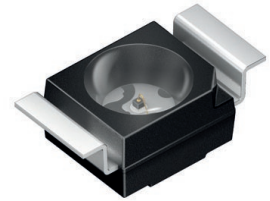


# SFH 2270R

## TOPLED® Reverse Gullwing

High Precision Ambient Light Photodiode



### Applications

- Industrial Automation (Machine Controls, Light Barriers, Vision Controls)
- Measurement Levelling

### Features:

- Package: black epoxy
- Qualifications: The product qualification test plan is based on the guidelines of AEC-Q101-REV-C, Stress Test Qualification for Automotive Grade Discrete Semiconductors.
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- Nearly perfect match with Human Eye Sensitivity ( $V_{\lambda}$ )
- Black coloured TOPLED®-package
- Low leakage current

### Ordering Information

Type	Photocurrent <sup>1)</sup> $E_e = 0.01 \text{ mW/cm}^2; \lambda = 560 \text{ nm};$ $V_R = 1 \text{ V}$ $I_P$	Photocurrent typ. $E_e = 0.01 \text{ mW/cm}^2; \lambda = 560 \text{ nm}; V_R = 1 \text{ V}$ $I_P$	Ordering Code
SFH 2270R	$\geq 4.8 \text{ nA}$	5.6 nA	Q65110A9911

Note: corresponds to an illuminance of app. 55 lx

## Maximum Ratings

 $T_A = 25\text{ °C}$ 

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

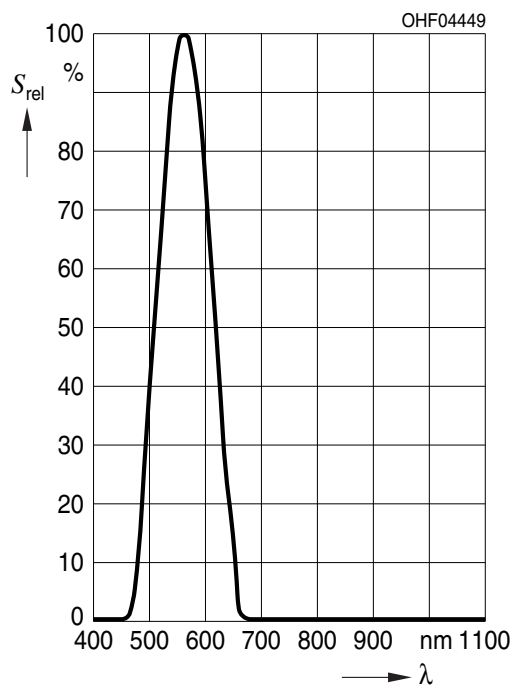
## Characteristics

$T_A = 25\text{ °C}$

Parameter	Symbol		Values
Recommended operating range for illuminance	$E_v$	typ.	5 ... 100000 lx
Wavelength of max sensitivity	$\lambda_{S\ max}$	typ.	560 nm
Spectral range of sensitivity	$\lambda_{10\%}$	typ.	480 ... 650 nm
Photocurrent $E_v = 1000\text{ lx}$ ; Std. Light A; $V_R = 1\text{ V}$	$I_P$	typ.	0.1 $\mu\text{A}$
Radiant sensitive area	A	typ.	0.16 mm <sup>2</sup>
Dimensions of active chip area	L x W	typ.	0.4 x 0.4 mm x mm
Half angle	$\varphi$	typ.	60 °
Dark current $V_R = 1\text{ V}$	$I_R$	typ. max.	0.005 nA 0.15 nA
Rise time $V_R = 1\text{ V}$ ; $R_L = 50\text{ k}\Omega$ ; $I_P = 4\text{ }\mu\text{A}$ ; white LED	$t_r$	typ.	6 $\mu\text{s}$
Fall time $V_R = 1\text{ V}$ ; $R_L = 50\text{ k}\Omega$ ; $I_P = 4\text{ }\mu\text{A}$ ; white LED	$t_f$	typ.	6 $\mu\text{s}$
Capacitance $V_R = 0\text{ V}$ ; $f = 1\text{ MHz}$ ; $E = 0$	$C_0$	typ.	42 pF
Temperature coefficient of short-circuit current	$TC_I$	typ.	0.17 % / K

