

# SFH 4558

## Radial SMR

Infrared Emitter (850nm) in SMR® Package



## Applications

- Electronic Equipment
- Highbay Industrial
- Industrial Automation (Machine Controls, Light Barriers, Vision Controls)
- Safety and Security, CCTV
- Smoke Detectors
- White Goods

## Features:

- Package: black epoxy
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- Wavelength 850nm
- SMR® (Surface Mount Radial) package
- Same package as photodiode SFH 2505 FA
- Device with straight leads
- UL version E9548 available (details & test conditions on request)

## Ordering Information

Type	Radiant intensity <sup>1)2)</sup> $I_F = 100 \text{ mA}; t_p = 20 \text{ ms}$ $I_e$	Radiant intensity <sup>1)</sup> typ. $I_F = 100 \text{ mA}; t_p = 20 \text{ ms}$ $I_e$	Ordering Code
SFH 4558	180 ... 710 mW/sr	350 mW/sr	Q65111A5984
SFH 4558 E9548	180 ... 710 mW/sr	350 mW/sr	Q65112A8626

## Maximum Ratings

$T_A = 25\text{ °C}$

Parameter	Symbol	Values
Operating temperature	$T_{op}$	min. -40 °C max. 85 °C
Storage temperature	$T_{stg}$	min. -40 °C max. 85 °C
Forward current	$I_F$	max. 100 mA
Surge current $t_p \leq 200\ \mu\text{s}; D = 0$	$I_{FSM}$	max. 1 A
Reverse voltage <sup>3)</sup>	$V_R$	max. 12 V
Power consumption	$P_{tot}$	max. 200 mW
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	$V_{ESD}$	max. 2 kV

## Characteristics

$I_F = 100 \text{ mA}$ ;  $t_p = 20 \text{ ms}$ ;  $T_A = 25 \text{ °C}$

Parameter	Symbol		Values
Peak wavelength	$\lambda_{\text{peak}}$	typ.	860 nm
Centroid wavelength	$\lambda_{\text{centroid}}$	typ.	850 nm
Spectral bandwidth at 50% $I_{\text{rel,max}}$ (FWHM)	$\Delta\lambda$	typ.	30 nm
Half angle	$\varphi$	typ.	10 °
Dimensions of active chip area	L x W	typ.	0.3 x 0.3 mm x mm
Rise time (10% / 90%) $I_F = 100 \text{ mA}$ ; $R_L = 50 \text{ }\Omega$	$t_r$	typ.	12 ns
Fall time (10% / 90%) $I_F = 100 \text{ mA}$ ; $R_L = 50 \text{ }\Omega$	$t_f$	typ.	12 ns
Forward voltage <sup>4)</sup>	$V_F$	typ. max.	1.7 V 1.9 V
Forward voltage <sup>4)</sup> $I_F = 1 \text{ A}$ ; $t_p = 100 \text{ }\mu\text{s}$	$V_F$	typ. max.	3.6 V 4.5 V
Reverse current <sup>3)</sup> $V_R = 5 \text{ V}$	$I_R$	max.	10 $\mu\text{A}$
Radiant intensity <sup>1)</sup> $I_F = 1 \text{ A}$ ; $t_p = 100 \text{ }\mu\text{s}$	$I_e$	typ.	1450 mW/sr
Total radiant flux <sup>5)</sup>	$\Phi_e$	typ.	80 mW
Temperature coefficient of voltage	$TC_V$	typ.	-0.6 mV / K
Temperature coefficient of brightness	$TC_I$	typ.	-0.3 % / K
Temperature coefficient of wavelength	$TC_\lambda$	typ.	0.3 nm / K
Thermal resistance junction solder point real <sup>6)</sup>	$R_{\text{thJS real}}$	max.	240 K / W
Thermal resistance junction ambient real <sup>7)</sup>	$R_{\text{thJA}}$	max.	430 K / W

