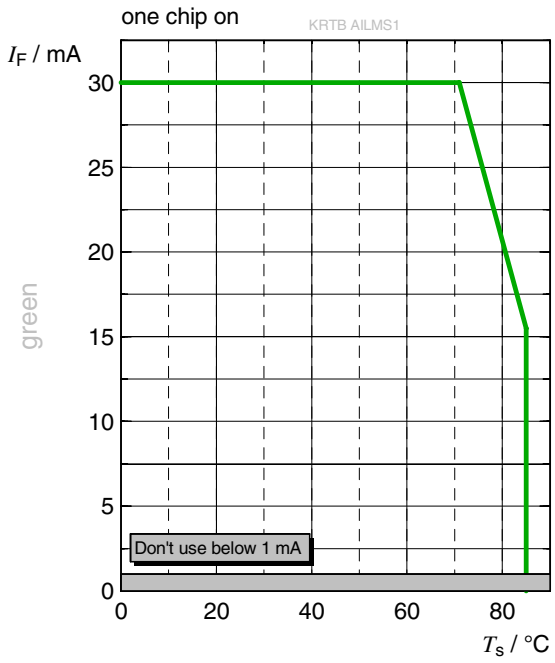
## Max. Permissible Forward Current

$I_F$ = f(T); ● red



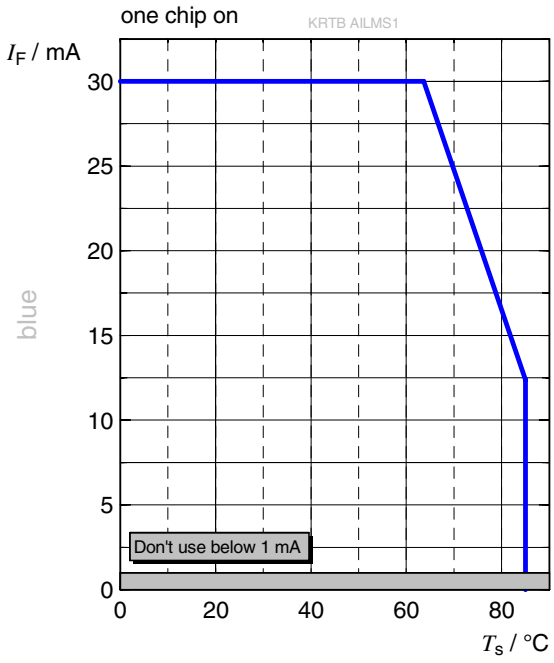

## Max. Permissible Forward Current

$I_F$ = f(T); ● green



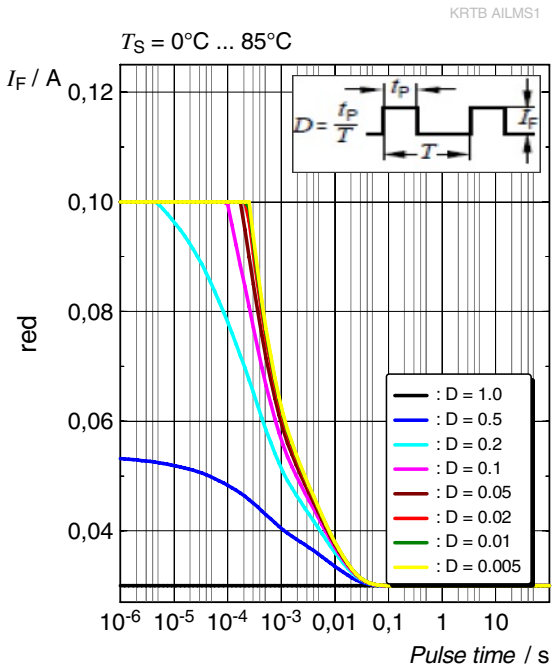

## Max. Permissible Forward Current

$I_F$ = f(T); ● blue



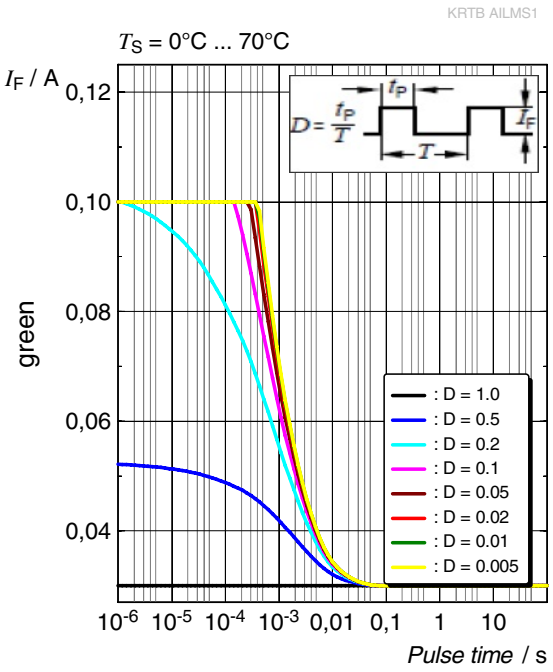
## Permissible Pulse Handling Capability

