

# OSRAM KW CSLPM2.CC

## Datasheet

Published by **ams-OSRAM AG**

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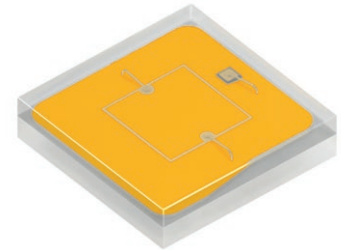
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## OSLON® Square Flat

# KW CSLPM2.CC

This most compact 3 x 3 mm high-power LED with electrically isolated thermal pad allows superior heat dissipation designs. The flat package enhances color quality due to a reduced color over angle variation. Its extremely low thermal resistance helps to keep the efficiency remarkably high even when driven at high currents.



### Applications

- Entertainment
- Transportation

### Features

- Package: Ceramic package
- Chip technology: UX:3
- Typ. Radiation: 120° (Lambertian emitter)
- Color: Cx = 0.41, Cy = 0.39 acc. to CIE 1931 (• white)
- Corrosion Robustness Class: 2B
- Color temperature: 3000K - 4000K
- CRI: 90 (min.)
- ESD: 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)

## Ordering Information

Type	Color temperature	Luminous Flux <sup>1)</sup> $I_F = 700 \text{ mA}$ $\Phi_V$	Ordering Code
KW CSLPM2.CC-8L8M-4R9T	3000 K	159 ... 280 lm	Q65112A2579
KW CSLPM2.CC-8L8M-4O9Q	3500 K	159 ... 280 lm	Q65112A2578
KW CSLPM2.CC-8L8M-4L8N	4000 K	159 ... 280 lm	Q65112A2445

## Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	$T_{op}$	min.	-40 °C
		max.	125 °C
Storage Temperature	$T_{stg}$	min.	-40 °C
		max.	125 °C
Junction Temperature	$T_j$	max.	135 °C
Forward current $T_s = 25\text{ °C}$	$I_F$	min.	200 mA
		max.	1800 mA
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)	$V_{ESD}$		8 kV
Reverse current <sup>2)</sup>	$I_R$	max.	200 mA

## Characteristics

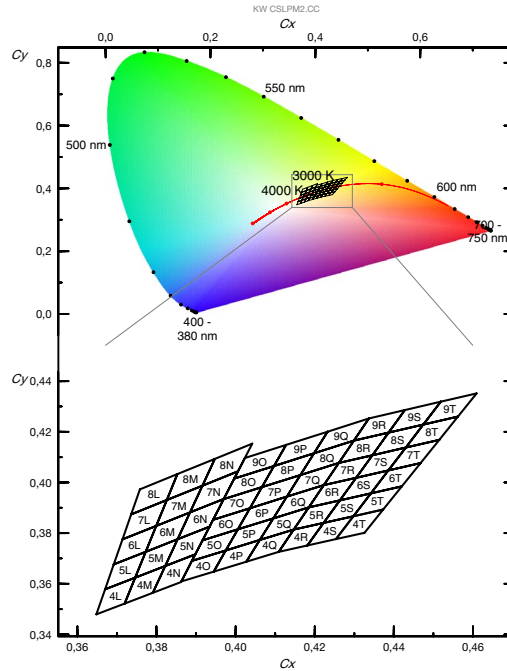
$I_F = 700 \text{ mA}$ ;  $T_S = 25 \text{ °C}$

Parameter	Symbol		Values
Chromaticity Coordinate <sup>3)</sup>	Cx	typ.	0.41
	Cy	typ.	0.39
Viewing angle at 50% $I_V$	$2\phi$	typ.	120 °
Forward Voltage <sup>4)</sup> $I_F = 700 \text{ mA}$	$V_F$	min.	2.70 V
		typ.	2.85 V
		max.	3.20 V
Reverse voltage (ESD device)	$V_{R\text{ESD}}$	min.	45 V
Reverse voltage <sup>2)</sup> $I_R = 20 \text{ mA}$	$V_R$	max.	1.2 V
Color Rendering Index	CRI	min.	90
Real thermal resistance junction/solderpoint <sup>5)</sup>	$R_{\text{thJS real}}$	typ.	3.0 K / W
		max.	3.9 K / W
Electrical thermal resistance junction/solderpoint <sup>5)</sup> with efficiency $\eta_e = 29 \text{ %}$	$R_{\text{thJS elec.}}$	typ.	2.1 K / W
		max.	2.8 K / W

## Brightness Groups

Group	Luminous Flux <sup>1)</sup> $I_F = 700 \text{ mA}$ min. $\Phi_V$	Luminous Flux <sup>1)</sup> $I_F = 700 \text{ mA}$ max. $\Phi_V$	Luminous Intensity <sup>6)</sup> $I_F = 700 \text{ mA}$ typ. $I_v$
8L	159 lm	180 lm	51 cd
5M	180 lm	201 lm	57 cd
6M	201 lm	224 lm	64 cd
7M	224 lm	250 lm	71 cd
8M	250 lm	280 lm	80 cd

