

# LSG T676

## Multi TOPLED®

Two chip LEDs for indicators that allow to display red, green and yellow by color mixing



## Applications

- Electronic Equipment

## Features:

- Package: white PLCC-4 package, colorless clear resin
- Chip technology: InGaAlP
- Typ. Radiation: 120° (Lambertian emitter)
- Color:  $\lambda_{\text{dom}} = 633 \text{ nm}$  (● super red);  $\lambda_{\text{dom}} = 570 \text{ nm}$  (● green)
- Optical efficacy: 7 lm/W; 5 lm/W
- Corrosion Robustness Class: 3B
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)

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## Ordering Information

Type	Brightness <sup>1)</sup>	Ordering Code
LSG T676-P7R-1-0+N7P9-24		Q65111A1615
• super red	• $I_v = 56 \dots 180 \text{ mcd}$ ( $I_F = 20 \text{ mA}$ )	
• green	• $I_v = 36 \dots 100 \text{ mcd}$ ( $I_F = 20 \text{ mA}$ )	

## Maximum Ratings

Parameter	Symbol		Values	Values
			● super red	● green
Operating Temperature	$T_{op}$	min.	-40 °C	-40 °C
		max.	100 °C	100 °C
Storage Temperature	$T_{stg}$	min.	-40 °C	-40 °C
		max.	100 °C	100 °C
Junction Temperature	$T_j$	max.	125 °C	125 °C
Forward Current $T_A = 25\text{ °C}$	$I_F$	max.	30 mA	30 mA
Surge Current $t \leq 10\ \mu\text{s}; D = 0.005; T_A = 25\text{ °C}$	$I_{FS}$	max.	1 A	0.5 A
Reverse voltage <sup>2)</sup> $T_A = 25\text{ °C}$	$V_R$	max.	12 V	12 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	$V_{ESD}$		2 kV	2 kV

## Characteristics

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

Parameter	Symbol		Values	
			● super red	● green
Peak Wavelength	$\lambda_{\text{peak}}$	typ.	645 nm	572 nm
Dominant Wavelength <sup>3)</sup>	$\lambda_{\text{dom}}$	min.	627 nm	566 nm
		typ.	633 nm	570 nm
		max.	639 nm	575 nm
Spectral bandwidth at 50% $I_{\text{rel,max}}$	$\Delta\lambda$	typ.	16 nm	22 nm
Viewing angle at 50 % $I_V$	$2\varphi$	typ.	120 °	120 °
Forward Voltage <sup>4)</sup> $I_F = 20 \text{ mA}$	$V_F$	min.	1.80 V	1.80 V
		typ.	2.00 V	2.00 V
		max.	2.30 V	2.40 V
Reverse current <sup>2)</sup> $V_R = 12 \text{ V}$	$I_R$	max.	10 $\mu\text{A}$	10 $\mu\text{A}$
Temperature Coefficient of Peak Wavelength	$TC_{\lambda_{\text{peak}}}$	typ.	0.14 nm / K	0.12 nm / K
Temperature Coefficient of Dominant Wavelength	$TC_{\lambda_{\text{dom}}}$	typ.	0.05 nm / K	0.10 nm / K
Temperature Coefficient of Forward Voltage	$TC_{V_F}$	typ.	-2.0 mV / K	-2.5 mV / K
Real thermal resistance junction/ambient <sup>5)6)</sup> 1 chip on	$R_{\text{thJA real}}$	max.	580 K / W	580 K / W
Real thermal resistance junction/solderpoint <sup>5)</sup> 1 chip on	$R_{\text{thJS real}}$	max.	340 K / W	340 K / W

## Brightness Groups

Color of emission	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>	
● super red	P7	56 mcd	90 mcd	220 mlm
● super red	P9	63 mcd	100 mcd	240 mlm
● super red	Q	71 mcd	112 mcd	270 mlm
● super red	Q5	80 mcd	125 mcd	310 mlm
● super red	Q7	90 mcd	140 mcd	350 mlm
● super red	Q9	100 mcd	159 mcd	390 mlm
● super red	R	112 mcd	180 mcd	440 mlm
● green	N7	36 mcd	56 mcd	140 mlm
● green	N9	40 mcd	63 mcd	150 mlm
● green	P	45 mcd	71 mcd	170 mlm
● green	P5	50 mcd	80 mcd	200 mlm
● green	P7	56 mcd	90 mcd	220 mlm
● green	P9	63 mcd	100 mcd	240 mlm

