

# LCB TVSG

## TOPLED®

TOPLED, SMT LED with integrated reflector. With our great experience in SMT LED we are able to offer a high quality product for all kind of applications.



## Applications

- Cluster, Button Backlighting
- Interior Illumination (e.g. Ambient Map)

## Features:

- Package: white PLCC-2 package, colored diffused silicone resin
- Chip technology: UX:3
- Typ. Radiation: 120° (Lambertian emitter)
- Color: Cx = 0.2, Cy = 0.3 acc. to CIE 1931 (● color on demand blue)
- Corrosion Robustness Class: 3B
- ESD: 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)

## Ordering Information

Type	Luminous Intensity <sup>1)</sup> $I_F = 20 \text{ mA}$ $I_v$	Ordering Code
LCB TVSG-AXBZ-2J8L-1	1120 ... 2800 mcd	Q65111A8184

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## 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.	50 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 <sup>2)</sup>	$I_R$	max.	200 mA

## Characteristics

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

Parameter	Symbol		Values
Chromaticity Coordinate <sup>3)</sup>	$C_x$	typ.	0.2
	$C_y$	typ.	0.3
Viewing angle at 50 % $I_v$	$2\phi$	typ.	120 °
Forward Voltage <sup>4)</sup> $I_F = 20 \text{ mA}$	$V_F$	min.	2.70 V
		typ.	3.05 V
		max.	3.40 V
Reverse voltage (ESD device)	$V_{R\text{ESD}}$	min.	5 V
Reverse voltage <sup>2)</sup> $I_R = 20 \text{ mA}$	$V_R$	max.	1.2 V
Real thermal resistance junction/solderpoint <sup>5)</sup>	$R_{\text{thJS real}}$	max.	78 K / W

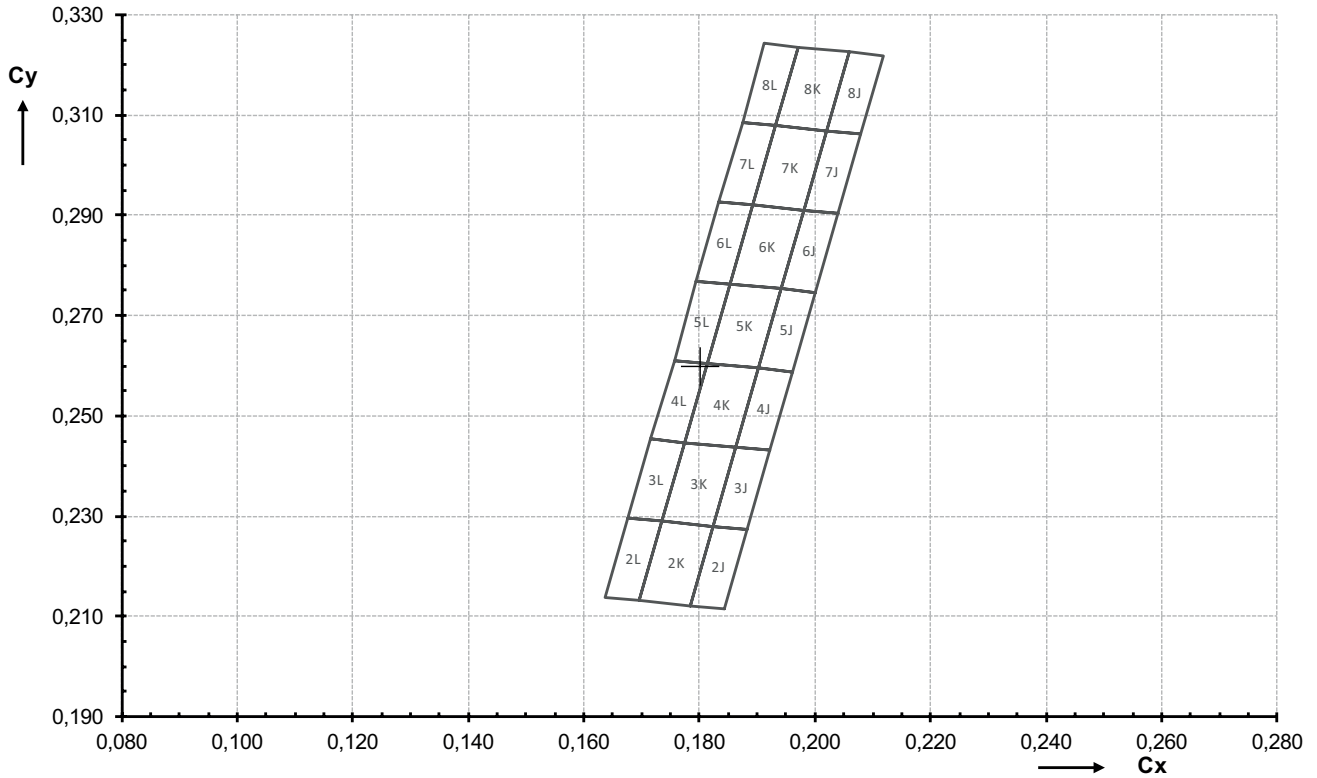
## Brightness Groups

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>6)</sup> $I_F = 20 \text{ mA}$ typ. $\Phi_v$
AX	1120 mcd	1300 mcd	3600 mlm
AY	1300 mcd	1500 mcd	4200 mlm
AZ	1500 mcd	1800 mcd	5000 mlm
BX	1800 mcd	2100 mcd	5900 mlm
BY	2100 mcd	2400 mcd	6800 mlm
BZ	2400 mcd	2800 mcd	7800 mlm

