

LW MVSG binning FK0PN0

Mini TOPLED®

Small size high-flux LED for slim designs



Applications

- Cluster, Button Backlighting

Features:

- Package: white SMT package, colored diffused silicone resin
- Chip technology: UX:3
- Typ. Radiation: 120° (Lambertian emitter)
- Color: Cx = 0.33, Cy = 0.33 acc. to CIE 1931 (● white)
- Corrosion Robustness Class: 3B
- ESD: 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)

Ordering Information

| Type | Luminous Intensity ¹⁾ $I_F = 20 \text{ mA}$ I_v | Ordering Code |
|-----------------------------|--|---------------|
| LW MVSG-AYBZ-FK0PN0-Z486-20 | 1300 ... 2800 mcd | Q65112A1326 |

Maximum Ratings

| Parameter | Symbol | | Values |
|--|-----------|------|--------|
| Operating Temperature | T_{op} | min. | -40 °C |
| | | max. | 110 °C |
| Storage Temperature | T_{stg} | min. | -40 °C |
| | | max. | 110 °C |
| Junction Temperature | T_j | max. | 125 °C |
| Forward Current $T_s = 25\text{ °C}$ | I_F | min. | 3 mA |
| | | max. | 30 mA |
| Surge Current $t \leq 10\ \mu\text{s}$; $D = 0.005$; $T_s = 25\text{ °C}$ | I_{FS} | max. | 300 mA |
| ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B) | V_{ESD} | | 8 kV |
| Reverse current ²⁾ | I_R | max. | 200 mA |

Characteristics

$I_F = 20 \text{ mA}$; $T_S = 25 \text{ °C}$

| Parameter | Symbol | | Values |
|--|------------------------|------|-----------|
| Chromaticity Coordinate ³⁾ | C_x | typ. | 0.33 |
| | C_y | typ. | 0.33 |
| Viewing angle at 50 % I_v | 2ϕ | typ. | 120 ° |
| Forward Voltage ⁴⁾ $I_F = 20 \text{ mA}$ | V_F | min. | 2.70 V |
| | | typ. | 3.05 V |
| | | max. | 3.40 V |
| Reverse voltage (ESD device) | $V_{R\text{ESD}}$ | min. | 45 V |
| Reverse voltage ²⁾ $I_R = 20 \text{ mA}$ | V_R | max. | 1.2 V |
| Real thermal resistance junction/ambient ^{5), 6)} | $R_{\text{thJA real}}$ | max. | 360 K / W |
| Real thermal resistance junction/solderpoint ⁵⁾ | $R_{\text{thJS real}}$ | max. | 130 K / W |

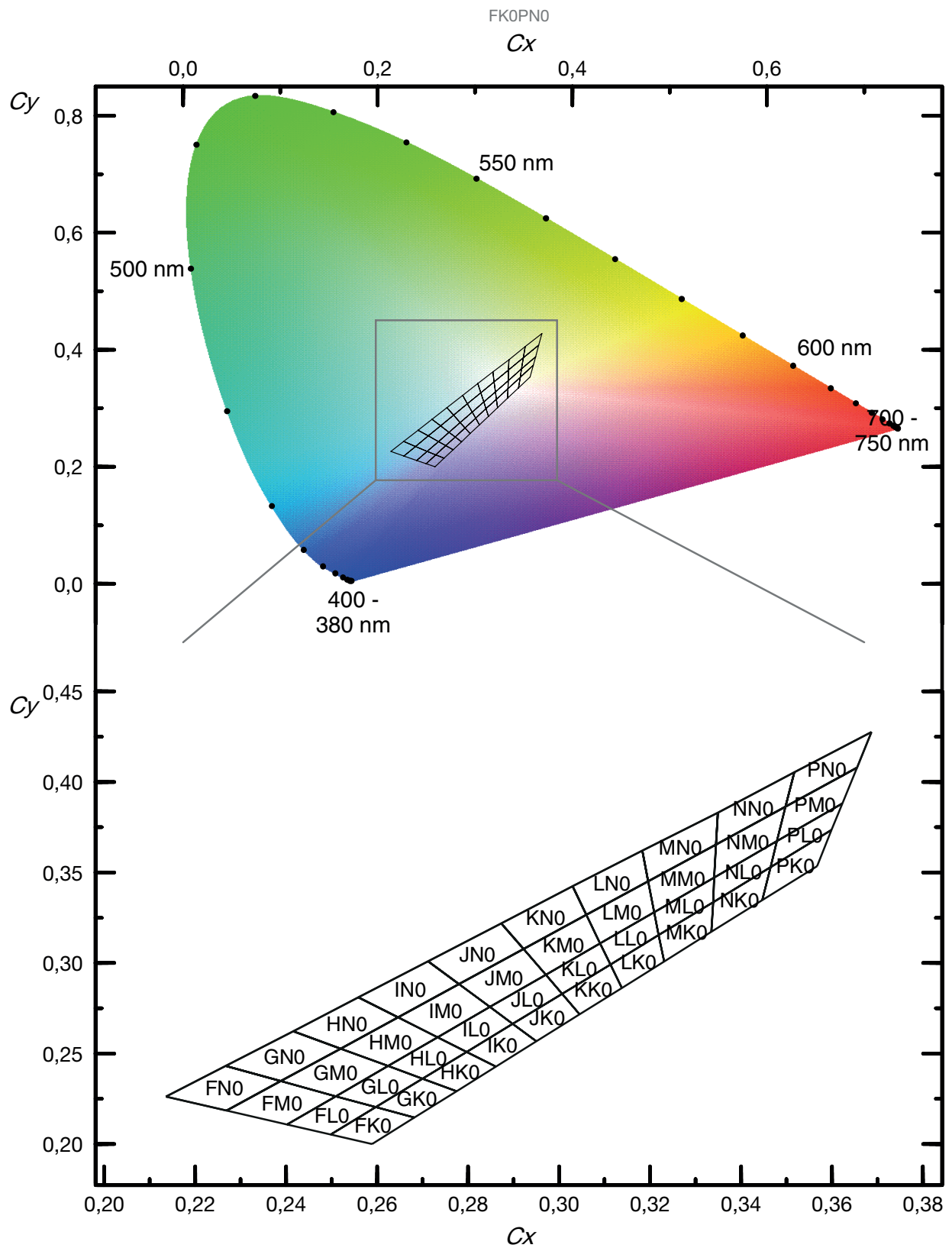
Brightness Groups

| Group | Luminous Intensity ¹⁾ $I_F = 20 \text{ mA}$ min. I_v | Luminous Intensity ¹⁾ $I_F = 20 \text{ mA}$ max. I_v | Luminous Flux ⁷⁾ $I_F = 20 \text{ mA}$ typ. Φ_v |
|-------|--|--|--|
| AY | 1300 mcd | 1500 mcd | 4200 mlm |
| AZ | 1500 mcd | 1800 mcd | 4950 mlm |
| BX | 1800 mcd | 2100 mcd | 5850 mlm |
| BY | 2100 mcd | 2400 mcd | 6750 mlm |
| BZ | 2400 mcd | 2800 mcd | 7800 mlm |