## Wavelength Groups

- super red

Group	Dominant Wavelength <sup>3)</sup> min. λ <sub>dom</sub>	Dominant Wavelength <sup>3)</sup> max. λ <sub>dom</sub>
1	627 nm	639 nm

## Wavelength Groups

- green

Group	Dominant Wavelength <sup>3)</sup> min. λ <sub>dom</sub>	Dominant Wavelength <sup>3)</sup> max. λ <sub>dom</sub>
2	566 nm	569 nm
3	569 nm	572 nm
4	572 nm	575 nm

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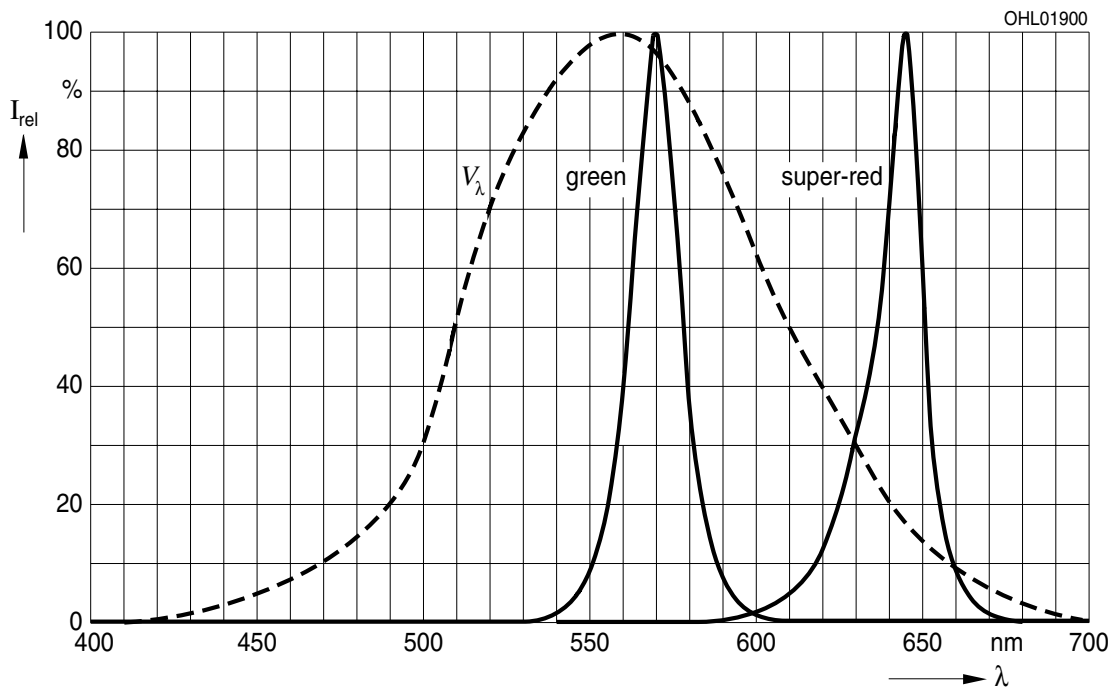
## Group Name on Label

