

# OSRAM LE CG Q7WP

## Datasheet

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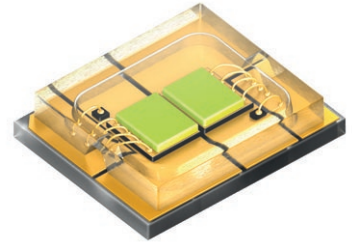
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OSRAM OSTAR® Projection Compact

# LE CG Q7WP Auto motive

High luminance device in a reliable ceramic package configuration dedicated for RGB projection systems in automotive environments.



## Applications

- Head-Up Display LED & Laser
- Signalling

## Features

- Package: compact lightsource in SMT technology with glass window on top
- Chip technology: UX:3
- Typ. Radiation: 120°
- Color:  $C_x = 0.317$ ,  $C_y = 0.642$  acc. to CIE 1931 (● converted green)
- Corrosion Robustness Class: 3B
- Qualifications: AEC-Q102 Qualified
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)

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## Ordering Information

Type	Luminous Flux <sup>1)</sup> $I_F = 1400 \text{ mA}$ $\Phi_v$	Ordering Code
LE CG Q7WP-5R7R-2-AM	1120 ... 1590 lm	Q65113A3684

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## 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.	150 °C
Forward Current $T_s = 25\text{ °C}$ ; per chip	$I_F$	min.	40 mA
		max.	5000 mA
Forward Current pulsed $D = 0.5$ ; $f = 120\text{ Hz}$ ; $T_s = 25\text{ °C}$ ; per chip	$I_{F\ pulse}$		6000 mA
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	$V_{ESD}$		2 kV
Reverse current <sup>2)</sup>	$I_R$	max.	200 mA

## Characteristics

$I_F = 1400 \text{ mA}$ ;  $T_S = 25 \text{ °C}$ ; per chip

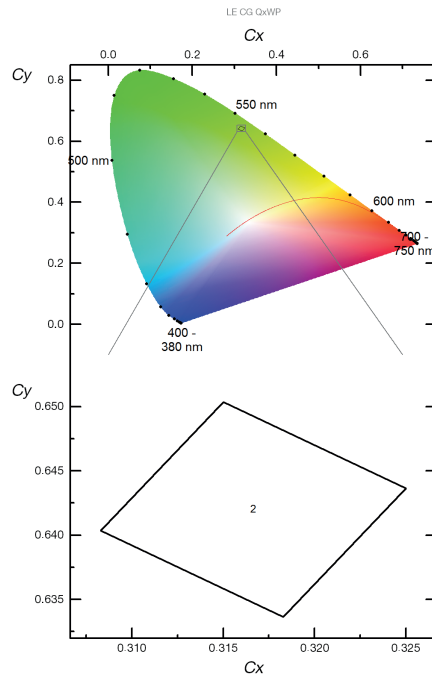
Parameter	Symbol		Values
Chromaticity Coordinate <sup>3)</sup> acc. to CIE 1931; within $\lambda = 500 \dots 600 \text{ nm}$	$C_x$	typ.	0.317
	$C_y$	typ.	0.642
Peak Wavelength	$\lambda_{\text{peak}}$	typ.	520 nm
Spectral bandwidth at 50% $I_{\text{rel,max}}$	$\Delta\lambda$	typ.	100 nm
Viewing angle at 50% $I_V$	$2\phi$	typ.	130 °
Radiating surface	$A_{\text{color}}$	typ.	1.55 x 2.55 mm <sup>2</sup>
Partial Flux acc. CIE 127:2007 <sup>4)</sup> $I_F = 1400 \text{ mA}$	$\Phi_{E/V, 120^\circ}$	typ.	0.77
Forward Voltage <sup>5)</sup> $I_F = 1400 \text{ mA}$ ; per Chip	$V_F$	min.	2.80 V
		typ.	2.95 V
		max.	3.50 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
Real thermal resistance junction/solderpoint <sup>6)</sup>	$R_{\text{thJS real}}$	typ.	1.00 K / W
		max.	1.30 K / W
Electrical thermal resistance junction/solderpoint <sup>6)</sup> with efficiency $\eta_e = 27 \%$	$R_{\text{thJS elec.}}$	typ.	0.73 K / W
		max.	0.95 K / W

## Brightness Groups

Group	Luminous Flux <sup>1)</sup> $I_F = 1400 \text{ mA}$ min. $\Phi_V$	Luminous Flux <sup>1)</sup> $I_F = 1400 \text{ mA}$ max. $\Phi_V$
5R	1120 lm	1250 lm
6R	1250 lm	1400 lm
7R	1400 lm	1590 lm

