

# OSRAM LO P476

## Datasheet

**Published by ams-OSRAM AG**

Tobelbader Strasse 30, 8141 Premstaetten, Austria

Phone +43 3136 500-0

[ams-osram.com](http://ams-osram.com)

© All rights reserved



PointLED®

# LO P476

With a diameter of just 2 mm, the PointLED is one of the smallest packages in its class and achieves high luminous efficacies. Due to its round and flat package, measuring only 0.775 mm high, it is ideal for application where space is a sensitive issue.



## Applications

- Access Control & Security
- Appliances & Tools
- Display Backlighting
- Factory Automation
- Home & Building Automation
- Material Processing
- Projection & Display
- Robotics

## Features

- Package: white SMT package, colorless clear resin
- Chip technology: Volume emitter (InGaAlP )
- Typ. Radiation: 120° (Lambertian emitter)
- Color:  $\lambda_{\text{dom}} = 606 \text{ nm}$  (● orange)
- Corrosion Robustness Class: 3B
- Qualifications: AEC-Q102 Qualified
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)

## Ordering Information

Type	Mounting methode	Luminous Intensity <sup>1)</sup> $I_F = 20 \text{ mA}$ $I_v$	Ordering Code
LO P476-R2T1-24	Reverse	140 ... 355 mcd	Q65110A7018
LO P476-R2T1-24-F	Top	140 ... 355 mcd	Q65110A7019

## Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	$T_{op}$	min.	-40 °C
		max.	100 °C
Storage Temperature	$T_{stg}$	min.	-40 °C
		max.	100 °C
Junction Temperature	$T_j$	max.	125 °C
Forward current $T_s = 25\text{ °C}$	$I_F$	max.	30 mA
Forward current pulsed $t \leq 10\text{ }\mu\text{s}$ ; $D = 0.005$ ; $T_s = 25\text{ °C}$	$I_{F\text{ pulse}}$	max.	250 mA
Surge current Single pulses; $t \leq 10\text{ }\mu\text{s}$ ; $T_s = 25\text{ °C}$	$I_{FS}$	max.	500 mA
Reverse voltage <sup>2)</sup> $T_s = 25\text{ °C}$	$V_R$	max.	12 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	$V_{ESD}$		2 kV

## Characteristics

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

Parameter	Symbol		Values
Peak Wavelength	$\lambda_{\text{peak}}$	typ.	610 nm
Dominant Wavelength <sup>3)</sup> $I_F = 20 \text{ mA}$	$\lambda_{\text{dom}}$	min.	600 nm
		typ.	606 nm
		max.	609 nm
Spectral Bandwidth at 50% $I_{\text{rel,max}}$	$\Delta\lambda$	typ.	16 nm
Viewing angle at 50% $I_V$	$2\phi$	typ.	120 °
Forward Voltage <sup>4)</sup> $I_F = 20 \text{ mA}$	$V_F$	min.	1.85 V
		typ.	2.00 V
		max.	2.35 V
Reverse current <sup>2)</sup> $V_R = 12 \text{ V}$	$I_R$	typ.	0.01 $\mu\text{A}$
		max.	10 $\mu\text{A}$
Temperature Coefficient of Peak Wavelength $-10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$\text{TC}_{\lambda_{\text{peak}}}$	typ.	0.13 nm / K
Real thermal resistance junction/ambient <sup>5)6)</sup>	$R_{\text{thJA real}}$	max.	520 K / W
Real thermal resistance junction/solderpoint <sup>5)</sup>	$R_{\text{thJS real}}$	max.	300 K / W

## Brightness Groups

Group	Luminous Intensity <sup>1)</sup> $I_F = 20 \text{ mA}$ min. $I_v$	Luminous Intensity <sup>1)</sup> $I_F = 20 \text{ mA}$ max. $I_v$	Luminous Flux <sup>7)</sup> $I_F = 20 \text{ mA}$ typ. $\Phi_v$
R2	140 mcd	180 mcd	480 mlm
S1	180 mcd	224 mcd	610 mlm
S2	224 mcd	280 mcd	760 mlm
T1	280 mcd	355 mcd	950 mlm

## Wavelength Groups

Group	Dominant Wavelength <sup>3)</sup> $I_F = 20 \text{ mA}$ min. $\lambda_{\text{dom}}$	Dominant Wavelength <sup>3)</sup> $I_F = 20 \text{ mA}$ max. $\lambda_{\text{dom}}$
2	600 nm	603 nm
3	603 nm	606 nm
4	606 nm	609 nm