Forward Voltage Groups

| Group | Forward Voltage ⁴⁾ $I_F = 20 \text{ mA}$ min. V_F | Forward Voltage ⁴⁾ $I_F = 20 \text{ mA}$ max. V_F |
|-------|---|---|
| Z4 | 2.70 V | 2.90 V |
| 44 | 2.90 V | 3.10 V |
| 86 | 3.10 V | 3.40 V |

Chromaticity Coordinate Groups



Color Chromaticity Groups ³⁾

| Group | Cx | Cy | Group | Cx | Cy | Group | Cx | Cy |
|-------|--------|--------|-------|--------|--------|-------|--------|--------|
| FK0 | 0.2498 | 0.2053 | HK0 | 0.2700 | 0.2361 | JK0 | 0.2898 | 0.2664 |
| | 0.2597 | 0.2204 | | 0.2797 | 0.2509 | | 0.3007 | 0.2830 |
| | 0.2682 | 0.2146 | | 0.2861 | 0.2427 | | 0.3045 | 0.2717 |
| | 0.2589 | 0.2000 | | 0.2775 | 0.2292 | | 0.2950 | 0.2568 |
| FL0 | 0.2402 | 0.2108 | HLO | 0.2624 | 0.2431 | JL0 | 0.2848 | 0.2757 |
| | 0.2509 | 0.2264 | | 0.2733 | 0.2590 | | 0.2971 | 0.2935 |
| | 0.2597 | 0.2204 | | 0.2797 | 0.2509 | | 0.3007 | 0.2830 |
| | 0.2498 | 0.2053 | | 0.2700 | 0.2361 | | 0.2898 | 0.2664 |
| FM0 | 0.2269 | 0.2185 | HMO | 0.2520 | 0.2527 | JMO | 0.2780 | 0.2883 |
| | 0.2388 | 0.2348 | | 0.2646 | 0.2700 | | 0.2922 | 0.3077 |
| | 0.2509 | 0.2264 | | 0.2733 | 0.2590 | | 0.2971 | 0.2935 |
| | 0.2402 | 0.2108 | | 0.2624 | 0.2431 | | 0.2848 | 0.2757 |
| FN0 | 0.2136 | 0.2262 | HNO | 0.2416 | 0.2623 | JNO | 0.2712 | 0.3009 |
| | 0.2267 | 0.2432 | | 0.2559 | 0.2810 | | 0.2873 | 0.3219 |
| | 0.2388 | 0.2348 | | 0.2646 | 0.2700 | | 0.2922 | 0.3077 |
| | 0.2269 | 0.2185 | | 0.2520 | 0.2527 | | 0.2780 | 0.2883 |
| GK0 | 0.2597 | 0.2204 | IK0 | 0.2797 | 0.2509 | KK0 | 0.3007 | 0.2830 |
| | 0.2700 | 0.2361 | | 0.2898 | 0.2664 | | 0.3113 | 0.2992 |
| | 0.2775 | 0.2292 | | 0.2950 | 0.2568 | | 0.3138 | 0.2862 |
| | 0.2682 | 0.2146 | | 0.2861 | 0.2427 | | 0.3045 | 0.2717 |
| GL0 | 0.2509 | 0.2264 | ILO | 0.2733 | 0.2590 | KLO | 0.2971 | 0.2935 |
| | 0.2624 | 0.2431 | | 0.2848 | 0.2757 | | 0.3090 | 0.3108 |
| | 0.2700 | 0.2361 | | 0.2898 | 0.2664 | | 0.3113 | 0.2992 |
| | 0.2597 | 0.2204 | | 0.2797 | 0.2509 | | 0.3007 | 0.2830 |
| GM0 | 0.2388 | 0.2348 | IMO | 0.2646 | 0.2700 | KM0 | 0.2922 | 0.3077 |
| | 0.2520 | 0.2527 | | 0.2780 | 0.2883 | | 0.3060 | 0.3266 |
| | 0.2624 | 0.2431 | | 0.2848 | 0.2757 | | 0.3090 | 0.3108 |
| | 0.2509 | 0.2264 | | 0.2733 | 0.2590 | | 0.2971 | 0.2935 |
| GN0 | 0.2267 | 0.2432 | INO | 0.2559 | 0.2810 | KN0 | 0.2873 | 0.3219 |
| | 0.2416 | 0.2623 | | 0.2712 | 0.3009 | | 0.3030 | 0.3424 |
| | 0.2520 | 0.2527 | | 0.2780 | 0.2883 | | 0.3060 | 0.3266 |
| | 0.2388 | 0.2348 | | 0.2646 | 0.2700 | | 0.2922 | 0.3077 |