$I_F = f(t_p)$; D: Duty cycle; $T_S$ = 25 °C; ● red



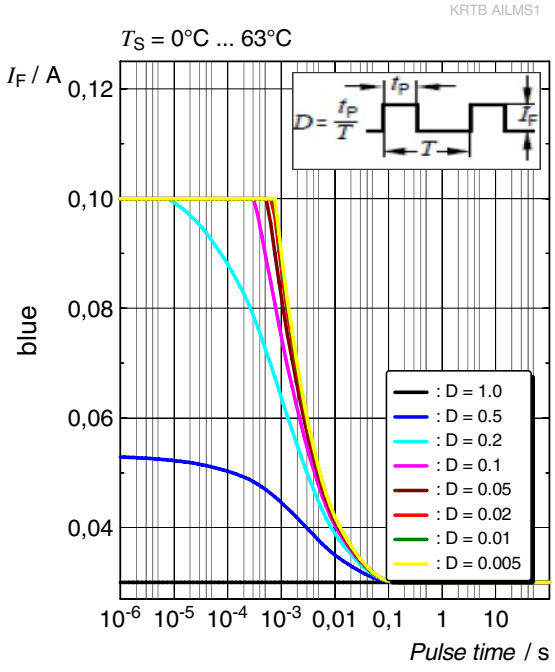

## Permissible Pulse Handling Capability

$I_F = f(t_p)$; D: Duty cycle; $T_S$ = 25 °C; ● green



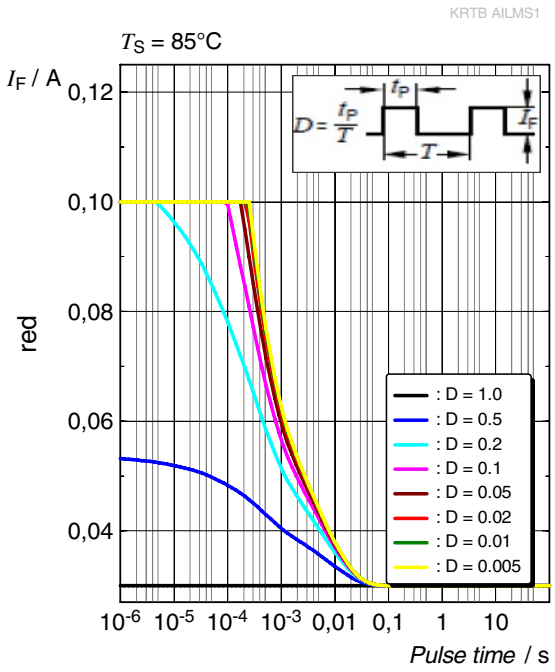

## Permissible Pulse Handling Capability

$I_F = f(t_p)$; D: Duty cycle; $T_S$ = 25 °C; ● blue



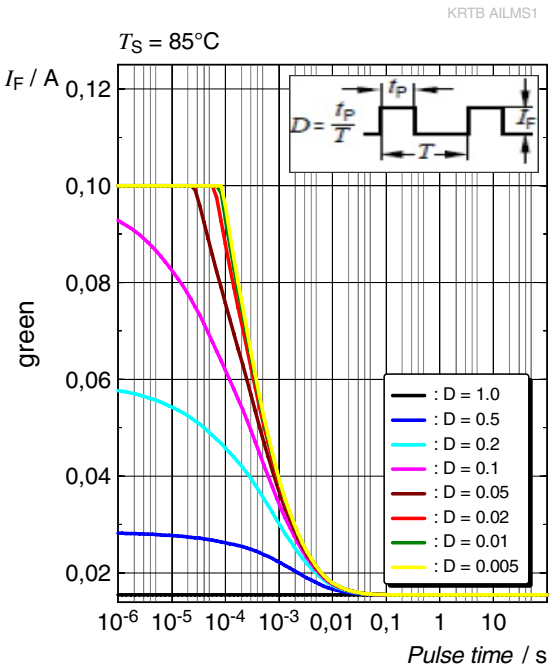
## Permissible Pulse Handling Capability