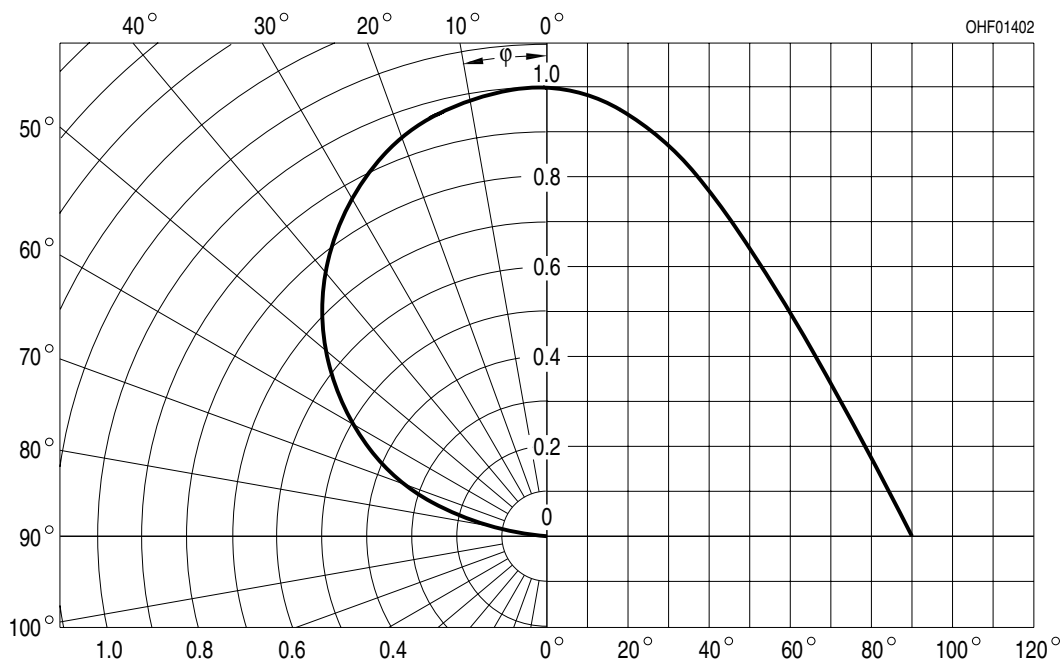
## Relative Spectral Sensitivity <sup>2)</sup>

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



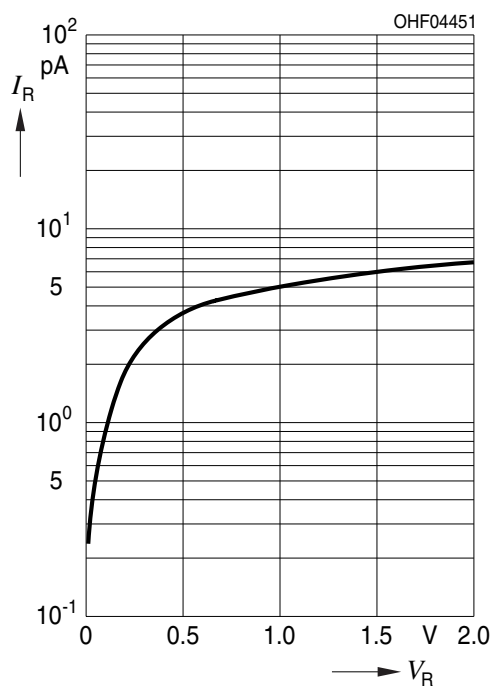
## Directional Characteristics <sup>2)</sup>