LW MVSG binning FK0PN0

| Group | Cx | Cy | Group | Cx | Cy | Group | Cx | Cy |
|-------|--------|--------|-------|--------|--------|-------|--------|--------|
| LK0 | 0.3113 | 0.2992 | MM0 | 0.3196 | 0.3451 | PK0 | 0.3465 | 0.3530 |
| | 0.3219 | 0.3154 | | 0.3345 | 0.3654 | | 0.3599 | 0.3735 |
| | 0.3231 | 0.3008 | | 0.3341 | 0.3472 | | 0.3567 | 0.3535 |
| | 0.3138 | 0.2862 | | 0.3209 | 0.3281 | | 0.3447 | 0.3347 |
| LLO | 0.3090 | 0.3108 | MNO | 0.3183 | 0.3621 | PLO | 0.3479 | 0.3673 |
| | 0.3209 | 0.3281 | | 0.3349 | 0.3830 | | 0.3623 | 0.3882 |
| | 0.3219 | 0.3154 | | 0.3345 | 0.3654 | | 0.3599 | 0.3735 |
| | 0.3113 | 0.2992 | | 0.3196 | 0.3451 | | 0.3465 | 0.3530 |
| LMO | 0.3060 | 0.3266 | NKO | 0.3339 | 0.3336 | PM0 | 0.3498 | 0.3863 |
| | 0.3196 | 0.3451 | | 0.3465 | 0.3530 | | 0.3655 | 0.4079 |
| | 0.3209 | 0.3281 | | 0.3447 | 0.3347 | | 0.3623 | 0.3882 |
| | 0.3090 | 0.3108 | | 0.3335 | 0.3172 | | 0.3479 | 0.3673 |
| LNO | 0.3030 | 0.3424 | NLO | 0.3341 | 0.3472 | PNO | 0.3517 | 0.4053 |
| | 0.3183 | 0.3621 | | 0.3479 | 0.3673 | | 0.3687 | 0.4276 |
| | 0.3196 | 0.3451 | | 0.3465 | 0.3530 | | 0.3655 | 0.4079 |
| | 0.3060 | 0.3266 | | 0.3339 | 0.3336 | | 0.3498 | 0.3863 |
| MK0 | 0.3219 | 0.3154 | NMO | 0.3345 | 0.3654 | | | |
| | 0.3339 | 0.3336 | | 0.3498 | 0.3863 | | | |
| | 0.3335 | 0.3172 | | 0.3479 | 0.3673 | | | |
| | 0.3231 | 0.3008 | | 0.3341 | 0.3472 | | | |
| MLO | 0.3209 | 0.3281 | NNO | 0.3349 | 0.3830 | | | |
| | 0.3341 | 0.3472 | | 0.3517 | 0.4053 | | | |
| | 0.3339 | 0.3336 | | 0.3498 | 0.3863 | | | |
| | 0.3219 | 0.3154 | | 0.3345 | 0.3654 | | | |

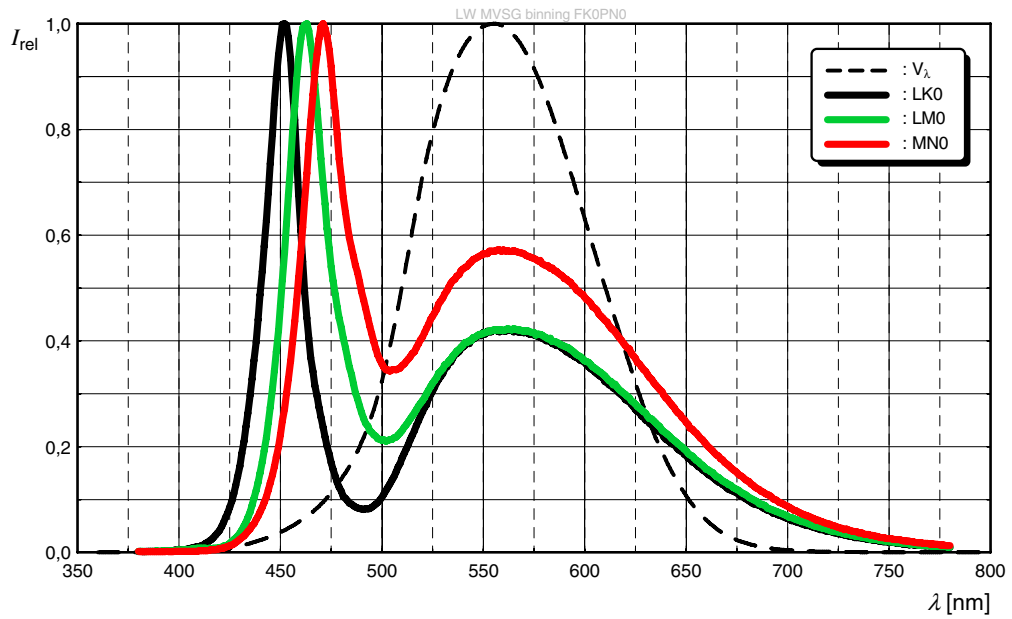
Group Name on Label

Example: AY-FK0-44

| Brightness | Color Chromaticity | Forward Voltage |
|------------|--------------------|-----------------|
| AY | FK0 | 44 |