### Brightness Groups

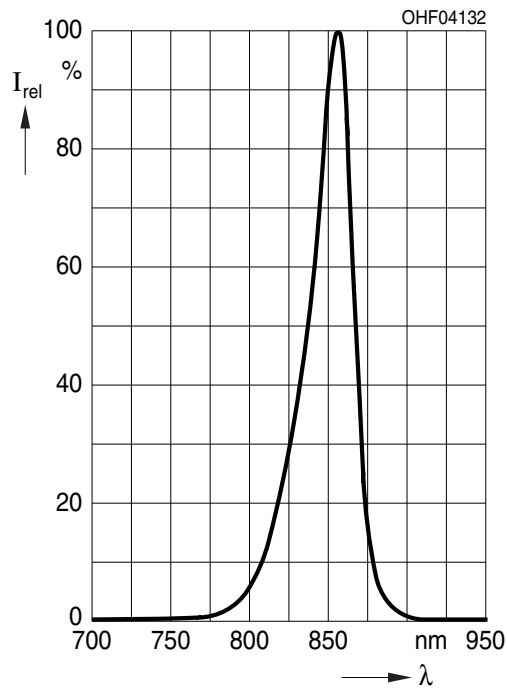
$T_A = 25\text{ °C}$

Group	Radiant intensity <sup>1)2)</sup> $I_F = 100\text{ mA}; t_p = 20\text{ ms}$ min. $I_e$	Radiant intensity <sup>1)2)</sup> $I_F = 100\text{ mA}; t_p = 20\text{ ms}$ max. $I_e$
	BW	180 mW/sr
CW	280 mW/sr	450 mW/sr
DW	450 mW/sr	710 mW/sr

Only one group in one packing unit (variation lower 2:1)

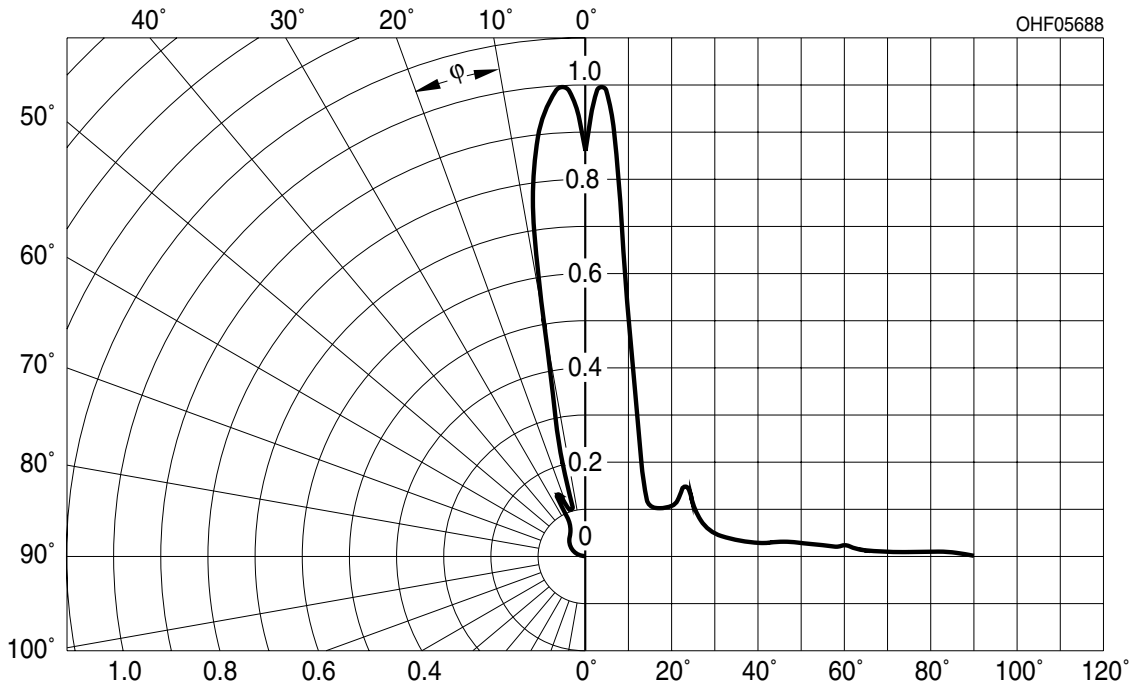
### Relative Spectral Emission <sup>8), 9)</sup>