$I_F = f(t_p)$; D: Duty cycle; $T_S$ = 85 °C; ● red



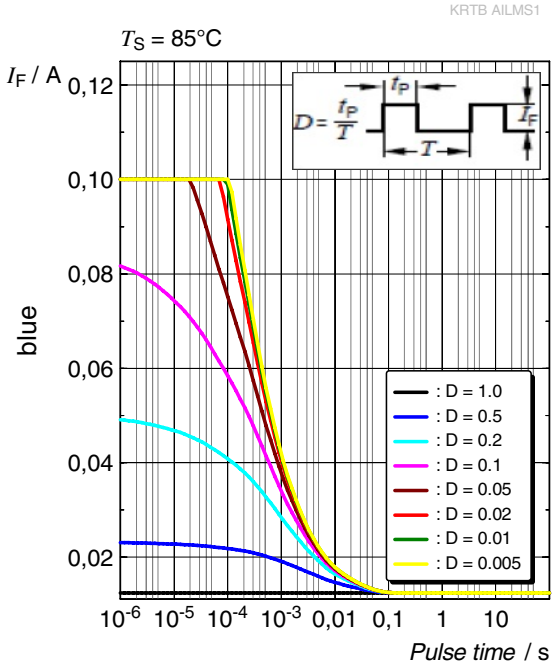

## Permissible Pulse Handling Capability

$I_F = f(t_p)$; D: Duty cycle; $T_S$ = 85 °C; ● green

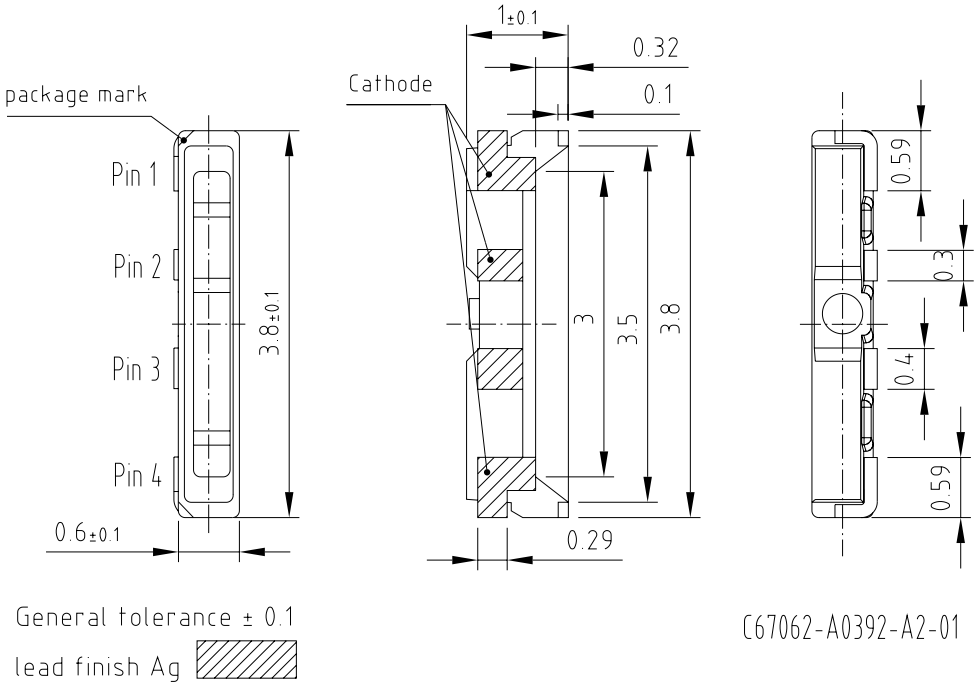



## Permissible Pulse Handling Capability

$I_F = f(t_p)$; D: Duty cycle; $T_S$ = 85 °C; ● blue



