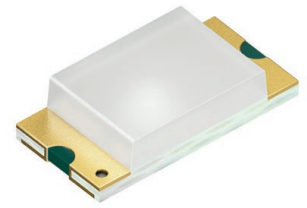


# LG Q396

## CHIPLED® 0603



### Applications

- Electronic Equipment
- Gaming, Amusement, Gambling
- White Goods

### Features:

- Package: SMT package 0603, colorless diffused resin
- Chip technology: InGaAlP
- Typ. Radiation: 150° (horizontal), 120° (vertical)
- Color:  $\lambda_{\text{dom}} = 573 \text{ nm}$  (● green)
- Corrosion Robustness Class: 3B
- ESD: 1 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM)

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## Ordering Information

Type	Luminous Intensity <sup>1)</sup> $I_F = 20 \text{ mA}$ $I_v$	Ordering Code
LG Q396-PS-35	45 ... 280 mcd	Q65111A3964

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## Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	$T_{op}$	min. max.	-30 °C 85 °C
Storage Temperature	$T_{stg}$	min. max.	-40 °C 85 °C
Junction Temperature	$T_j$	max.	95 °C
Forward current $T_A = 25\text{ °C}$	$I_F$	min. max.	1 mA 30 mA
Surge Current $t \leq 10\ \mu\text{s}$ ; $D = 0.005$ ; $T_A = 25\text{ °C}$	$I_{FS}$	max.	100 mA
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM)	$V_{ESD}$		1 kV
Reverse voltage <sup>2)</sup>	$V_R$		Not designed for reverse operation

## Characteristics

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

Parameter	Symbol	Values
Dominant Wavelength <sup>3)</sup>	$\lambda_{\text{dom}}$	min. 569 nm typ. 573 nm max. 578 nm
Viewing angle at 50 % $I_V$ values for 0°, 90°	$2\phi$	typ. 150 ° typ. 120 °
Forward Voltage <sup>4)</sup> $I_F = 20 \text{ mA}$	$V_F$	min. 1.60 V max. 2.40 V
Reverse current <sup>2)</sup>	$I_R$	Not designed for reverse operation
Real thermal resistance junction/ambient <sup>5), 6)</sup>	$R_{\text{thJA real}}$	max. 630 K / W
Real thermal resistance junction/solderpoint <sup>5)</sup>	$R_{\text{thJS real}}$	max. 380 K / W

## Brightness Groups

Group	Luminous Intensity <sup>1)</sup> I <sub>F</sub> = 20 mA min. I <sub>v</sub>	Luminous Intensity. <sup>1)</sup> I <sub>F</sub> = 20 mA max. I <sub>v</sub>	Luminous Flux <sup>7)</sup> I <sub>F</sub> = 20 mA typ. Φ <sub>v</sub>
P	45 mcd	71 mcd	200 mlm
Q	71 mcd	112 mcd	310 mlm
R	112 mcd	180 mcd	500 mlm
S	180 mcd	280 mcd	780 mlm

## Wavelength Groups

Group	Dominant Wavelength <sup>3)</sup> min. λ <sub>dom</sub>	Dominant Wavelength <sup>3)</sup> max. λ <sub>dom</sub>
3	569 nm	572 nm
4	572 nm	575 nm
5	575 nm	578 nm