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



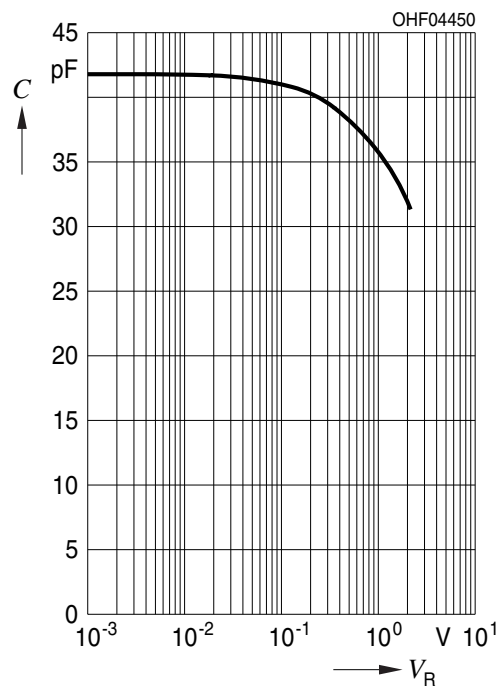
### Dark Current <sup>2)</sup>

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

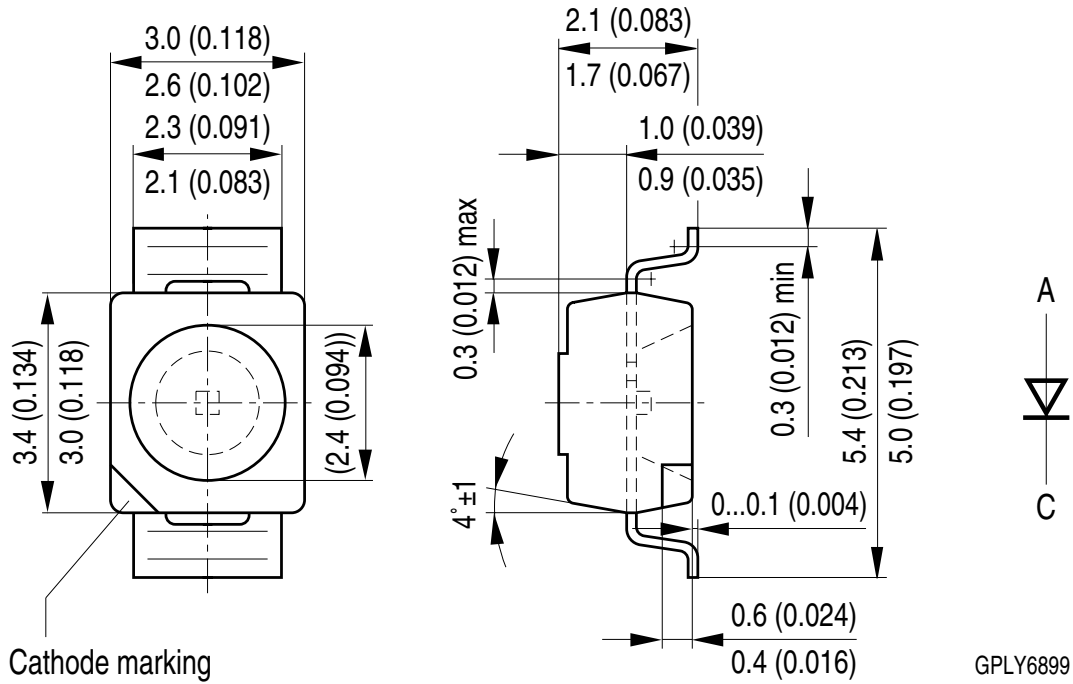


### Capacitance <sup>2)</sup>

$$C = f(V_R); f = 1\text{MHz}; E = 0; T_A = 25^\circ\text{C}$$



**Dimensional Drawing** <sup>3)</sup>



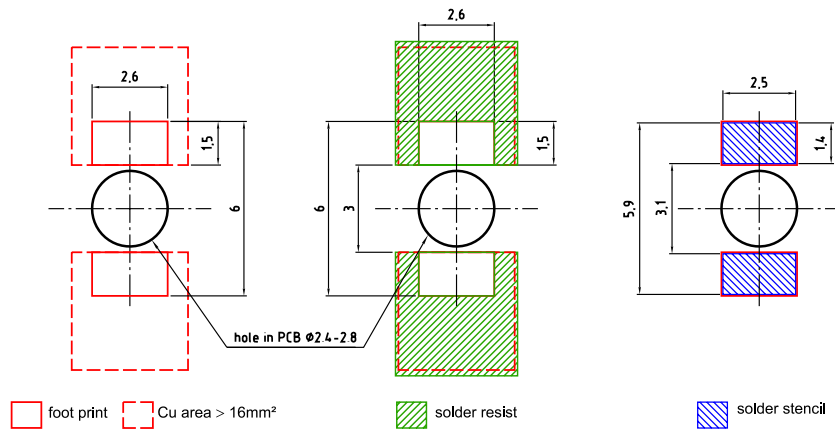
GPLY6899

**Further Information:**

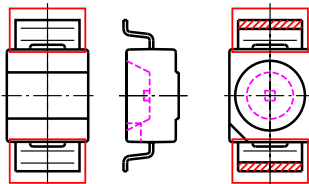
**Approximate Weight:** 35.0 mg

**Package marking:** Cathode

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



