

# SFH 4045N

## CHIPLED® Lens

High Power Infrared Emitter (940 nm)



## Applications

- Remote Control, Proximity, Ambient Light Sensing

## Features:

- Package: clear epoxy
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- High Power Infrared LED
- Short switching times
- small package: (WxDxH) 3 mm x 2.65 mm x 1.2mm
- SMT Sidelooker

## Ordering Information

Type	Radiant intensity <sup>1)</sup> $I_F = 70 \text{ mA}; t_p = 20 \text{ ms}$ $I_e$	Radiant intensity <sup>1)</sup> typ. $I_F = 70 \text{ mA}; t_p = 20 \text{ ms}$ $I_e$	Ordering Code
SFH 4045N	40 ... 200 mW/sr	90 mW/sr	Q65111A3903

## Maximum Ratings

 $T_A = 25\text{ °C}$ 

Parameter	Symbol		Values
Operating temperature	$T_{op}$	min. max.	-40 °C 85 °C
Storage temperature	$T_{stg}$	min. max.	-40 °C 85 °C
Reverse voltage <sup>2)</sup>	$V_R$	max.	12 V
Forward current	$I_F$	max.	70 mA
Surge current $t_p \leq 100\ \mu\text{s}; D = 0$	$I_{FSM}$	max.	0.7 A
Power consumption	$P_{tot}$	max.	140 mW
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	$V_{ESD}$	max.	2 kV

## Characteristics

$I_F = 70 \text{ mA}$ ;  $t_p = 20 \text{ ms}$ ;  $T_A = 25 \text{ °C}$

Parameter	Symbol		Values
Peak wavelength	$\lambda_{\text{peak}}$	typ.	950 nm
Centroid wavelength	$\lambda_{\text{centroid}}$	typ.	940 nm
Spectral bandwidth at 50% $I_{\text{rel,max}}$ $I_F = 70 \text{ mA}$ ; $t_p = 10 \text{ ms}$	$\Delta\lambda$	typ.	42 nm
Half angle	$\varphi$	typ.	9 °
Dimensions of active chip area	L x W	typ.	0.2 x 0.2 mm x mm
Rise time (10% / 90%) $I_F = 70 \text{ mA}$ ; $R_L = 50 \text{ }\Omega$	$t_r$	typ.	12 ns
Fall time (10% / 90%) $I_F = 70 \text{ mA}$ ; $R_L = 50 \text{ }\Omega$	$t_f$	typ.	12 ns
Forward voltage	$V_F$	typ. max.	1.6 V 2 V
Forward voltage $I_F = 700 \text{ mA}$ ; $t_p = 100 \text{ }\mu\text{s}$	$V_F$	typ.	2.8 V
Reverse current <sup>2)</sup> $V_R = 5 \text{ V}$	$I_R$	max. typ.	10 $\mu\text{A}$ 0.01 $\mu\text{A}$
Total radiant flux <sup>3)</sup>	$\Phi_e$	typ.	40 mW
Radiant intensity <sup>1)</sup> $I_F = 700 \text{ mA}$ ; $t_p = 25 \text{ }\mu\text{s}$	$I_e$	typ.	540 mW/sr
Temperature coefficient of brightness $I_F = 70 \text{ mA}$ ; $t_p = 10 \text{ ms}$	$TC_I$	typ.	-0.5 % / K
Temperature coefficient of voltage $I_F = 70 \text{ mA}$ ; $t_p = 10 \text{ ms}$	$TC_V$	typ.	-1.3 mV / K
Temperature coefficient of wavelength $I_F = 70 \text{ mA}$ ; $t_p = 10 \text{ ms}$	$TC_\lambda$	typ.	0.3 nm / K
Thermal resistance junction ambient real <sup>4)</sup>	$R_{\text{thJA}}$	max.	540 K / W
Thermal resistance junction solder point real <sup>5)</sup>	$R_{\text{thJS}}$	max.	360 K / W