## Chromaticity Coordinate Groups

within  $\lambda = 500 \dots 600 \text{ nm}$



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

Group	Cx	Cy
2	0.3083	0.6404
	0.3150	0.6504
	0.3250	0.6437
	0.3183	0.6337

## Group Name on Label

**Example: 5R-2**

Brightness

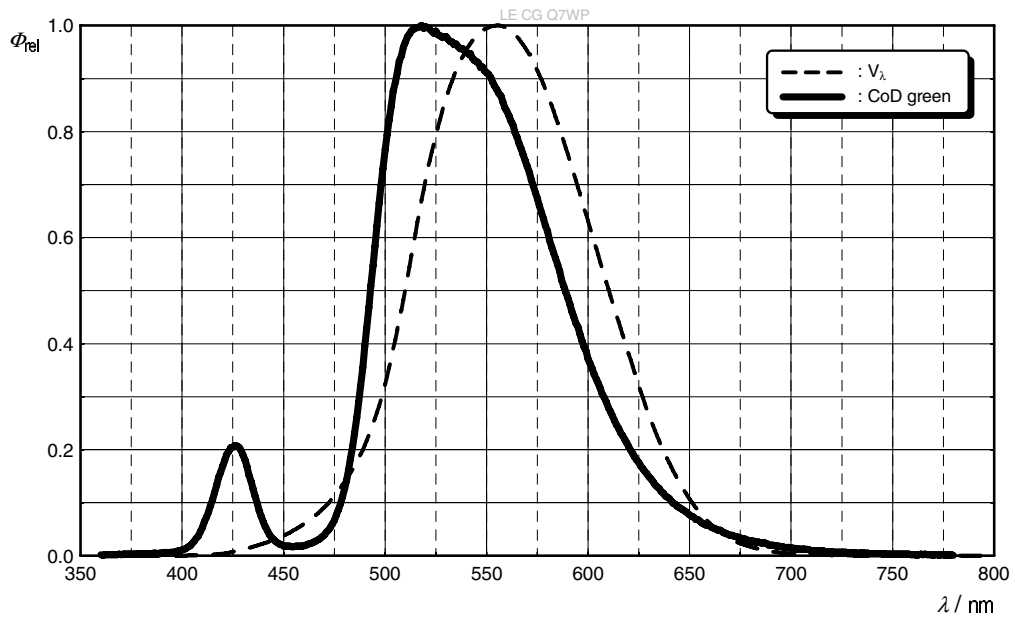
Color Chromaticity

5R

2

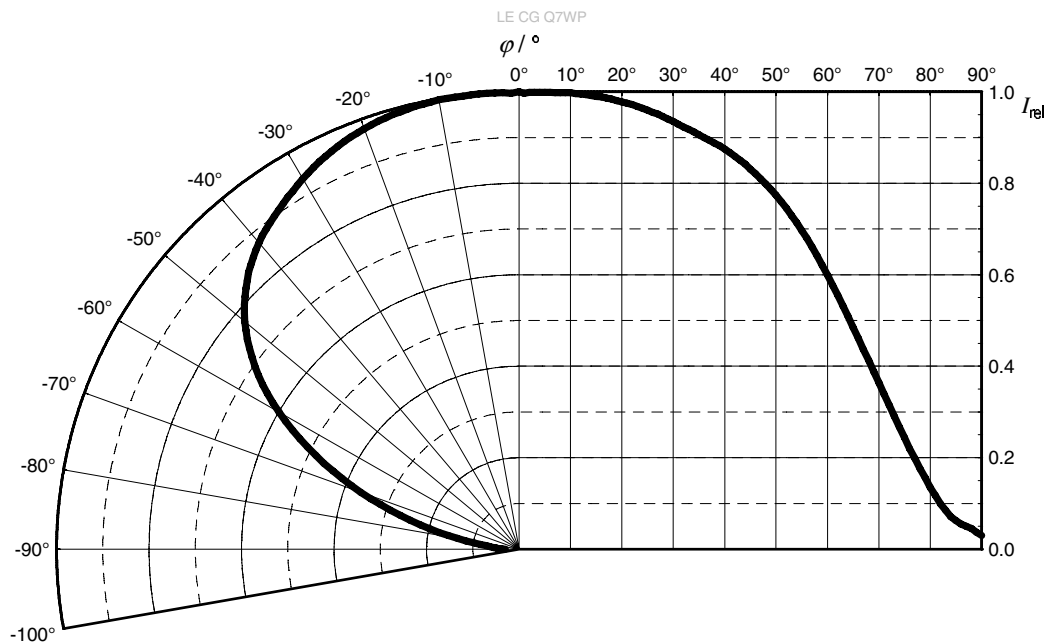
### Relative Spectral Emission <sup>4)</sup>

$\Phi_{rel} = f(\lambda)$ ;  $I_F = 1400 \text{ mA}$ ;  $T_J = 25 \text{ }^\circ\text{C}$ ; per Chip



### Radiation Characteristics <sup>4)</sup>

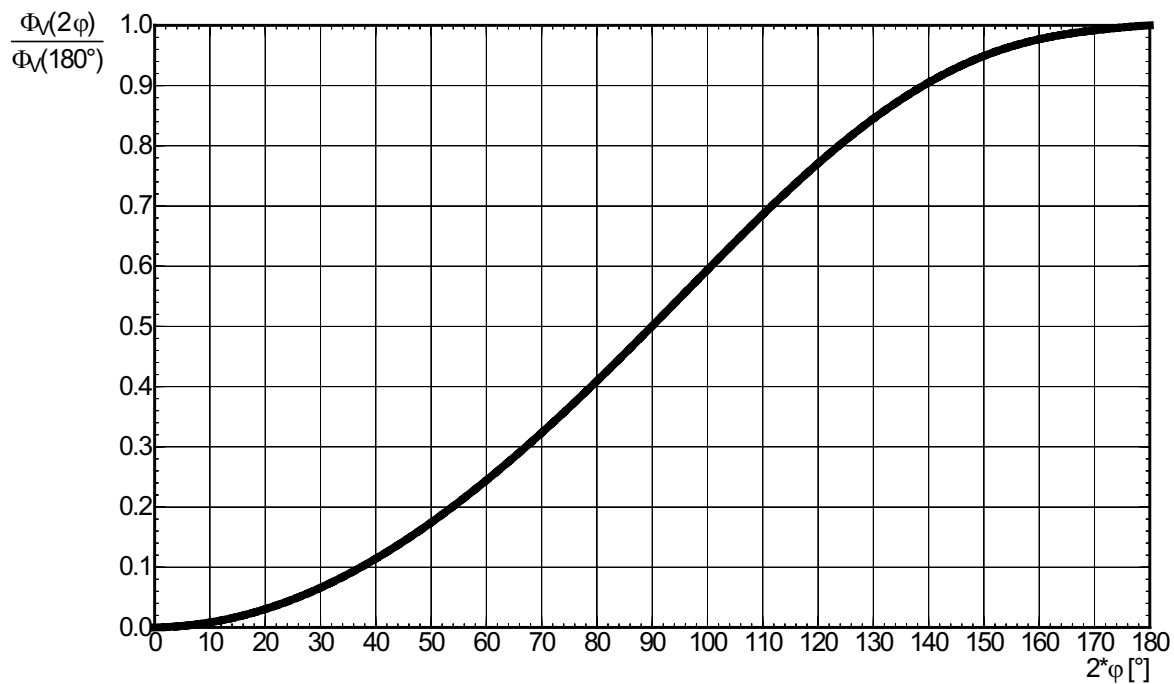
$I_{rel} = f(\phi)$ ;  $T_J = 25 \text{ }^\circ\text{C}$





