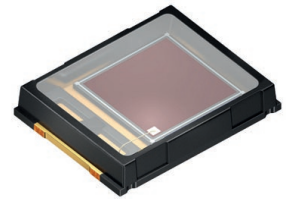


# SFH 2240

## TOPLED®

Silicon Photodiode with  $V_{\lambda}$  Characteristic



### Applications

- Electronic Equipment
- Health monitoring (Health rate, Blood, Oximetry, ...)

### Features:

- Package: clear silicone
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- Spectral sensitivity adapted to human eye sensitivity ( $V_{\lambda}$ )
- Low temperature coefficient of spectral sensitivity
- High linearity
- Fast switching time

### Ordering Information

Type	Photocurrent $E_v = 1000 \text{ lx; white LED; } V_R = 5 \text{ V}$ $I_p$	Photocurrent typ. $E_v = 1000 \text{ lx; white LED; } V_R = 5 \text{ V}$ $I_p$	Ordering Code
SFH 2240	$\geq 6.0 \mu\text{A}$	$7.3 \mu\text{A}$	Q65112A0060

## Maximum Ratings

 $T_A = 25\text{ °C}$ 

Parameter	Symbol		Values
Operating Temperature	$T_{op}$	min. max.	-40 °C 100 °C
Storage temperature	$T_{stg}$	min. max.	-40 °C 100 °C
Reverse voltage	$V_R$	max.	16 V
Total power dissipation	$P_{tot}$	max.	150 mW
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	$V_{ESD}$	max.	1.5 kV

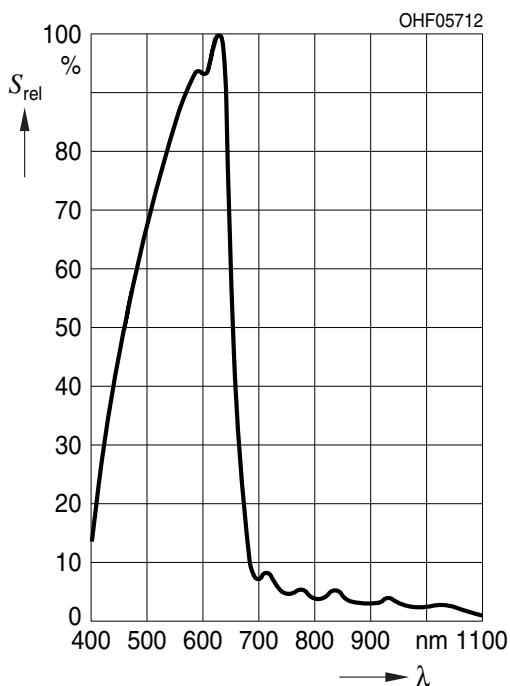
## Characteristics

$T_A = 25\text{ °C}$

Parameter	Symbol		Values
Spectral sensitivity $E_v = 1000\text{ lx}$ ; white LED; $V_R = 5\text{ V}$	S	min. typ.	6 nA/lx 7.3 nA/lx
Wavelength of max sensitivity	$\lambda_{S\text{ max}}$	typ.	620 nm
Spectral range of sensitivity	$\lambda_{10\%}$	typ.	400 ... 690 nm
Radiant sensitive area	A	typ.	7.02 mm <sup>2</sup>
Dimensions of active chip area	L x W	typ.	2.65 x 2.65 mm x mm
Half angle	$\varphi$	typ.	60 °
Dark current $V_R = 5\text{ V}$	$I_R$	typ. max.	1 nA 10 nA
Spectral sensitivity of the chip $\lambda = 550\text{ nm}$	$S_\lambda$	typ.	0.37 A / W
Quantum yield of the chip $\lambda = 550\text{ nm}$	$\eta$	typ.	0.83 Electrons / Photon
Short-circuit current $E_v = 1000\text{ lx}$ ; Std. Light A	$I_{SC}$	typ.	7.3 $\mu$ A
Rise time $V_R = 5\text{ V}$ ; $R_L = 50\ \Omega$ ; $\lambda = 550\text{ nm}$	$t_r$	typ.	0.09 $\mu$ s
Fall time $V_R = 5\text{ V}$ ; $R_L = 50\ \Omega$ ; $\lambda = 550\text{ nm}$	$t_f$	typ.	0.09 $\mu$ s
Forward voltage $I_F = 100\text{ mA}$ ; $E = 0$	$V_F$	typ.	1 V
Capacitance $V_R = 0\text{ V}$ ; $f = 1\text{ MHz}$ ; $E = 0$	$C_0$	typ.	135 pF
Temperature coefficient of short-circuit current Std. Light A	$TC_I$	typ.	0.16 % / K
Noise equivalent power $V_R = 5\text{ V}$ ; $\lambda = 550\text{ nm}$	NEP	typ.	0.048 pW / Hz <sup>1/2</sup>
Detection limit	$D^*$	typ.	5.5e12 cm x Hz <sup>1/2</sup> / W