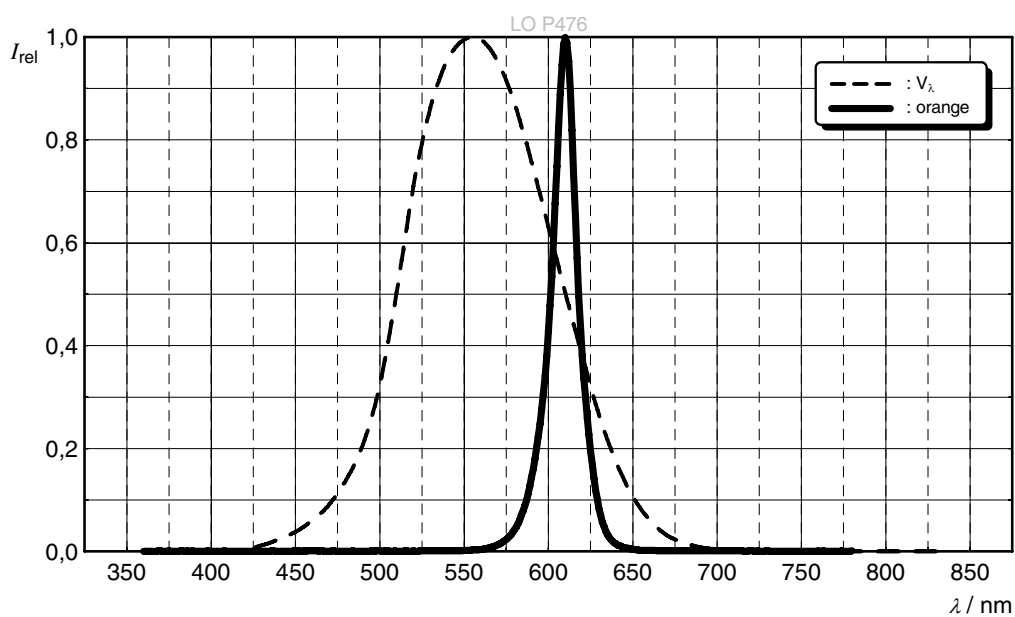
Group Name on Label

Example: R2-2

Brightness	Wavelength
R2	2

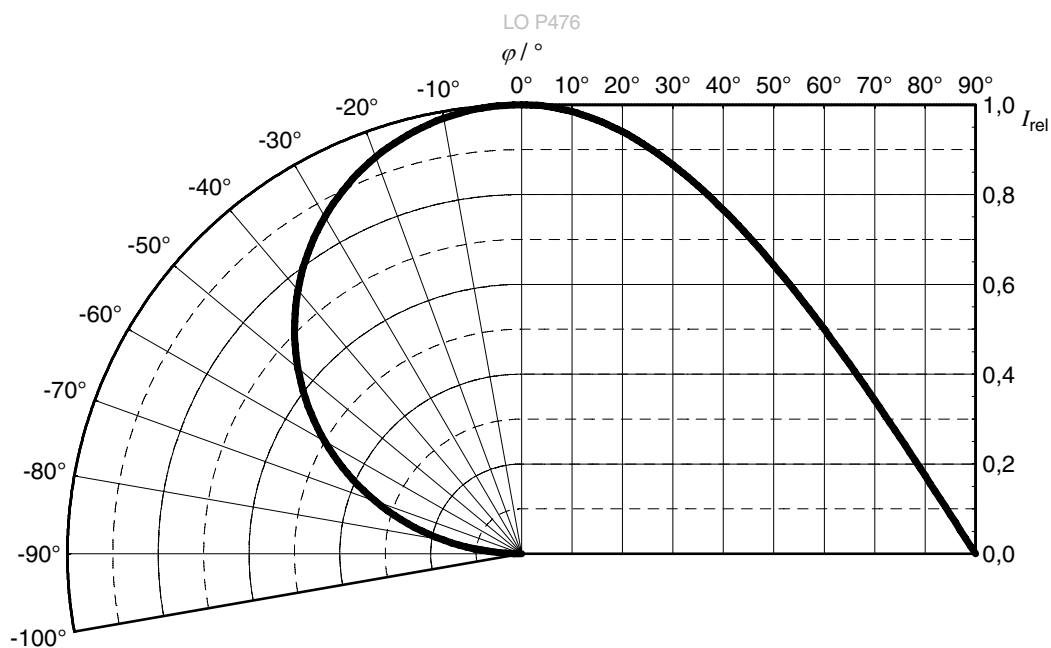
## Relative Spectral Emission <sup>7)</sup>