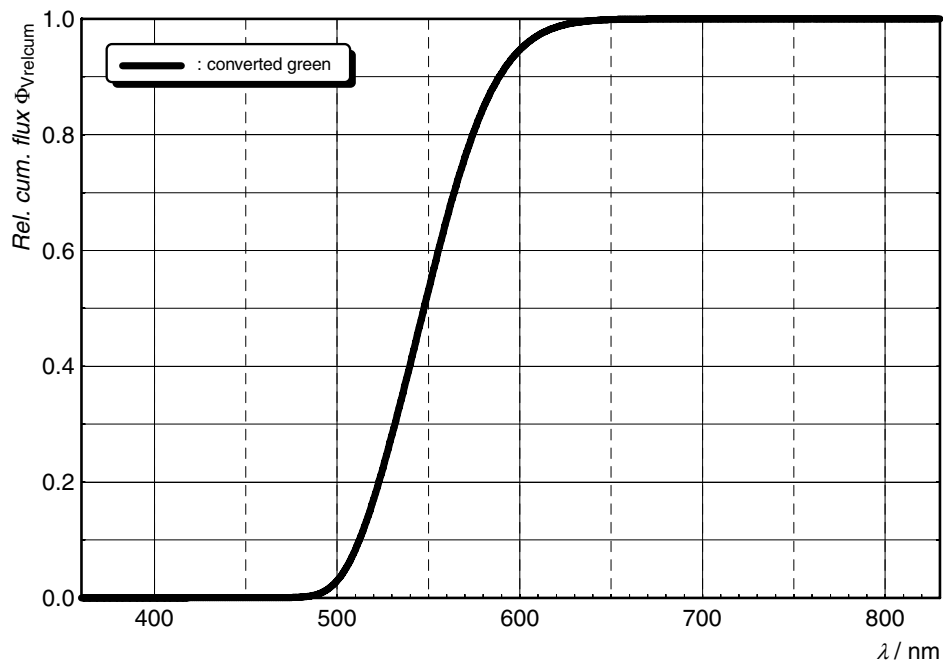
### Relative Partial Flux <sup>4)</sup>

$$\Phi_v(2\varphi)/\Phi_v(180^\circ) = f(\varphi); T_J = 25^\circ\text{C}$$



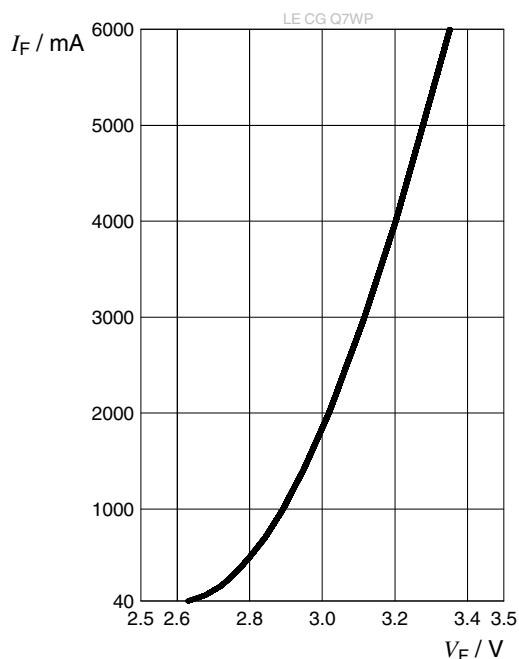
### Relative cumulated Luminous Flux <sup>4)</sup>

$$\Phi_{Vrel} - cum = f(\lambda); I_F = 1400\text{ mA}; T_J = 25^\circ\text{C}; \text{ per Chip}$$



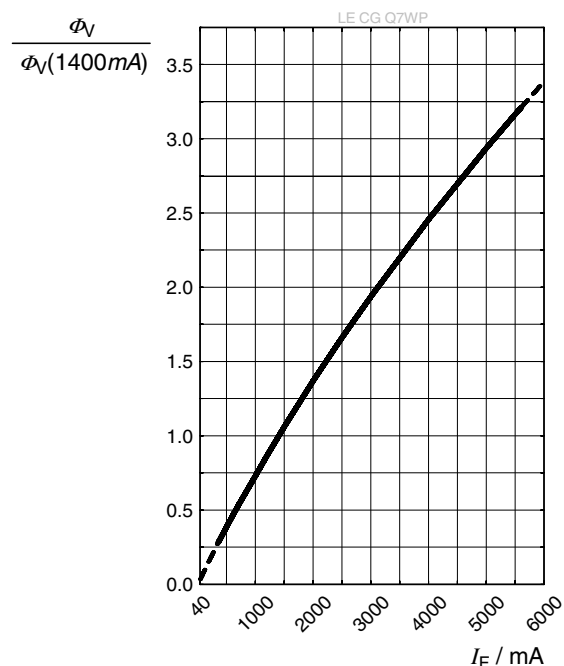
### Forward current <sup>4), 7)</sup>

$I_F = f(V_F)$ ;  $T_J = 25\text{ °C}$ ; per Chip



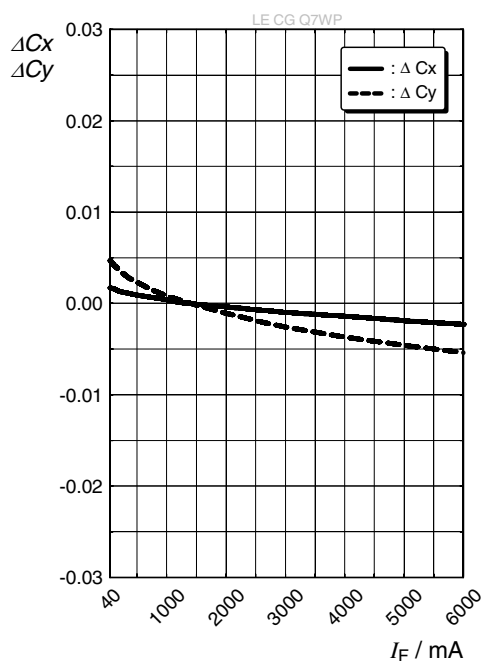
### Relative Luminous Flux <sup>4), 7)</sup>

$\Phi_V / \Phi_V(1400\text{ mA}) = f(I_F)$ ;  $T_J = 25\text{ °C}$ ; per Chip



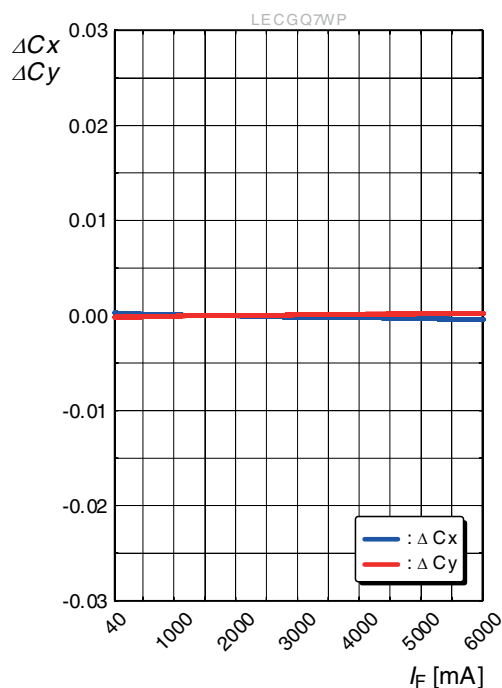
### Chromaticity Coordinate Shift <sup>4)</sup>