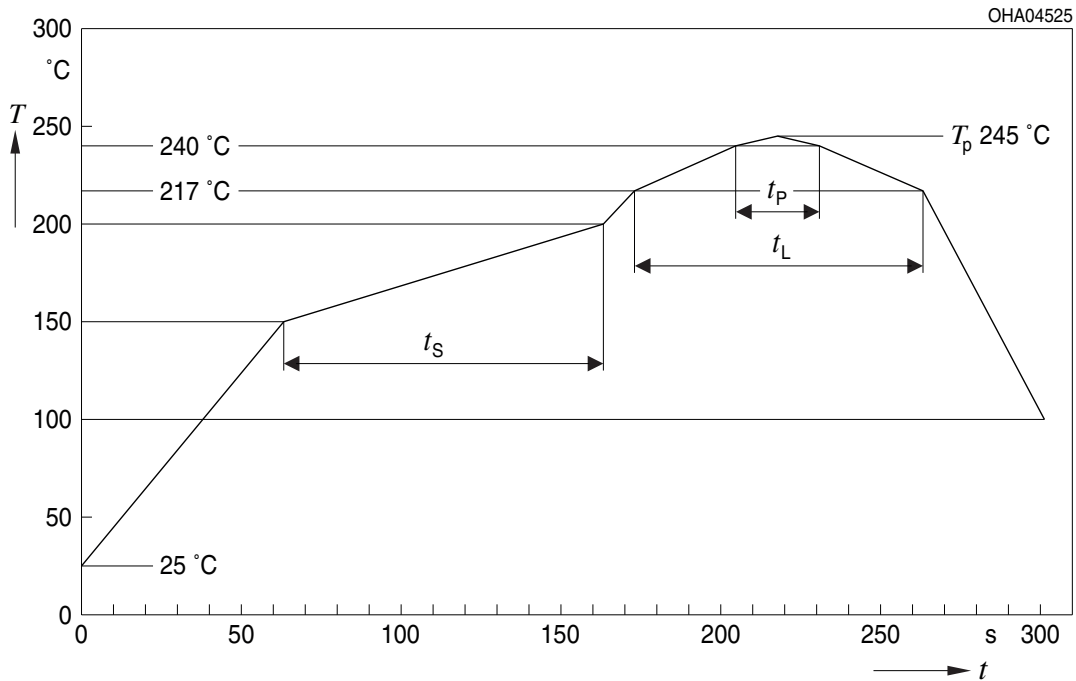
Component Location on Pad



E062 3010 05-02

## Reflow Soldering Profile

Product complies to MSL Level 3 acc. to JEDEC J-STD-020E



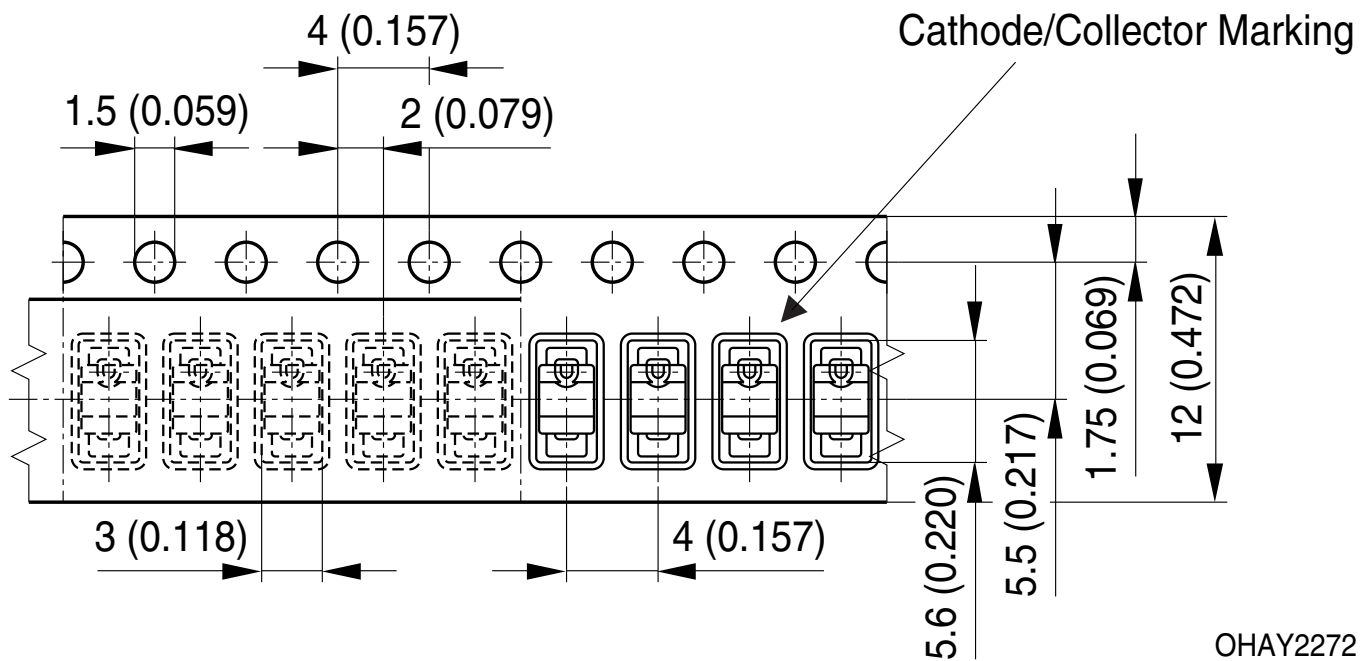
Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat <sup>*)</sup> 25 °C to 150 °C			2	3	K/s
Time $t_s$ $T_{Smin}$ to $T_{Smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak <sup>*)</sup> $T_{Smax}$ to $T_p$			2	3	K/s
Liquidus temperature	$T_L$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