### Chromaticity Coordinate Groups



### Chromaticity Coordinate Groups <sup>3)</sup>

Group	Cx	Cy	CCT	Group	Cx	Cy	CCT	Group	Cx	Cy	CCT
4R	0.4109	0.3726	3000	5S	0.4222	0.3840	3000	6T	0.4342	0.3957	3000
	0.4147	0.3814	3000		0.4263	0.3929	3000		0.4386	0.4048	3000
	0.4222	0.3840	3000		0.4342	0.3957	3000		0.4468	0.4077	3000
	0.4181	0.3751	3000		0.4298	0.3867	3000		0.4420	0.3985	3000
4S	0.4181	0.3751	3000	5T	0.4298	0.3867	3000	7R	0.4223	0.3990	3000
	0.4222	0.3840	3000		0.4342	0.3957	3000		0.4261	0.4077	3000
	0.4298	0.3867	3000		0.4420	0.3985	3000		0.4346	0.4108	3000
	0.4254	0.3776	3000		0.4373	0.3893	3000		0.4305	0.4019	3000
4T	0.4254	0.3776	3000	6R	0.4185	0.3902	3000	7S	0.4305	0.4019	3000
	0.4298	0.3867	3000		0.4223	0.3990	3000		0.4346	0.4108	3000
	0.4373	0.3893	3000		0.4305	0.4019	3000		0.4430	0.4138	3000
	0.4326	0.3801	3000		0.4263	0.3929	3000		0.4386	0.4048	3000
5R	0.4147	0.3814	3000	6S	0.4263	0.3929	3000	7T	0.4386	0.4048	3000
	0.4185	0.3902	3000		0.4305	0.4019	3000		0.4430	0.4138	3000
	0.4263	0.3929	3000		0.4386	0.4048	3000		0.4515	0.4168	3000
	0.4222	0.3840	3000		0.4342	0.3957	3000		0.4468	0.4077	3000

Group	Cx	Cy	CCT	Group	Cx	Cy	CCT	Group	Cx	Cy	CCT
8R	0.4261	0.4077	3000	4Q	0.4027	0.3687	3500	7P	0.4036	0.3898	3500
	0.4299	0.4165	3000		0.4061	0.3773	3500		0.4067	0.3982	3500
	0.4387	0.4197	3000		0.4147	0.3814	3500		0.4164	0.4029	3500
	0.4346	0.4108	3000		0.4109	0.3726	3500		0.4130	0.3944	3500
8S	0.4346	0.4108	3000	5O	0.3890	0.3690	3500	7Q	0.4130	0.3944	3500
	0.4387	0.4197	3000		0.3916	0.3772	3500		0.4164	0.4029	3500
	0.4474	0.4228	3000		0.4006	0.3815	3500		0.4261	0.4077	3500
	0.4430	0.4138	3000		0.3975	0.3731	3500		0.4223	0.3990	3500
8T	0.4430	0.4138	3000	5P	0.3975	0.3731	3500	8O	0.3970	0.3934	3500
	0.4474	0.4228	3000		0.4006	0.3815	3500		0.3997	0.4015	3500
	0.4562	0.4260	3000		0.4095	0.3858	3500		0.4097	0.4065	3500
	0.4515	0.4168	3000		0.4061	0.3773	3500		0.4067	0.3982	3500
9R	0.4299	0.4165	3000	5Q	0.4061	0.3773	3500	8P	0.4067	0.3982	3500
	0.4337	0.4253	3000		0.4095	0.3858	3500		0.4097	0.4065	3500
	0.4428	0.4286	3000		0.4185	0.3902	3500		0.4198	0.4115	3500
	0.4387	0.4197	3000		0.4147	0.3814	3500		0.4164	0.4029	3500
9S	0.4387	0.4197	3000	6O	0.3916	0.3772	3500	8Q	0.4164	0.4029	3500
	0.4428	0.4286	3000		0.3943	0.3853	3500		0.4198	0.4115	3500
	0.4519	0.4319	3000		0.4036	0.3898	3500		0.4299	0.4165	3500
	0.4474	0.4228	3000		0.4006	0.3815	3500		0.4261	0.4077	3500
9T	0.4474	0.4228	3000	6P	0.4006	0.3815	3500	9O	0.3997	0.4015	3500
	0.4519	0.4319	3000		0.4036	0.3898	3500		0.4023	0.4097	3500
	0.4609	0.4352	3000		0.4130	0.3944	3500		0.4128	0.4148	3500
	0.4562	0.4260	3000		0.4095	0.3858	3500		0.4097	0.4065	3500
4O	0.3863	0.3609	3500	6Q	0.4095	0.3858	3500	9P	0.4097	0.4065	3500
	0.3890	0.3690	3500		0.4130	0.3944	3500		0.4128	0.4148	3500
	0.3975	0.3731	3500		0.4223	0.3990	3500		0.4232	0.4201	3500
	0.3945	0.3648	3500		0.4185	0.3902	3500		0.4198	0.4115	3500
4P	0.3945	0.3648	3500	7O	0.3943	0.3853	3500	9Q	0.4198	0.4115	3500
	0.3975	0.3731	3500		0.3970	0.3934	3500		0.4232	0.4201	3500
	0.4061	0.3773	3500		0.4067	0.3982	3500		0.4337	0.4253	3500
	0.4027	0.3687	3500		0.4036	0.3898	3500		0.4299	0.4165	3500