$\Delta C_x, \Delta C_y = f(I_F)$ ;  $T_J = 25\text{ °C}$ ; per Chip;  
full spectral range



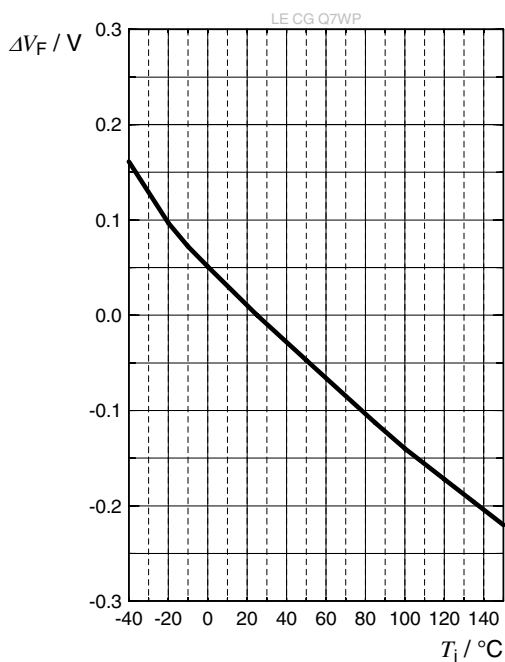
### Chromaticity Coordinate Shift <sup>4)</sup>

$\Delta C_x, \Delta C_y = f(I_F)$ ;  $T_J = 25\text{ °C}$ ; per Chip;  
within  $\lambda = 500 \dots 600\text{ nm}$



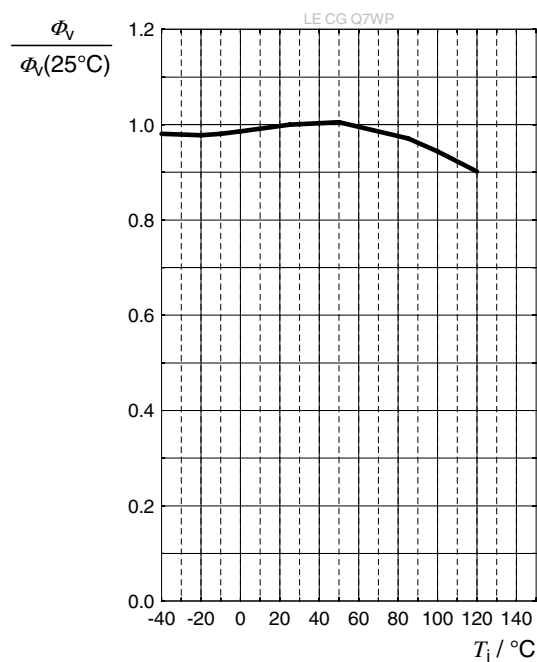
### Forward Voltage <sup>4)</sup>

$\Delta V_F = V_F - V_F(25\text{ }^\circ\text{C}) = f(T_j)$ ;  $I_F = 1400\text{ mA}$ ; per Chip



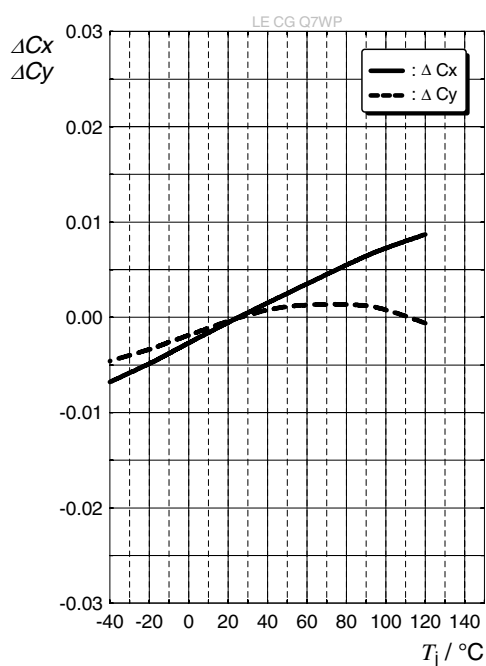
### Relative Luminous Flux <sup>4)</sup>

$\Phi_V / \Phi_V(25\text{ }^\circ\text{C}) = f(T_j)$ ;  $I_F = 1400\text{ mA}$ ; per Chip



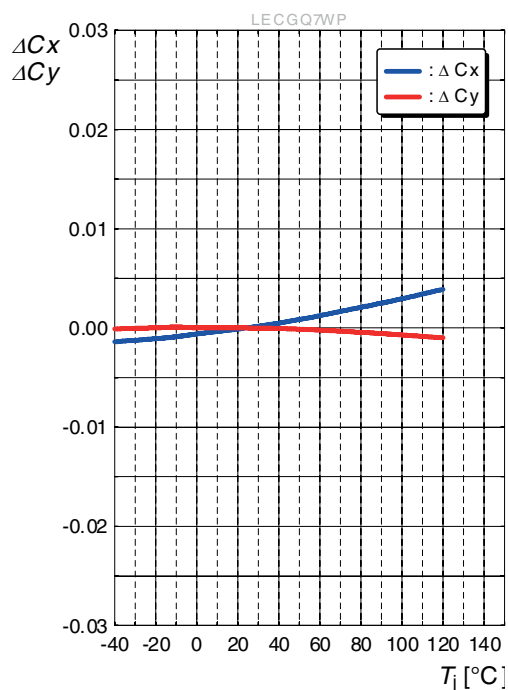
### Chromaticity Coordinate Shift <sup>4)</sup>

$\Delta C_x, \Delta C_y = f(T_j)$ ;  $I_F = 1400\text{ mA}$ ; per Chip;  
full spectral range