## Forward Voltage Groups

Group	Forward Voltage <sup>4)</sup> $I_F = 20 \text{ mA}$ min. $V_F$	Forward Voltage <sup>4)</sup> $I_F = 20 \text{ mA}$ 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 <sup>3)</sup>



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

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
2J	0.1823	0.2280	3J	0.1862	0.2437	4J	0.1902	0.2595
	0.1882	0.2273		0.1921	0.2431		0.1960	0.2588
	0.1842	0.2116		0.1882	0.2273		0.1921	0.2431
	0.1784	0.2122		0.1823	0.2280		0.1862	0.2437
2K	0.1735	0.2290	3K	0.1775	0.2447	4K	0.1814	0.2605
	0.1823	0.2280		0.1862	0.2437		0.1902	0.2595
	0.1784	0.2122		0.1823	0.2280		0.1862	0.2437
	0.1696	0.2132		0.1735	0.2290		0.1775	0.2447
2L	0.1677	0.2296	3L	0.1716	0.2454	4L	0.1756	0.2611
	0.1735	0.2290		0.1775	0.2447		0.1814	0.2605
	0.1696	0.2132		0.1735	0.2290		0.1775	0.2447
	0.1637	0.2139		0.1677	0.2296		0.1716	0.2454

## LCB TVSG

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
5J	0.1941	0.2753	6K	0.1893	0.2920	7L	0.1874	0.3084
	0.2000	0.2746		0.1980	0.2910		0.1932	0.3078
	0.1960	0.2588		0.1941	0.2753		0.1893	0.2920
	0.1902	0.2595		0.1853	0.2762		0.1834	0.2926
5K	0.1853	0.2762	6L	0.1834	0.2926	8J	0.2059	0.3225
	0.1941	0.2753		0.1893	0.2920		0.2118	0.3219
	0.1902	0.2595		0.1853	0.2762		0.2078	0.3061
	0.1814	0.2605		0.1795	0.2769		0.2020	0.3068
5L	0.1795	0.2769	7J	0.2020	0.3068	8K	0.1971	0.3235
	0.1853	0.2762		0.2078	0.3061		0.2059	0.3225
	0.1814	0.2605		0.2039	0.2904		0.2020	0.3068
	0.1756	0.2611		0.1980	0.2910		0.1932	0.3078
6J	0.1980	0.2910	7K	0.1932	0.3078	8L	0.1913	0.3242
	0.2039	0.2904		0.2020	0.3068		0.1971	0.3235
	0.2000	0.2746		0.1980	0.2910		0.1932	0.3078
	0.1941	0.2753		0.1893	0.2920		0.1874	0.3084

### Group Name on Label

**Example: AX-2J-44**

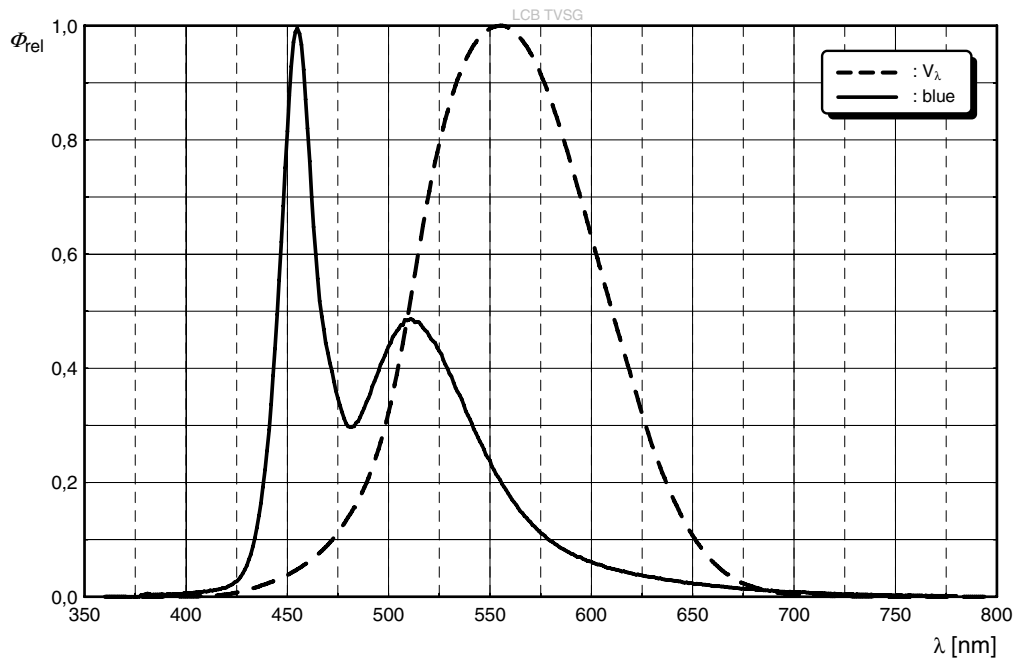
Brightness	Color chromaticity	Forward Voltage
AX	2J	44