Example: P7-1+N7-2

Color	Brightness	Wavelength
● super red	P7	1
● green	N7	2

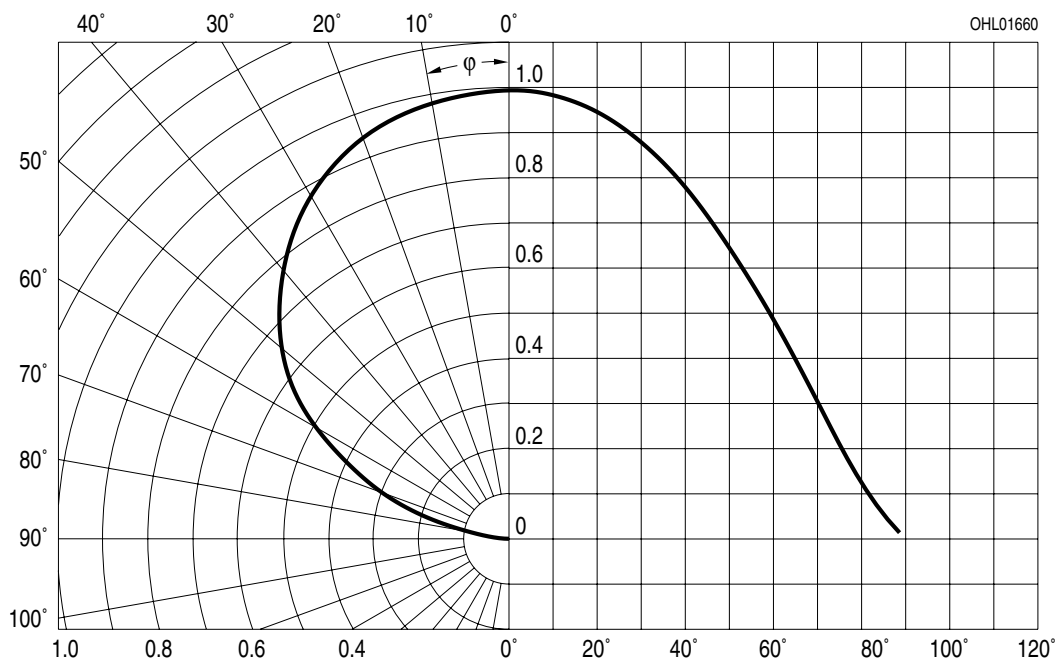
### Relative Spectral Emission <sup>7)</sup>

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



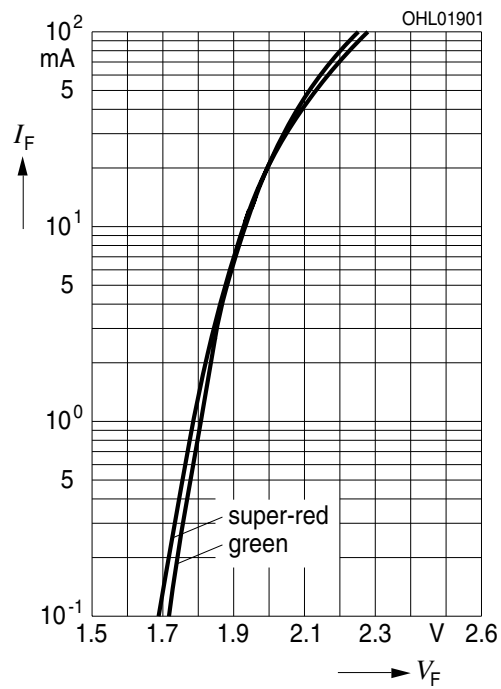
### Radiation Characteristics <sup>7)</sup>

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



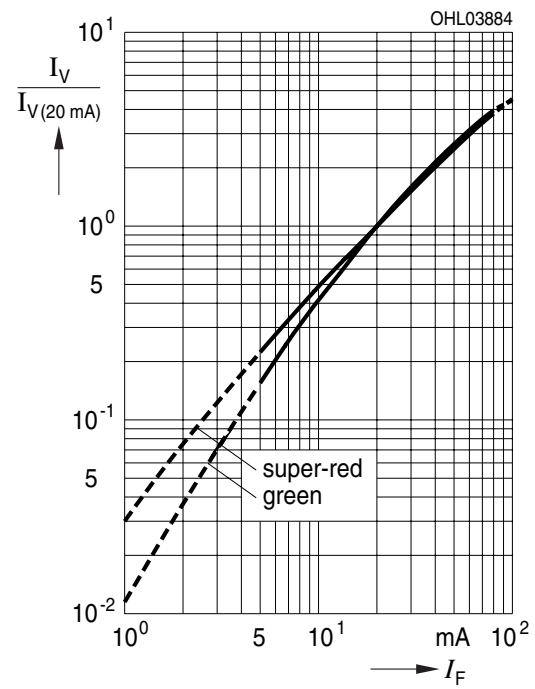
**Forward current** 7), 8)