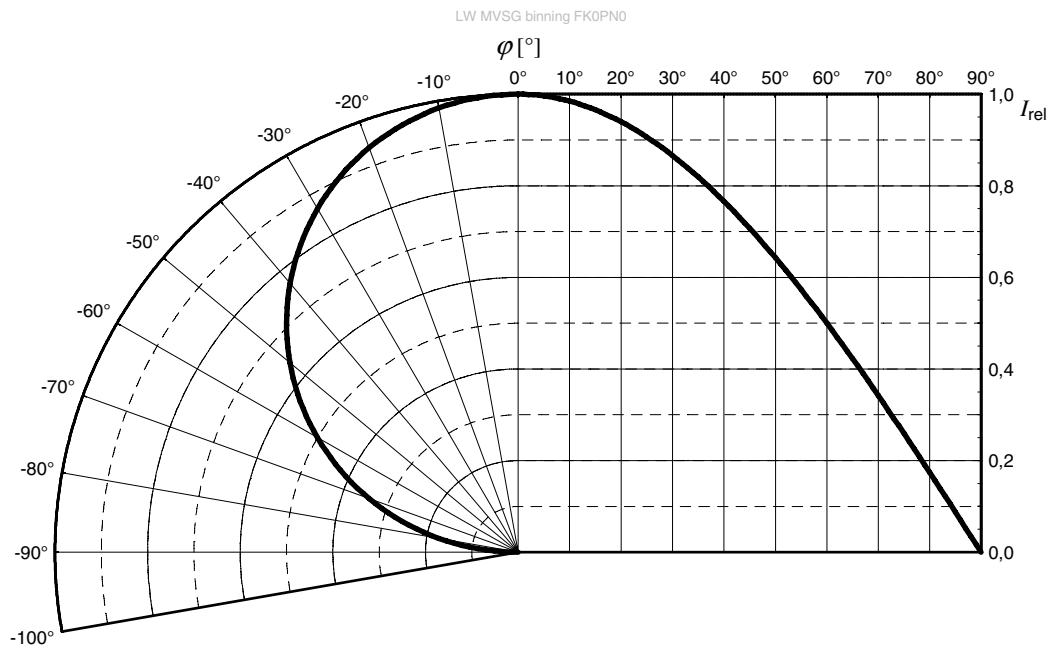
Relative Spectral Emission ⁷⁾

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



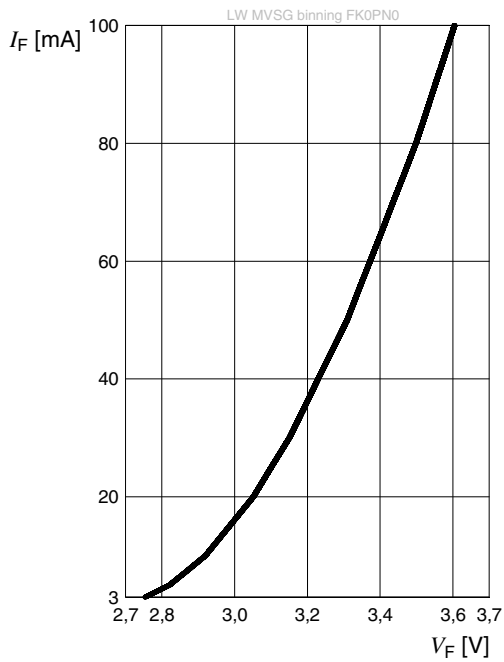
Radiation Characteristics ⁷⁾

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



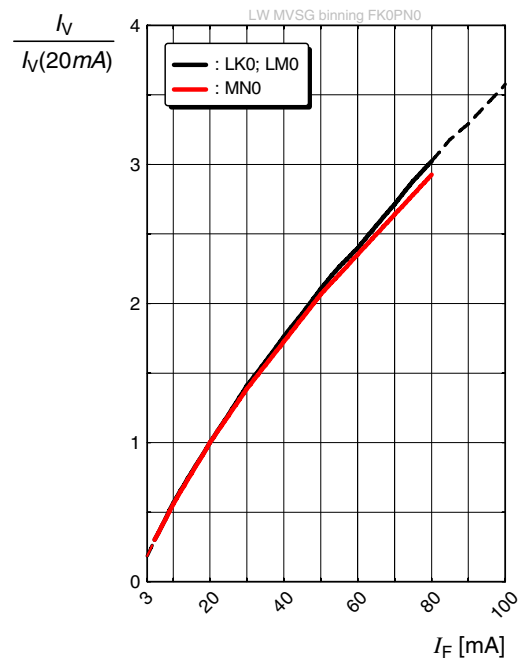
Forward current ⁷⁾

$$I_F = f(V_F); T_S = 25 \text{ }^\circ\text{C}$$



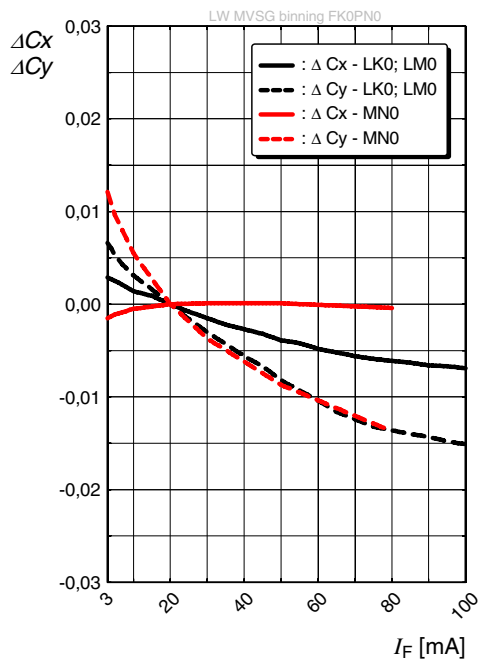
Relative Luminous Intensity ^{7), 8)}

$$I_V/I_V(20 \text{ mA}) = f(I_F); T_S = 25 \text{ }^\circ\text{C}$$



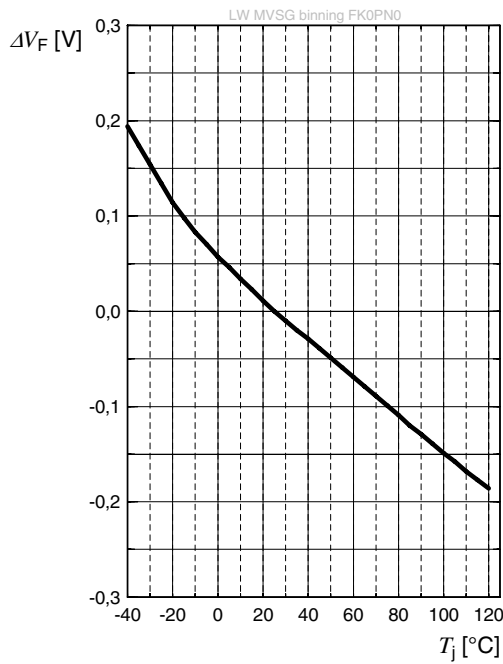
Chromaticity Coordinate Shift ⁷⁾

$$\Delta C_x, \Delta C_y = f(I_F); T_S = 25 \text{ }^\circ\text{C}$$



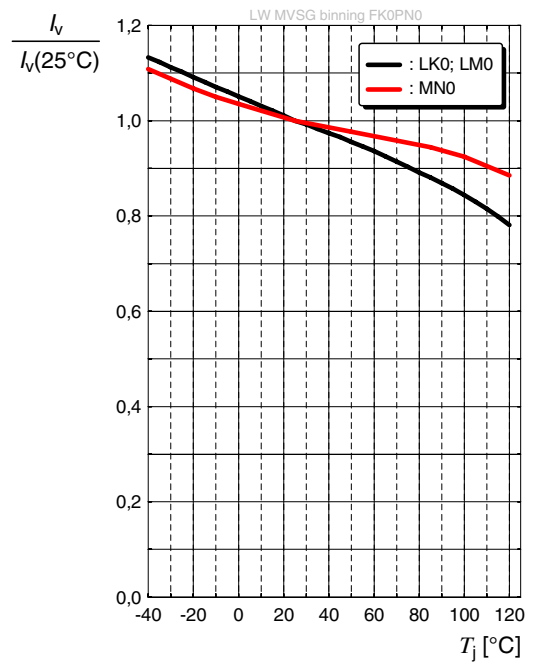