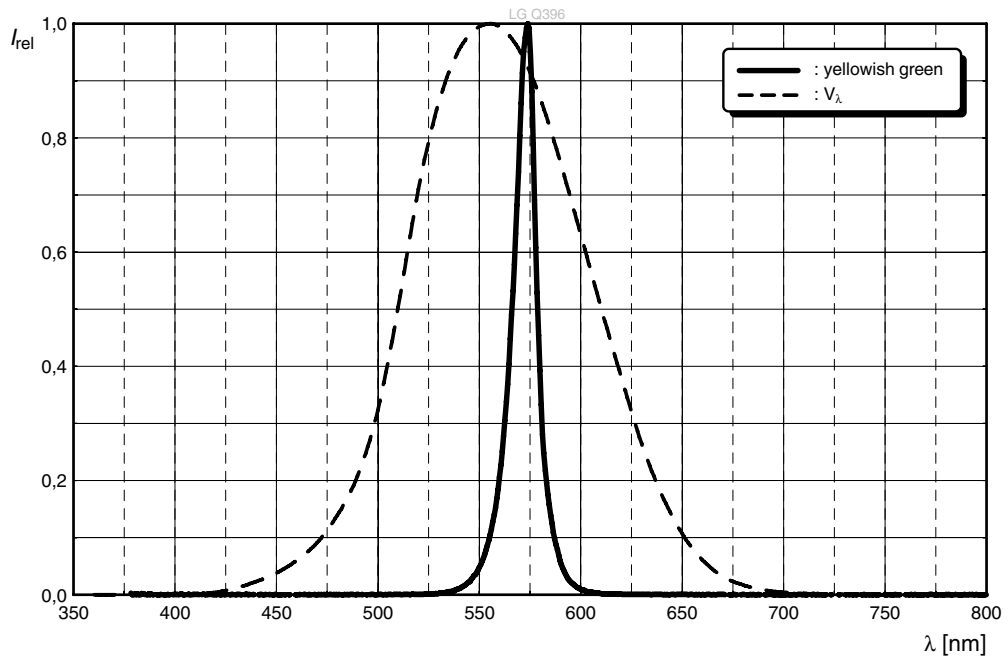
## Group Name on Label

### Example: P-3

Brightness	Wavelength
P	3

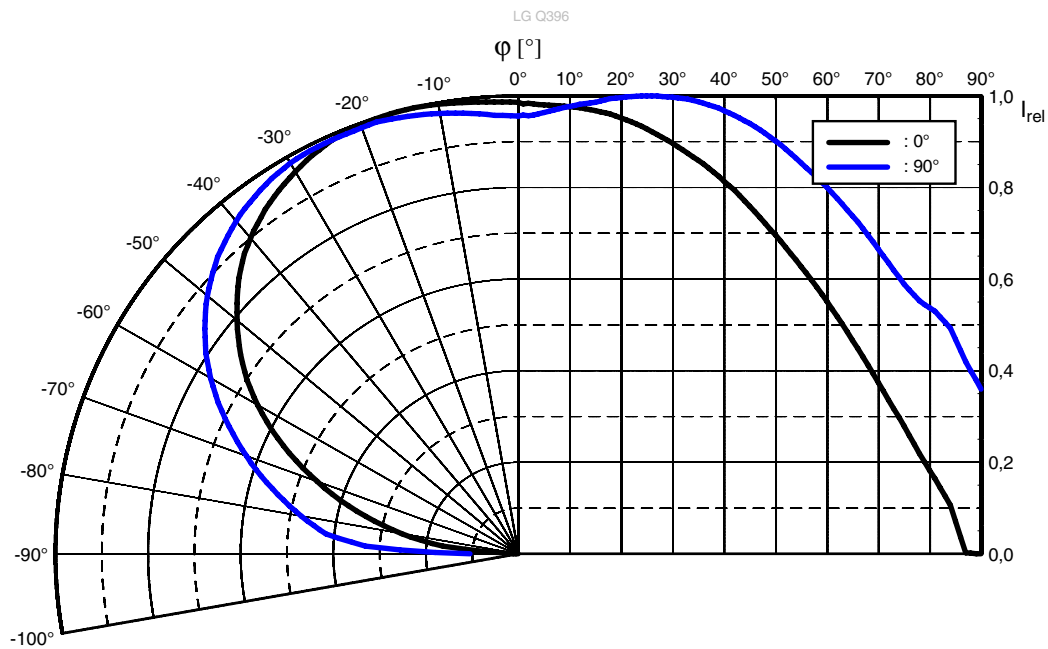
### Relative Spectral Emission <sup>7)</sup>

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



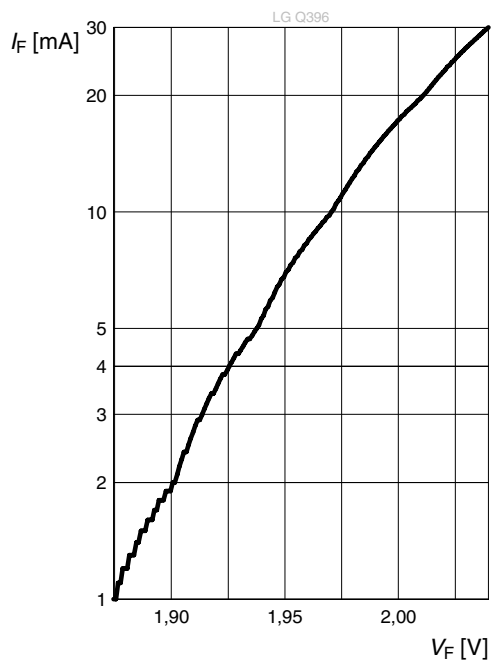
### Radiation Characteristics <sup>7)</sup>