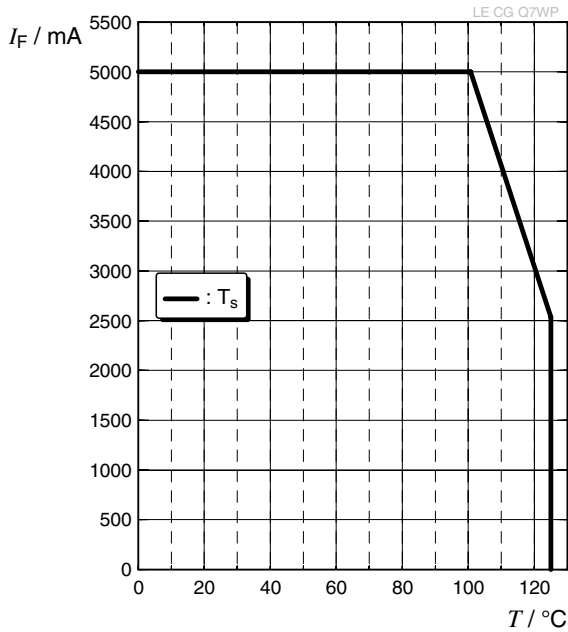
### Chromaticity Coordinate Shift <sup>4)</sup>

$\Delta C_x, \Delta C_y = f(T_j)$ ;  $I_F = 1400\text{ mA}$ ; per Chip;  
within  $\lambda = 500 \dots 600\text{ nm}$



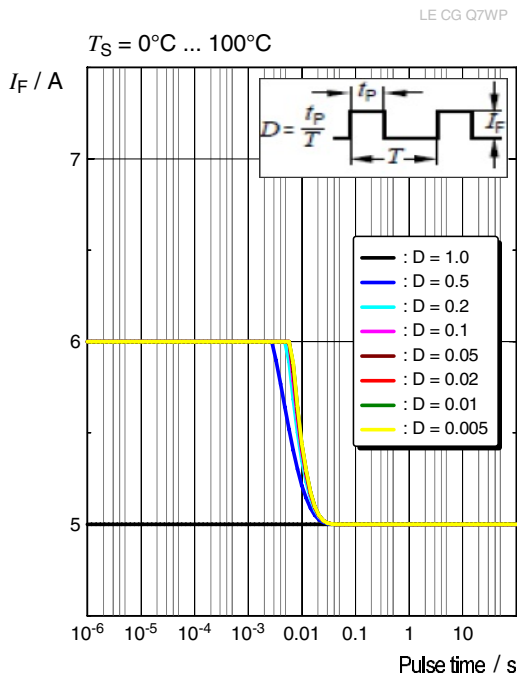
### Max. Permissible Forward Current

$I_F = f(T)$



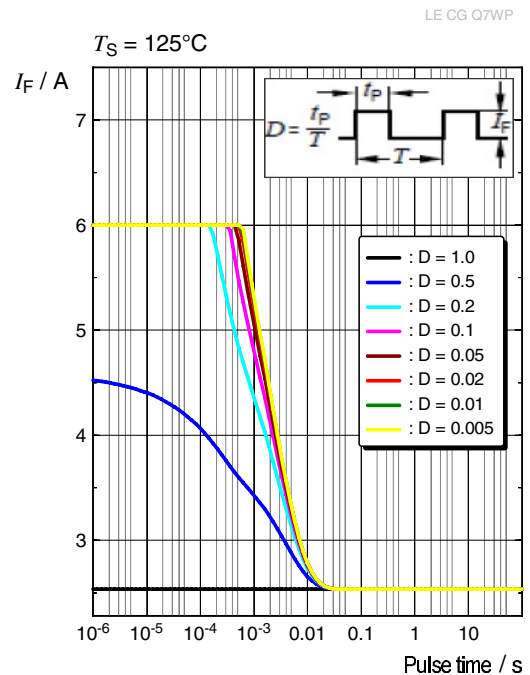
### Permissible Pulse Handling Capability

$I_F = f(t_p)$ ; D: Duty cycle



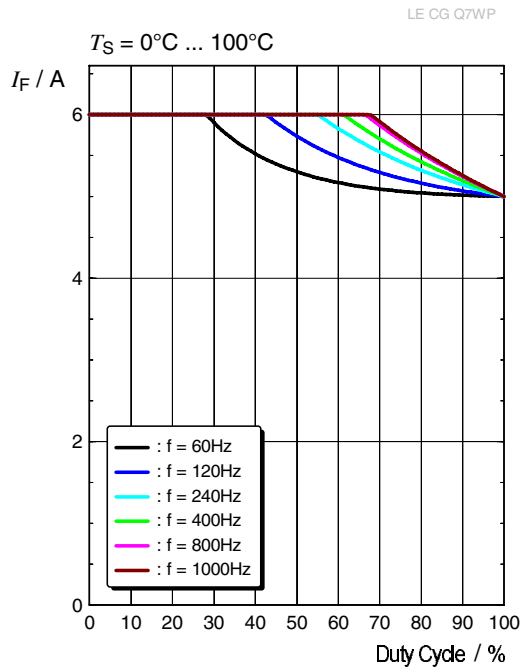
### Permissible Pulse Handling Capability