### Brightness Groups

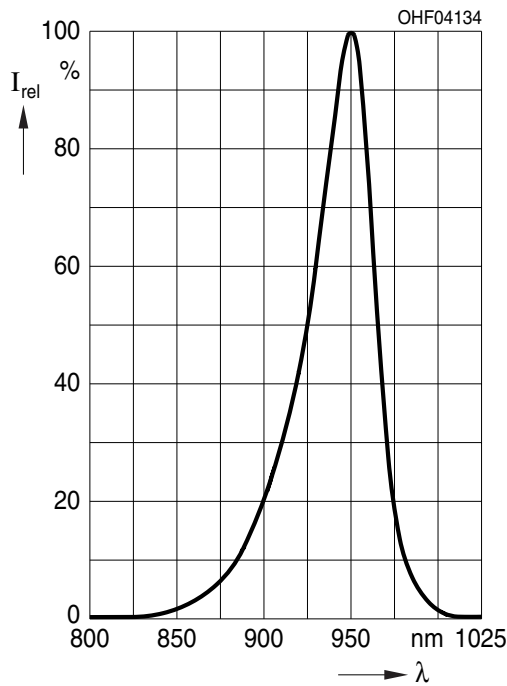
$T_A = 25\text{ °C}$

Group	Radiant intensity $I_F = 70\text{ mA}; t_p = 20\text{ ms}$ min. $I_e$	Radiant intensity $I_F = 70\text{ mA}; t_p = 20\text{ ms}$ max. $I_e$
U	40 mW/sr	80 mW/sr
V	63 mW/sr	125 mW/sr
AW	100 mW/sr	200 mW/sr

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

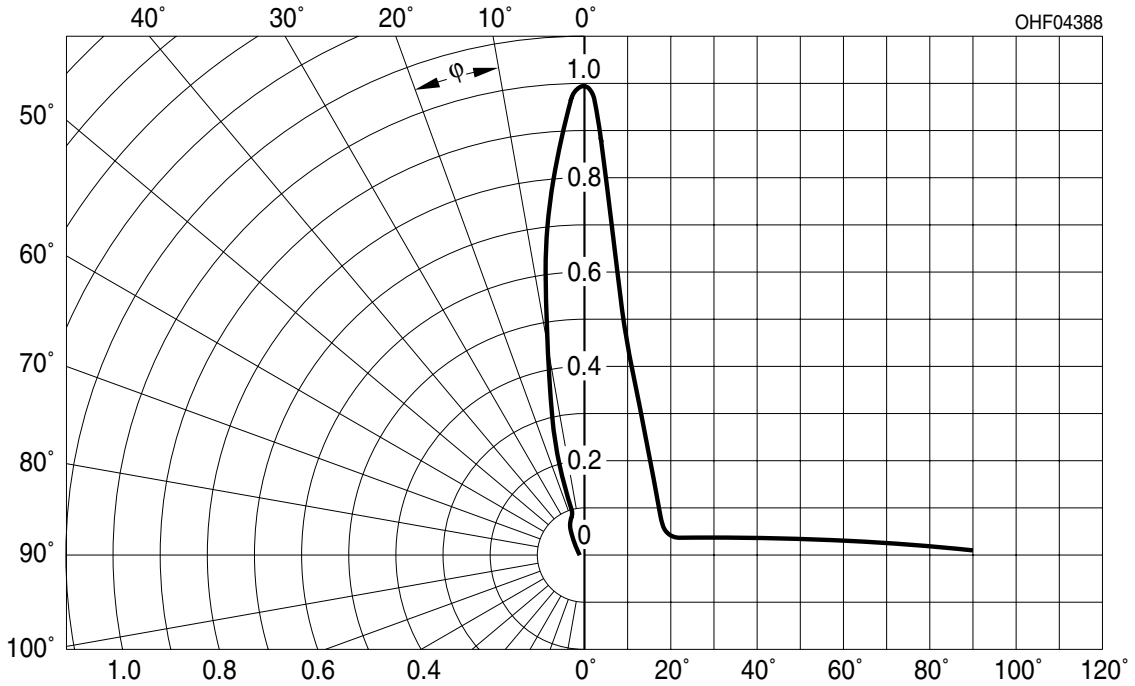
### Relative Spectral Emission <sup>6), 7)</sup>