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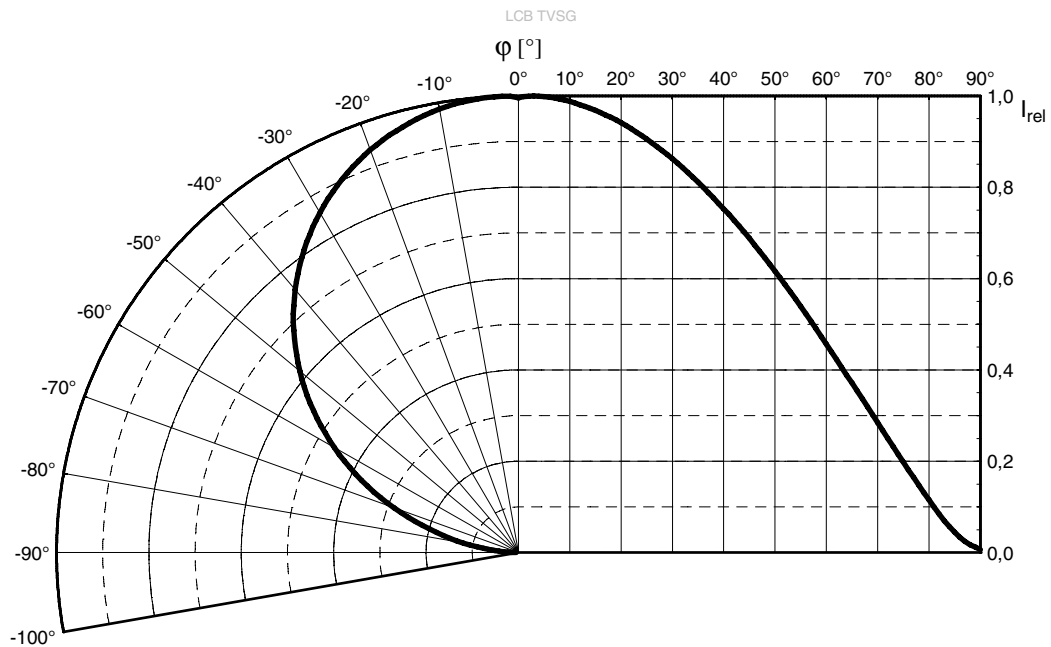
### Relative Spectral Emission <sup>6)</sup>

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



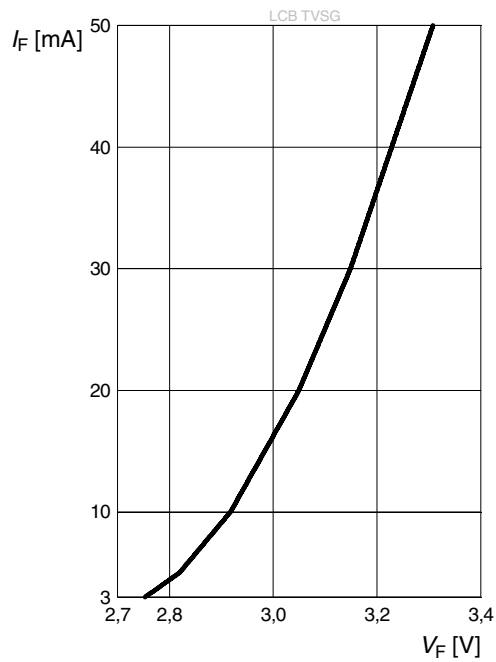
### Radiation Characteristics <sup>6)</sup>