$I_F = f(t_p)$ ; D: Duty cycle



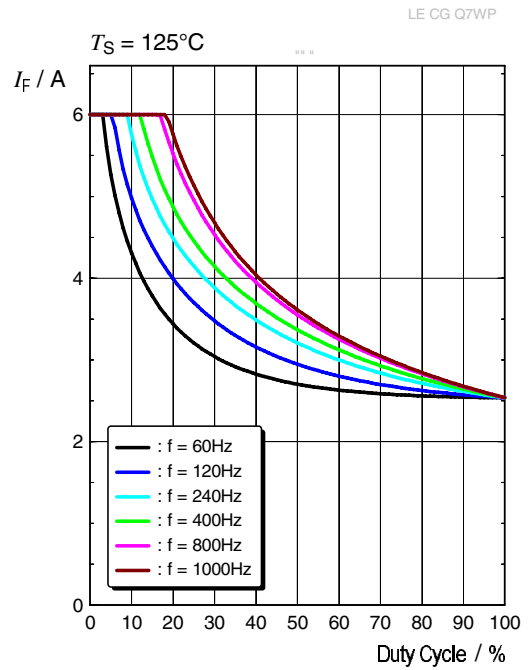
### Permissible F. Handling Capability

f: Frequency

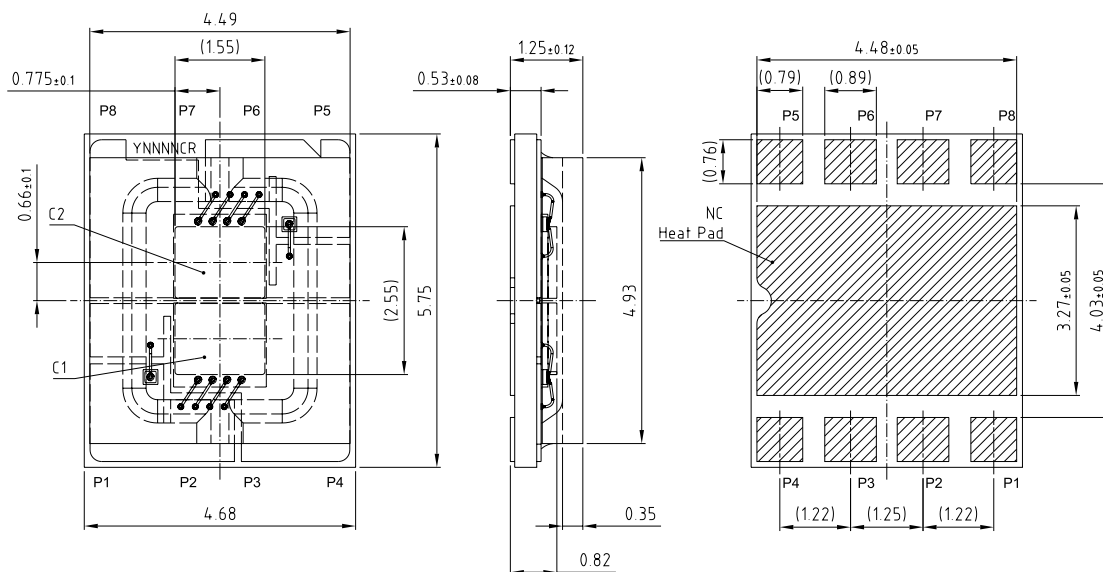



### Permissible F. Handling Capability

f: Frequency



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



general tolerance  $\pm 0.1$   
lead finish Au 

**Pinning:**  
P1, P2 Anode C1  
P3, P4 Cathode C1  
P5, P6 Anode C2  
P7, P8 Cathode C2

C63062-A4194-A1-08

## Further Information:

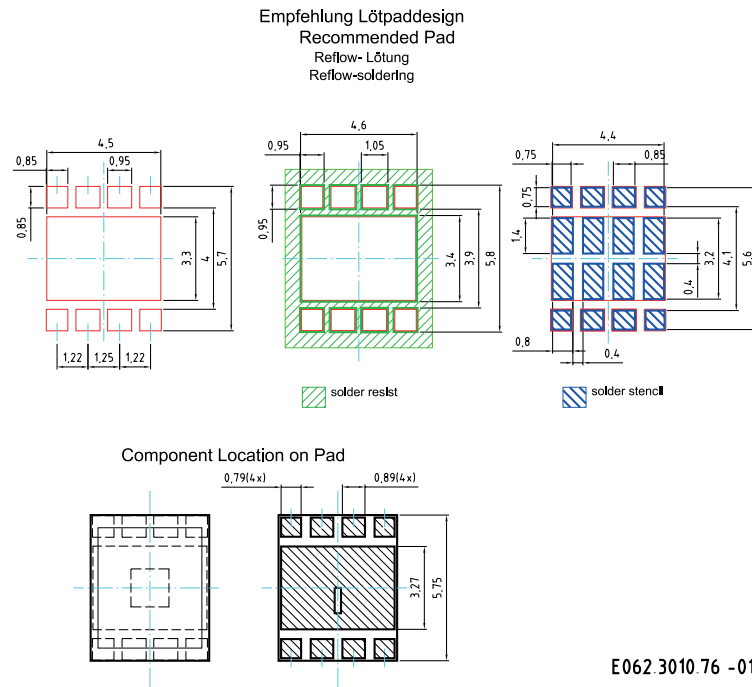
**Approximate Weight:** 100.0 mg

**Package marking:** Cathode

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

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

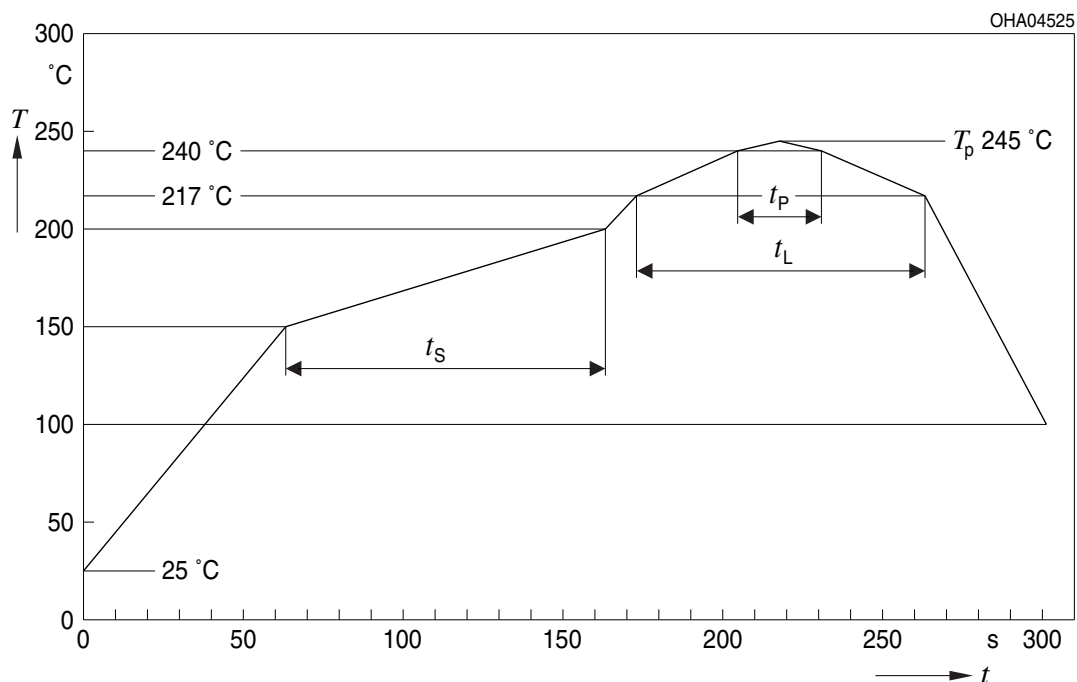
## Recommended Solder Pad <sup>8)</sup>



Do not use exposed copper MCPCB technology for automotive applications. 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 2 acc. to JEDEC J-STD-020E