## Dimensional Drawing [7)]

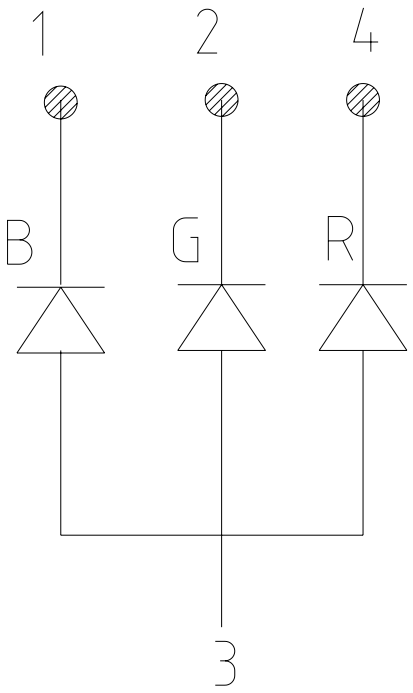



## Further Information:

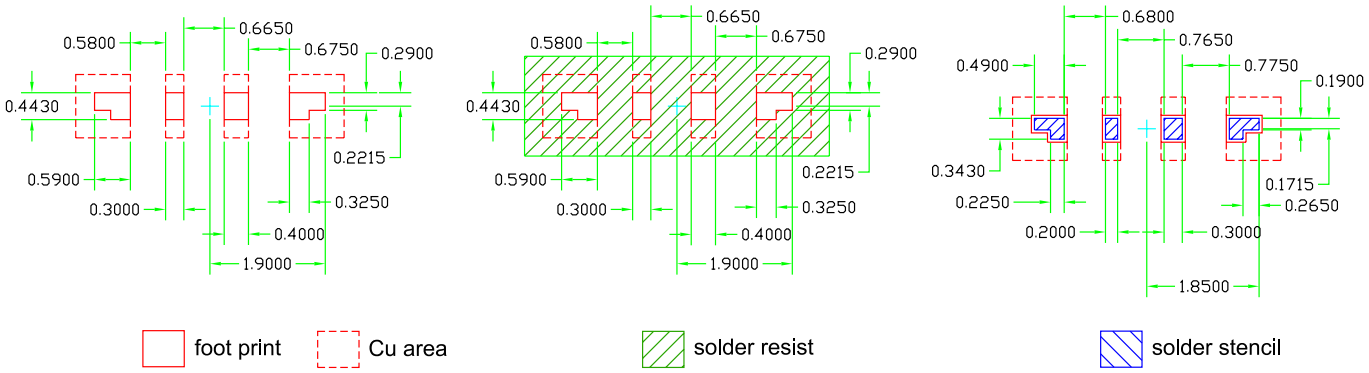
**Approximate Weight:** 4.7 mg

**Corrosion test:** Class: 1B
Test condition: 25°C / 75 % RH / 200ppb $SO_2$, 200ppb $NO_2$, 10ppb $H_2S$, 10ppb $Cl_2$ / 21 days (EN 60068-2-60 (Method 4))