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



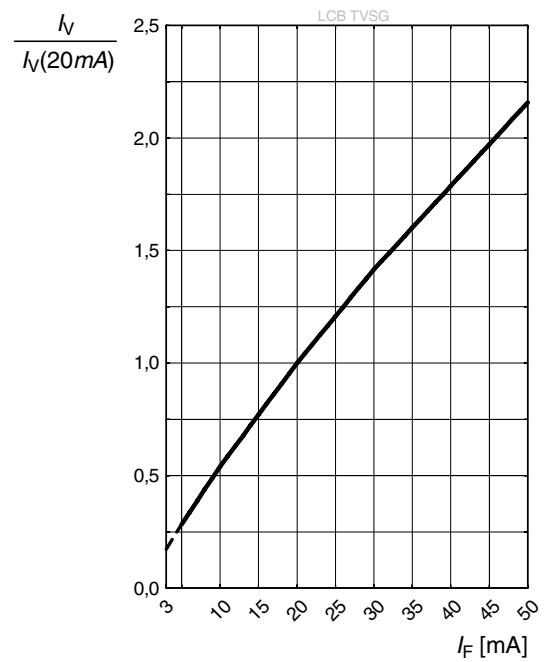
**Forward current** <sup>6), 7)</sup>

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



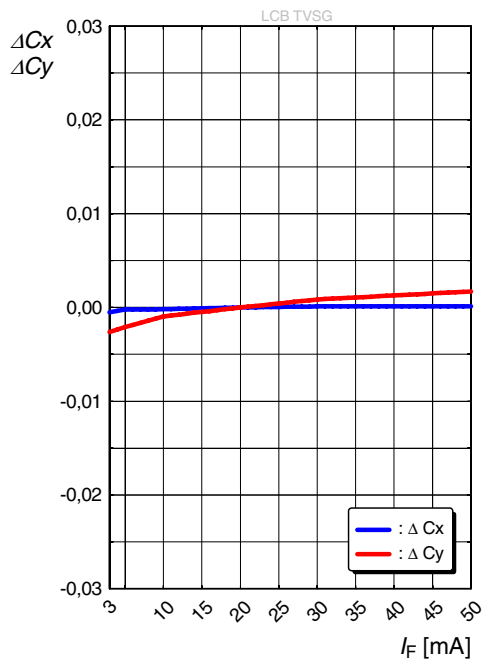
**Relative Luminous Intensity** <sup>6), 7)</sup>

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



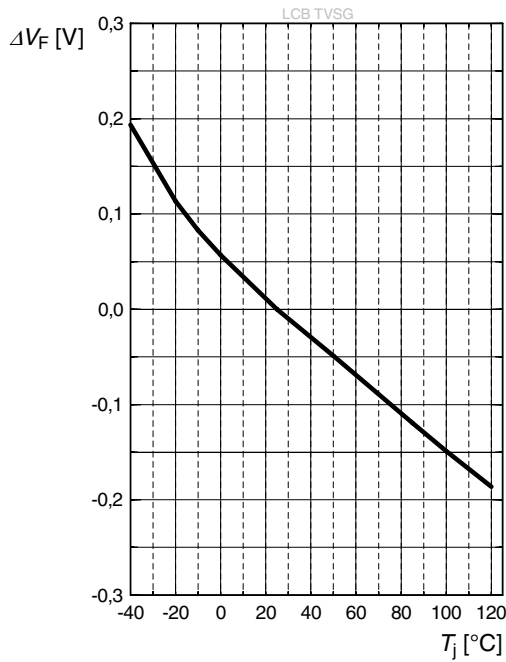
**Chromaticity Coordinate Shift** <sup>6)</sup>

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



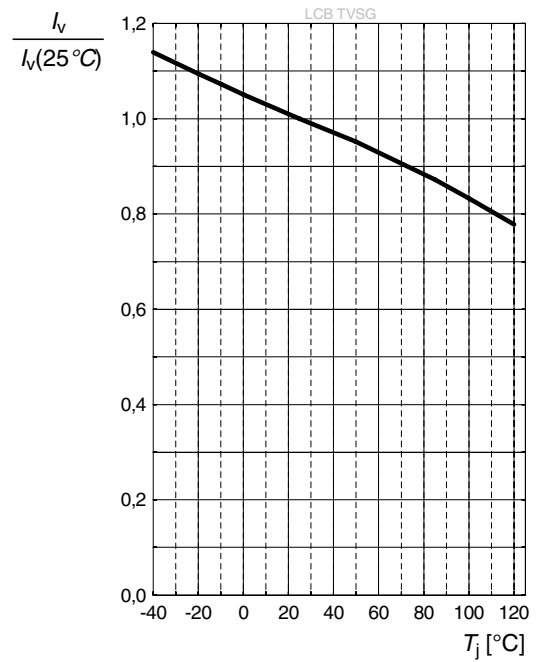
### Forward Voltage <sup>6)</sup>

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



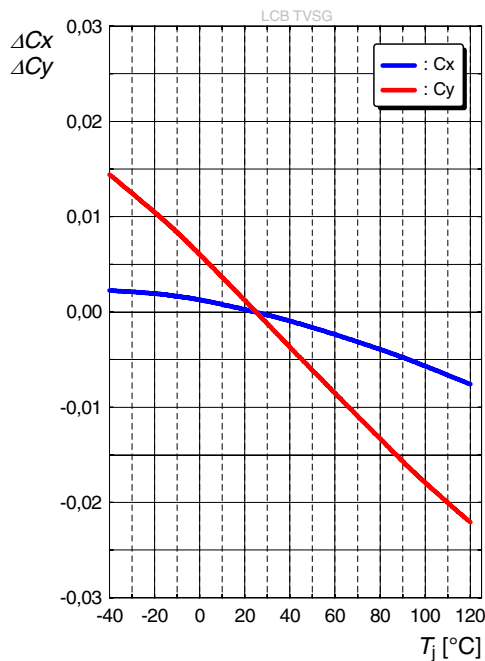
### Relative Luminous Intensity <sup>6)</sup>