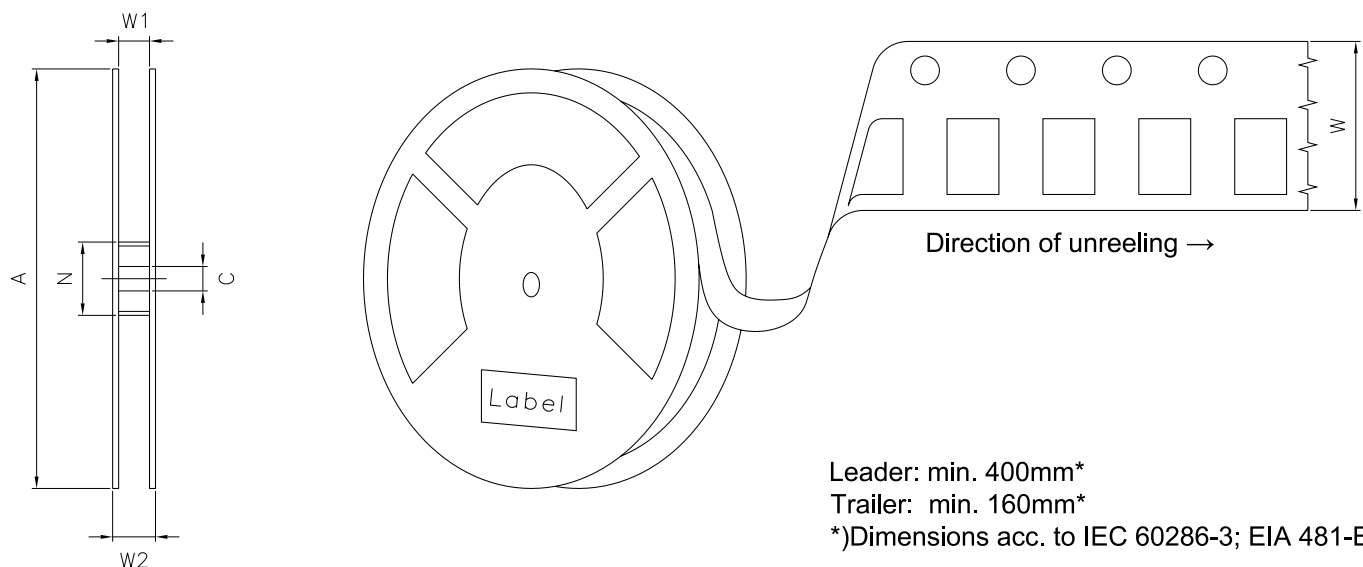


Taping <sup>3)</sup>



OHAY2272

## Tape and Reel <sup>4)</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	2000
330 mm	12 + 0.3 / - 0.1 mm	60 mm	12.4 + 2 mm	18.4 mm	8000