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



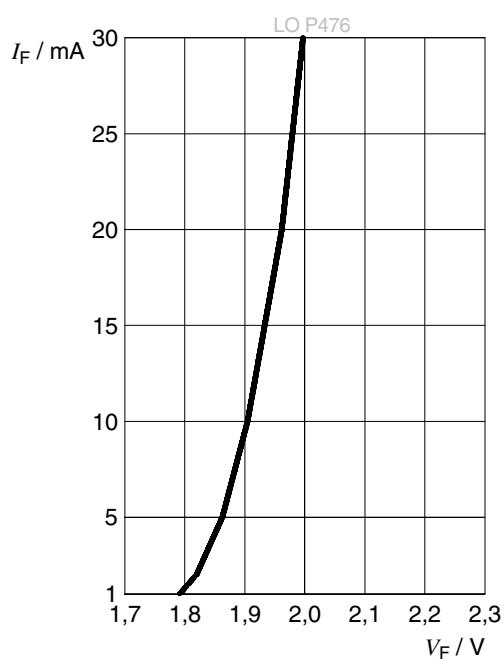
## Radiation Characteristics <sup>7)</sup>

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



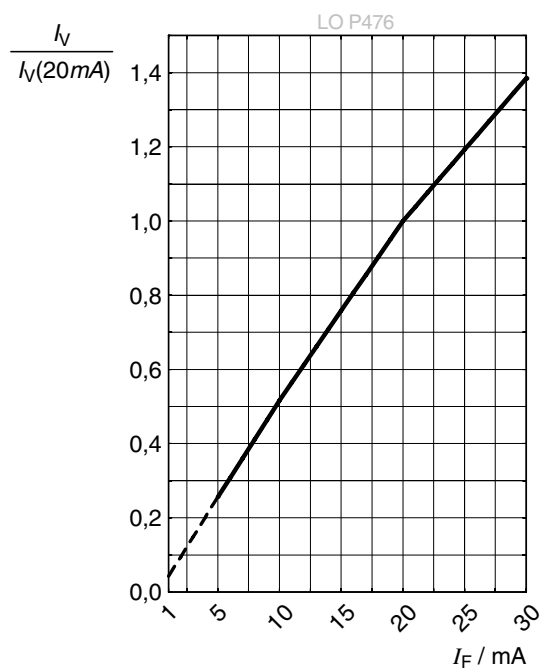
## Forward current <sup>7)</sup>

$$I_F = f(V_F); T_S = 25\text{ °C}$$



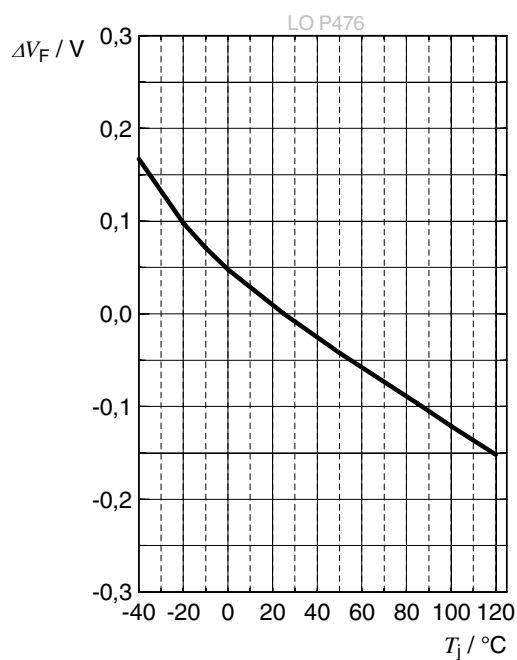
## Relative Luminous Intensity <sup>7), 8)</sup>