## Electrical Internal Circuit



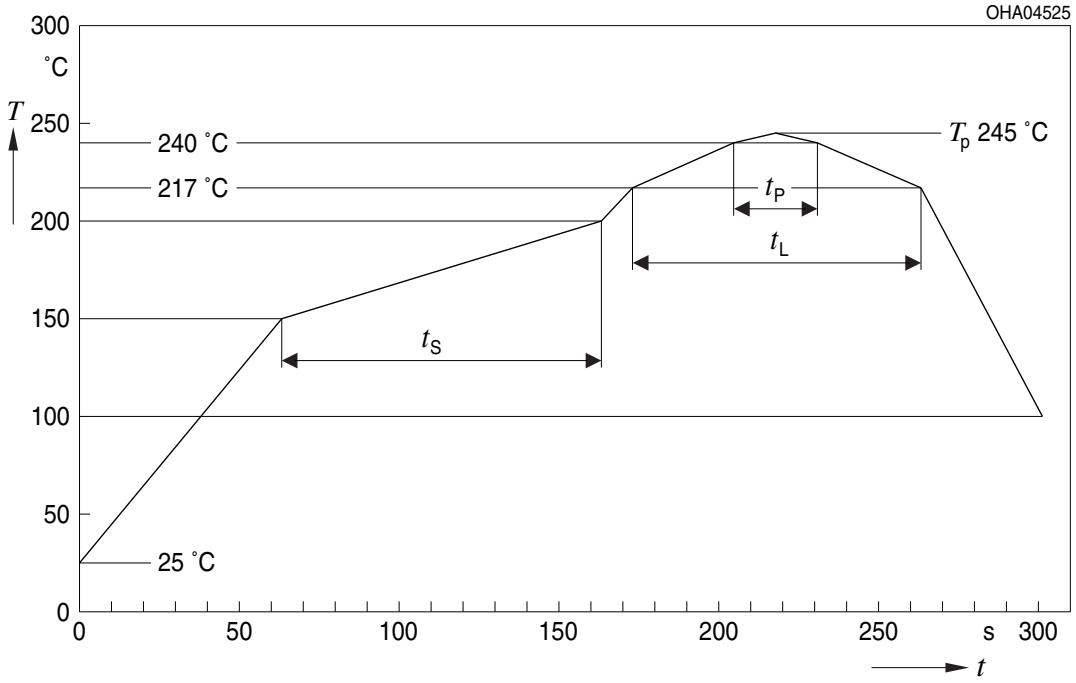
## Recommended Solder Pad [7)]




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.