$I_{e,rel} = f(\lambda); I_F = 100\text{ mA}; t_p = 20\text{ ms}$



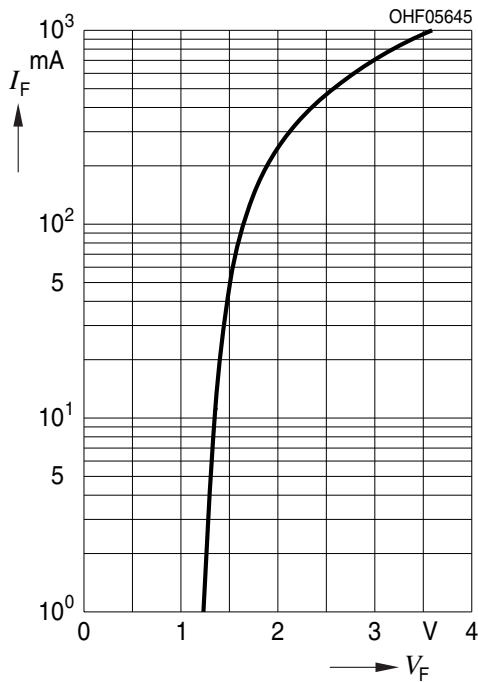
**Radiation Characteristics** 8), 9)

$I_{e,rel} = f(\varphi)$



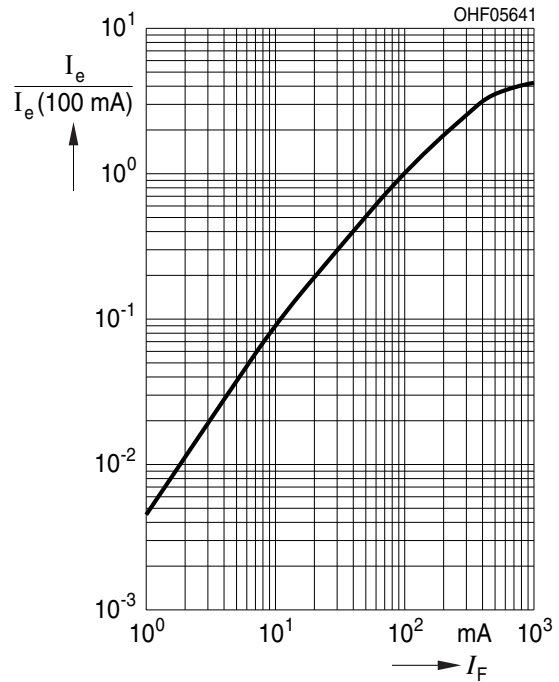
**Forward current** 8), 9)

$I_F = f(V_F)$ ; single pulse;  $t_p = 100 \mu s$



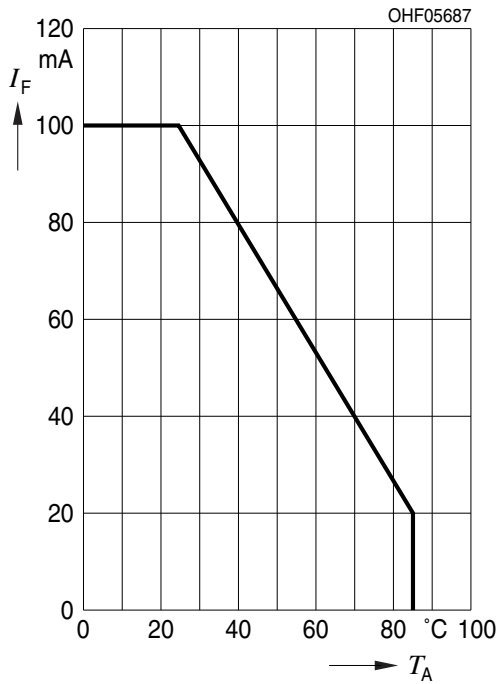
**Radiant Intensity** 8), 9)