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



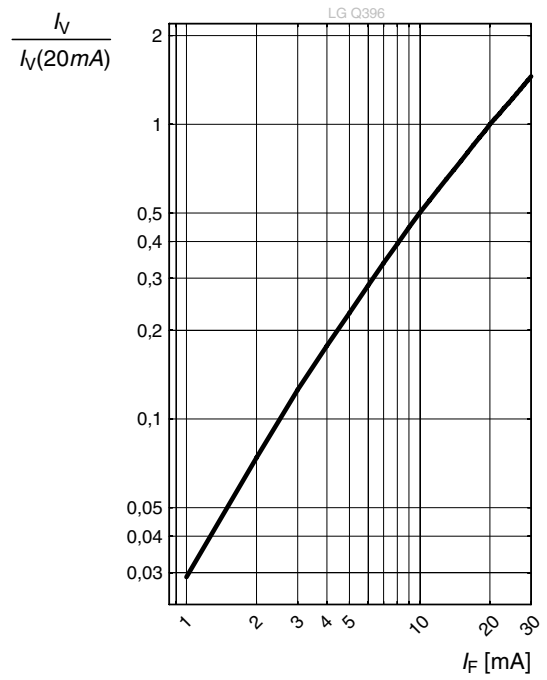
**Forward current** 7), 8)

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



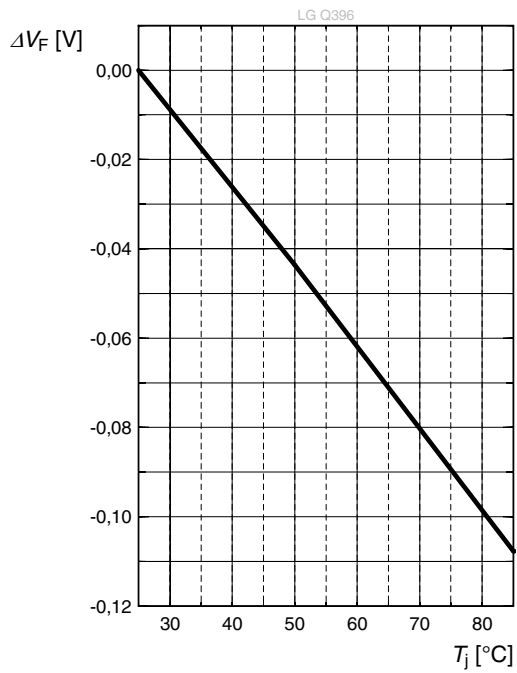
**Relative Luminous Intensity** 7), 8)

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



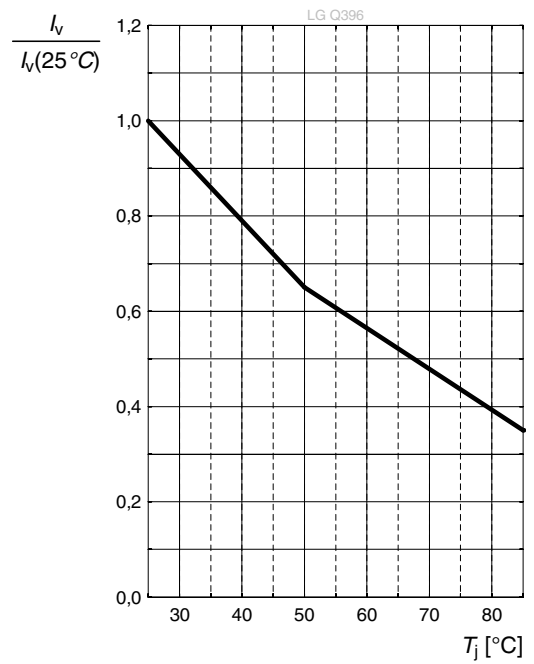
### Forward Voltage <sup>7)</sup>

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



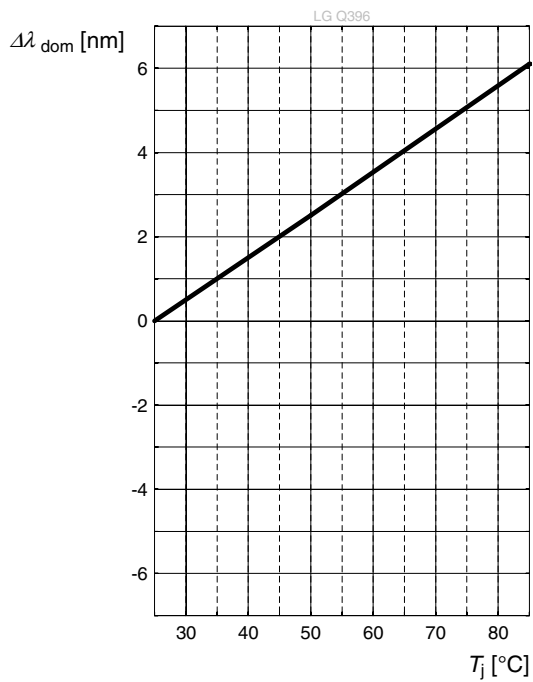
### Relative Luminous Intensity <sup>7)</sup>