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



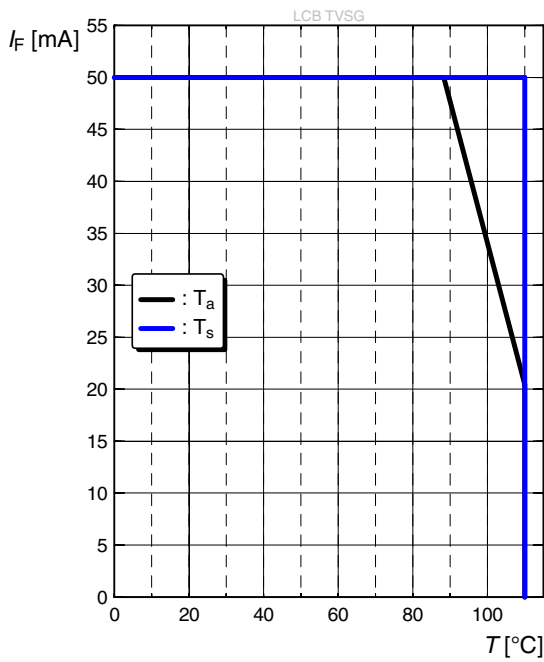
### Chromaticity Coordinate Shift <sup>6)</sup>

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



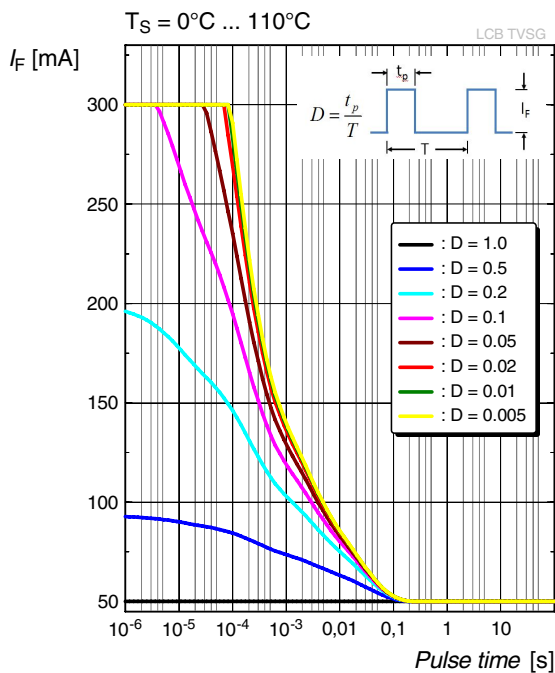
## Max. Permissible Forward Current

$$I_F = f(T)$$

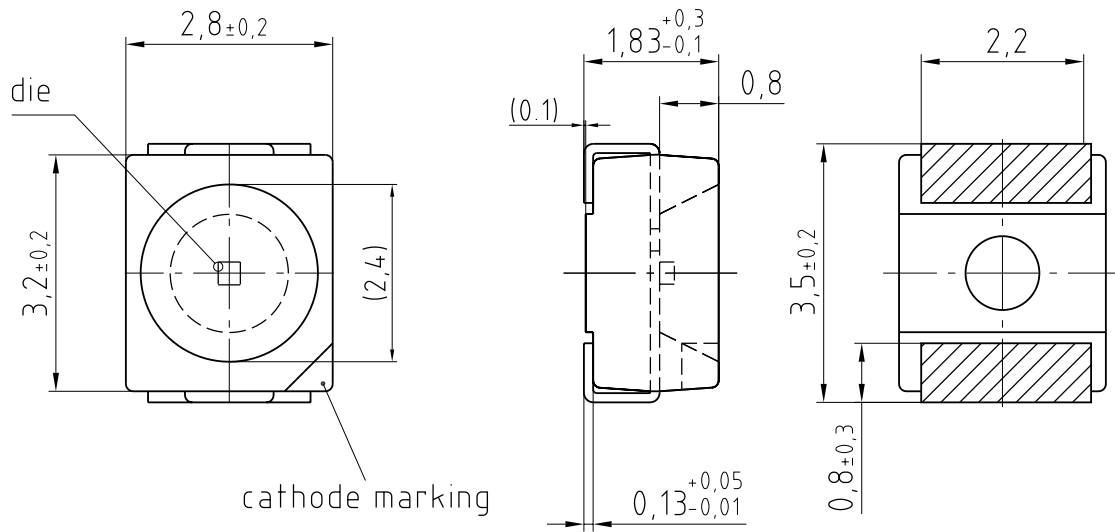


## Permissible Pulse Handling Capability

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



Dimensional Drawing <sup>8)</sup>

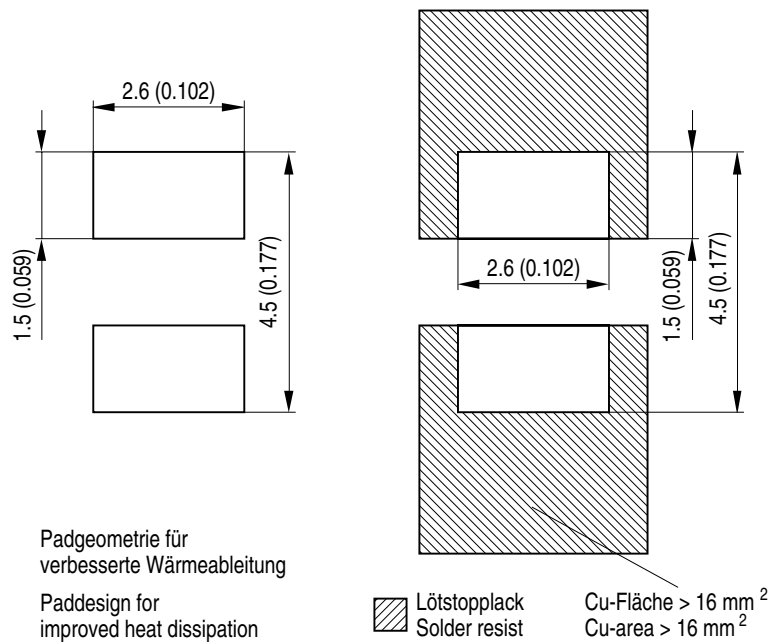