$I_F = f(V_F); T_A = 25\text{ °C}$



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

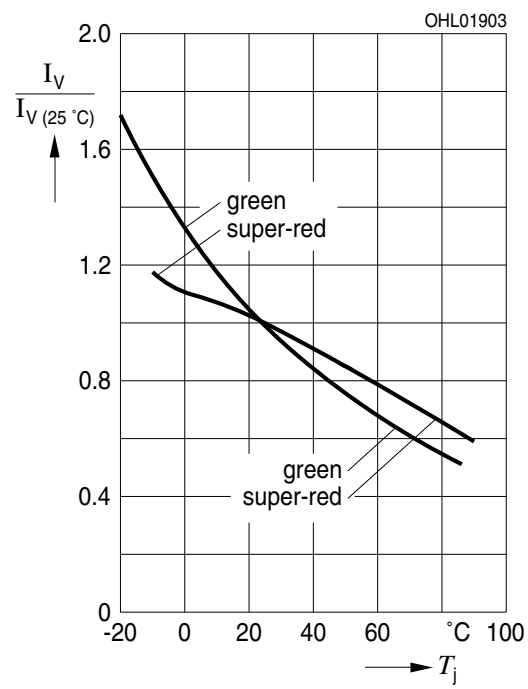
$I_V/I_{V(20\text{ mA})} = f(I_F); T_A = 25\text{ °C}$





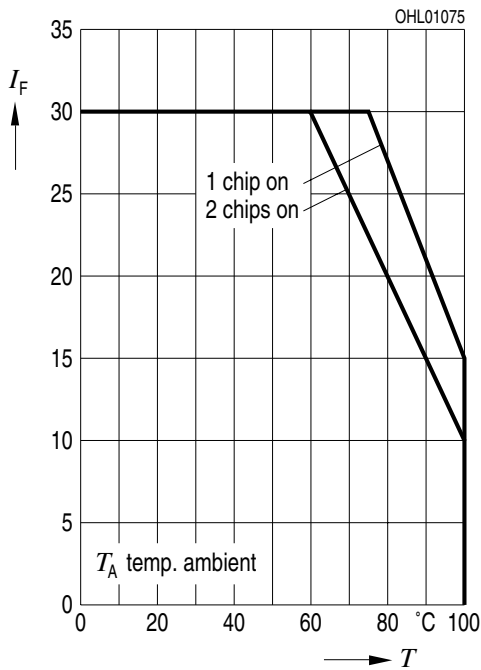
## Relative Luminous Intensity <sup>7)</sup>