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



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

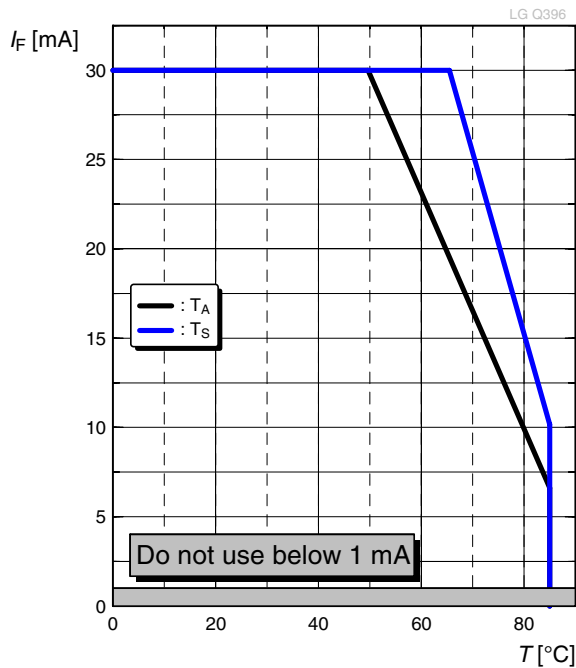
$$\Delta \lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25\text{ °C}) = f(T_j); I_F = 20\text{ mA}$$





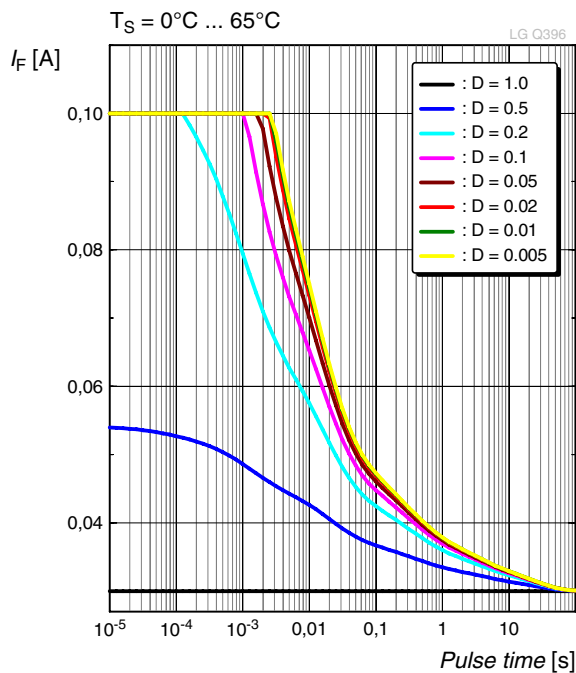
### Max. Permissible Forward Current

$$I_F = f(T)$$



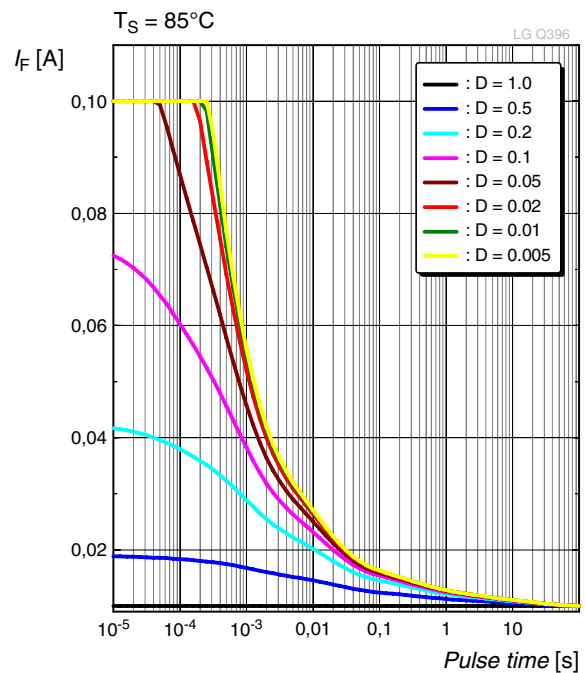
### Permissible Pulse Handling Capability