general tolerance  $\pm 0.1$   
 lead finish Au 

C63062-A4140-A1..-06

- Approximate Weight:** 33.0 mg
- Package marking:** Cathode
- Corrosion test:** Class: 3B  
 Test condition: 40°C / 90 % RH / 15 ppm H<sub>2</sub>S / 14 days (stricter then IEC 60068-2-43)
- ESD advice:** LED is protected by ESD device which is connected in parallel to LED-Chip.

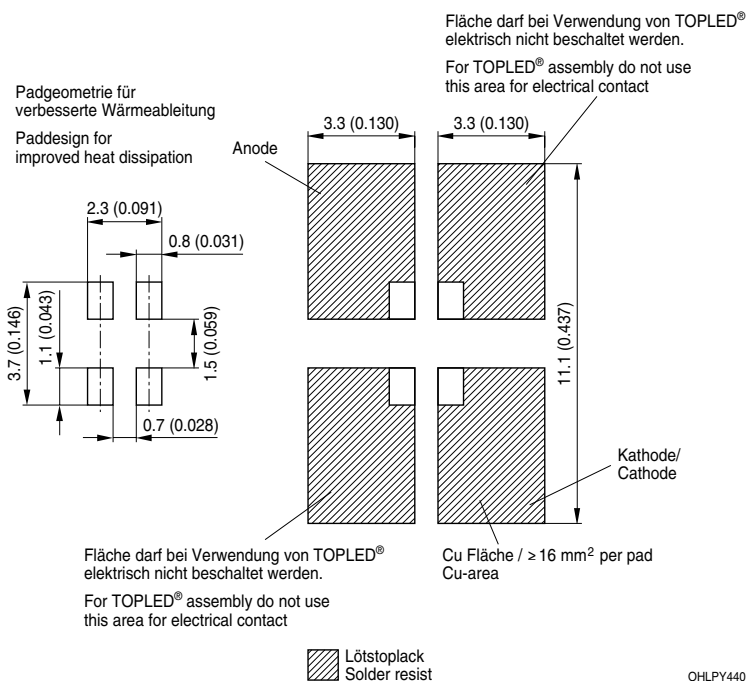
## Recommended Solder Pad <sup>8)</sup>



OHLPY970

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere.