$I_e/I_e(100mA) = f(I_F)$ ; single pulse;  $t_p = 100 \mu s$



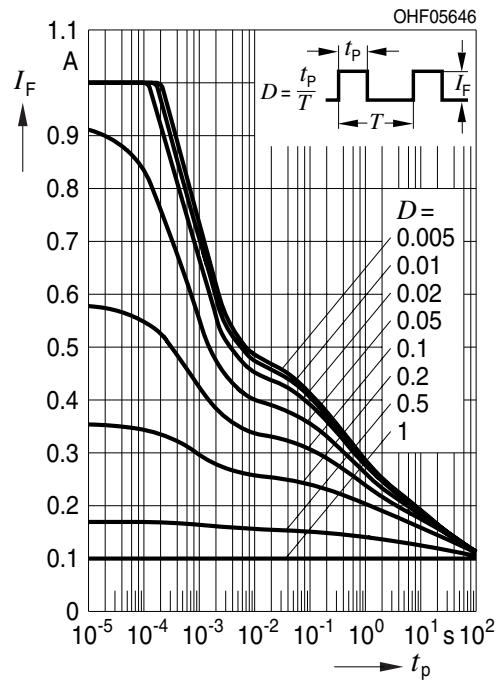
### Max. Permissible Forward Current

$I_{F,max} = f(T_A)$ ;  $R_{th,ja} = 430K / W$ ; single pulse



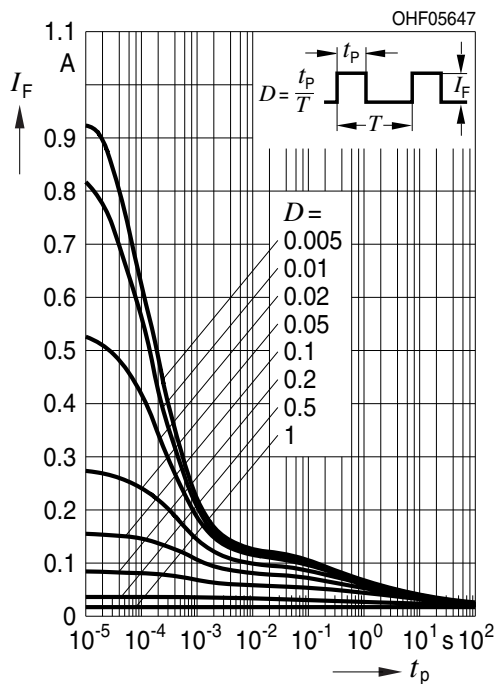
### Permissible Pulse Handling Capability