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

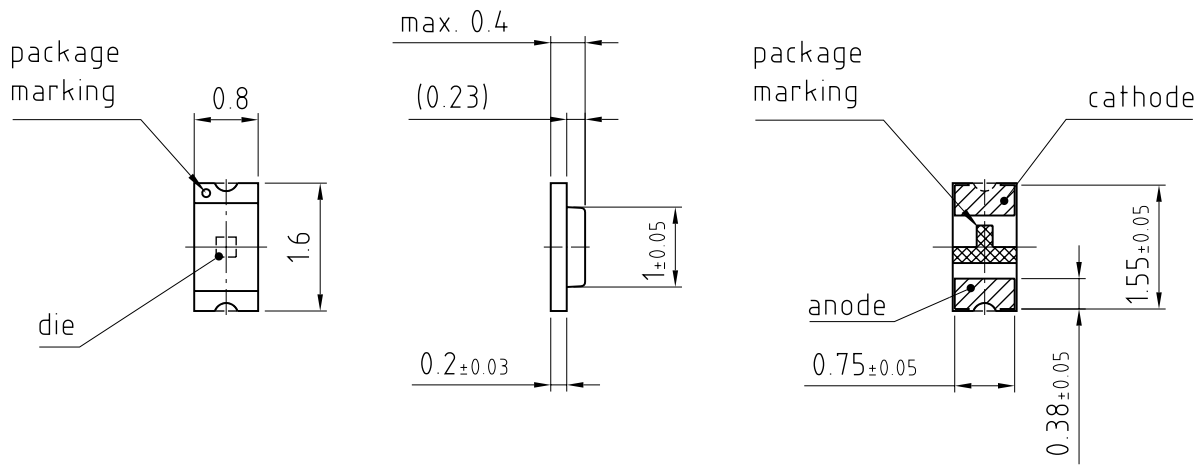


### Permissible Pulse Handling Capability

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



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



general tolerance  $\pm 0.1$   
 lead finish Ag 

C63062-A4179-A1..-04

**Approximate Weight:** 1.3 mg

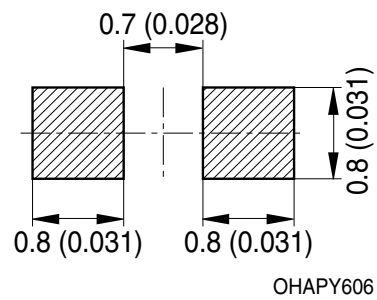
**Corrosion test:** Class: 3B  
 Test condition: 40°C / 90 % RH / 15 ppm H<sub>2</sub>S / 14 days (stricter than IEC 60068-2-43)