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

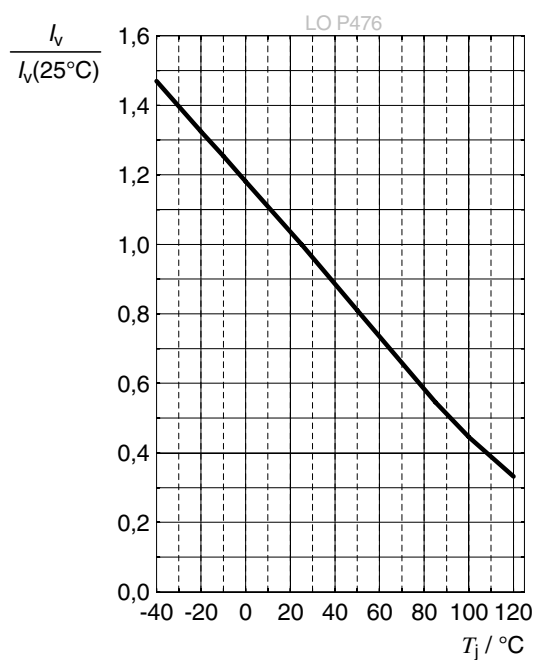


**Forward Voltage** <sup>7)</sup>

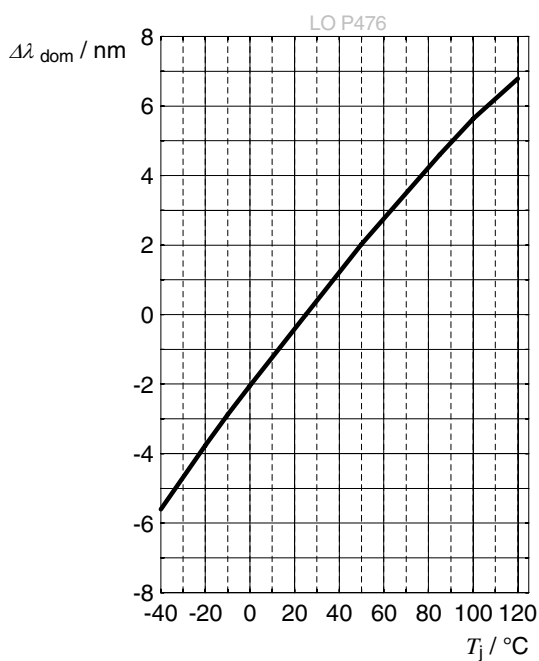
$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 20\text{ mA}$$

**Relative Luminous Intensity** <sup>7)</sup>

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

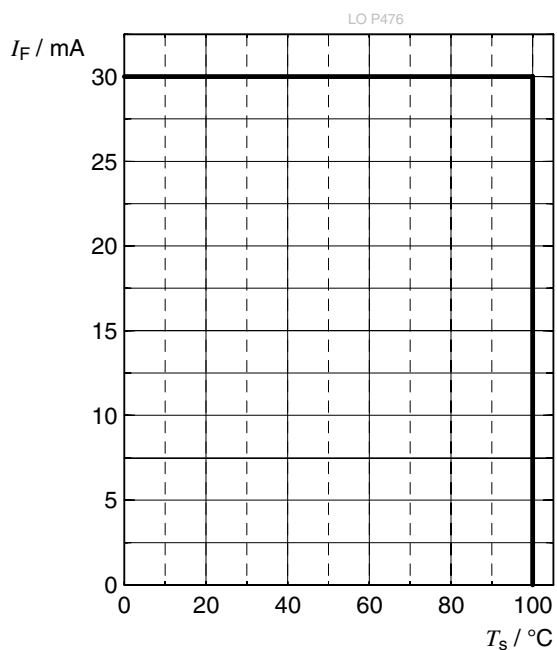
**Dominant Wavelength** <sup>7)</sup>

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



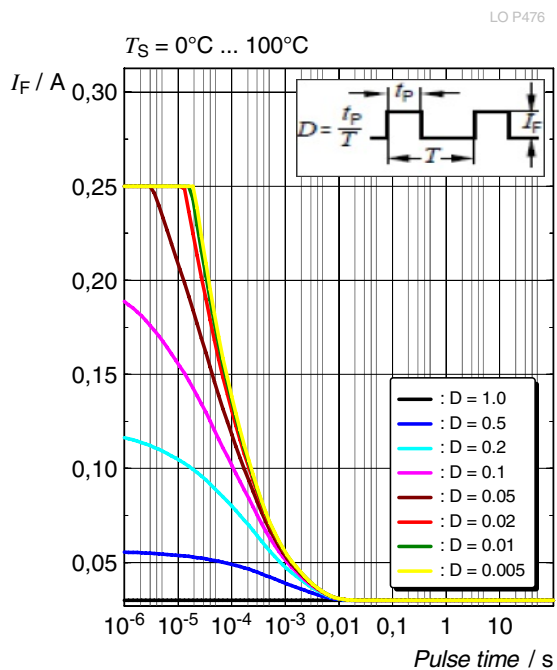
## Max. Permissible Forward Current <sup>5)</sup>