$I_{rel} = f(\lambda); I_F = 70\text{ mA}; t_p = 20\text{ ms}$



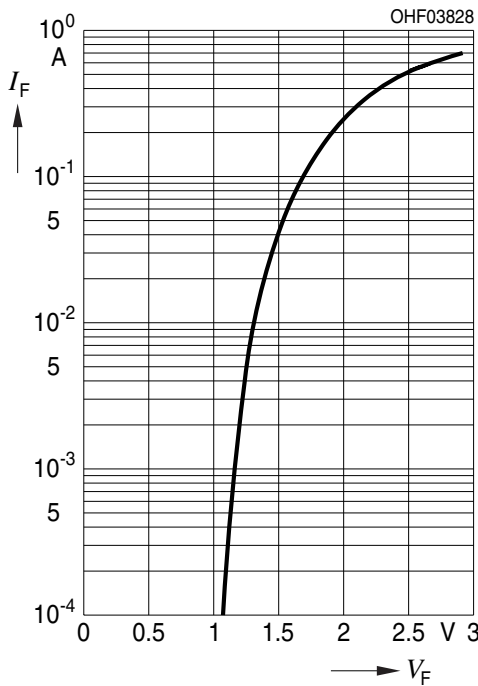
**Radiation Characteristics** (6), 7)

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



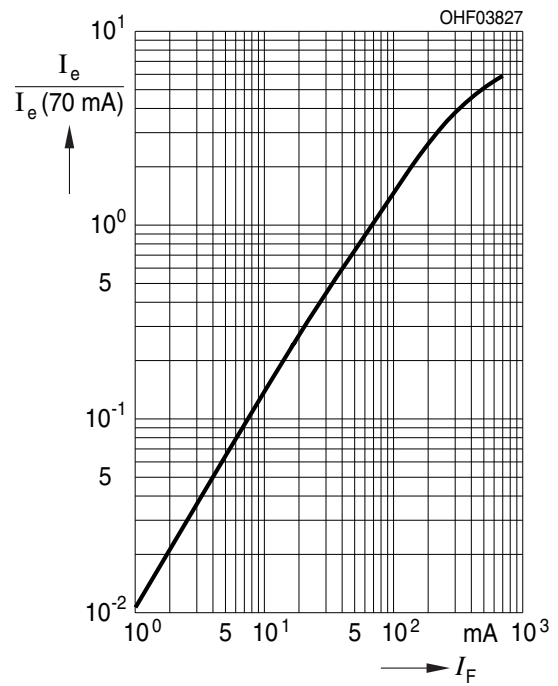
**Forward current** (6), 7)

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



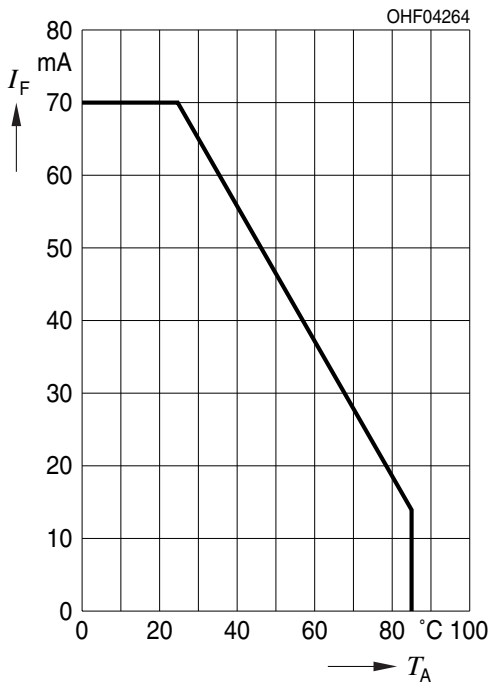
**Relative Radiant Intensity** (6), 7)