$I_F = f(t_p)$ ; duty cycle  $D = \text{parameter}$ ;  $T_A = 25^\circ C$

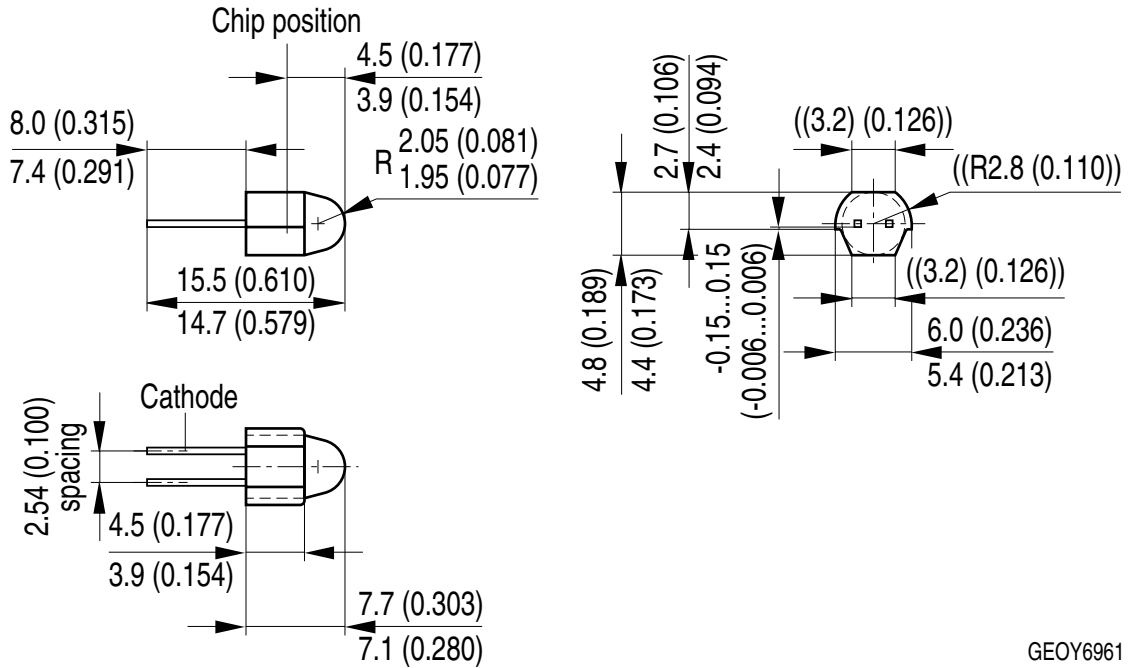


### Permissible Pulse Handling Capability

$I_F = f(t_p)$ ; duty cycle  $D = \text{parameter}$ ;  $T_A = 85^\circ C$



**Dimensional Drawing** <sup>10)</sup>



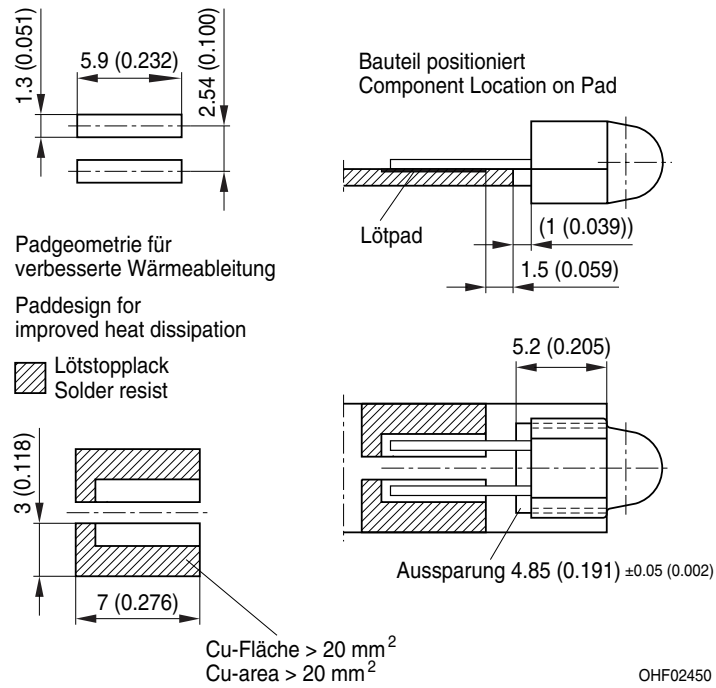