$$I_F = f(T)$$

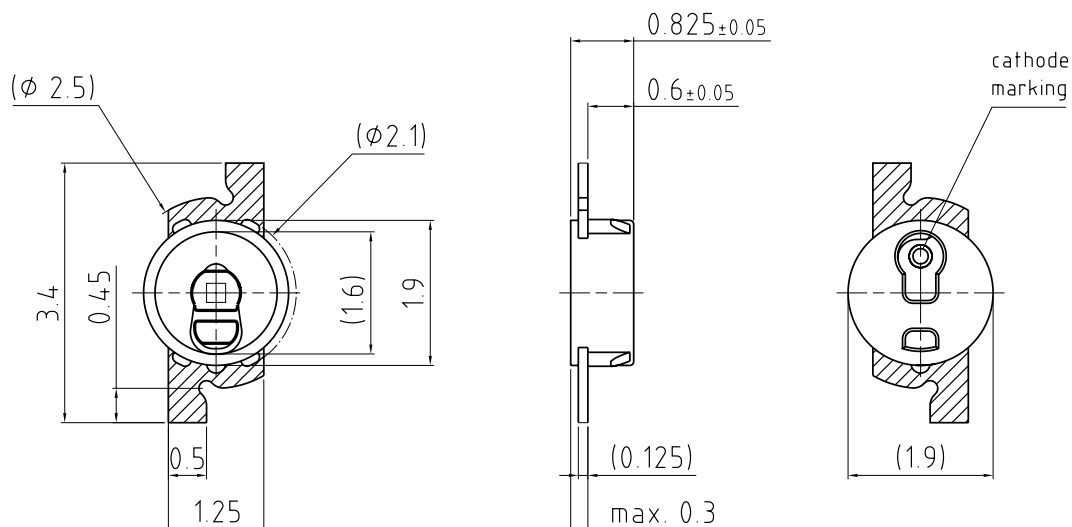


## Permissible Pulse Handling Capability

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



## Dimensional Drawing <sup>9)</sup>



general tolerance  $\pm 0.1$

lead finish Sn 

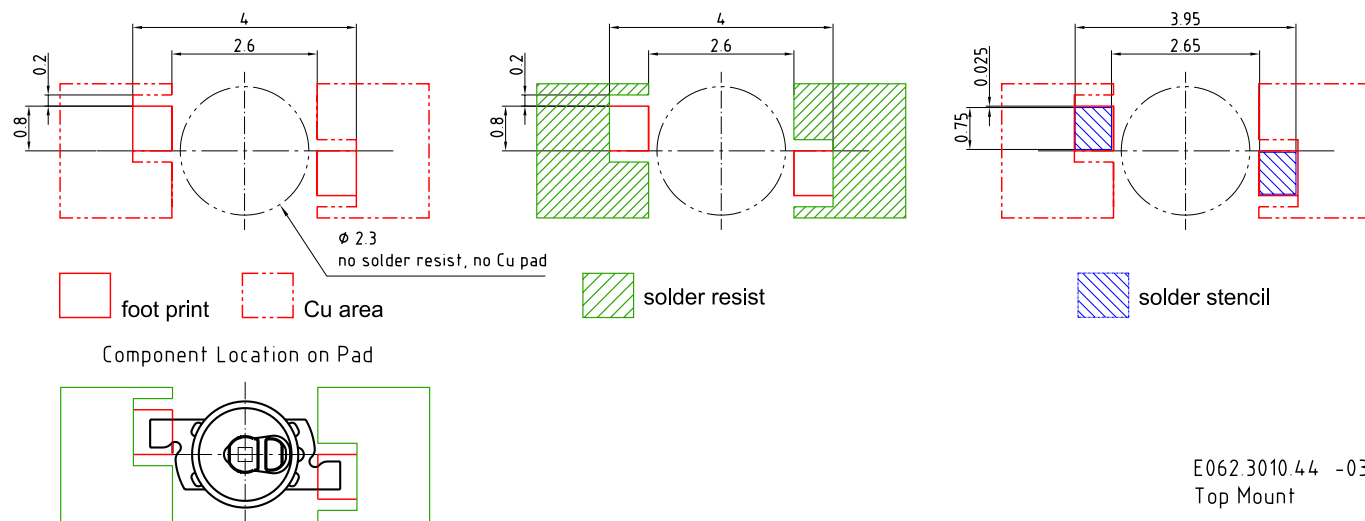
C63062-A3773-A10.. -06

## Further Information:

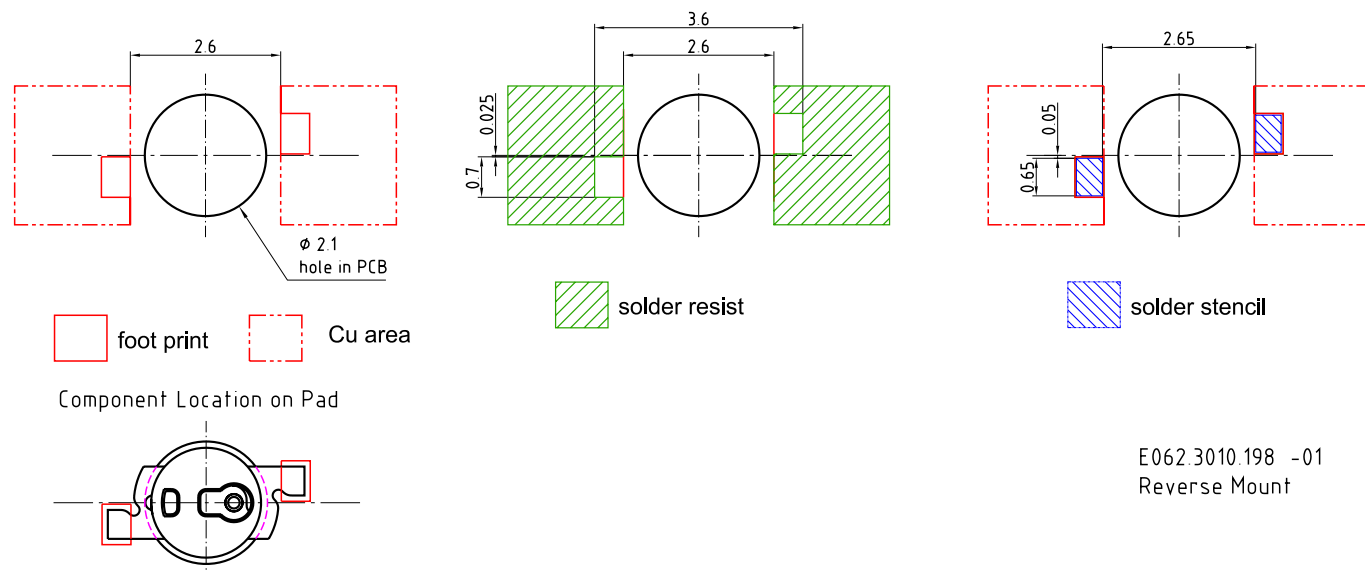