Group	Cx	Cy	CCT	Group	Cx	Cy	CCT	Group	Cx	Cy	CCT
4L	0.3648	0.3479	4000	5N	0.3822	0.3670	4000	7M	0.3799	0.3828	4000
	0.3670	0.3578	4000		0.3853	0.3776	4000		0.3826	0.3931	4000
	0.3746	0.3624	4000		0.3934	0.3825	4000		0.3916	0.3987	4000
	0.3719	0.3522	4000		0.3898	0.3716	4000		0.3885	0.3882	4000
4M	0.3719	0.3522	4000	6L	0.3692	0.3677	4000	7N	0.3885	0.3882	4000
	0.3746	0.3624	4000		0.3714	0.3775	4000		0.3916	0.3987	4000
	0.3822	0.3670	4000		0.3799	0.3828	4000		0.4006	0.4044	4000
	0.3791	0.3564	4000		0.3773	0.3726	4000		0.3970	0.3935	4000
4N	0.3791	0.3564	4000	6M	0.3773	0.3726	4000	8L	0.3736	0.3874	4000
	0.3822	0.3670	4000		0.3799	0.3828	4000		0.3758	0.3973	4000
	0.3898	0.3716	4000		0.3885	0.3882	4000		0.3853	0.4033	4000
	0.3862	0.3607	4000		0.3853	0.3776	4000		0.3826	0.3931	4000
5L	0.3670	0.3578	4000	6N	0.3853	0.3776	4000	8M	0.3826	0.3931	4000
	0.3692	0.3677	4000		0.3885	0.3882	4000		0.3853	0.4033	4000
	0.3773	0.3726	4000		0.3970	0.3935	4000		0.3947	0.4093	4000
	0.3746	0.3624	4000		0.3934	0.3825	4000		0.3916	0.3987	4000
5M	0.3746	0.3624	4000	7L	0.3714	0.3775	4000	8N	0.3916	0.3987	4000
	0.3773	0.3726	4000		0.3736	0.3874	4000		0.3947	0.4093	4000
	0.3853	0.3776	4000		0.3826	0.3931	4000		0.4042	0.4153	4000
	0.3822	0.3670	4000		0.3799	0.3828	4000		0.4006	0.4044	4000

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## Group Name on Label

**Example: 5M-4L**

Brightness

Color Chromaticity

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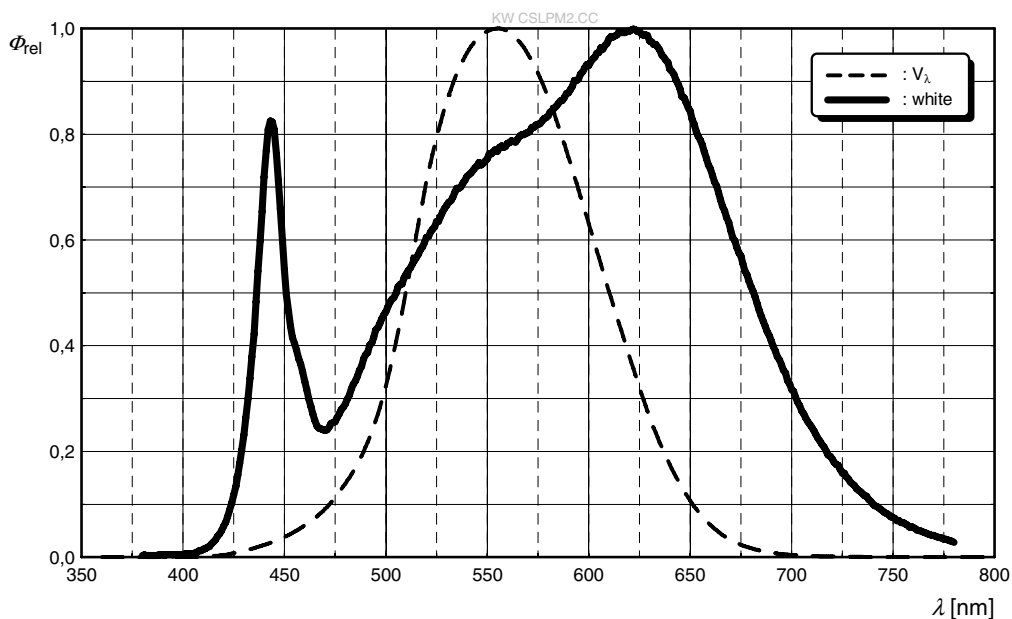
5M

4L

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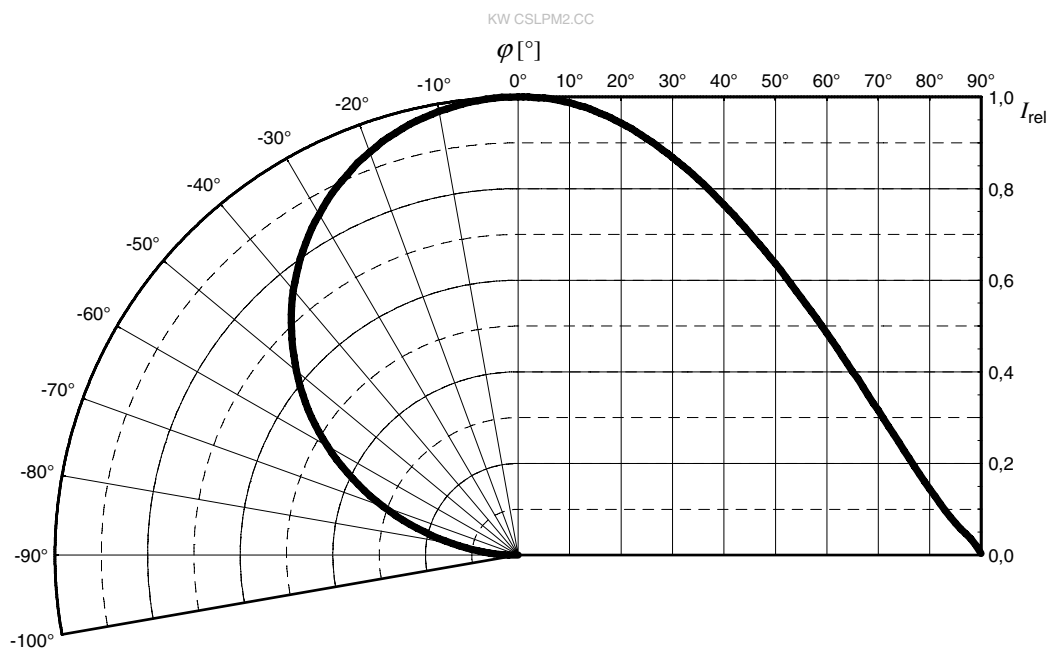
### Relative Spectral Emission <sup>6)</sup>