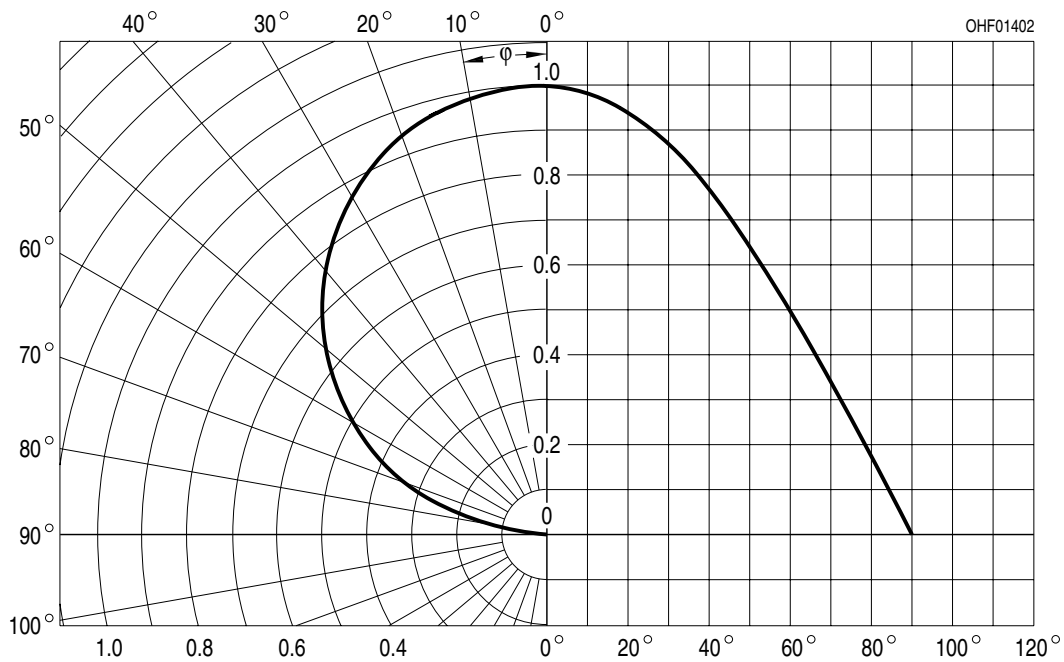
### Relative Spectral Sensitivity <sup>1), 2)</sup>

$$S_{rel} = f(\lambda)$$



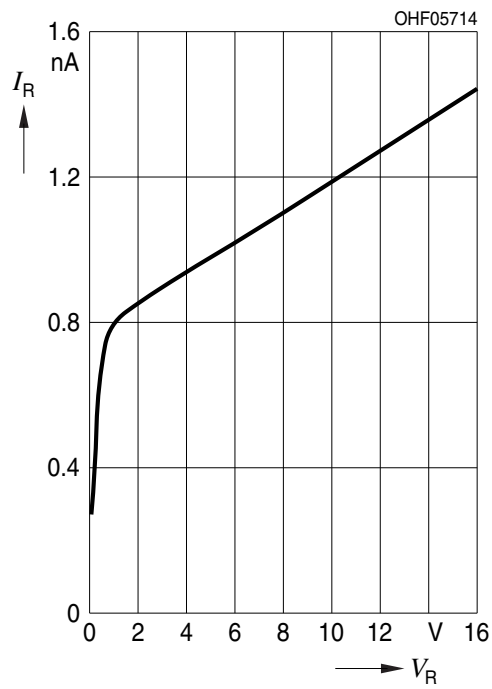
### Directional Characteristics <sup>1), 2)</sup>