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



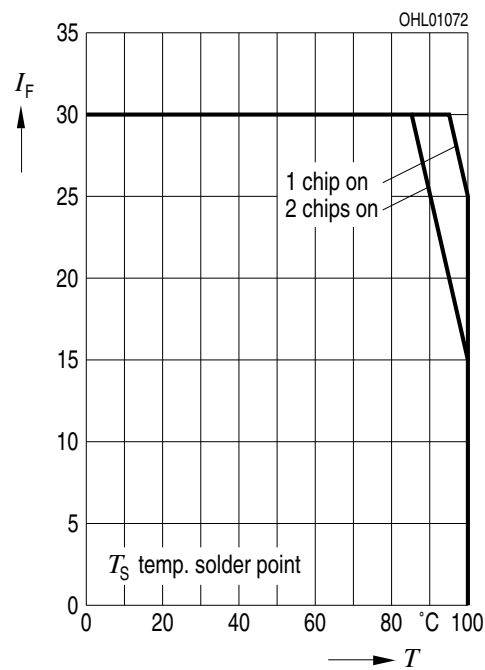
### Max. Permissible Forward Current

$I_F = f(T)$



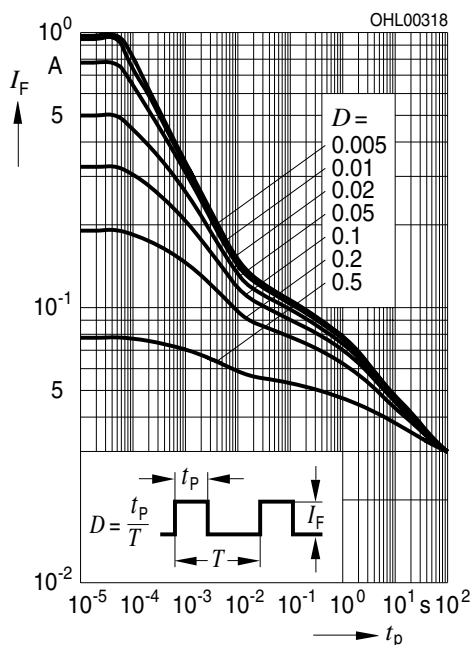
### Max. Permissible Forward Current

$I_F = f(T)$

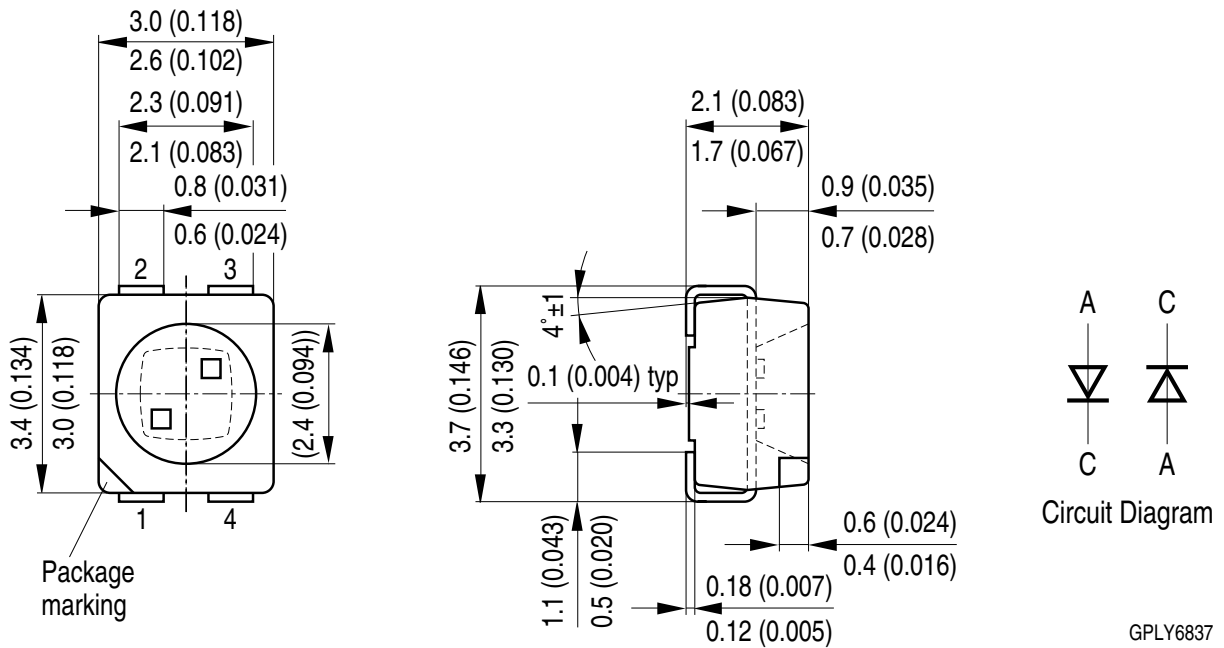


### Permissible Pulse Handling Capability

$I_F = f(t_p)$ ; D: Duty cycle;  $T_A = 25\text{ °C}$  (Super red)