GEOY6961

**Further Information:**

**Approximate Weight:** 240.0 mg

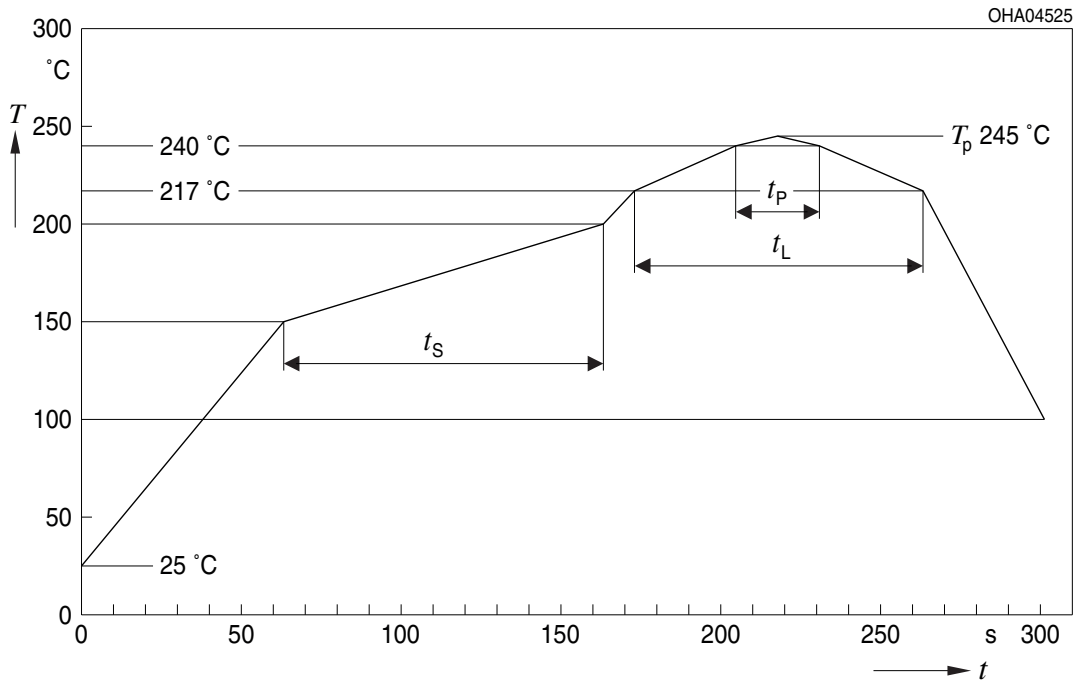
**Package marking:** Cathode

## Recommended Solder Pad <sup>10)</sup>



## Reflow Soldering Profile

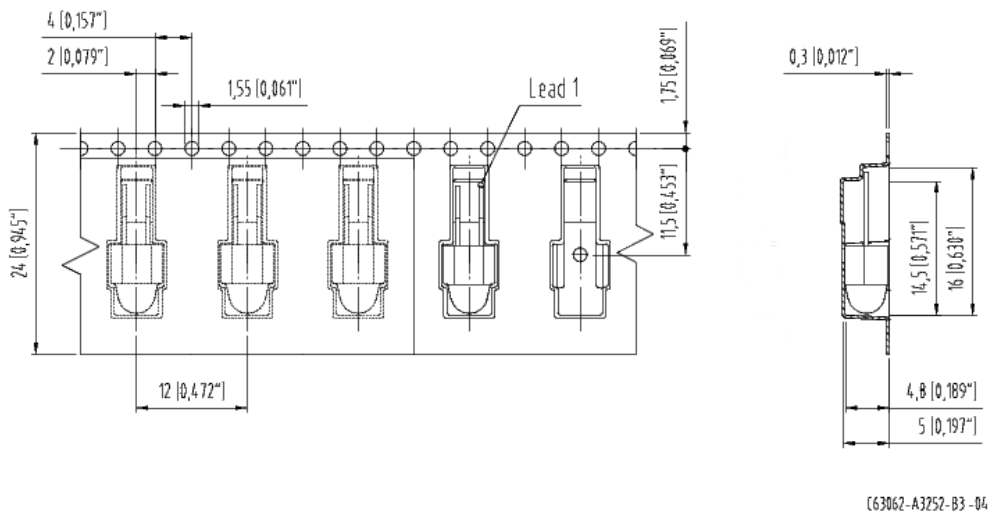
Product complies to MSL Level 3 acc. to JEDEC J-STD-020E