$$S_{rel} = f(\varphi)$$



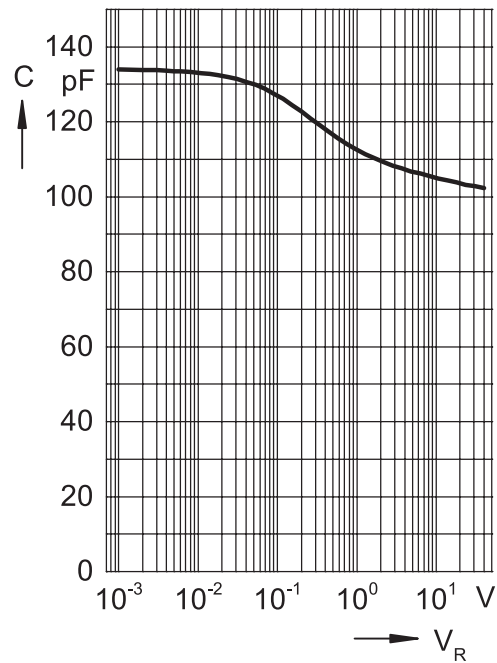
### Dark Current <sup>1), 2)</sup>

$$I_R = f(V_R); E = 0$$



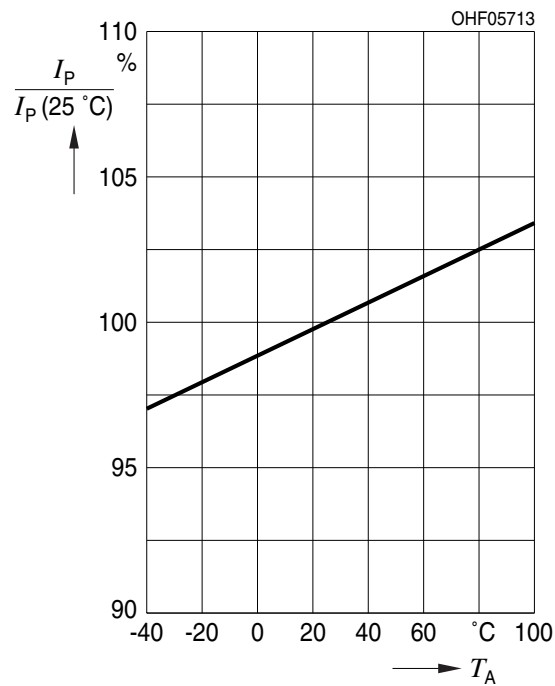
### Capacitance <sup>1), 2)</sup>

$$C = f(V_R); f = 1 \text{ MHz}; E = 0;$$



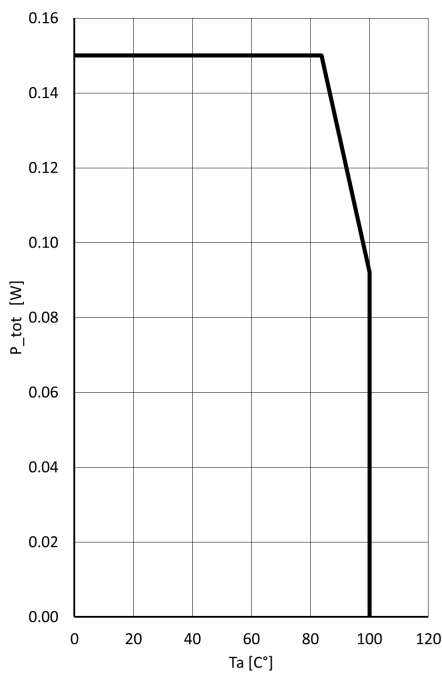
## Photocurrent

$$I_{P,rel} = f(T_A); E_V = 1000 \text{ lx}; V_R = 5 \text{ V}$$