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

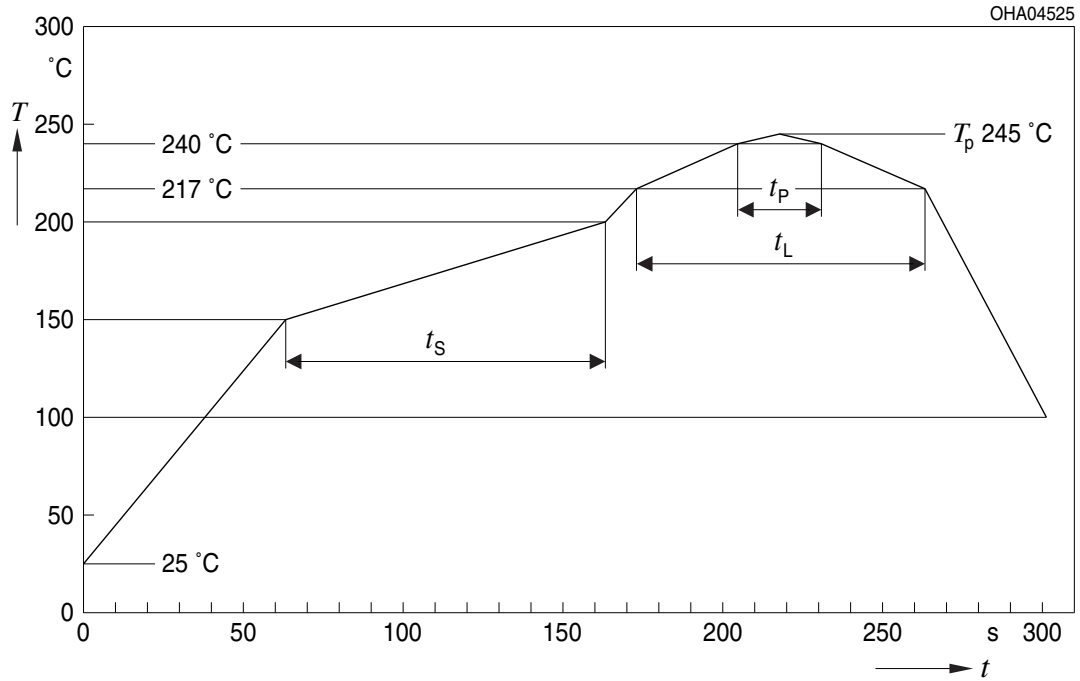


OHLPY440

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere.

## Reflow Soldering Profile

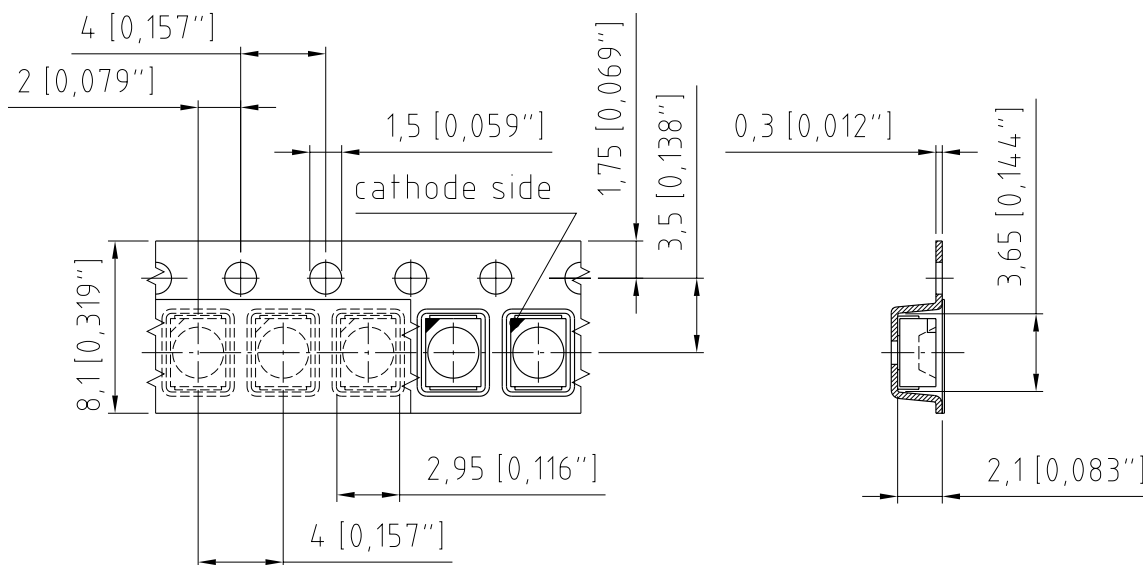
Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