**Approximate Weight:** 6.0 mg

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

## Recommended Solder Pad <sup>9)</sup>



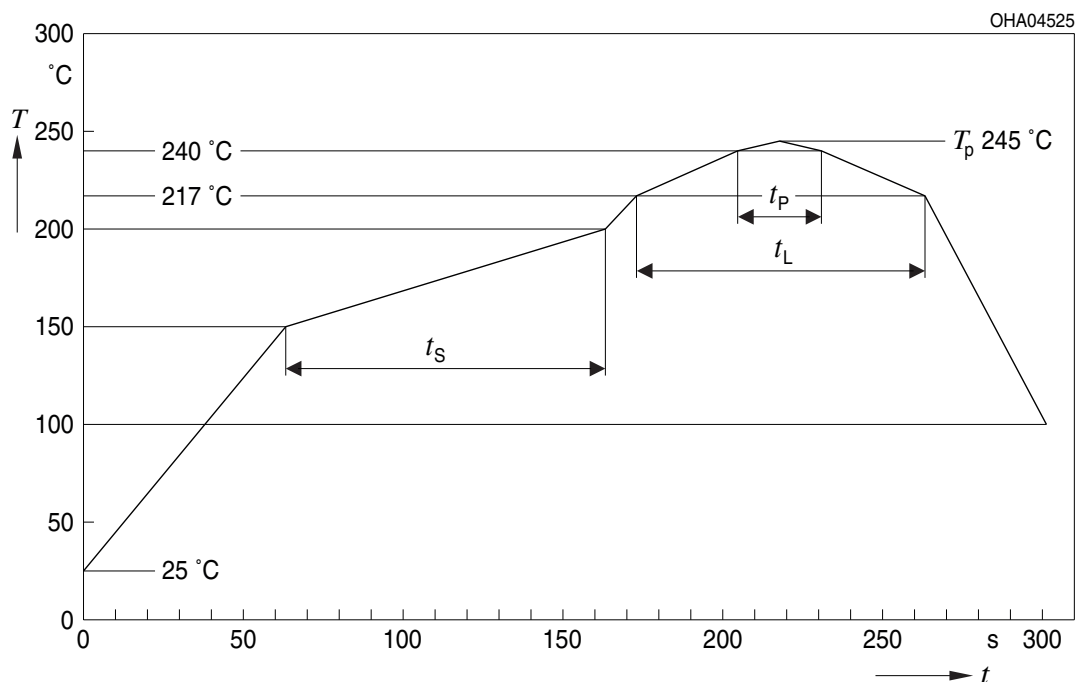
## Recommended Solder Pad <sup>9)</sup>



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

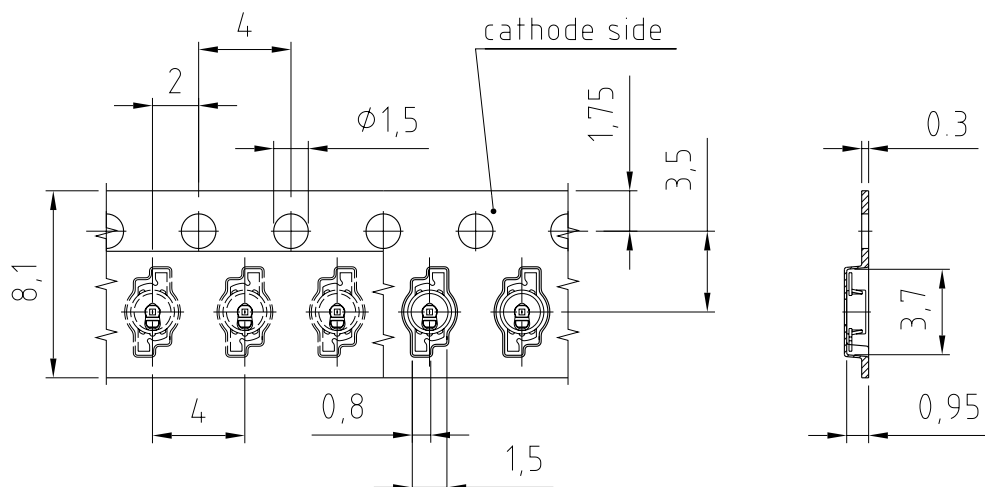


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat <sup>*)</sup> 25 °C to 150 °C			2	3	K/s