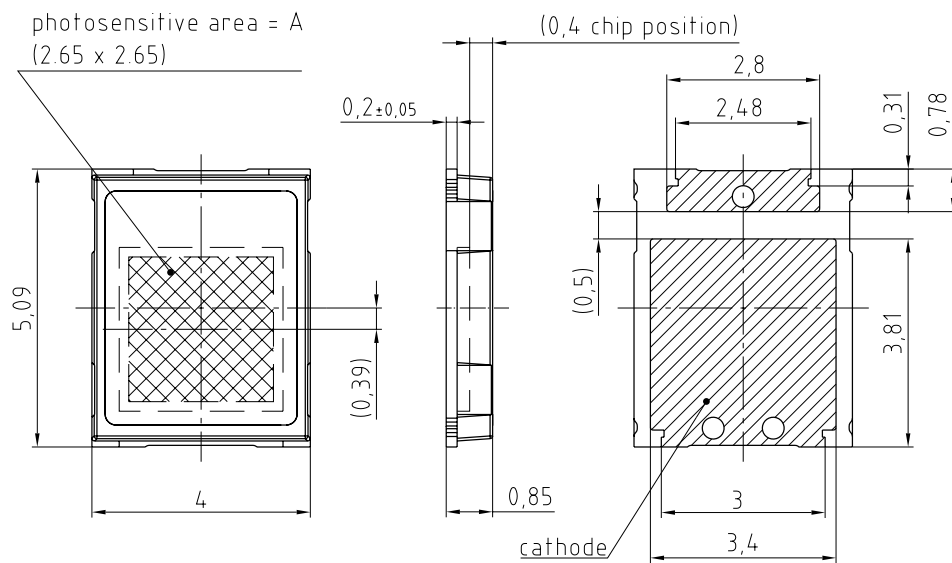


## Power Consumption

$$P_{tot} = f(T_A);$$



Dimensional Drawing <sup>3)</sup>

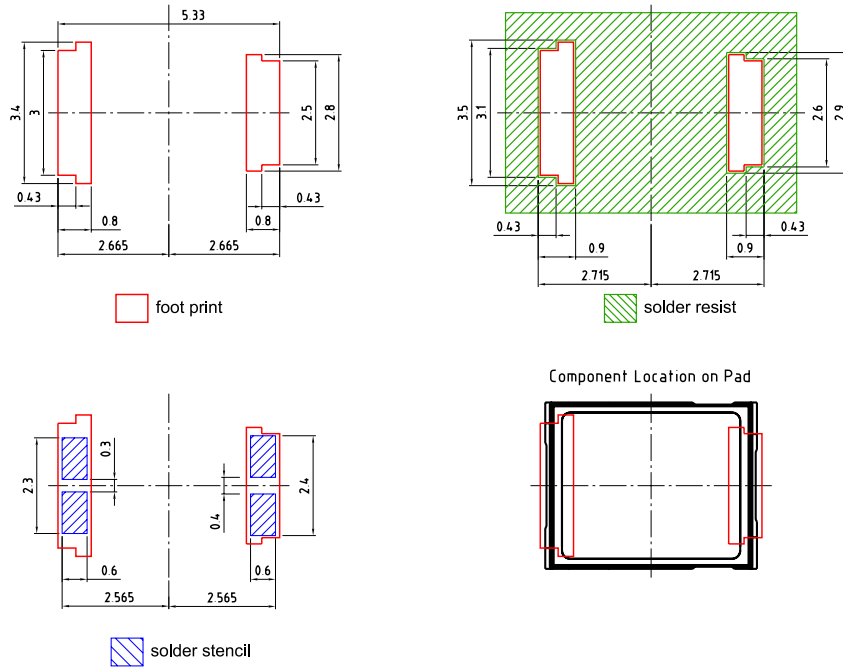


general tolerance  $\pm 0.1$   
 lead finish Au 

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**Approximate Weight:** 46.0 mg