## Electrical internal circuit

### Polarity



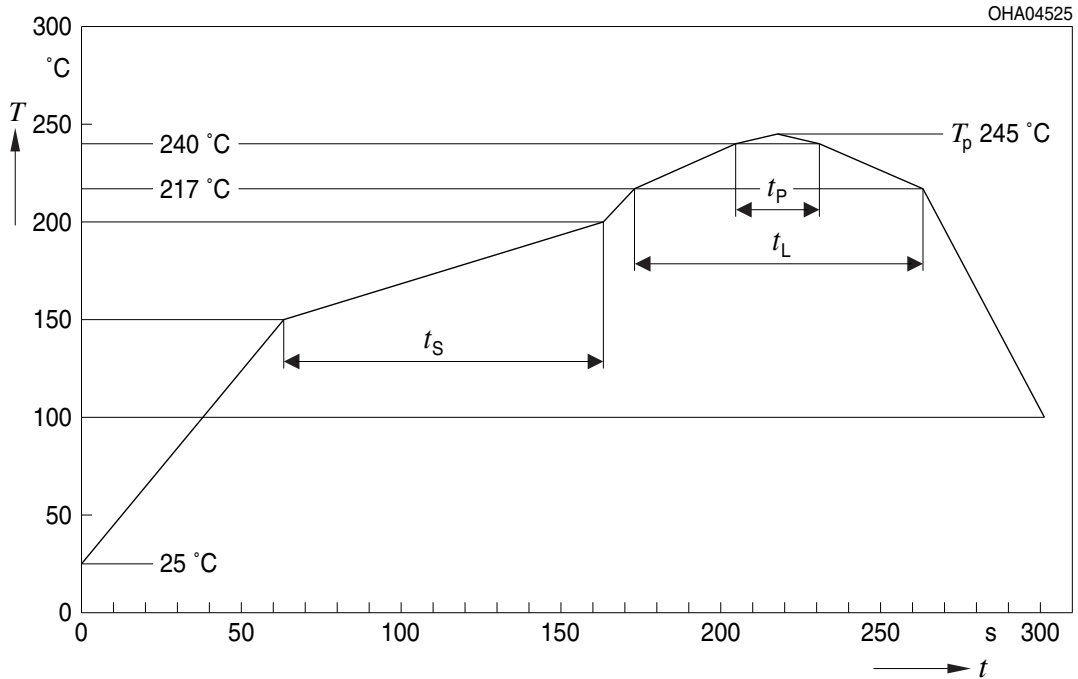
## Recommended Solder Pad <sup>9)</sup>



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

## Reflow Soldering Profile

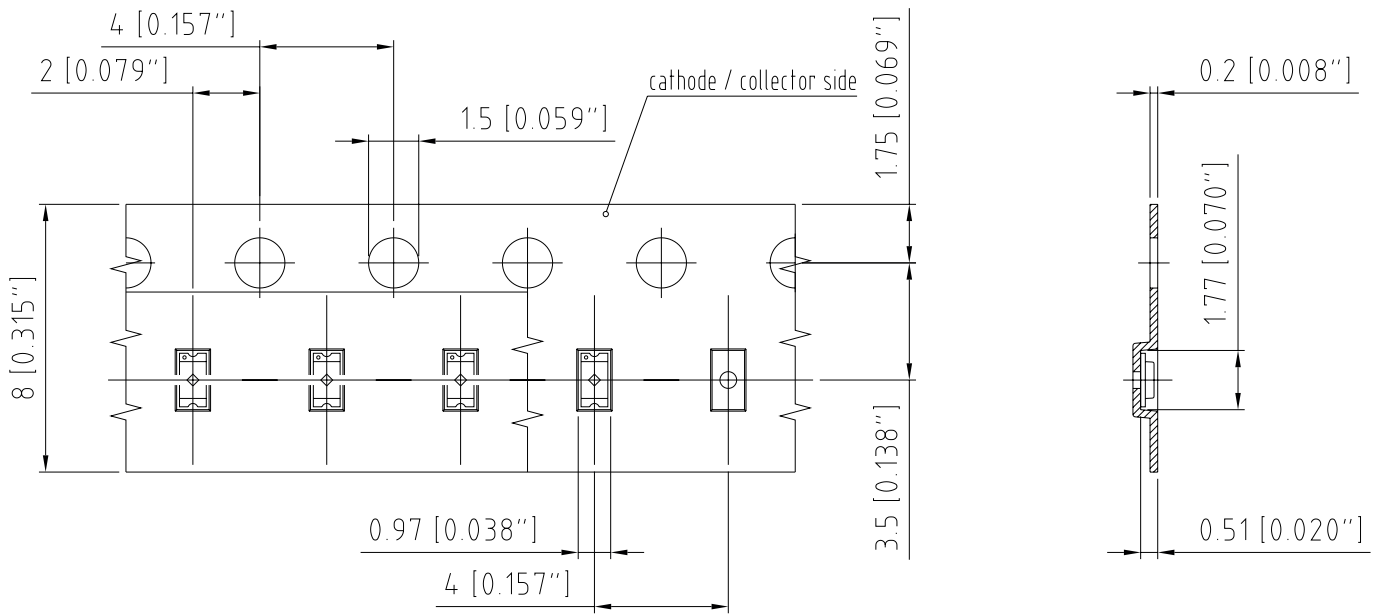
Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



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

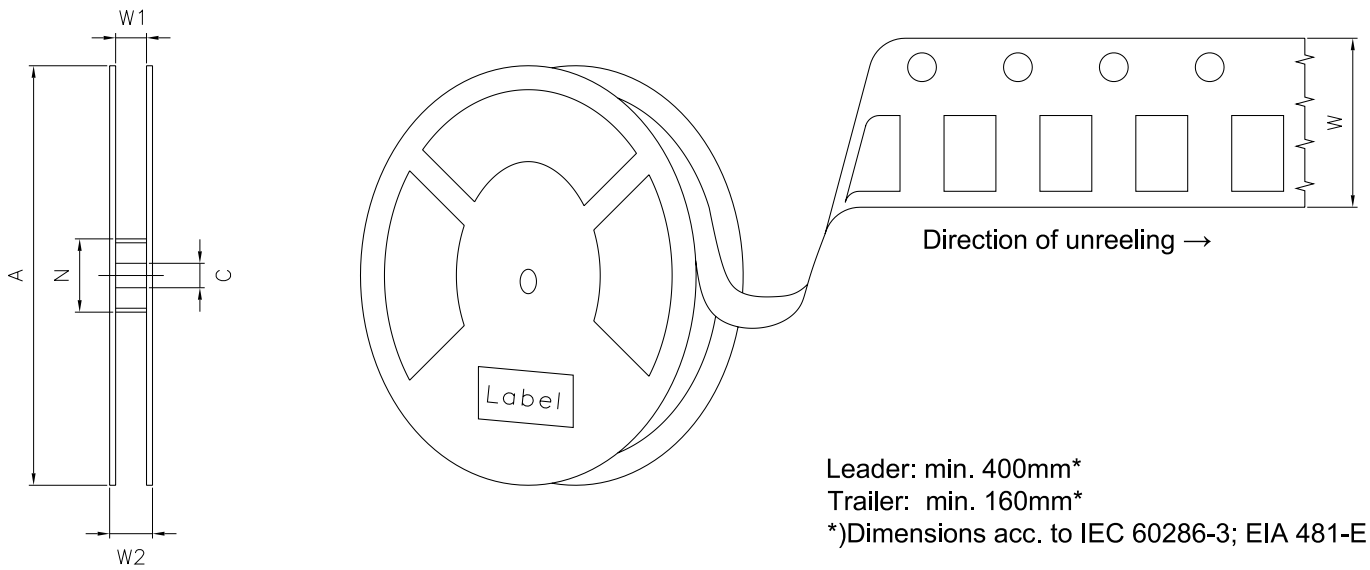
All temperatures refer to the center of the package, measured on the top of the component  
 \*) slope calculation  $DT/Dt$ :  $Dt$  max. 5 s; fulfillment for the whole T-range