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



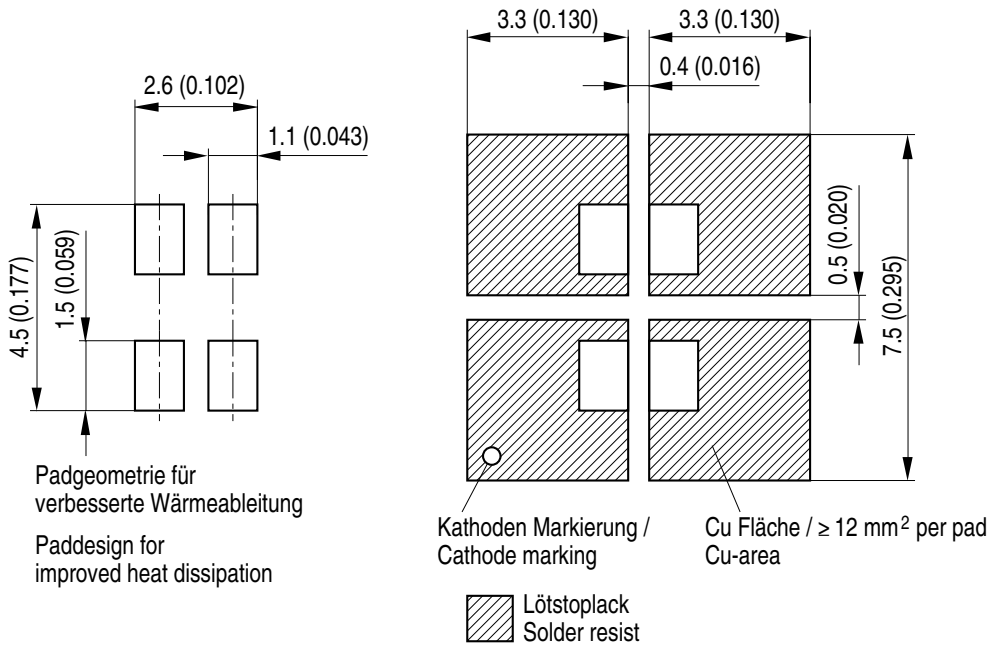
GPLY6837

**Approximate Weight:** 31.0 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)

Pin	Description
Pin 1	Cathode super red
Pin 2	Anode super red
Pin 3	Cathode green
Pin 4	Anode green

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



OHLPY439

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

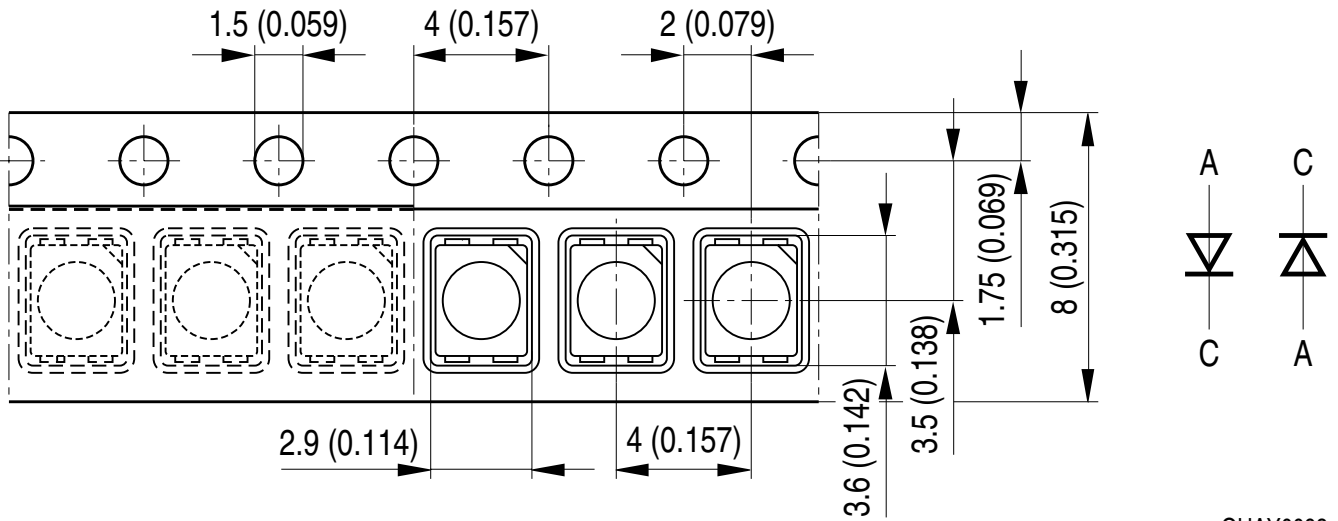


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat <sup>*)</sup> 25 °C to 150 °C			2	3	K/s
Time $t_s$ $T_{Smin}$ to $T_{Smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak <sup>*)</sup> $T_{Smax}$ to $T_p$			2	3	K/s
Liquidus temperature	$T_L$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



OHAY0093

**Tape and Reel** <sup>10)</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
330 mm	8 + 0.3 / - 0.1	60	8.4 + 2	14.4	8000