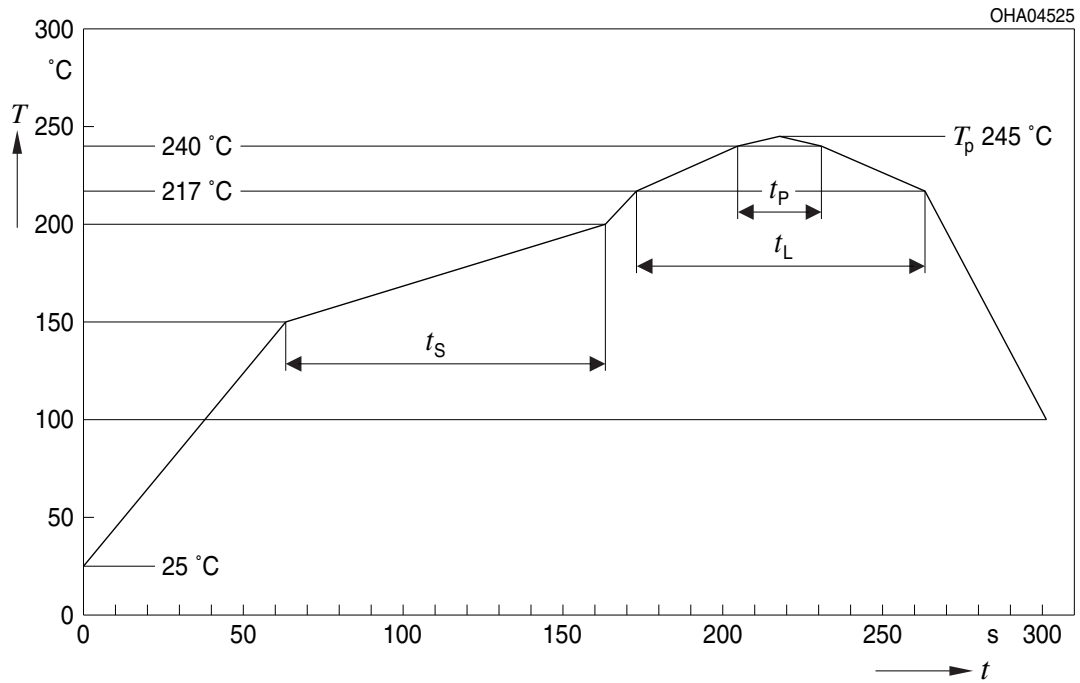
### Recommended Solder Pad <sup>3)</sup>



E062.3010.210-01

### Reflow Soldering Profile

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



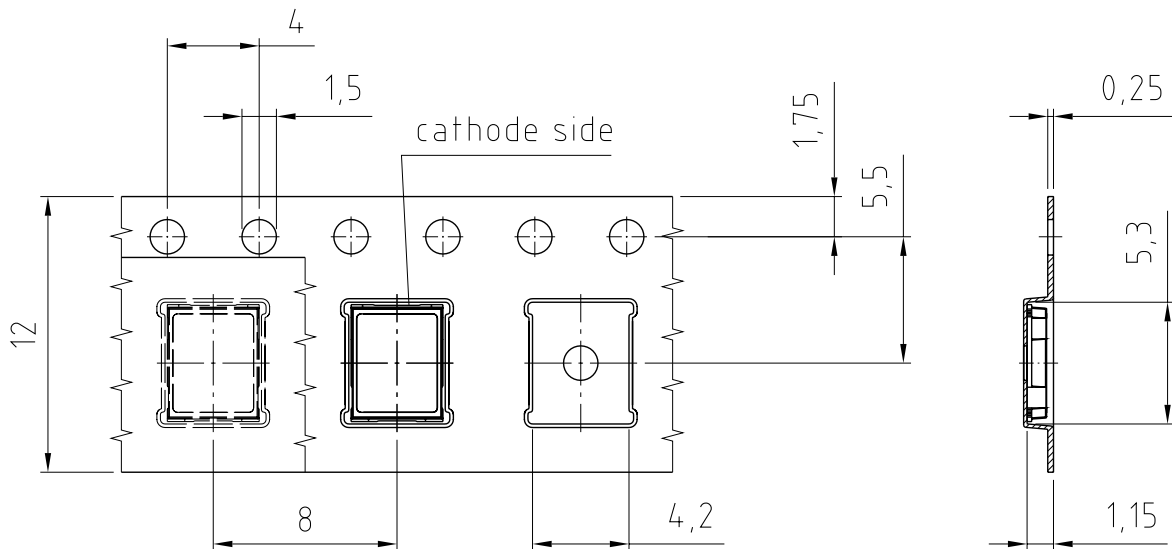


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat <sup>*)</sup> 25 °C to 150 °C			2	3	K/s
Time $t_s$ $T_{Smin}$ to $T_{Smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak <sup>*)</sup> $T_{Smax}$ to $T_p$			2	3	K/s
Liquidus temperature	$T_L$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