$\Phi_{rel} = f(\lambda); I_F = 700 \text{ mA}; T_S = 25 \text{ }^\circ\text{C}$



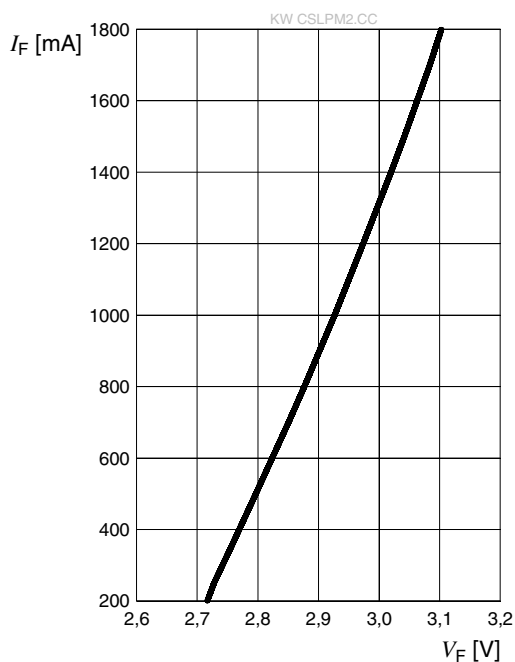
### Radiation Characteristics <sup>6)</sup>

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



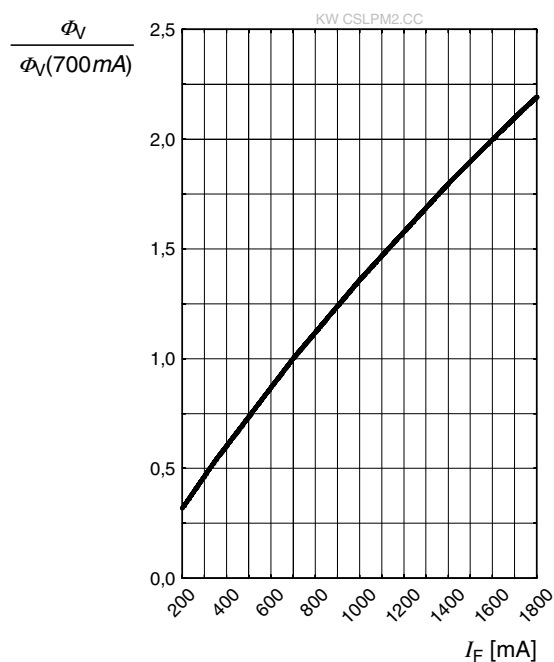
### Forward current <sup>6), 7)</sup>

$$I_F = f(V_F); T_S = 25\text{ °C}$$



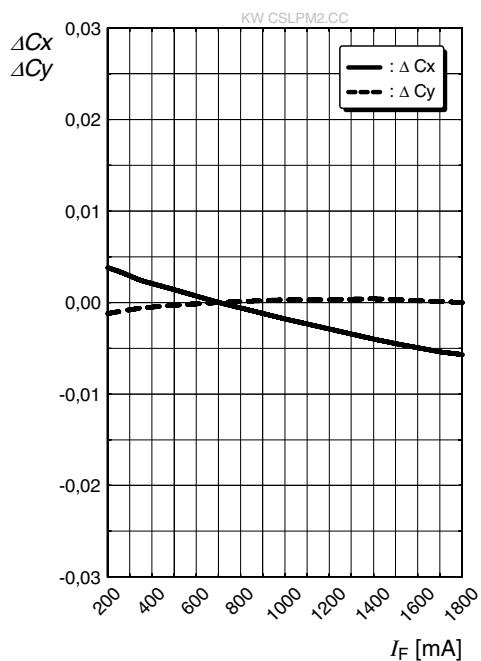
### Relative Luminous Flux <sup>6), 7)</sup>

$$\Phi_V / \Phi_V(700\text{ mA}) = f(I_F); T_S = 25\text{ °C}$$



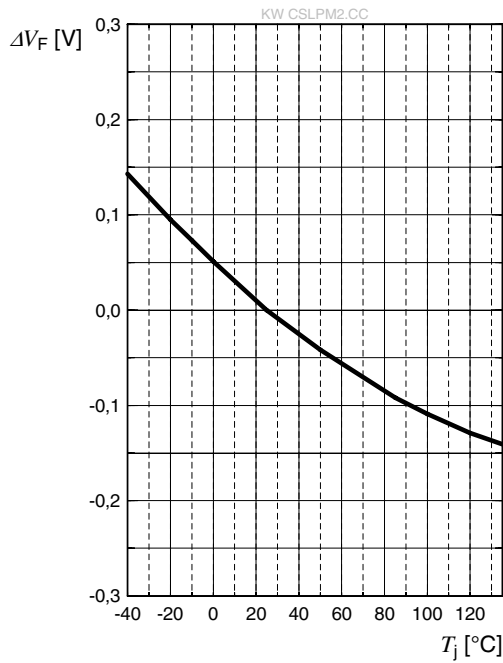
### Chromaticity Coordinate Shift <sup>6)</sup>