Forward Voltage ⁷⁾

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



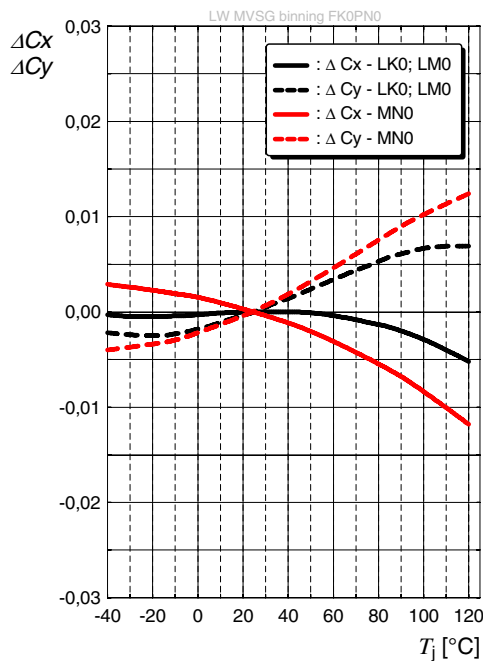
Relative Luminous Intensity ⁷⁾

$$I_V/I_V(25^\circ\text{C}) = f(T_j); I_F = 20\text{ mA}$$



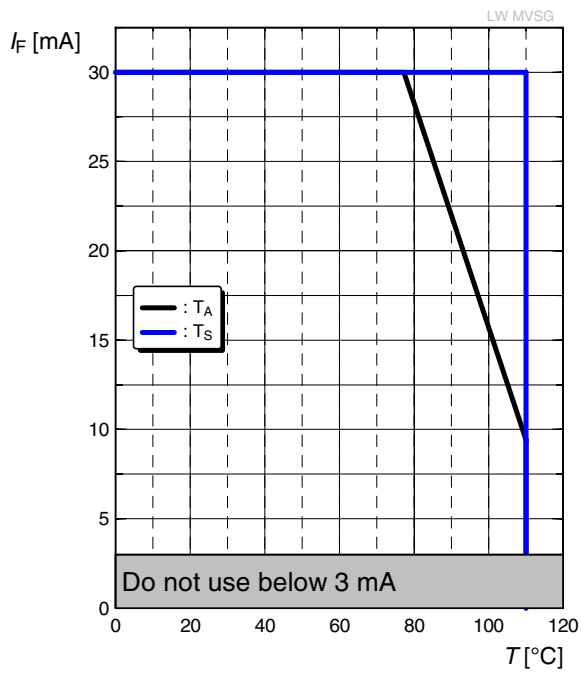
Chromaticity Coordinate Shift ⁷⁾

$$\Delta C_x, \Delta C_y = f(T_j); I_F = 20\text{ mA}$$



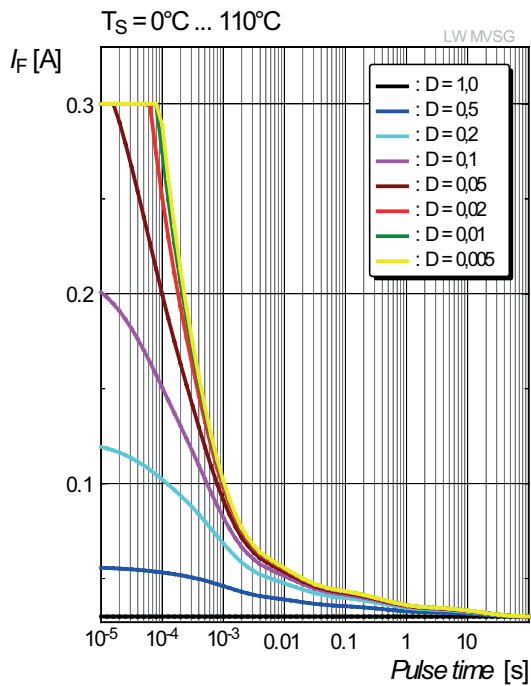
Max. Permissible Forward Current

$$I_F = f(T)$$

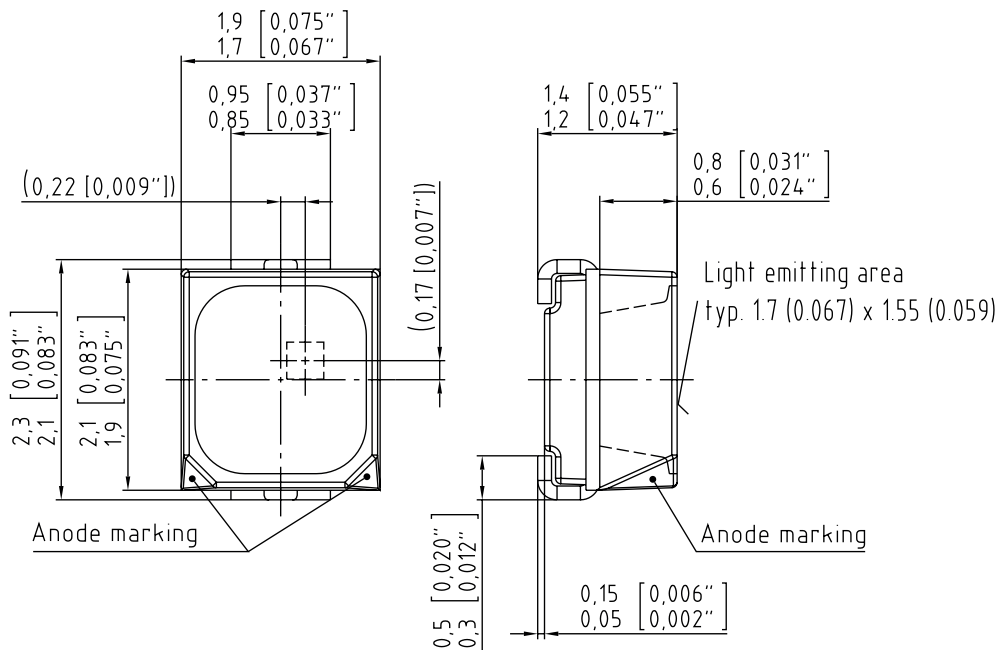


Permissible Pulse Handling Capability

$$I_F = f(t_p); D: \text{Duty cycle}$$



Dimensional Drawing ⁹⁾



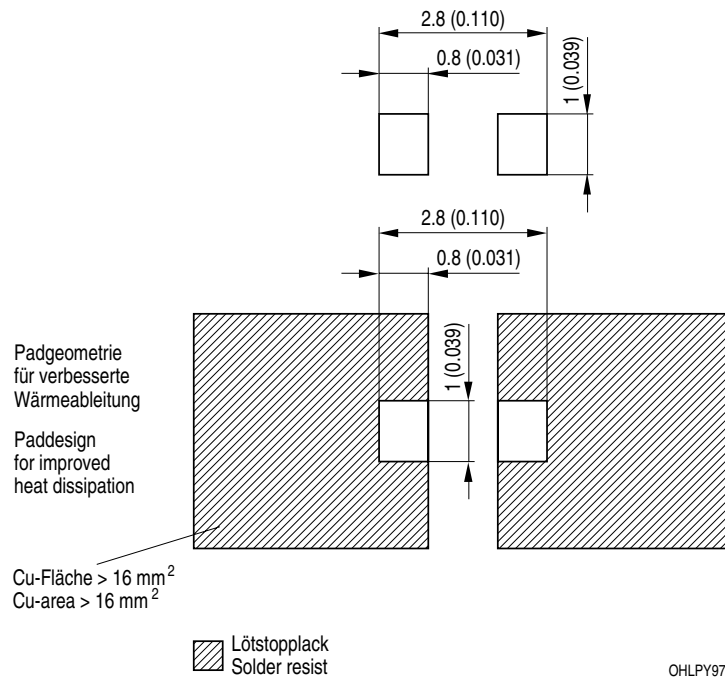
C63062-A4112-A10...-03

Approximate Weight: 9.0 mg

Corrosion test: Class: 3B