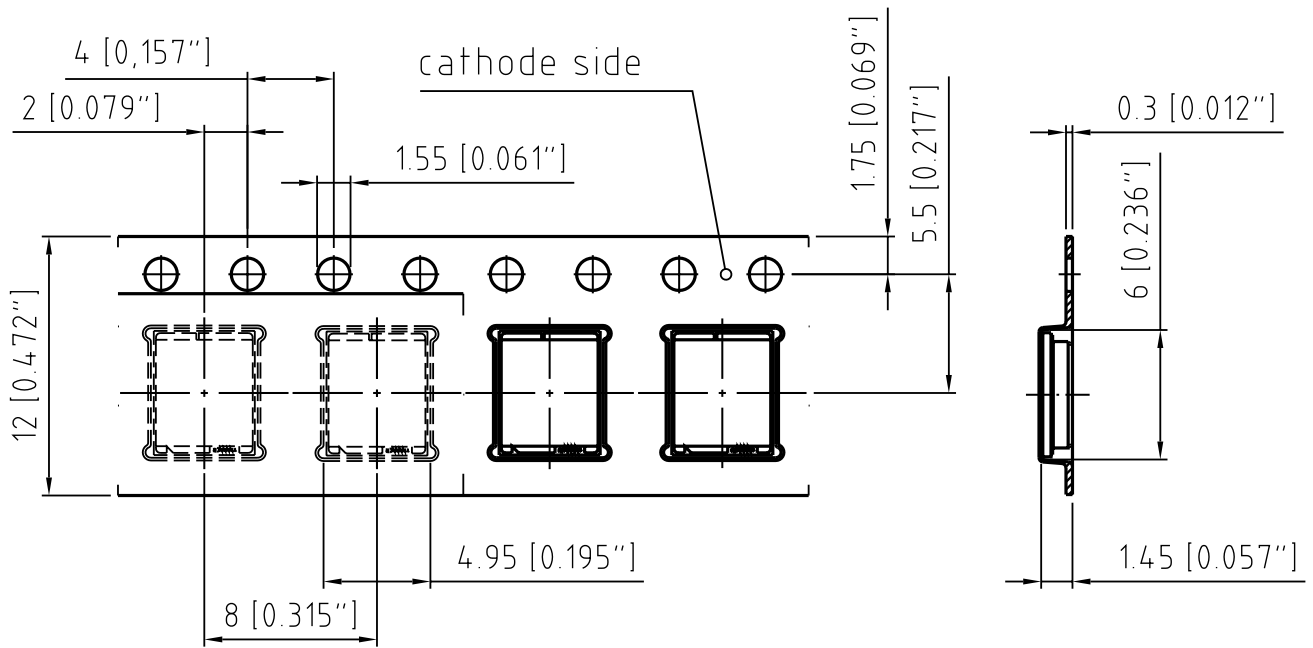
Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat <sup>*)</sup> 25 °C to 150 °C			2	3	K/s
Time $t_s$ $T_{Smin}$ to $T_{Smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak <sup>*)</sup> $T_{Smax}$ to $T_p$			2	3	K/s
Liquidus temperature	$T_L$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