$$\Delta Cx, \Delta Cy = f(I_F); T_S = 25\text{ °C}$$



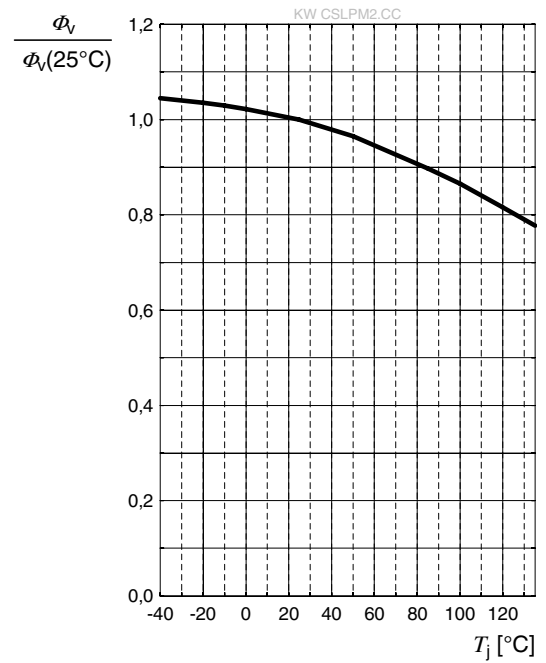
### Forward Voltage <sup>6)</sup>

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 700\text{ mA}$$



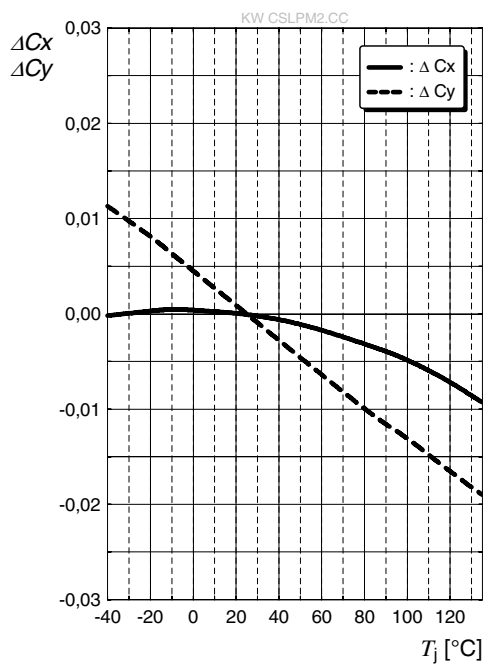
### Relative Luminous Flux <sup>6)</sup>

$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j); I_F = 700\text{ mA}$$



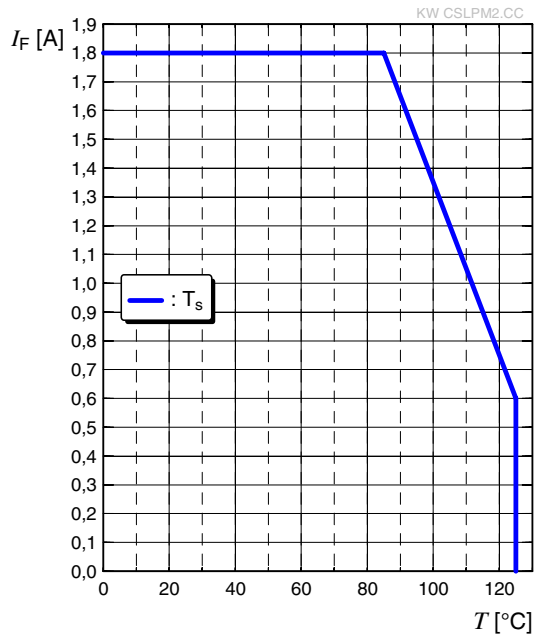
### Chromaticity Coordinate Shift <sup>6)</sup>