 Test condition: 40°C / 90 % RH / 15 ppm H₂S / 14 days (stricter than IEC 60068-2-43)

ESD advice: The device is protected by ESD device which is connected in parallel to the Chip.

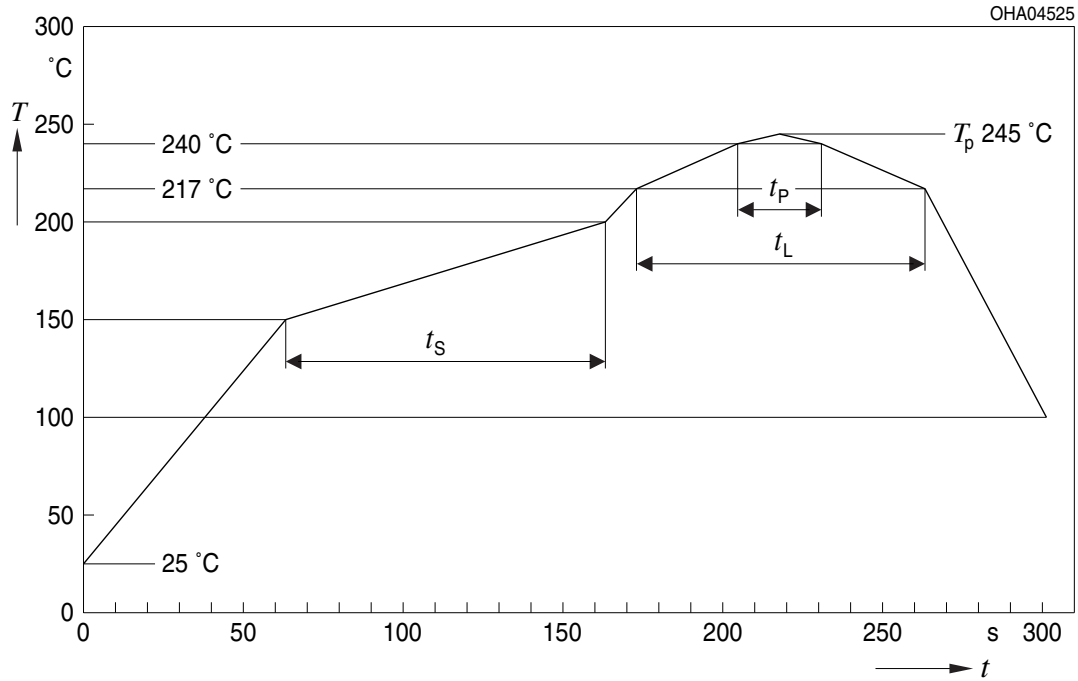
Recommended Solder Pad ⁹⁾



For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for ultra sonic cleaning.

Reflow Soldering Profile

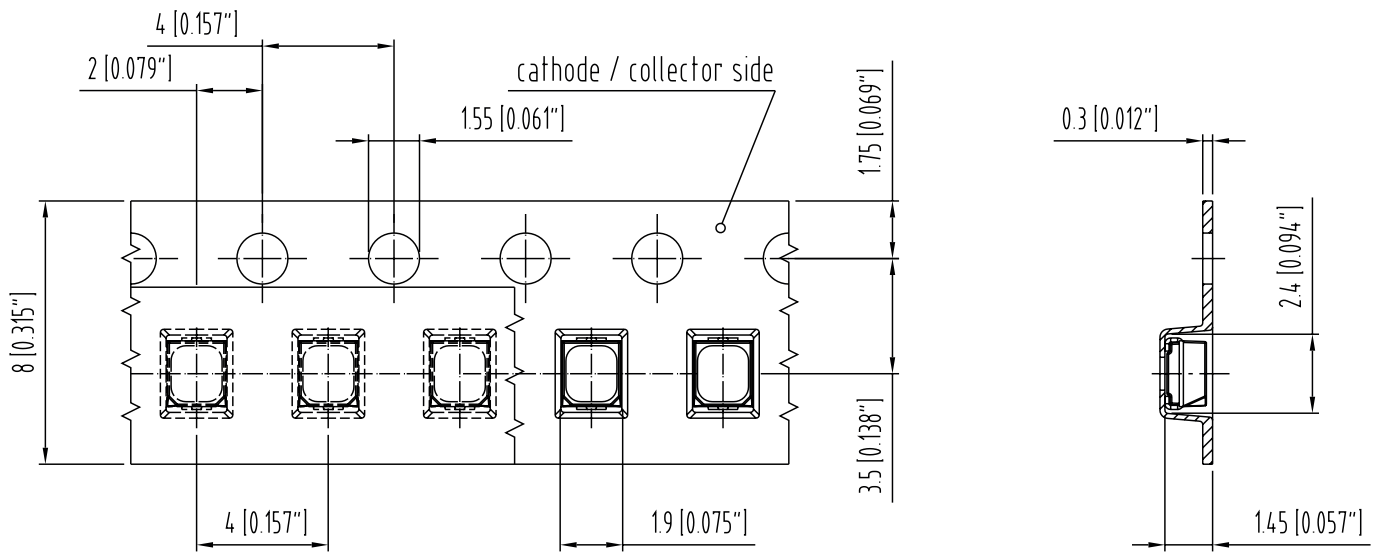
Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



| Profile Feature | Symbol | Pb-Free (SnAgCu) Assembly | | | Unit |
|--|--------|---------------------------|----------------|---------|------|
| | | Minimum | Recommendation | Maximum | |
| Ramp-up rate to preheat*) 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 |

