

# OSRAM SFH 7061

## Datasheet

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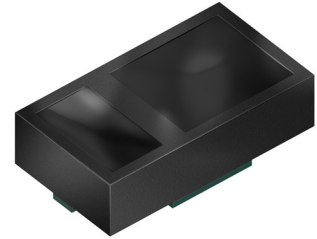
## Optical Force

# SFH 7061

Optical Force and Proximity Sensing

Ultra-slim and small Optical Frontend (OFE) for Optical Force Sensing (OFS).

The device integrates an infrared emitter (940 nm IR LED), a photo diode (sensitive to 940nm), as well as a light barrier to block optical crosstalk in a tiny 1.8 x 1.0 x 0.5mm package.



## Features

- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- Light Barrier to block optical crosstalk
- Small package
- Package size (WxDxH): 1.8mm x 1.0 mm x 0.5 mm
- Multi chip package featuring 1 emitter and one detector

Ordering Information

| Type                | Ordering Code |
|---------------------|---------------|
| SFH 7061            | Q65115A2090   |
| ● infrared (940 nm) |               |
| ■ photodiode        |               |

## Maximum Ratings

$T_A = 25\text{ °C}$

| Parameter                                                                | Symbol              | Values |        |
|--------------------------------------------------------------------------|---------------------|--------|--------|
| Operating temperature range                                              | $T_{op}$            | min.   | -40 °C |
|                                                                          |                     | max.   | 85 °C  |
| Storage temperature range                                                | $T_{stg}$           | min.   | -40 °C |
|                                                                          |                     | max.   | 85 °C  |
| ESD withstand voltage<br>acc. to ANSI/ESDA/JEDEC JS-001 - HBM            | $V_{ESD}$           | max.   | 2 kV   |
| <b>Infrared Emitter</b>                                                  |                     |        |        |
| Forward current                                                          | $I_F (DC)$          | min.   | 1 mA   |
|                                                                          |                     | max.   | 100 mA |
| Forward current pulsed<br>$t_p \leq 50\text{ }\mu\text{s}$ ; $D = 0.005$ | $I_F \text{ pulse}$ | max.   | 700 mA |
| Reverse voltage <sup>5)</sup>                                            | $V_R$               | max.   | 5 V    |
| <b>Photodiode</b>                                                        |                     |        |        |
| Reverse voltage                                                          | $V_R$               | max.   | 6 V    |

## Characteristics

$T_A = 25\text{ °C}$

| Parameter                                                                                         | Symbol                      |                                    | Values                     |
|---------------------------------------------------------------------------------------------------|-----------------------------|------------------------------------|----------------------------|
| Infrared Emitter                                                                                  |                             |                                    |                            |
| Peak wavelength<br>$I_F = 20\text{ mA}; t_p = 20\text{ ms}$                                       | $\lambda_{\text{peak}}$     | typ.                               | 950 nm                     |
| Centroid Wavelength <sup>6)</sup><br>$I_F = 20\text{ mA}; t_p = 20\text{ ms}$                     | $\lambda_{\text{centroid}}$ | min.<br>typ.<br>max.               | 930 nm<br>940 nm<br>950 nm |
| Spectral bandwidth at 50% $I_{\text{rel,max}}$ (FWHM)<br>$I_F = 20\text{ mA}; t_p = 20\text{ ms}$ | $\Delta \lambda$            | typ.                               | 29 nm                      |
| Half angle                                                                                        | $\Phi$                      | typ.                               | $\pm 60^\circ$             |
| Rise time (10%/ 90%)<br>$I_F = 10\text{ mA}; R_L = 50\ \Omega$                                    | $t_r$                       | typ.                               | 8 ns                       |
| Fall time (10%/ 90%)<br>$I_F = 10\text{ mA}; R_L = 50\ \Omega$                                    | $t_f$                       | typ.                               | 8 ns                       |
| Forward voltage <sup>8)</sup><br>$I_F = 20\text{ mA}; t_p = 20\text{ ms}$                         | $V_F$                       | typ.<br>max.                       | 1.3 V<br>1.5 V             |
| Forward voltage <sup>8)</sup><br>$I_F = 500\text{ mA}; t_p = 100\ \mu\text{s}$                    | $V_F$                       | typ.<br>max.                       | 2.4 V<br>2.9 V             |
| Reverse current<br>$V_R = 5\text{ V}$                                                             | $I_R$                       | Not designed for reverse operation |                            |
| Radiant intensity<br>$I_F = 20\text{ mA}; t_p = 20\text{ ms}$                                     | $I_e$                       | typ.                               | 2 mW / sr                  |
| Total radiant flux<br>$I_F = 20\text{ mA}; t_p = 20\text{ ms}$                                    | $\Phi_e$                    | typ.                               | 5.6 mW                     |
| Thermal resistance junction solderpoint real                                                      | $R_{\text{thjs}}$           | typ.<br>max.                       | 120 K/W<br>145 K/W         |