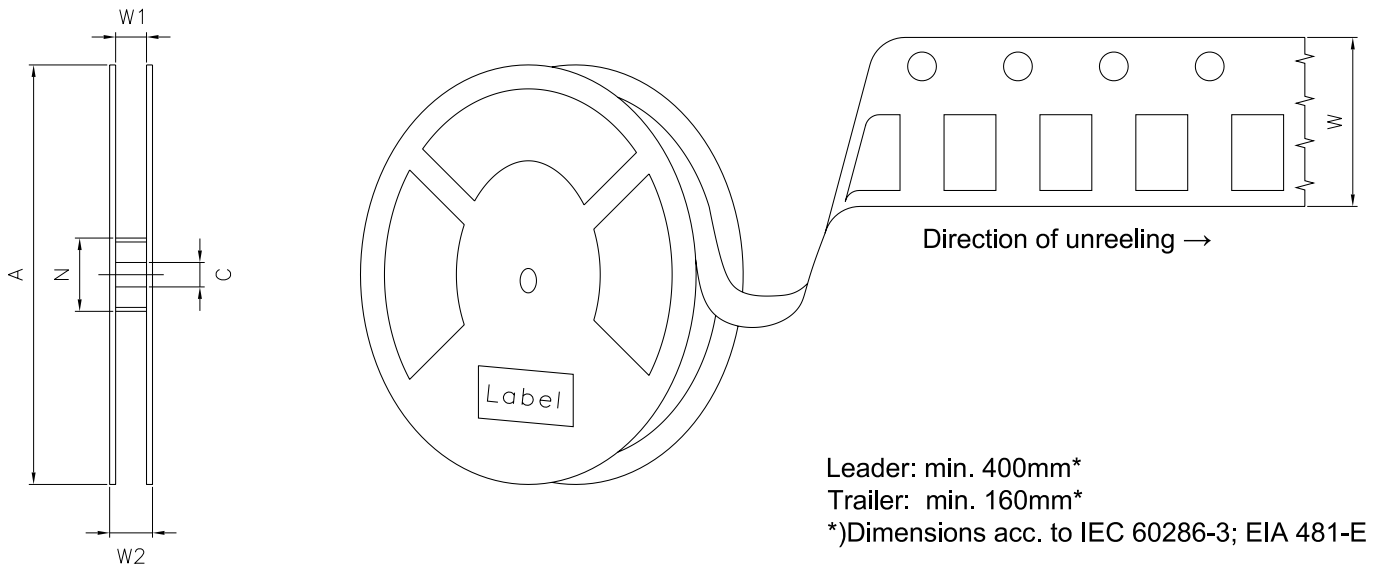


Taping <sup>8)</sup>



C63062-A4194-B8 -03

## 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	1000

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

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

RoHS Compliant

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

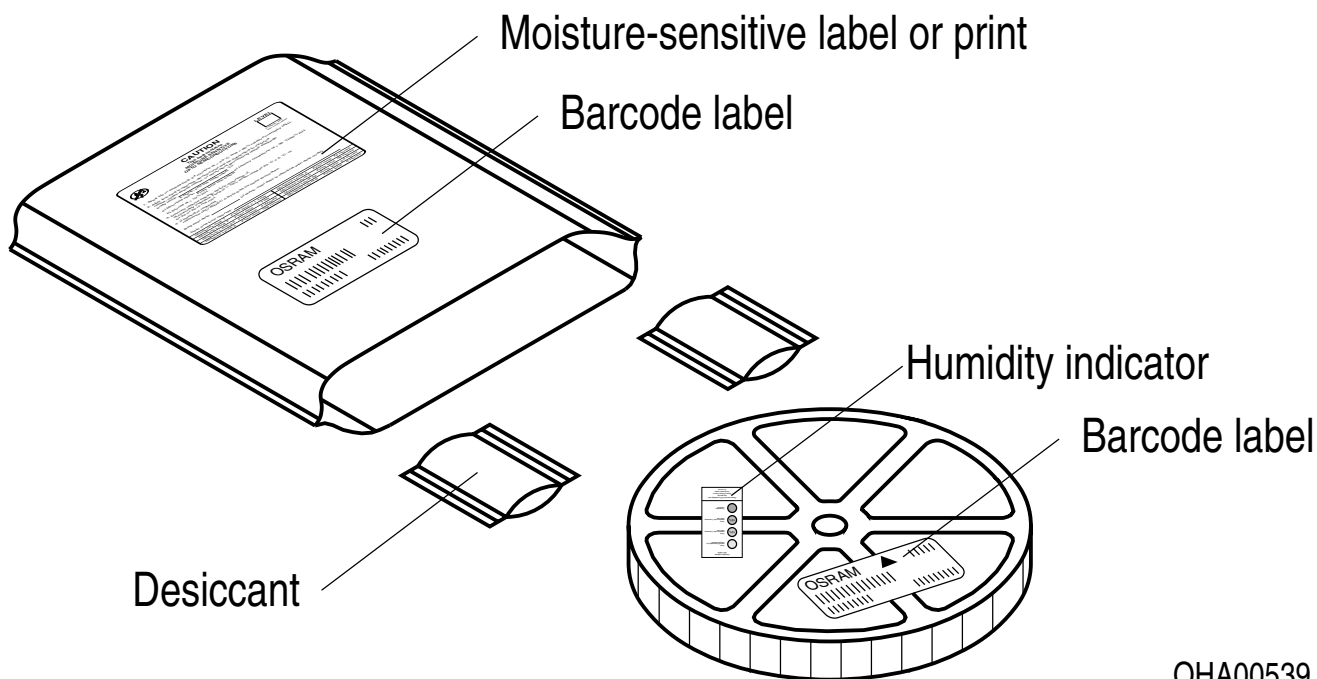
(1T) LOT NO: 1234567890 (9D) D/C: 1234

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

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

OHA04563

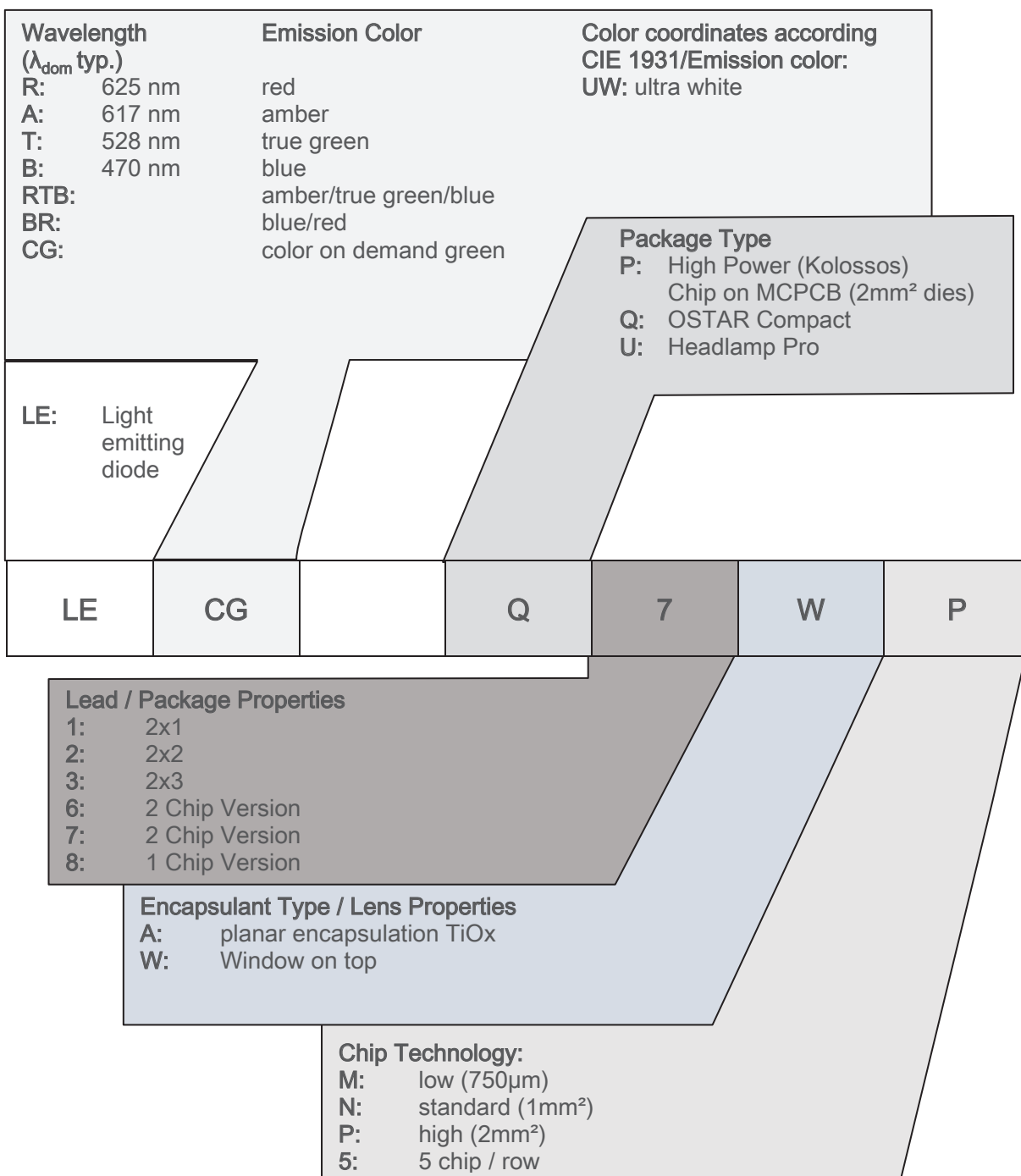
**Dry Packing Process and Materials** <sup>8)</sup>



OHA00539

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

## Type Designation System



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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.

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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:** 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) **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.
- 5) **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  $k = 3$ ).
- 6) **Thermal Resistance:**  $R_{th\ max}$  is based on statistic values ( $6\sigma$ ).
- 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
1.0	2021-09-21	Applications Features
1.1	2022-03-31	New Layout

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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。

**Published by ams-OSRAM AG**

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