$$\Delta C_x, \Delta C_y = f(T_j); I_F = 700\text{ mA}$$

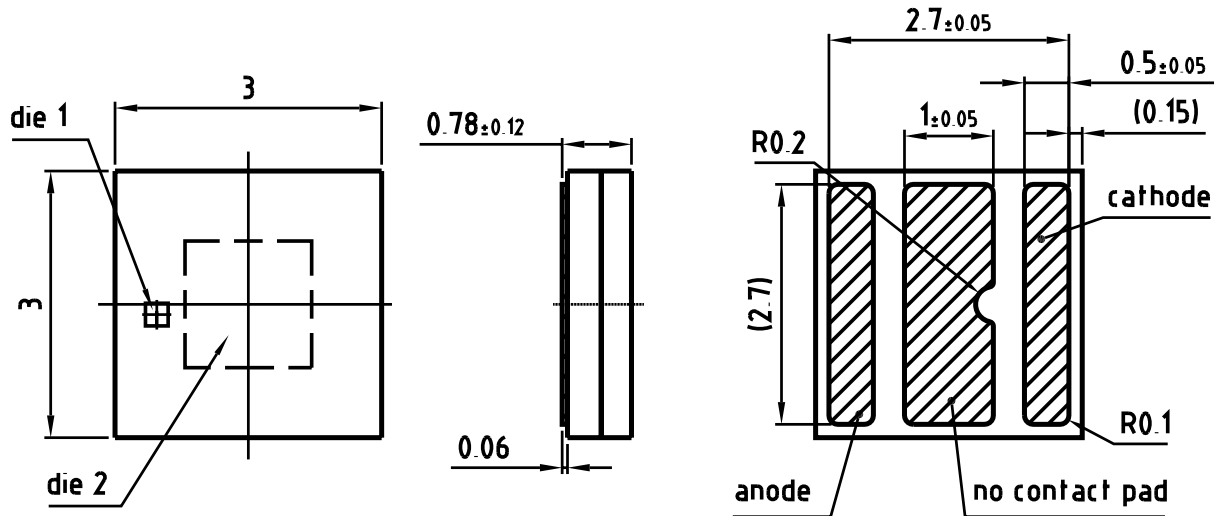


## Max. Permissible Forward Current

$$I_F = f(T)$$



## Dimensional Drawing <sup>8)</sup>



C67062-A0240-A1-01

### Further Information:

**Approximate Weight:** 21.2 mg

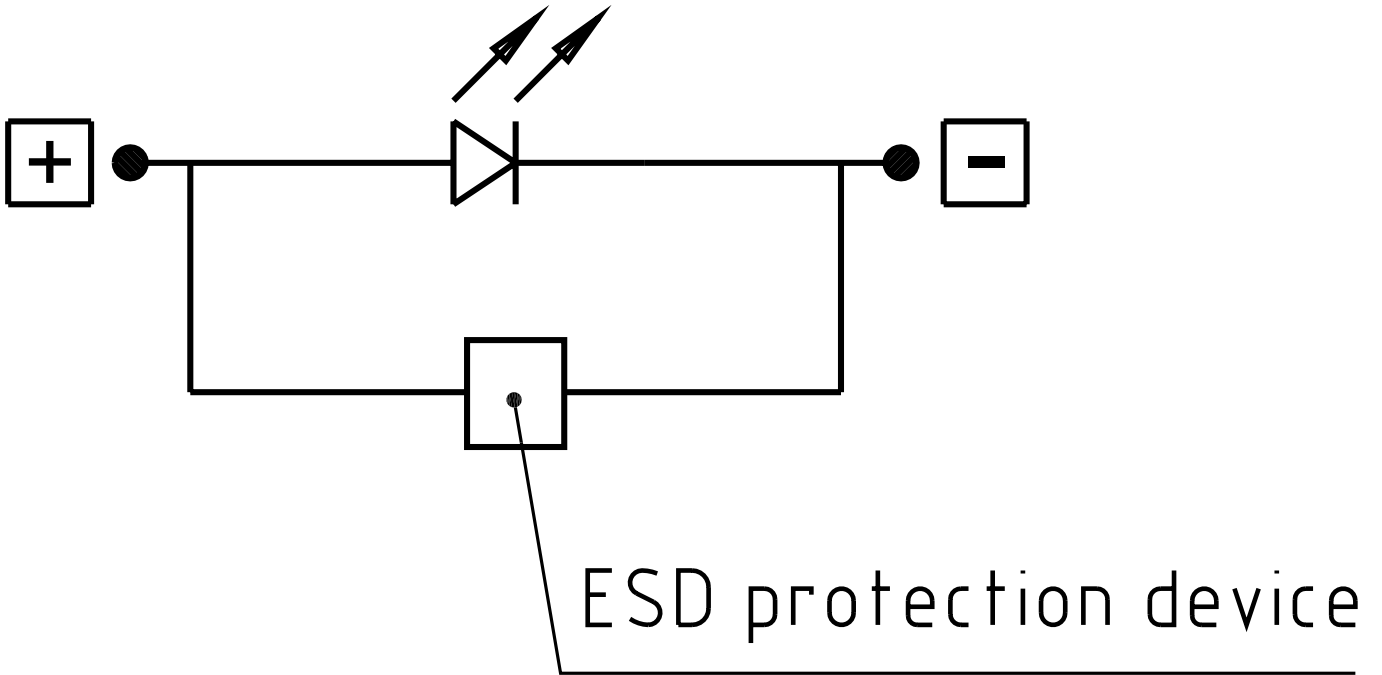
**Package marking:** Cathode

**Corrosion test:** Class: 2B

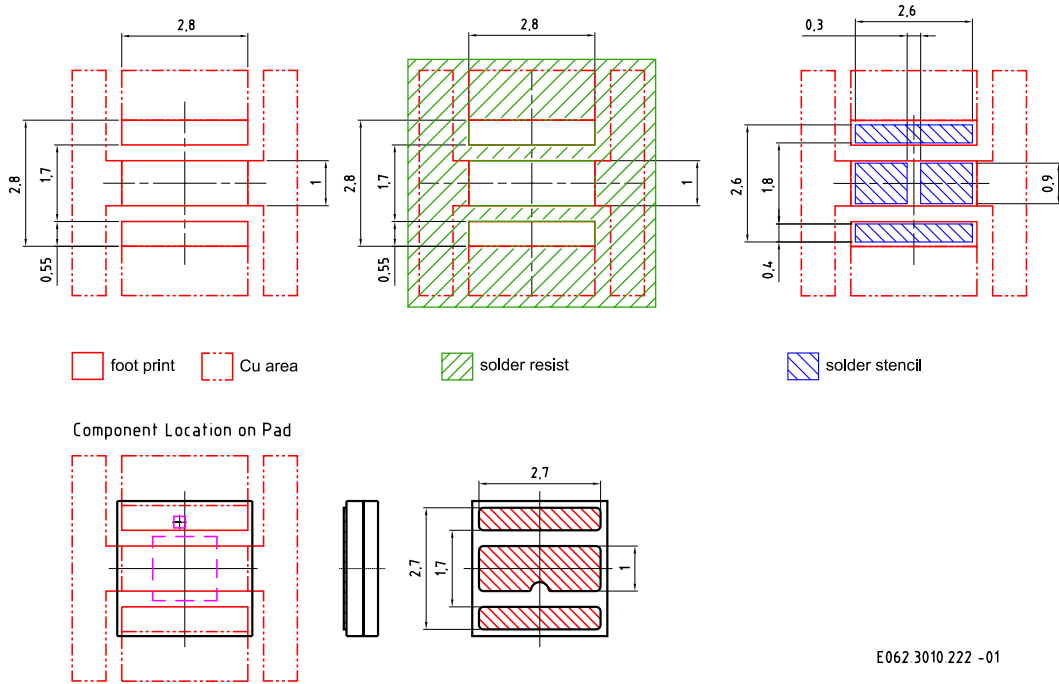
Test condition: 25°C / 75 % RH / 10 ppm H<sub>2</sub>S / 21 days (IEC 60068-2-43)