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

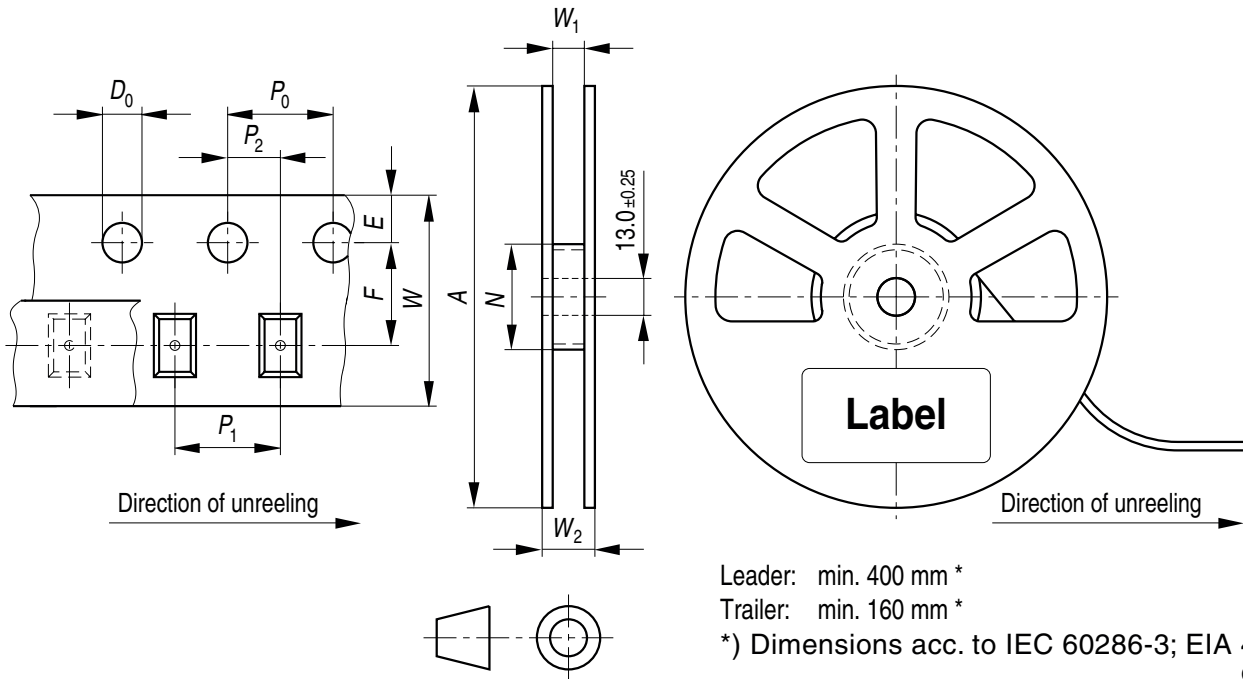
**Taping** <sup>10)</sup>



**Taping** <sup>10)</sup>

straight leads/ Lead 1 = cathode

**Tape and Reel** <sup>11)</sup>



Leader: min. 400 mm \*

Trailer: min. 160 mm \*

\*) Dimensions acc. to IEC 60286-3; EIA 481-D

OHAY0324

**Reel Dimensions**

A	W	N <sub>min</sub>	W <sub>1</sub>	W <sub>2 max</sub>	Pieces per PU
330 mm	24 + 0.3 / - 0.1 mm	60/100 mm	24.4 + 2 mm	30.4 mm	1000