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

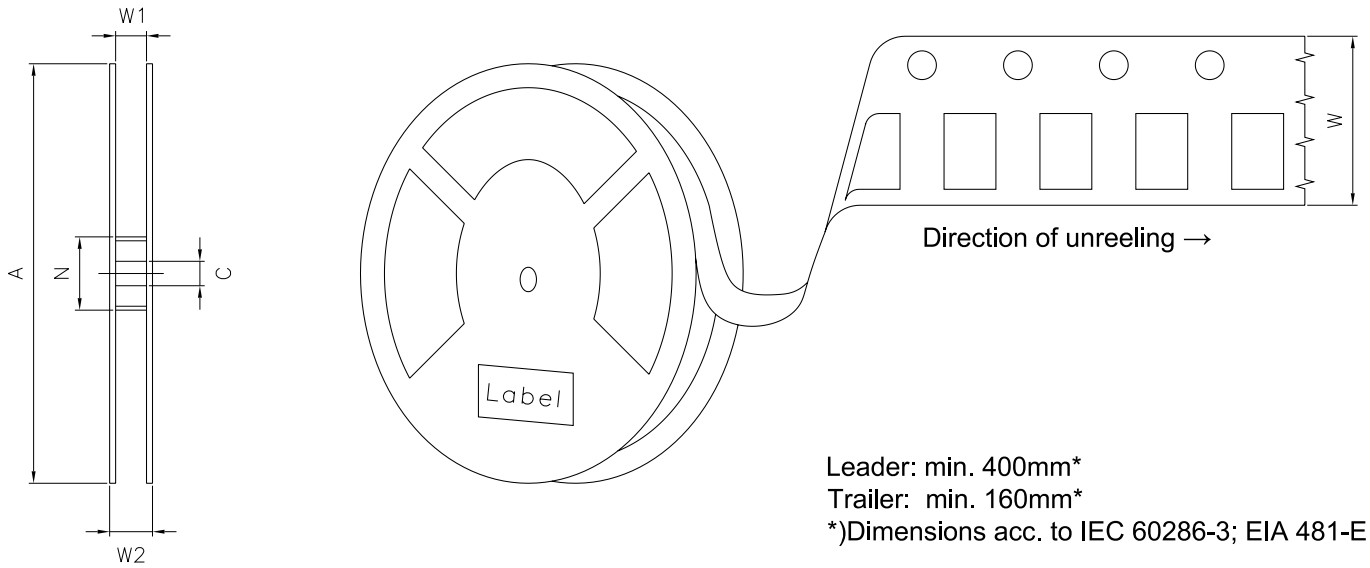
Taping <sup>8)</sup>



C63062-A3863-B3 -02



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



**Reel dimensions [mm]**

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	60	8.4 + 2	14.4	2000

## Barcode-Product-Label (BPL)



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



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

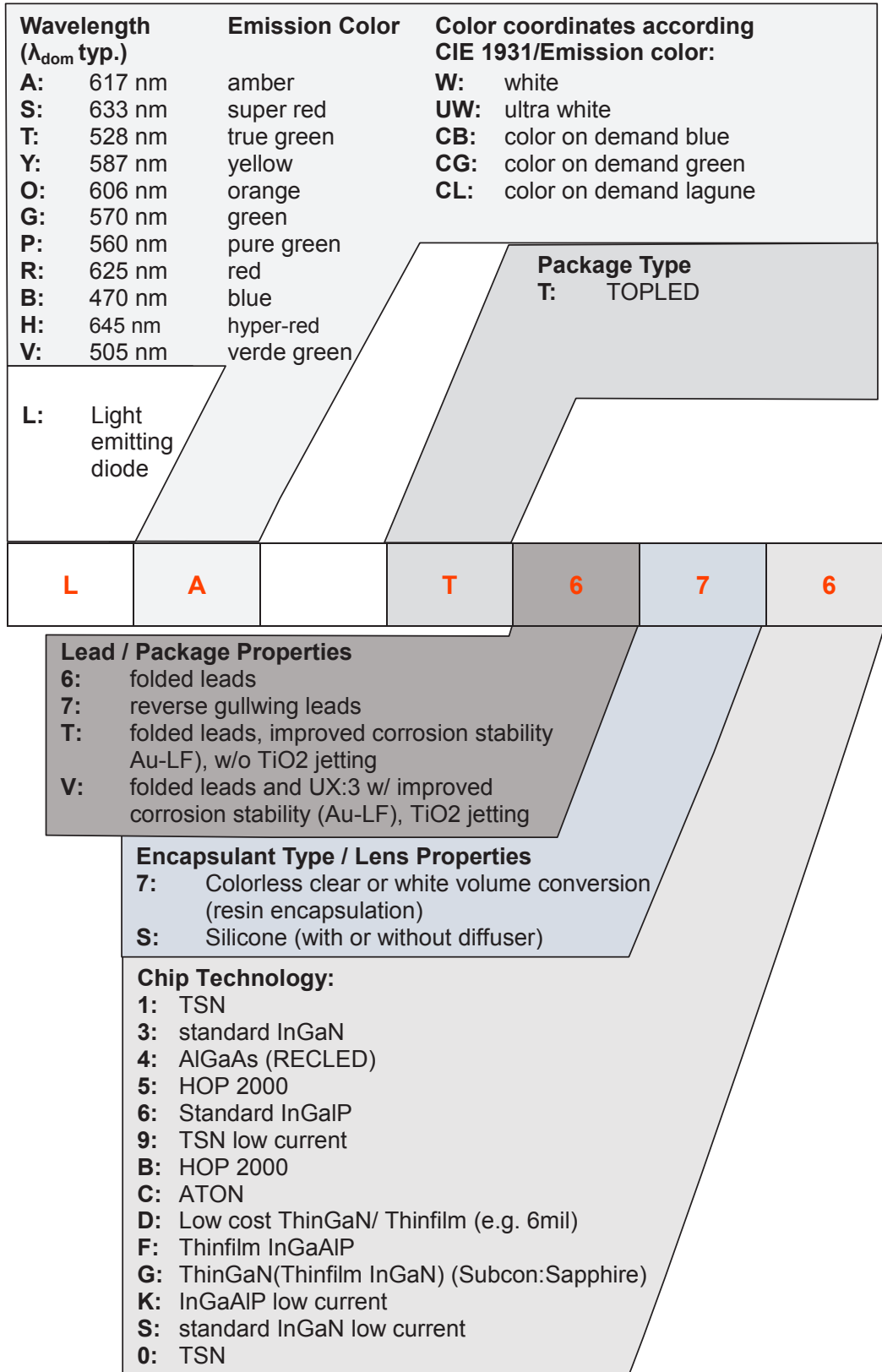
**Transportation Packing and Materials** <sup>8)</sup>



**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 LED 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](http://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!

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 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.

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.

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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  $\pm 0.005$  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  $\pm 0.05\text{ V}$  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 ( $6\sigma$ ).
- 6) **Typical Values:** Due to the special conditions of the manufacturing processes of LED, 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 LEDs 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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