Taping <sup>9)</sup>



C63062-A4006-B1-03

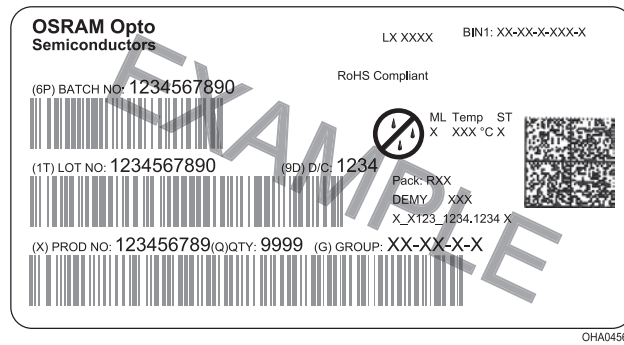
**Tape and Reel** <sup>10)</sup>



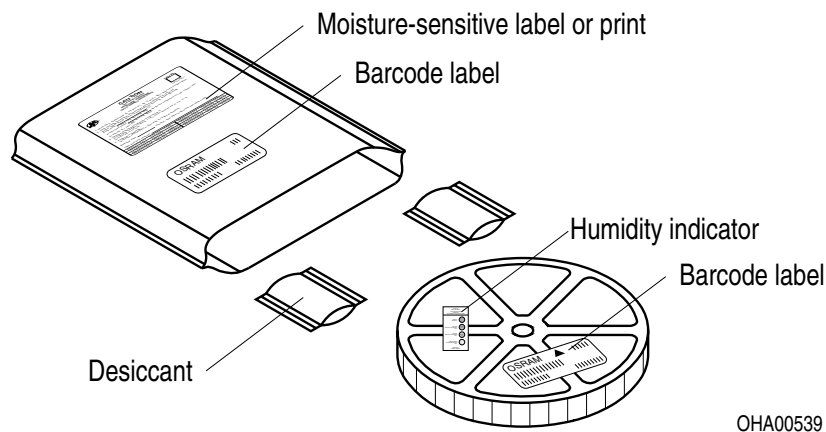
**Reel dimensions [mm]**

A	W	N <sub>min</sub>	W <sub>1</sub>	W <sub>2max</sub>	Pieces per PU
180 mm	8 + 0.3 / - 0.1	60	8.4 + 2	14.4	4000

## Barcode-Product-Label (BPL)



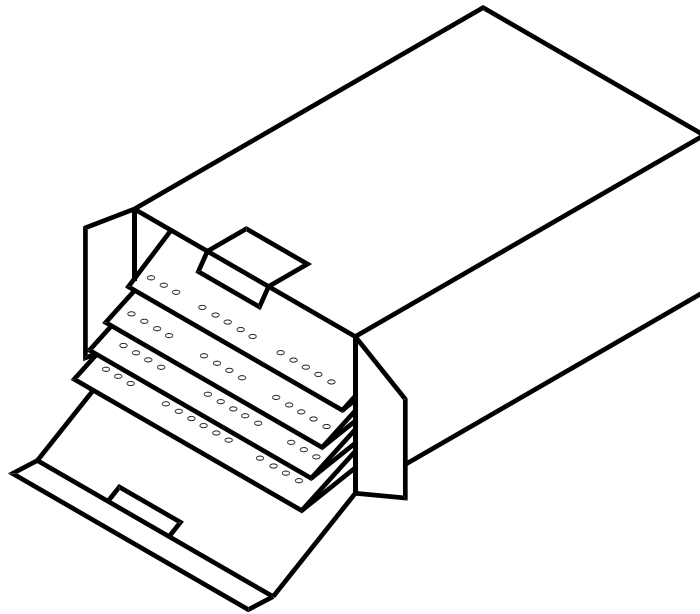
## Dry Packing Process and Materials <sup>9)</sup>



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

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## Transportation Packing and Materials <sup>9)</sup>