$I_e/I_e(70mA) = f(I_F)$ ; single pulse;  $t_p = 25 \mu s$



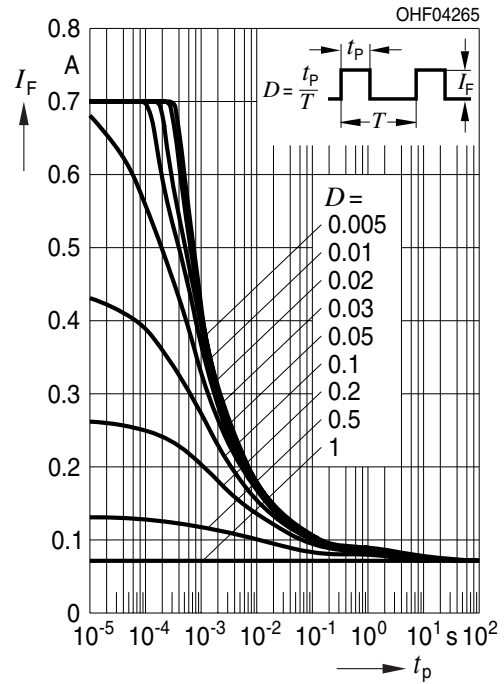
### Max. Permissible Forward Current

$I_{F,max} = f(T_A); R_{thJA} = 540 \text{ K/W}$



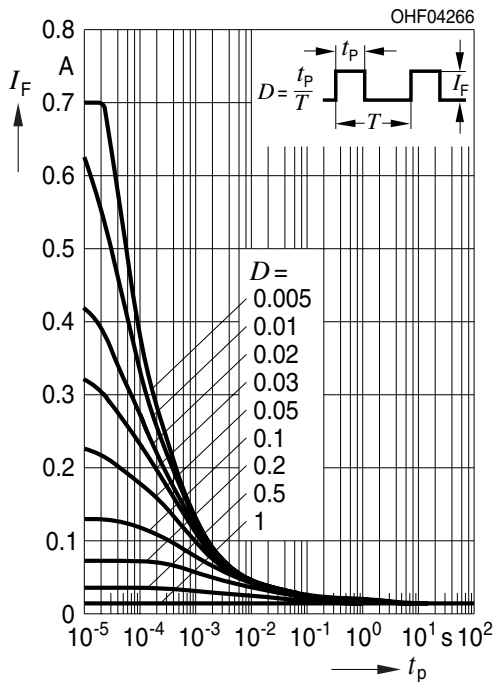
### Permissible Pulse Handling Capability