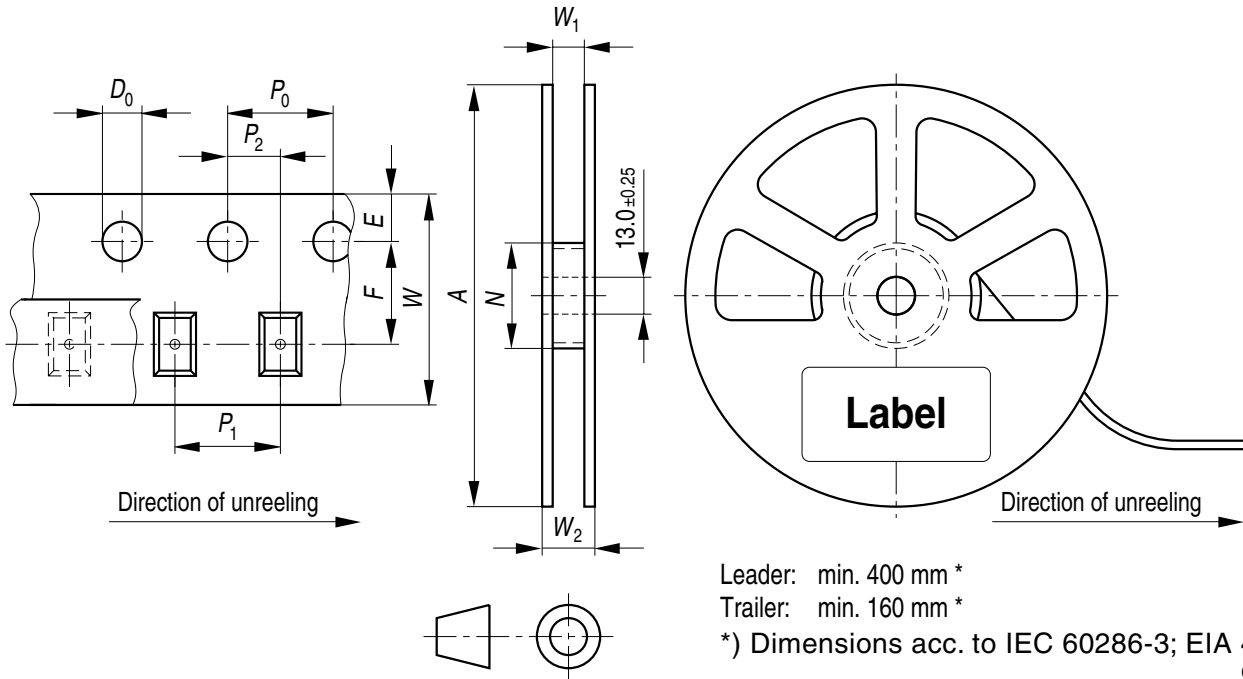
\* slope calculation  $DT/Dt$ :  $Dt$  max. 5 s; fulfillment for the whole T-range

**Taping** <sup>3)</sup>



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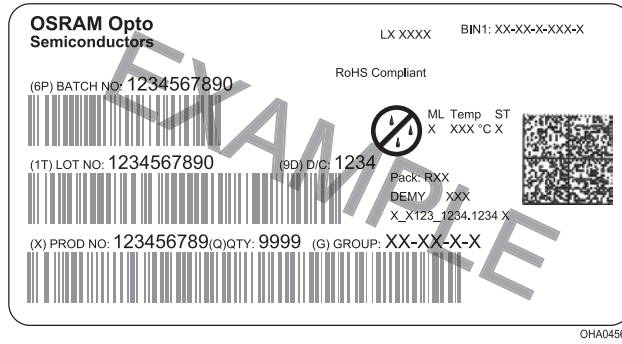
**Tape and Reel** <sup>4)</sup>