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

Electrical Internal Circuit



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



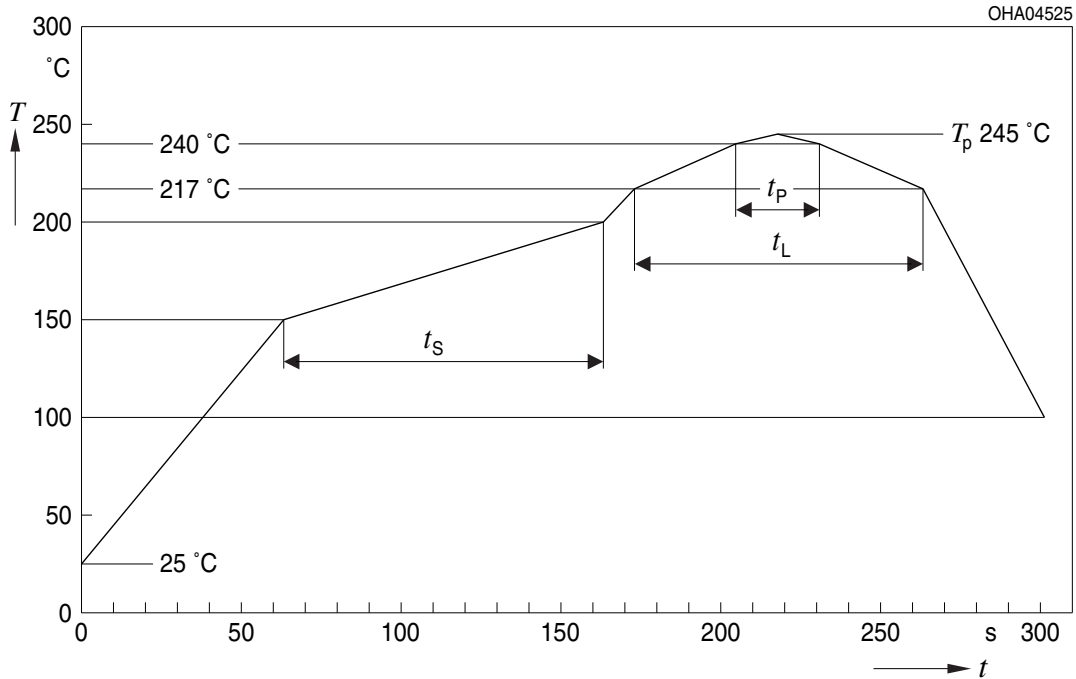
E062.3010.222 -01

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

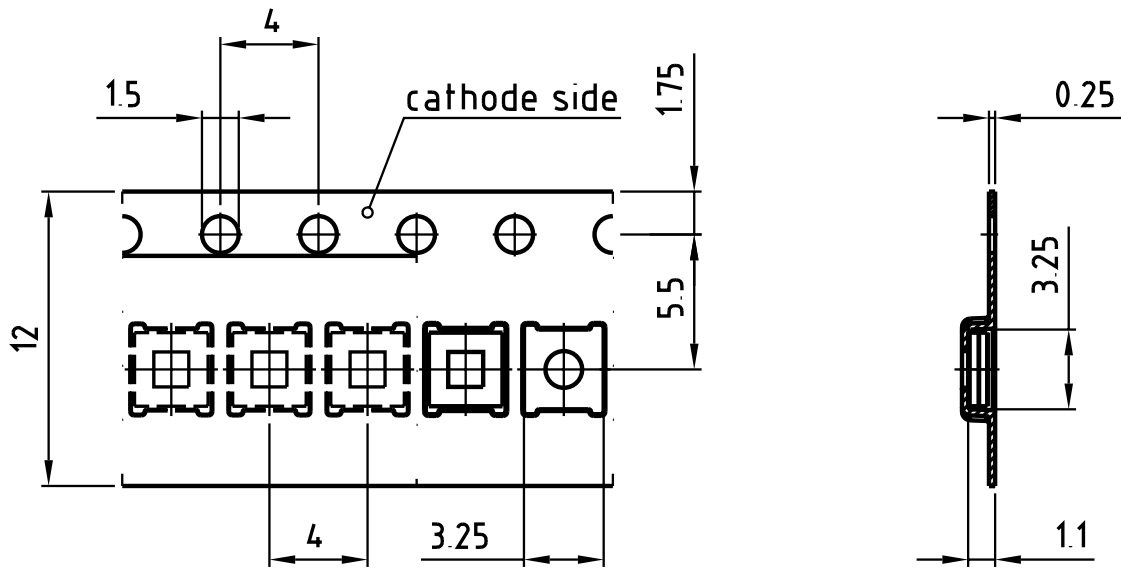


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat <sup>*)</sup> 25 °C to 150 °C			2	3	K/s
Time $t_s$ $T_{Smin}$ to $T_{Smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak <sup>*)</sup> $T_{Smax}$ to $T_p$			2	3	K/s
Liquidus temperature	$T_L$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