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

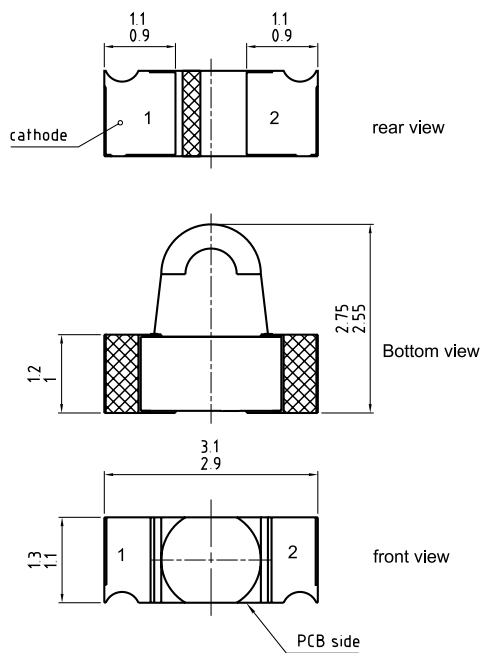


### Permissible Pulse Handling Capability

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



## Dimensional Drawing <sup>8)</sup>

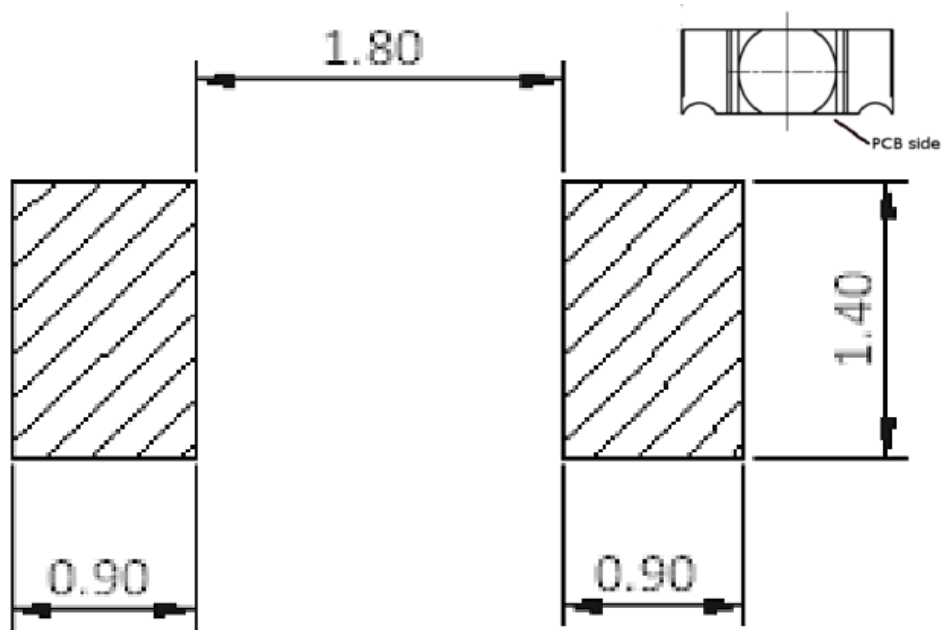


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**Approximate Weight:** 14.0 mg

**Package marking:** Cathode

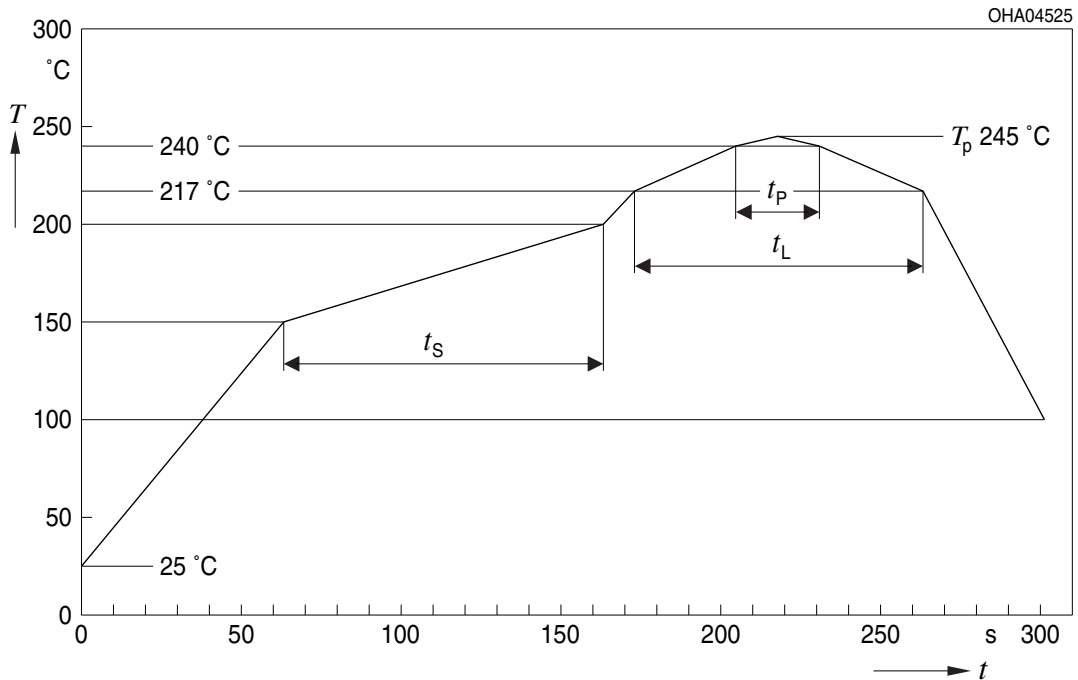
**Recommended Solder Pad** <sup>8)</sup>



Metalization layer is thicker than the solder resist layer. Recommended solder thickness: 120 - 150  $\mu\text{m}$ .