### Barcode-Product-Label (BPL)

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

RoHS Compliant

(6P) BATCH NO: 1234567890

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

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

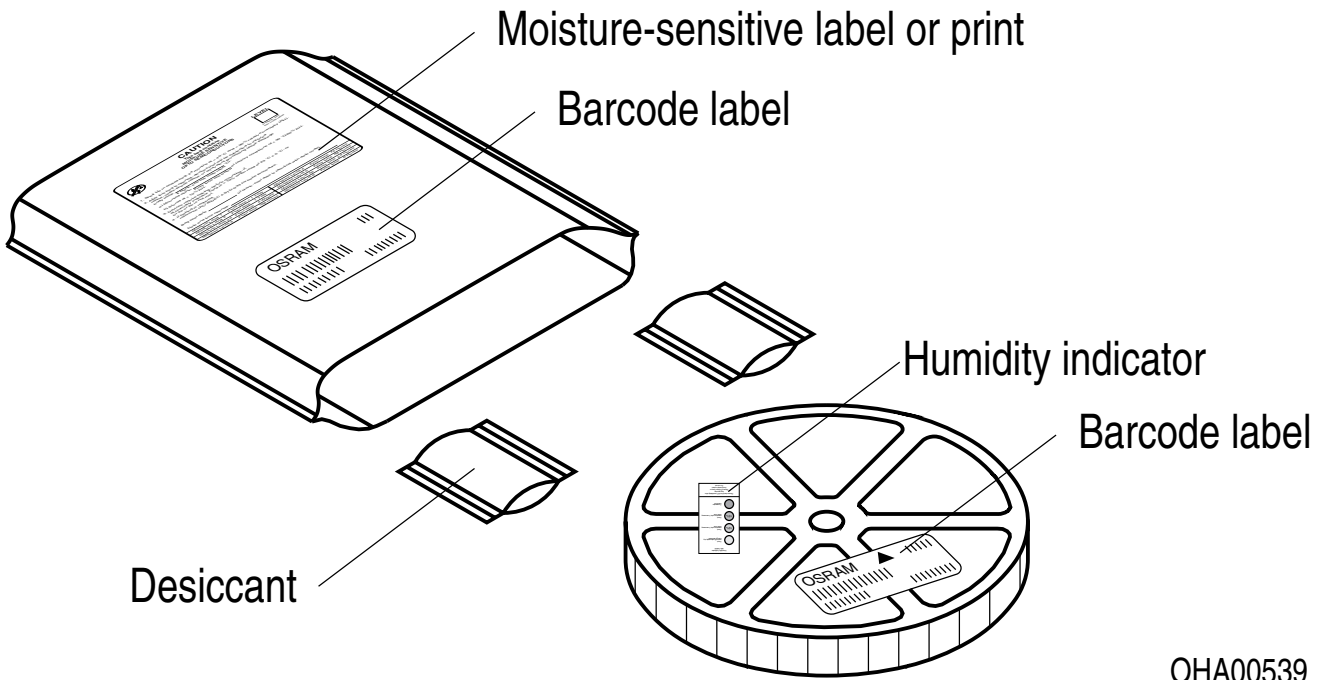
ML Temp ST  
X XXX °C X

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

The diagram shows a rectangular label with rounded corners. It contains the OSRAM logo and name, a part number 'LX XXXX', and a bin number 'BIN1: XX-XX-X-XXX-X'. It features three main barcode sections: a top one for batch number, a middle one for lot number and date code, and a bottom one for product number, quantity, and group. A 'RoHS Compliant' logo is present. A 'Moisture Sensitive Device' symbol (a circle with a diagonal line and three drops) is shown next to 'ML Temp ST X XXX °C X'. A QR code is located on the right side. A 'Pack: RXX', 'DEMY XXX', and 'X\_X123\_1234.1234 X' are listed at the bottom right. A large 'EXAMPLE' watermark is overlaid diagonally across the label.