## Reflow Soldering Profile

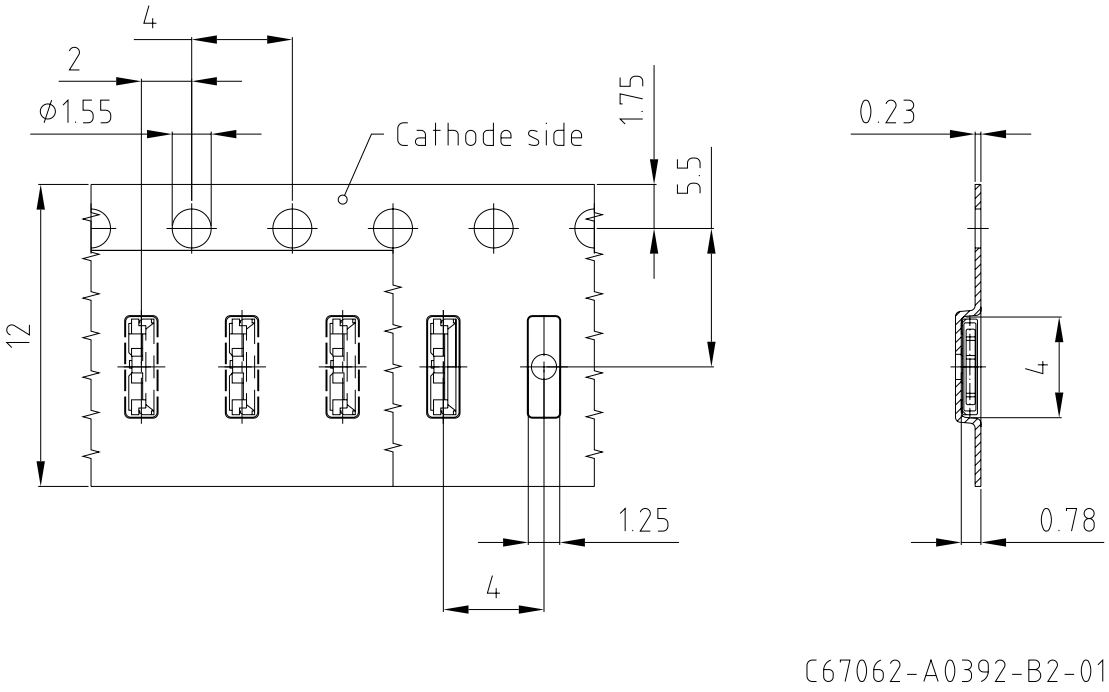
Product complies to MSL Level 3 acc. to JEDEC J-STD-020E




| Profile Feature | Symbol | Pb-Free (SnAgCu) Assembly | | | Unit |
|---|---|---|---|---|---|
| | | Minimum | Recommendation | Maximum | |
| Ramp-up rate to preheat*) 25 °C to 150 °C | | | 2 | 3 | K/s |
| Time $t_S$ $T_{Smin}$ to $T_{Smax}$ | $t_S$ | 60 | 100 | 120 | s |
| Ramp-up rate to peak*) $T_{Smax}$ to $T_P$ | | | 2 | 3 | K/s |
| Liquidus temperature | $T_L$ | | 217 | | °C |
| Time above liquidus temperature | $t_L$ | | 80 | 100 | s |
| Peak temperature | $T_P$ | | 245 | 260 | °C |
| Time within 5 °C of the specified peak temperature $T_P$ - 5 K | $t_P$ | 10 | 20 | 30 | s |
| Ramp-down rate* $T_P$ to 100 °C | | | 3 | 6 | K/s |
| Time 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 [7)]

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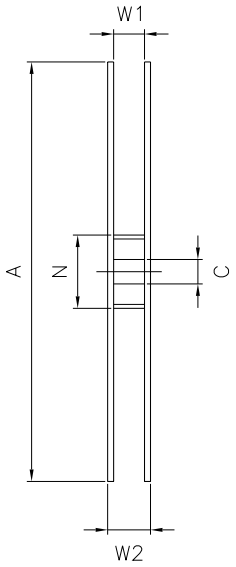
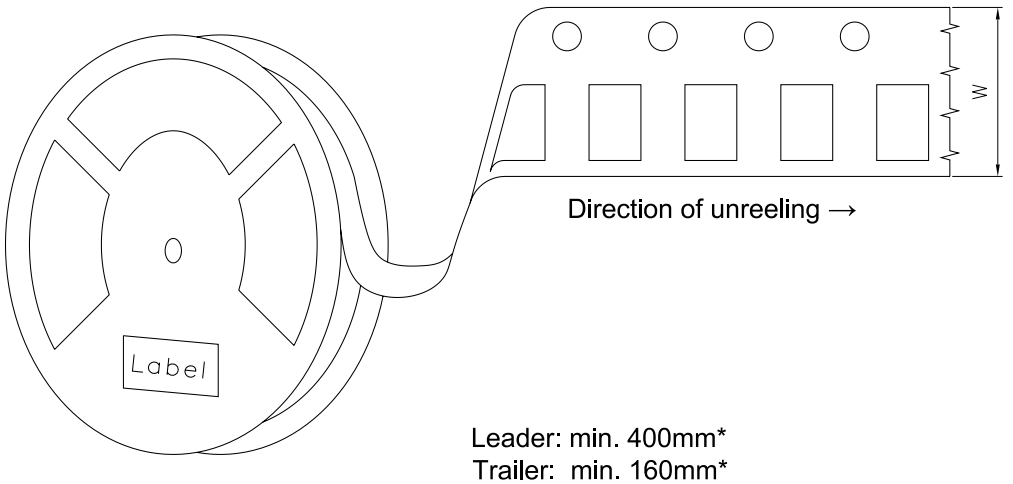
## Tape and Reel [8)]