### 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

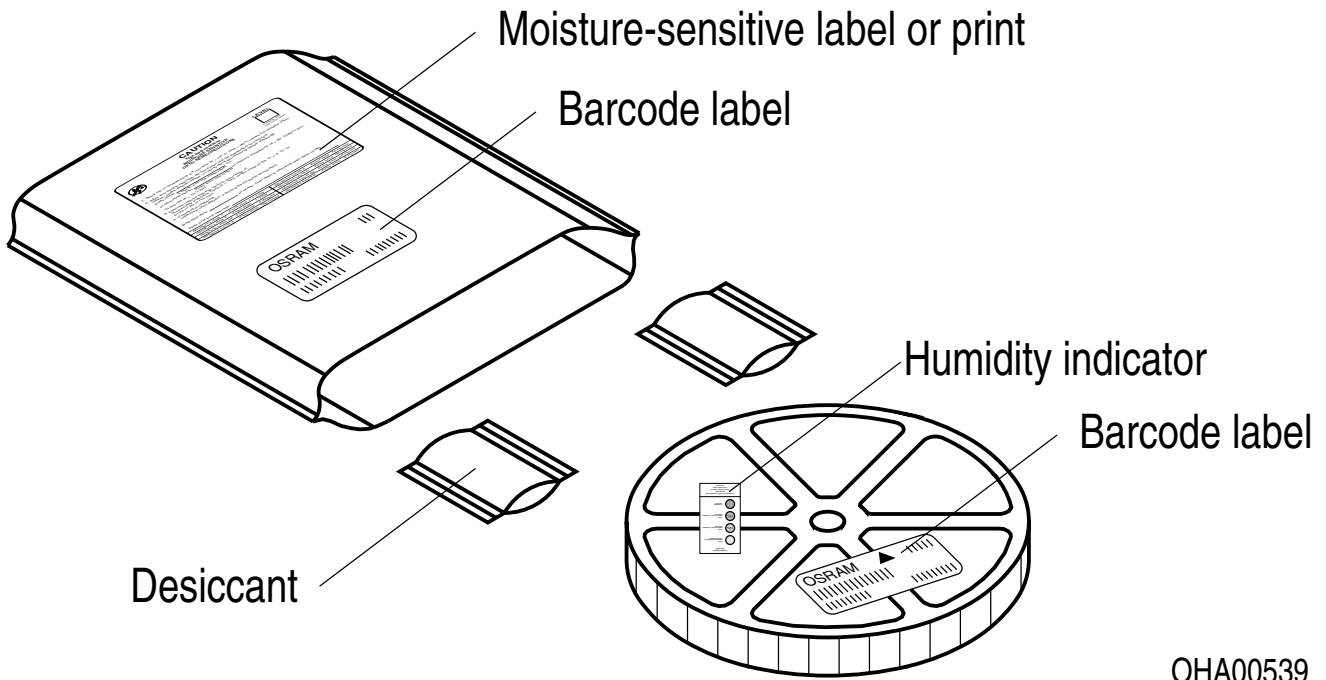
ML Temp ST  
X XXX °C X

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 this is 'RoHS Compliant'. The main body of the label is divided into three horizontal sections, each with a barcode and associated text: (6P) BATCH NO: 1234567890, (1T) LOT NO: 1234567890 (9D) D/C: 1234, and (X) PROD NO: 123456789 (Q) QTY: 9999 (G) GROUP: XX-XX-X-X. To the right of the second section is a circular icon with a crossed-out rain cloud and the text 'ML Temp ST X XXX °C X'. Below that is a square QR code and further text: 'Pack: RXX', 'DEMY XXX', and 'X\_X123\_1234.1234 X'. A large 'EXAMPLE' watermark is overlaid diagonally across the label.

OHA04563

### Dry Packing Process and Materials <sup>10)</sup>



OHA00539

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

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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 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 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.

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## Glossary

- 1) **Radiant intensity:** Measured at a solid angle of  $\Omega = 0.001$  sr
- 2) **Brightness:** The brightness values are measured with a tolerance of  $\pm 11\%$ .
- 3) **Reverse Operation:** Reverse Operation of 10 hours is permissible in total. Continuous reverse operation is not allowed.
- 4) **Forward Voltage:** The forward voltages are measured with a tolerance of  $\pm 0.1$  V.
- 5) **Total radiant flux:** Measured with integrating sphere.
- 6) **Thermal resistance:** junction - soldering point, of the device only, mounted on an ideal heatsink (e.g. metal block)
- 7) **Thermal resistance:** junction - ambient, mounted on PC-board (FR4), padsize 20 mm<sup>2</sup> each
- 8) **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.
- 9) **Testing temperature:** TA = 25°C (unless otherwise specified)
- 10) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with  $\pm 0.1$  and dimensions are specified in mm.
- 11) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

## Revision History

Version	Date	Change
1.4	2020-02-06	Features Ordering Information

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