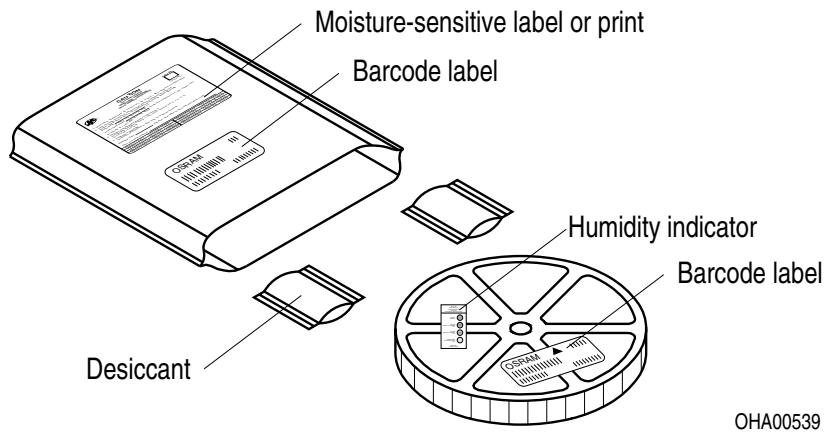
**Reel dimensions [mm]**

A	W	N <sub>min</sub>	W <sub>1</sub>	W <sub>2max</sub>	Pieces per PU
180 mm	12 + 0.3 / - 0.1	60	12.4 + 2	18.4	1500

## Barcode-Product-Label (BPL)

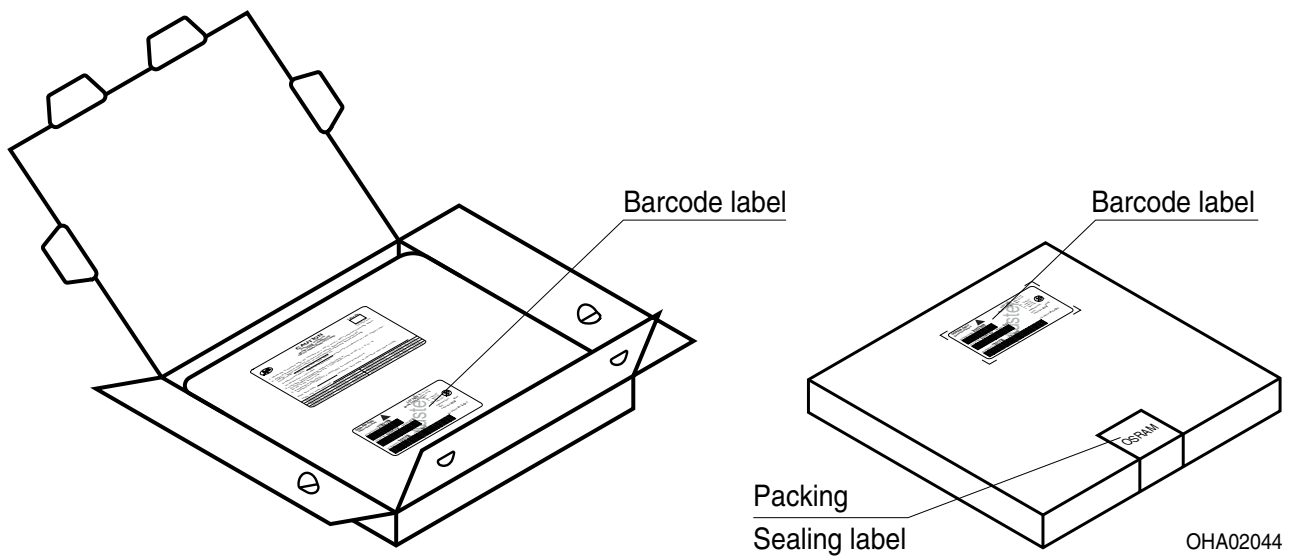


## Dry Packing Process and Materials <sup>3)</sup>



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

## Transportation Packing and Materials <sup>3)</sup>



### Dimensions of transportation box in mm

Width	Length	Height
195 ± 5 mm	195 ± 5 mm	30 ± 5 mm

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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 LED specified in this data sheet fall 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.

For further application related informations please visit [www.osram-os.com/apnotes](http://www.osram-os.com/apnotes)

## 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 in the OSRAM OS Webside.

### 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) **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.
- 2) **Testing temperature:**  $T_A = 25^\circ\text{C}$
- 3) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with  $\pm 0.1$  and dimensions are specified in mm.
- 4) **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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