C63062-A3437-X121-01

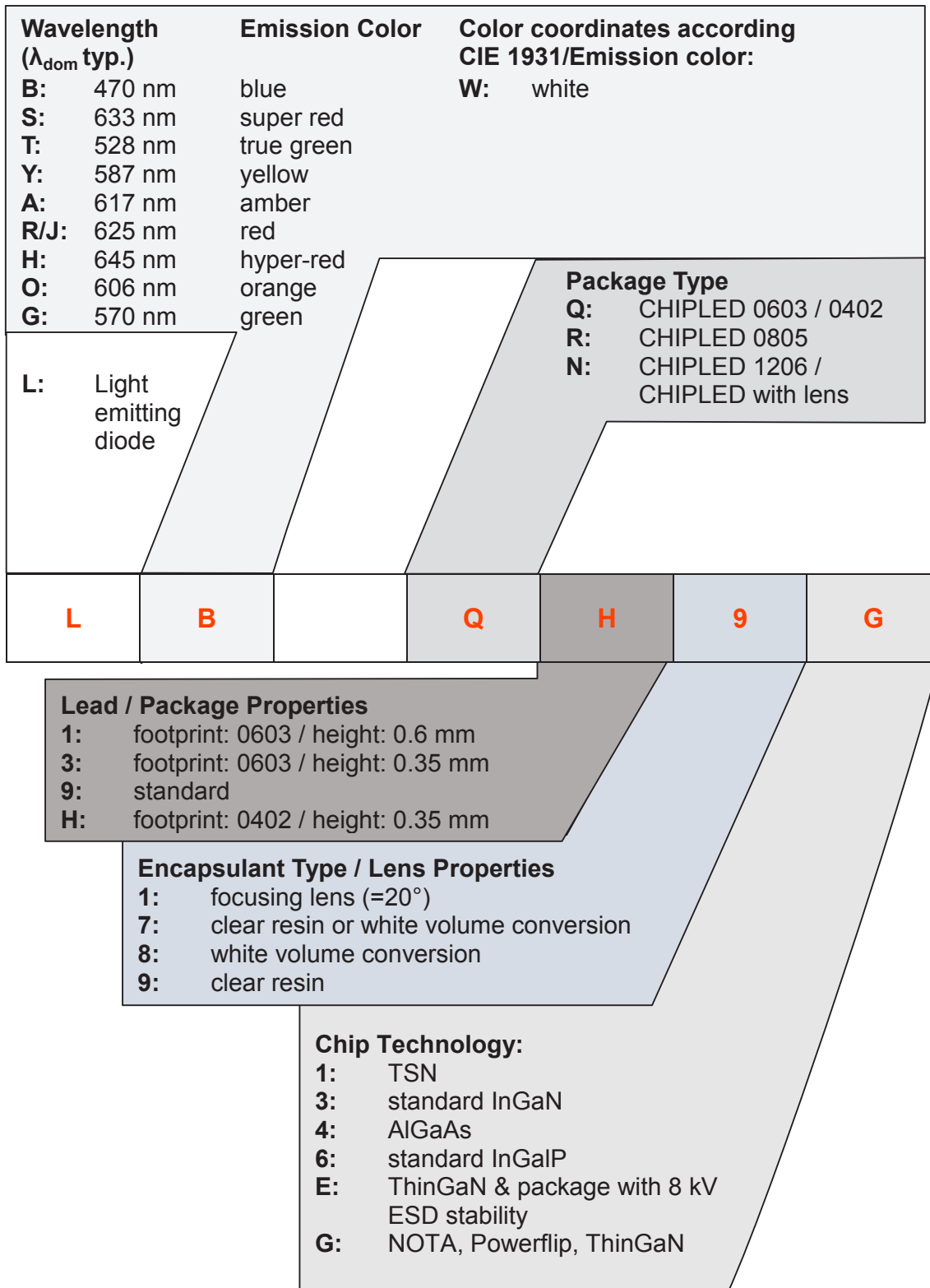
### Dimensions of transportation box in mm

Width	Length	Height
260 ± 5 mm	230 ± 5 mm	85 ± 5 mm

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## 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 fall into the class **exempt group (exposure time 10000 s)**. Under real circumstances (for exposure time, 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. As is also true when viewing other 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.

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## Glossary

- 1) **Brightness:** Brightness groups are tested at a current pulse duration of 25 ms and a tolerance of  $\pm 11\%$ .
- 2) **Reverse Operation:** Not designed for reverse operation. Continuous reverse operation can cause migration and damage of the device.
- 3) **Wavelength:** Wavelengths are tested at a current pulse duration of 25 ms and a tolerance of  $\pm 1$  nm.
- 4) **Forward Voltage:** Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.1$  V.
- 5) **Thermal Resistance:**  $R_{th\ max}$  is based on statistic values ( $6\sigma$ ).
- 6) **Thermal Resistance:**  $R_{thJA}$  results from mounting on PC board FR 4 (pad size  $\geq 5$  mm<sup>2</sup> per pad)
- 7) **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.
- 8) **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.
- 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.

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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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