OHA04563

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



OHA00539

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



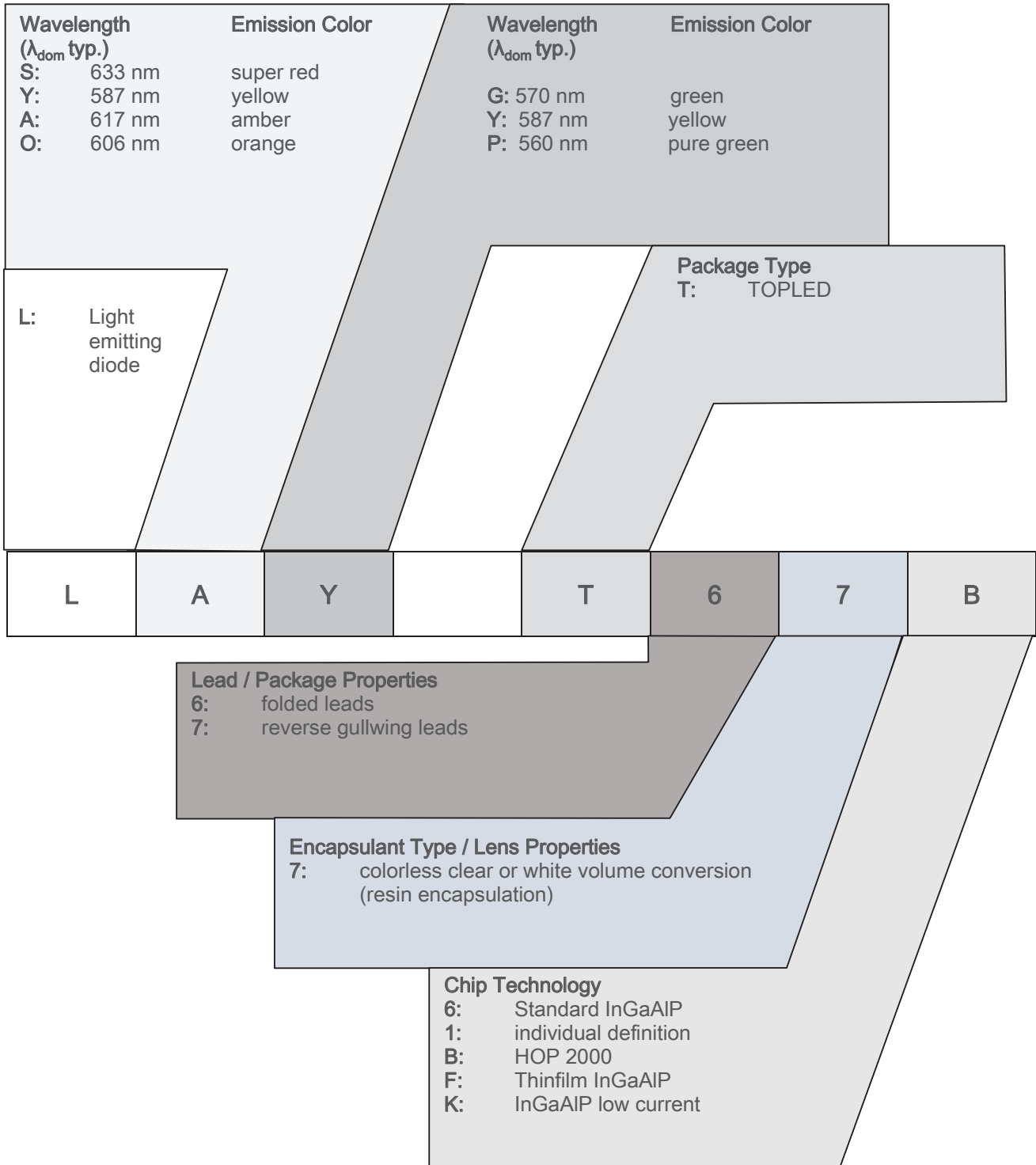
**Transportation Packing and Materials** <sup>9)</sup>



**Dimensions of transportation box in mm**

Width	Length	Height
200 ± 5 mm	195 ± 5 mm	30 ± 5 mm
352 ± 5 mm	352 ± 5 mm	33 ± 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 device 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 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 informations 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 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 groups are tested at a current pulse duration of 25 ms and a tolerance of  $\pm 11\%$ .
- 2) **Reverse Operation:** Reverse Operation of 10 hours is permissible in total. Continuous reverse operation is not allowed.
- 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 16 mm<sup>2</sup> 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.

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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。

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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