Time $t_s$ $T_{Smin}$ to $T_{Smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak <sup>*)</sup> $T_{Smax}$ to $T_p$			2	3	K/s
Liquidus temperature	$T_L$		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

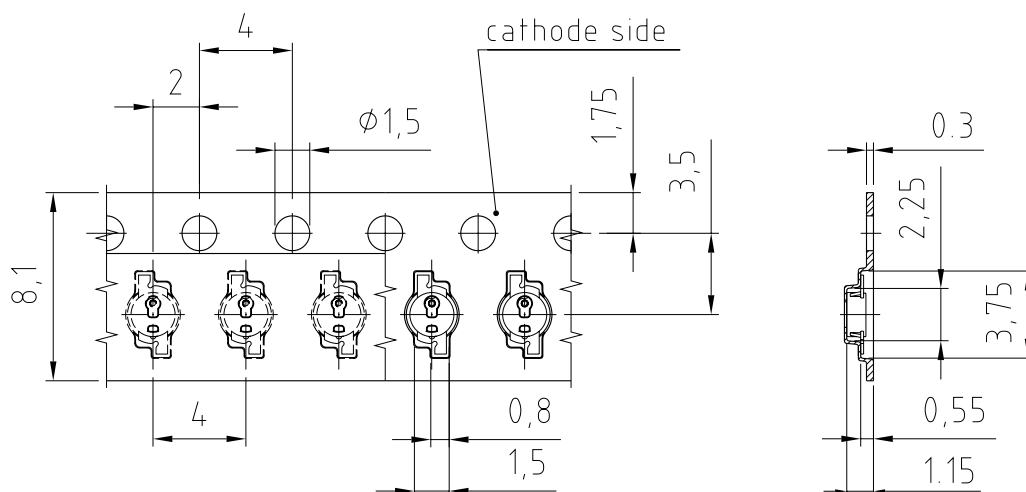
\* slope calculation  $DT/Dt$ :  $Dt$  max. 5 s; fulfillment for the whole T-range