**Reflow Soldering Profile**

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

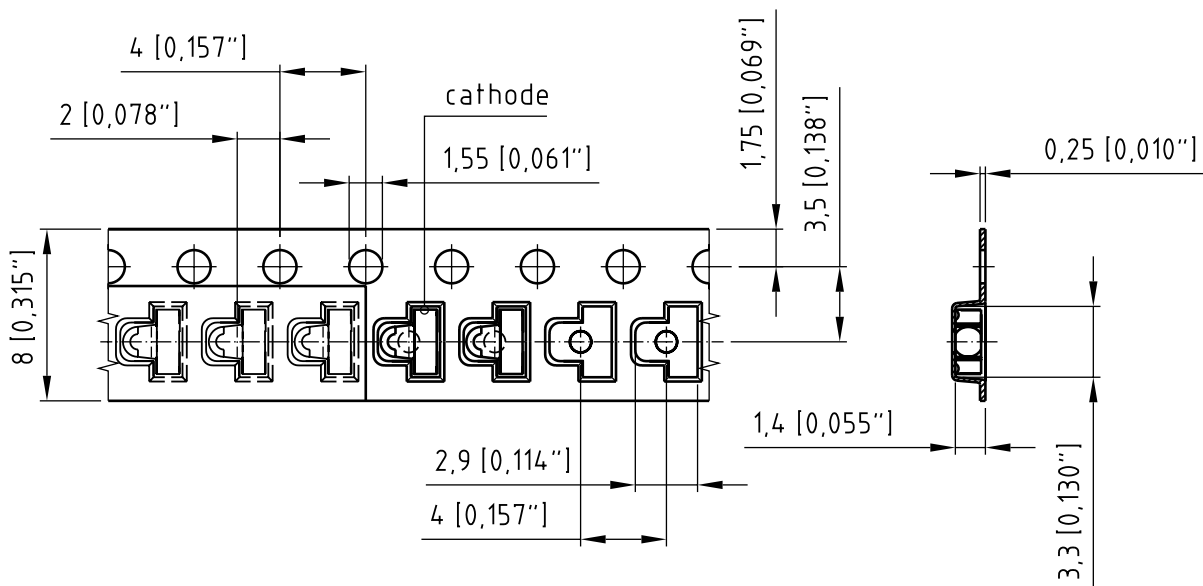




Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time $t_s$ $T_{Smin}$ to $T_{Smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak*) $T_{Smax}$ to $T_p$			2	3	K/s
Liquidus temperature	$T_L$		217		°C
Time above liquidus 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>8)</sup>



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Tape and Reel <sup>9)</sup>



Leader: min. 400 mm \*  
 Trailer: min. 160 mm \*

\*) Dimensions acc. to IEC 60286-3; EIA 481-D  
 OHAY0324

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

## Barcode-Product-Label (BPL)



## Dry Packing Process and Materials <sup>8)</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>8)</sup>



### Dimensions of transportation box in mm

Width	Length	Height
200 ± 5 mm	195 ± 5 mm	30 ± 5 mm

## 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.

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 in 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.

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## Glossary

- 1) **Radiant intensity:** Measured at a solid angle of  $\Omega = 0.01$  sr
- 2) **Reverse Operation:** Reverse Operation of 10 hours is permissible in total. Continuous reverse operation is not allowed.
- 3) **Total radiant flux:** Measured with integrating sphere.
- 4) **Thermal resistance:** junction - ambient, mounted on PC-board (FR4), pads size 16 mm<sup>2</sup> each
- 5) **Thermal resistance:** junction - soldering point, of the device only, mounted on an ideal heatsink (e.g. metal block)
- 6) **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.
- 7) **Testing temperature:**  $T_A = 25^\circ\text{C}$
- 8) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with  $\pm 0.1$  and dimensions are specified in mm.
- 9) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

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