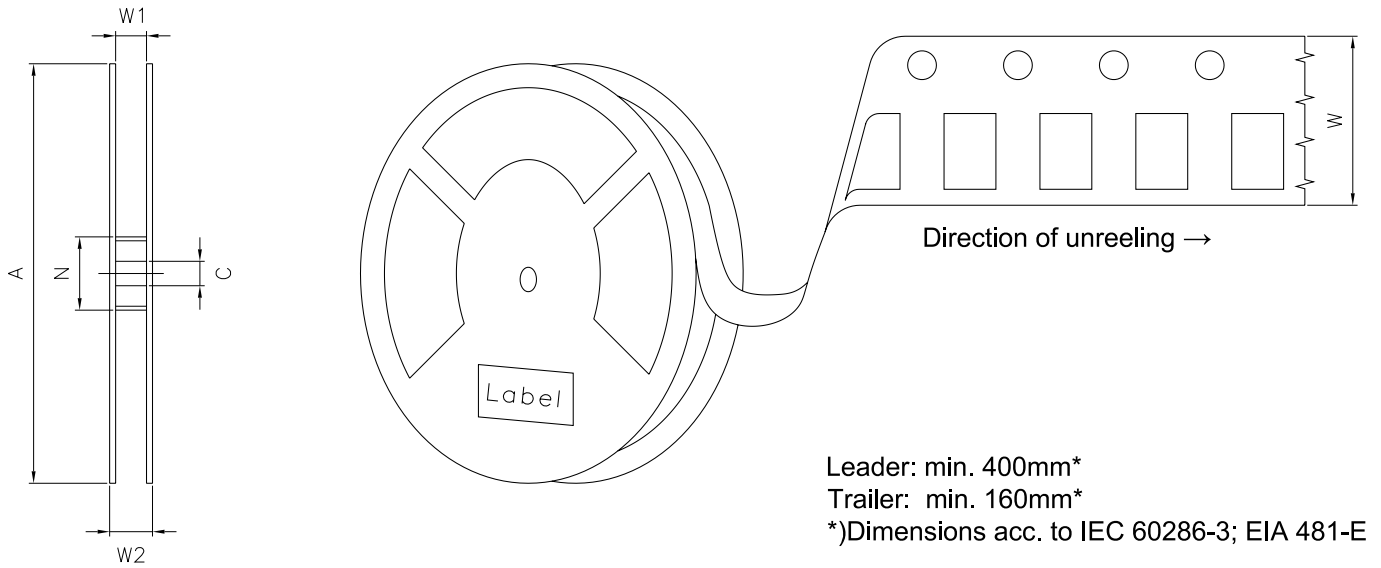
All temperatures refer to the center of the package, measured on the top of the component
 * slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T-range

Taping ⁹⁾



C63062-A4112-B10 -01

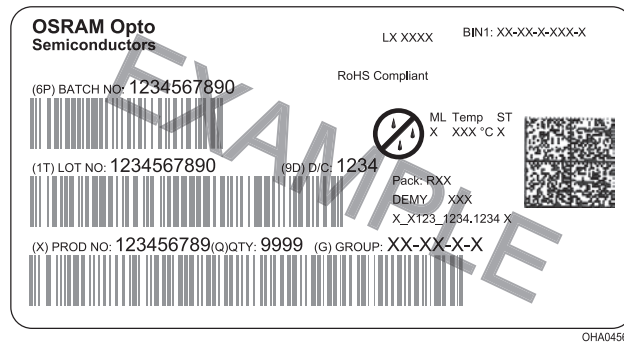
Tape and Reel ¹⁰⁾



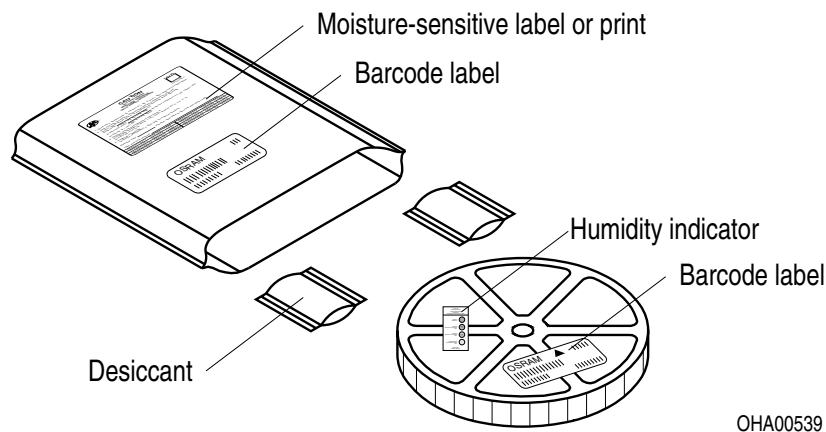
Reel dimensions [mm]

| A | W | N _{min} | W ₁ | W _{2max} | Pieces per PU |
|--------|-----------------|------------------|----------------|-------------------|---------------|
| 180 mm | 8 + 0.3 / - 0.1 | 60 | 8.4 + 2 | 14.4 | 3000 |

Barcode-Product-Label (BPL)