### Barcode-Product-Label (BPL)

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

RoHS Compliant

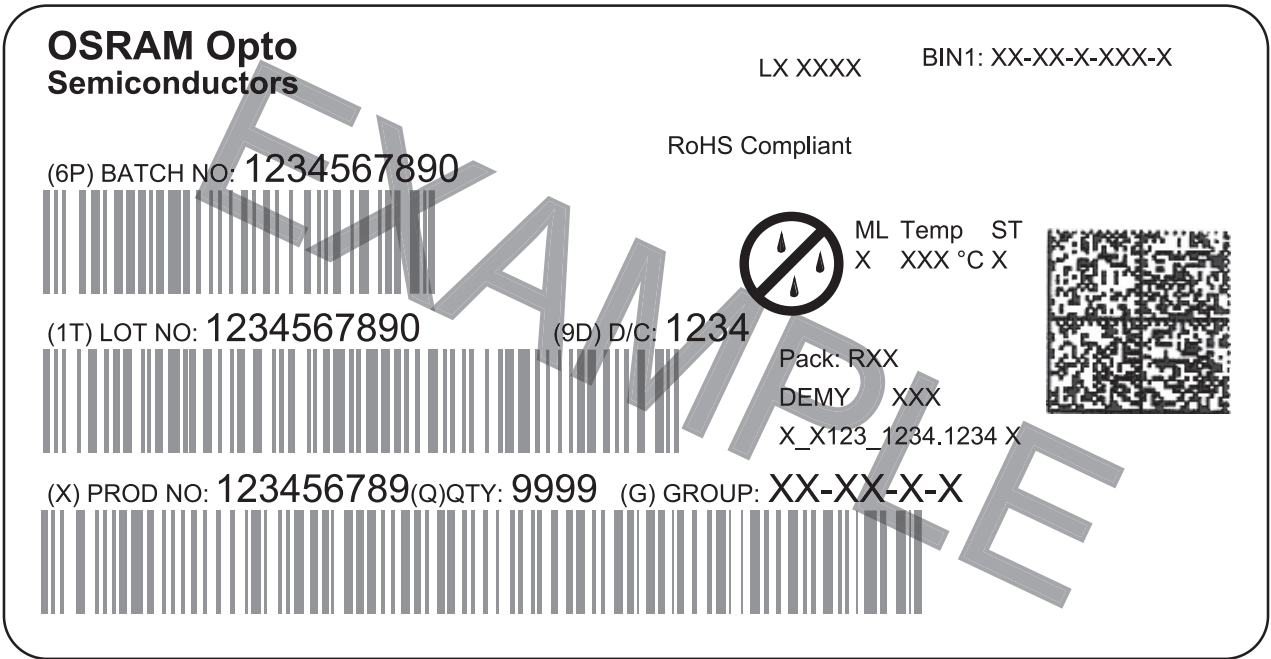
(6P) BATCH NO: 1234567890

(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

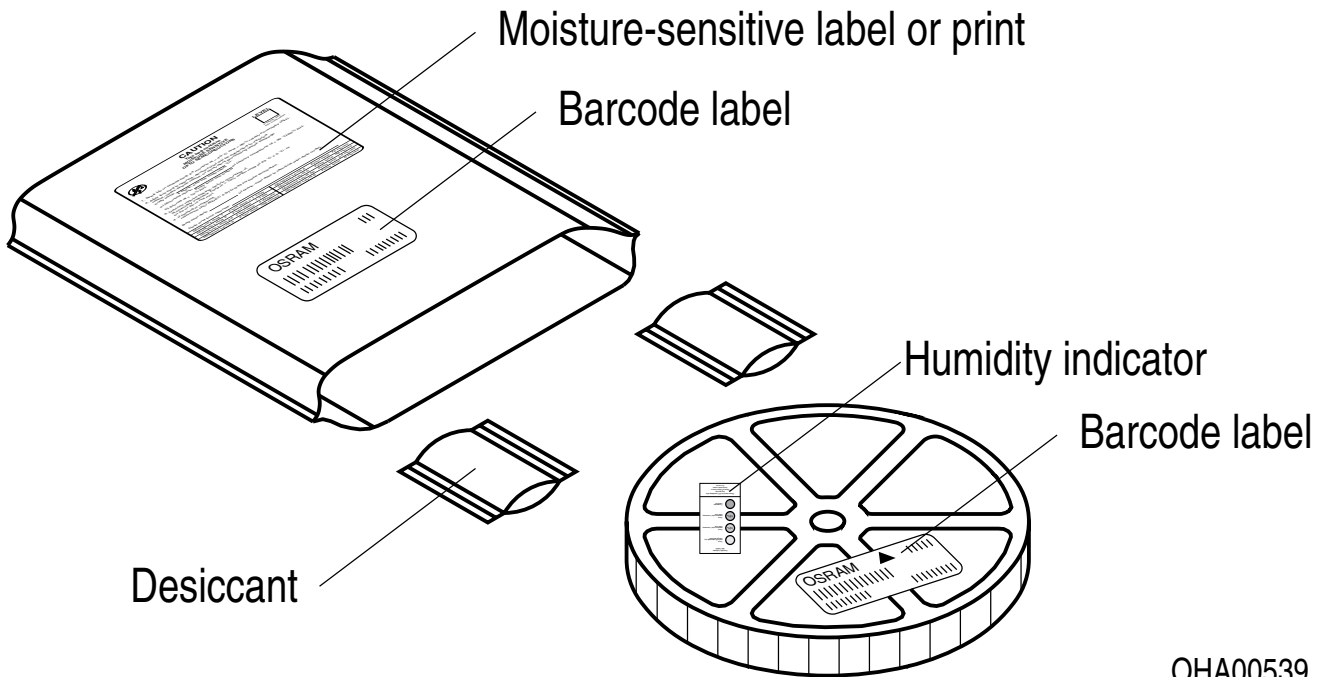
Pack: RXX  
DEMY XXX  
X\_X123\_1234.1234 X



The diagram shows a rectangular label with rounded corners. It contains the OSRAM logo and product name at the top left. To the right are fields for 'LX XXXX' and 'BIN1: XX-XX-X-XXX-X'. Below the logo is the text 'RoHS Compliant'. The label features three horizontal barcode sections. The first is labeled '(6P) BATCH NO: 1234567890'. The second is labeled '(1T) LOT NO: 1234567890' and '(9D) D/C: 1234'. The third is labeled '(X) PROD NO: 123456789 (Q) QTY: 9999 (G) GROUP: XX-XX-X-X'. To the right of the second barcode is a circular icon with a crossed-out rain cloud and the text 'ML Temp ST X XXX °C X'. Below this icon is the text 'Pack: RXX', 'DEMY XXX', and 'X\_X123\_1234.1234 X'. A square QR code is located on the right side of the label.

OHA04563

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



OHA00539

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

## Notes

Depending on the mode of operation, these devices emit highly concentrated visible and non visible light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 60825-1.

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 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 and functional 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.

OSRAM OS products are not qualified at module and system level for such application.

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.

## Glossary

- 1) **Photocurrent:** The photocurrent values are measured (by irradiating the devices with a homogenous light source and applying a voltage to the device) with a tolerance of  $\pm 11\%$ .
- 2) **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.
- 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.

## Revision History

Version	Date	Change
1.5	2020-12-10	Schematic Transportation Box Dimensions of Transportation Box Ordering Information

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