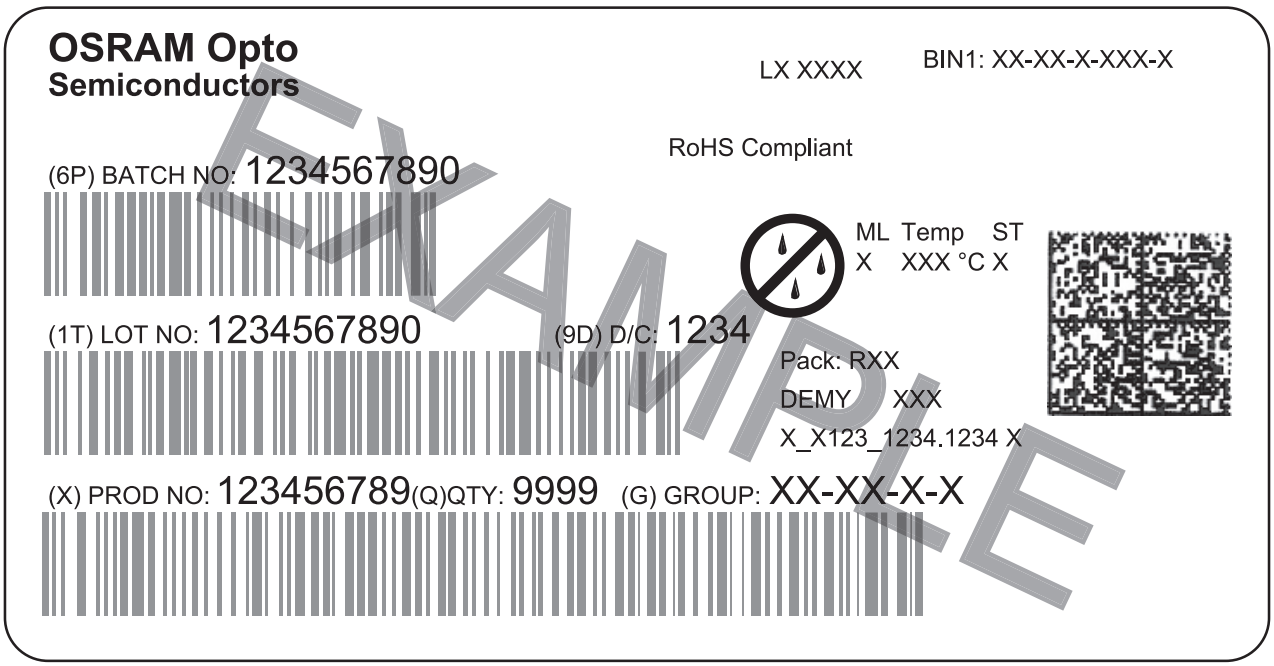




Leader: min. 400mm*
Trailer: min. 160mm*
*)Dimensions acc. to IEC 60286-3; EIA 481-E