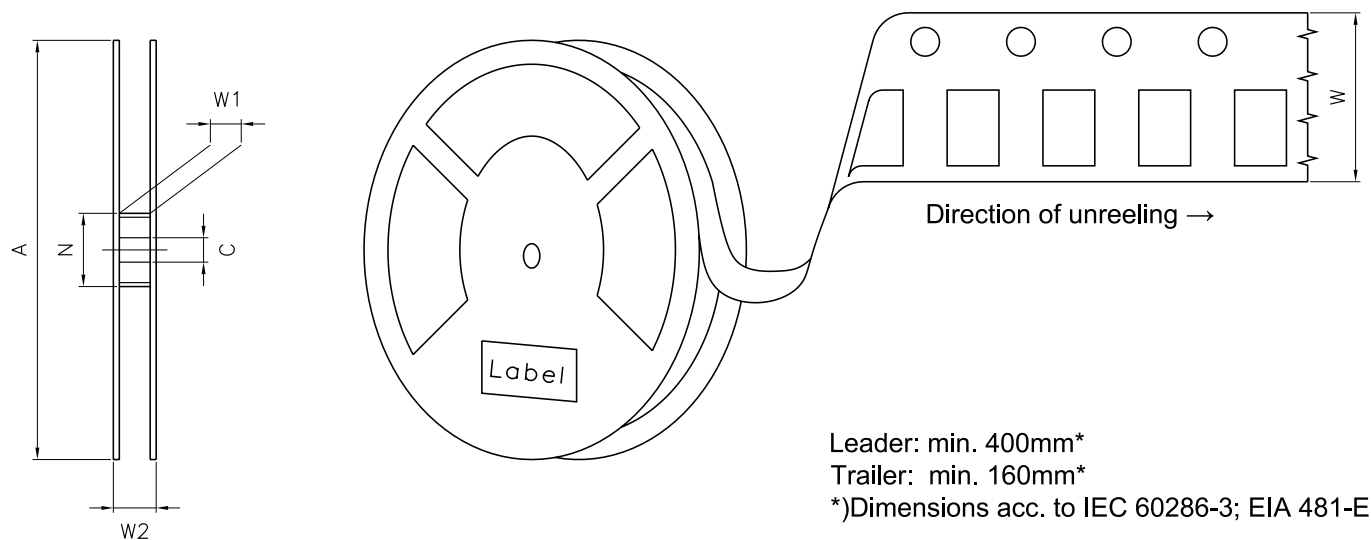
\* slope calculation  $DT/Dt$ :  $Dt$  max. 5 s; fulfillment for the whole T-range

Taping <sup>8)</sup>



C67062-A0240-B5-01

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



### 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	600

**Barcode-Product-Label (BPL)**

**OSRAM** LX XXXX    BIN1: XX-XX-X-XXX-X

RoHS Compliant

(6P) BATCH NO: 1234567890 ML Temp    ST  
X    XXX °C X

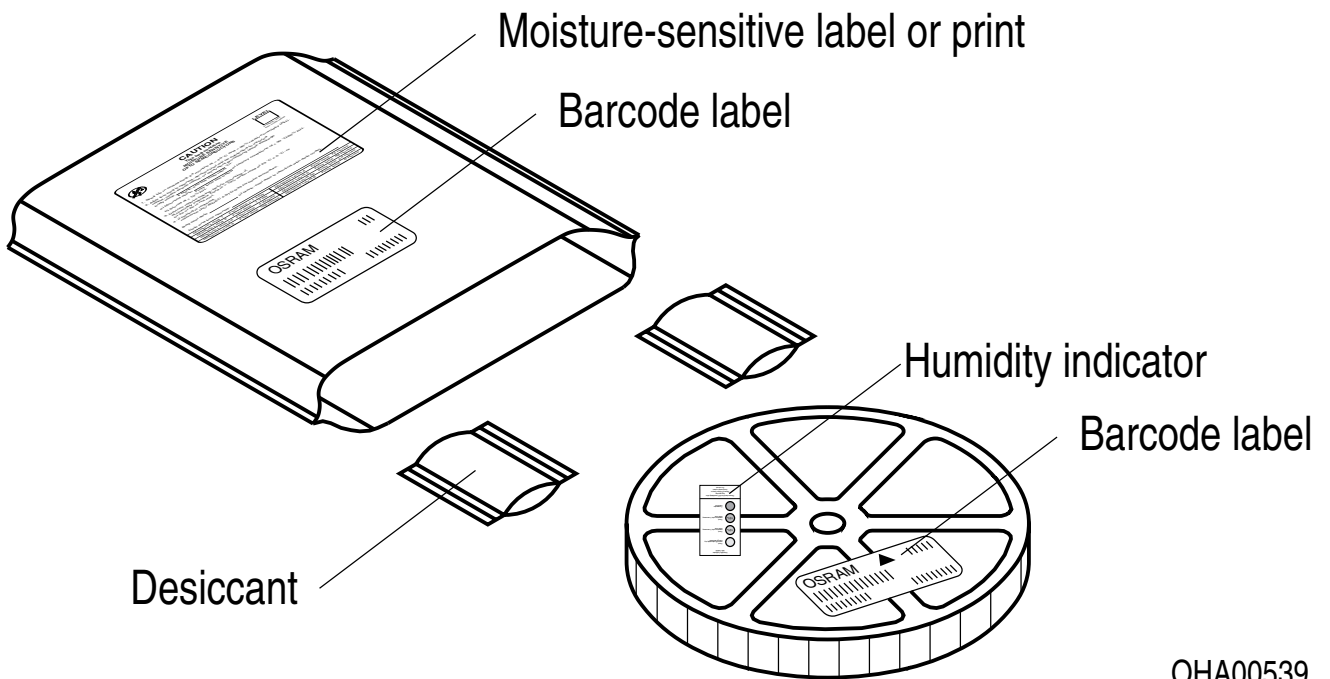
(1T) LOT NO: 1234567890 (9D) D/C: 1234

Pack: RXX  
DEMY    XXX  
X\_X123\_1234.1234 X

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

OHA04563

**Dry Packing Process and Materials <sup>8)</sup>**



OHA00539

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 **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 [www.osram-os.com/appnotes](http://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 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) **Chromaticity coordinate groups:** Chromaticity coordinates are measured during a current pulse of typically 25 ms, with an internal reproducibility of  $\pm 0.005$  and an expanded uncertainty of  $\pm 0.01$  (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  $\pm 0.05$  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 ( $6\sigma$ ).
- 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.

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## Revision History

Version	Date	Change
1.2	2020-03-23	Schematic Transportation Box Dimensions of Transportation Box
1.3	2022-11-09	New Layout Applications
1.4	2023-01-04	Further Information Barcode-Product-Label (BPL)





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**

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