## Taping <sup>9)</sup>



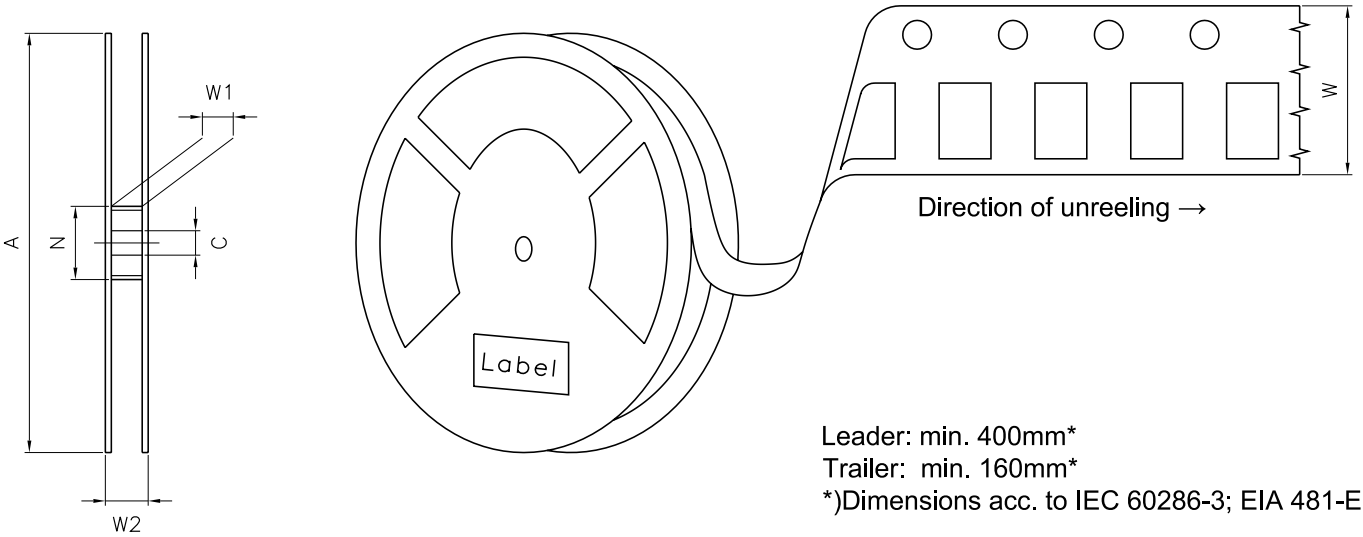
C63062-A3773-B8 -05  
Top Mount

## Taping <sup>9)</sup>



C63062-A3773-B4 -05  
Reverse Mount

Tape and Reel <sup>10)</sup>



Reel Dimensions

A	W	N <sub>min</sub>	W <sub>1</sub>	W <sub>2 max</sub>	Pieces per PU
180 mm	8 + 0.3 / - 0.1 mm	60 mm	8.4 + 2 mm	14.4 mm	3000
330 mm	8 + 0.3 / - 0.1 mm	60 mm	8.4 + 2 mm	14.4 mm	12000

<b>OSRAM</b>		LX XXXX	BIN1: XX-XX-X-XXX-X
		RoHS Compliant	
(6P) BATCH NO: 1234567890			
			ML Temp ST X XXX °C X
(1T) LOT NO: 1234567890	(9D) D/C: 1234		
		Pack: RXX DEMY XXX X_X123_1234.1234 X	
(X) PROD NO: 123456789	(Q) QTY: 9999	(G) GROUP: XX-XX-X-X	
			

Moisture-sensitive label or print

Barcode label

Humidity indicator

Barcode label

Desiccant

OHA00539

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

Type Designation System

<b>Wavelength</b> ( $\lambda_{\text{dom typ.}}$ )	<b>Emission Color</b>	<b>Color coordinates according CIE 1931/Emission color:</b>				
A: 617 nm	amber	<b>W:</b> white				
S: 633 nm	super red	<b>UW:</b> ultra white				
T: 528 nm	true green	<b>CB:</b> color on demand blue				
Y: 587 nm	yellow	<b>CG:</b> color on demand green				
O: 606 nm	orange	<b>CL:</b> color on demand lagune				
G: 570 nm	green	<b>Package Type</b> P: POINTLED				
P: 560 nm	pure green					
R: 625 nm	red					
B: 470 nm	blue					
H: 645 nm	hyper-red					
V: 505 nm	verde green					
L: Light emitting diode						
L	A		P	4	7	6
<b>Lead / Package Properties</b> 4: through hole W: folded leads and UX:3, Ag-LF, w/o TO2 jetting						
<b>Encapsulant Type / Lens Properties</b> 7: Colorless clear or white volume conversion (resin encapsulation) S: Silicone (with or without diffuser)						
<b>Chip Technology:</b> 1: TSN 3: standard InGaN 4: AlGaAs 5: HOP 2000 6: Standard InGaIP 9: TSN low current B: HOP 2000 C: ATON D: Small ThinGaN/ Thinfilm (e.g. 6mil) F: Thinfilm InGaAIP G: ThinGaN(Thinfilm InGaN) K: InGaAIP low current S: standard InGaN low current O: TSN						

---

## 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>

---

## 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.

---

## 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:** 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  $k = 3$ ).
- 5) **Thermal Resistance:**  $R_{th\ max}$  is based on statistic values ( $6\sigma$ ) used for Derating.
- 6) **Thermal Resistance:**  $R_{thJA}$  results from mounting on PC board FR 4 (pad size  $\geq 5\text{ mm}^2$  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  $\pm 0.1$  and dimensions are specified in mm.
- 10) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

Revision History

Version	Date	Change
1.5	2021-07-15	Features Schematic Transportation Box Dimensions of Transportation Box
1.6	2021-12-07	Maximum Ratings Characteristics Electro - Optical Characteristics (Diagrams) Derating (Diagrams)
1.7	2024-11-12	New Layout Applications Features



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。

**Published by ams-OSRAM AG**

Tobelbader Strasse 30, 8141 Premstaetten, Austria

Phone +43 3136 500-0

[ams-osram.com](http://ams-osram.com)

© All rights reserved

**am** 

**OSRAM**