## Reel Dimensions

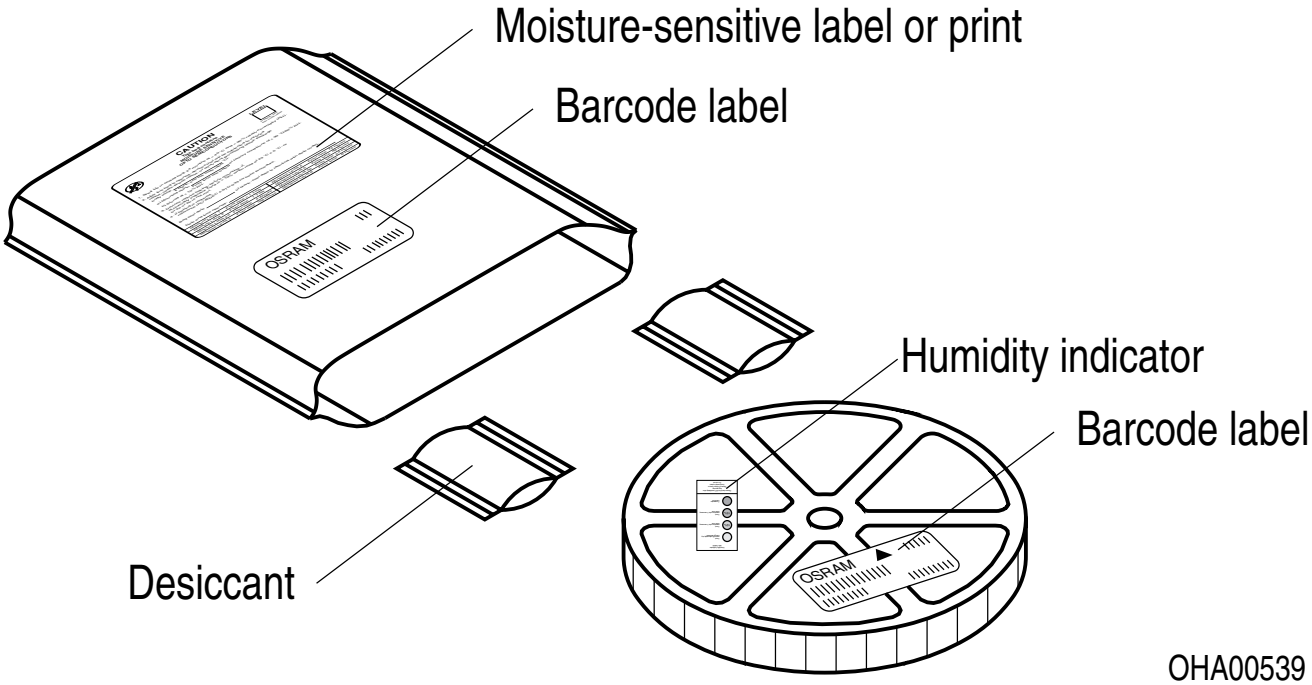
| A | W | $N_{min}$ | $W_1$ | $W_{2\,max}$ | Pieces per PU |
|---|---|---|---|---|---|
| 180 mm | 12 + 0.3 / - 0.1 mm | 60 mm | 12.4 + 2 mm | 18.4 mm | 3000 |

## Barcode-Product-Label (BPL)




OHA04563

## Dry Packing Process and Materials [7)]




OHA00539

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 **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 www.osram-os.com/appnotes

## 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 the OSRAM OS 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**
OSRAM OS components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.
OSRAM OS products are not qualified at module and system level for such application.

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

## Glossary

1) **Wavelength:** Wavelengths are tested at a current pulse duration of 25 ms and a tolerance of ±1 nm.

2) **Forward Voltage:** Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of ±0.1 V.

3) **Thermal Resistance:** Rth max is based on statistic values (6σ).

4) **Brightness:** Brightness groups are tested at a current pulse duration of 25 ms and a tolerance of ±11 %.

5) **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.

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 ±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 | 2021-06-02 | Initial Version |

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按照中国的相关法规和标准，不含有毒有害物质或元素。