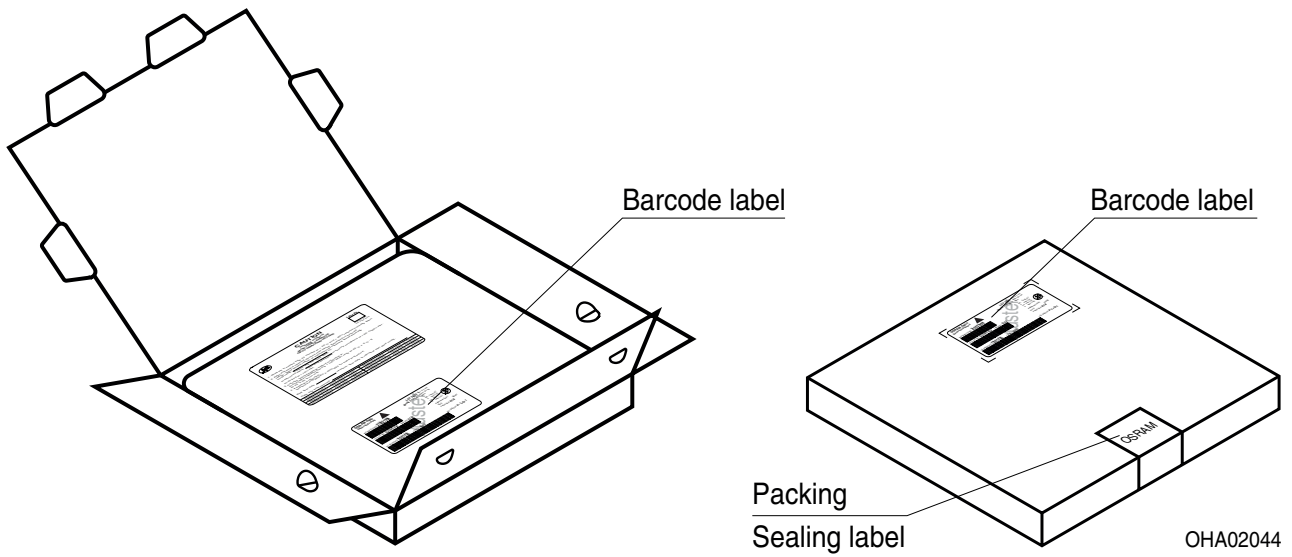


Dry Packing Process and Materials ⁹⁾



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

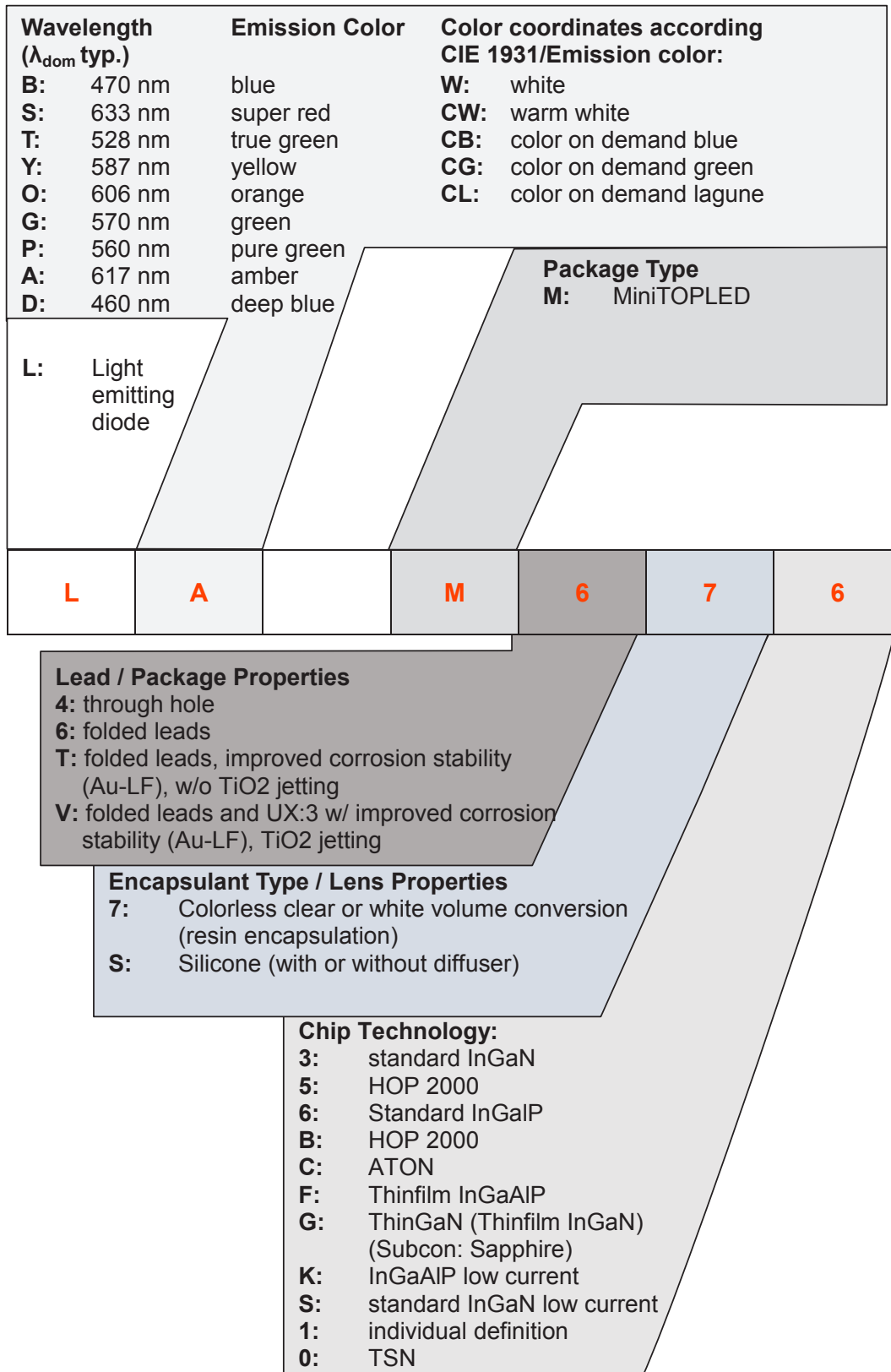
Transportation Packing and Materials ⁹⁾



Dimensions of transportation box in mm

| Width | Length | Height |
|------------|------------|-----------|
| 200 ± 5 mm | 195 ± 5 mm | 30 ± 5 mm |

Type Designation System



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 falls 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 LED 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 LED exposure to aggressive substances during storage, production, and use. LEDs 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 informations please visit www.osram-os.com/appnotes

Disclaimer

Disclaimer

Language english will prevail in case of any discrepancies or deviations between the two language wordings.

Attention please!

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

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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.

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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:** Reverse Operation of 10 hours is permissible in total. Continuous reverse operation is not allowed.
- 3) **Chromaticity coordinate groups:** Chromaticity coordinates are measured during a current pulse of typically 25 ms, with an internal reproducibility of ± 0.005 and an expanded uncertainty of ± 0.01 (acc. to GUM with a coverage factor of $k = 3$).
- 4) **Forward Voltage:** The forward voltage is measured during a current pulse of typically 8 ms, with an internal reproducibility of $\pm 0.05\text{ V}$ and an expanded uncertainty of $\pm 0.1\text{ V}$ (acc. to GUM with a coverage factor of $k = 3$).
- 5) **Thermal Resistance:** $R_{th\ max}$ is based on statistic values (6σ).
- 6) **Thermal Resistance:** R_{thJA} results from mounting on PC board FR 4 (pad size 16 mm^2 per pad)
- 7) **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.
- 8) **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.
- 9) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimensions are specified in mm.
- 10) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

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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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Наши преимущества:

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- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
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- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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