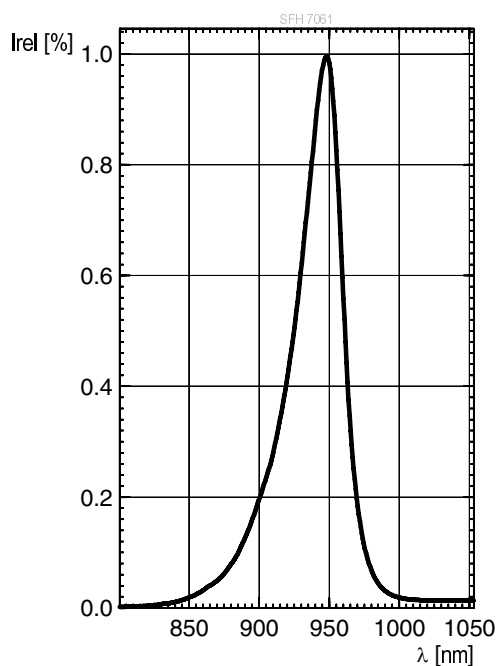
## Characteristics

$T_A = 25\text{ °C}$

| Parameter                                                                                   | Symbol                   |              | Values                   |
|---------------------------------------------------------------------------------------------|--------------------------|--------------|--------------------------|
| Photodiode                                                                                  |                          |              |                          |
| Wavelength of max. sensitivity                                                              | $\lambda_{S\text{ max}}$ | typ.         | 910 nm                   |
| Spectral range of sensitivity                                                               | $\lambda_{10\%}$         | typ.         | 820 ... 1100 nm          |
| Photocurrent<br>$E_e = 0.1\text{ mW/cm}^2$ ; $\lambda = 940\text{ nm}$ ; $VR = 1\text{ V}$  | $I_P$                    | typ.         | 90 nA                    |
| Photocurrent<br>$E_e = 0.1\text{ mW/cm}^2$ ; $\lambda = 940\text{ nm}$ ; $VR = 5\text{ V}$  | $I_P$                    | typ.         | 100 nA                   |
| Radiant sensitive area                                                                      | A                        | typ.         | 0.121 mm <sup>2</sup>    |
| Dimensions of active chip area                                                              | L x W                    | typ.         | 0.348 x 0.348<br>mm x mm |
| Dark current<br>$V_R = 1\text{ V}$ ; $E = 0$                                                | $I_R$                    | typ.<br>max. | 0.1 nA<br>4 nA           |
| Dark current<br>$V_R = 5\text{ V}$ ; $E = 0$                                                | $I_R$                    | typ.<br>max. | 0.4 nA<br>5 nA           |
| Open-circuit voltage<br>$E_e = 0.1\text{ mW/cm}^2$ ; $\lambda = 940\text{ nm}$              | $V_O$                    | typ.         | 225 mV                   |
| Rise time (10%/ 90%)<br>$V_R = 0\text{ V}$ ; $R_L = 50\ \Omega$ ; $\lambda = 940\text{ nm}$ | $t_r$                    | typ.         | 2.2 $\mu\text{s}$        |
| Fall time (10%/ 90%)<br>$V_R = 0\text{ V}$ ; $R_L = 50\ \Omega$ ; $\lambda = 940\text{ nm}$ | $t_f$                    | typ.         | 2.1 $\mu\text{s}$        |
| Rise time (10%/ 90%)<br>$V_R = 5\text{ V}$ ; $R_L = 50\ \Omega$ ; $\lambda = 940\text{ nm}$ | $t_r$                    | typ.         | 0.8 $\mu\text{s}$        |
| Fall time (10%/ 90%)<br>$V_R = 5\text{ V}$ ; $R_L = 50\ \Omega$ ; $\lambda = 940\text{ nm}$ | $t_f$                    | typ.         | 0.75 $\mu\text{s}$       |
| Forward voltage<br>$I_F = 10\text{ mA}$ ; $E = 0$                                           | $V_F$                    | typ..        | 0.9 V                    |
| Capacitance<br>$V_R = 0\text{ V}$ ; $f = 1\text{ MHz}$ ; $E = 0$                            | $C_0$                    | typ.         | 2 pF                     |
| Capacitance<br>$V_R = 5\text{ V}$ ; $f = 1\text{ MHz}$ ; $E = 0$                            | $C_0$                    | typ.         | 1.1 pF                   |

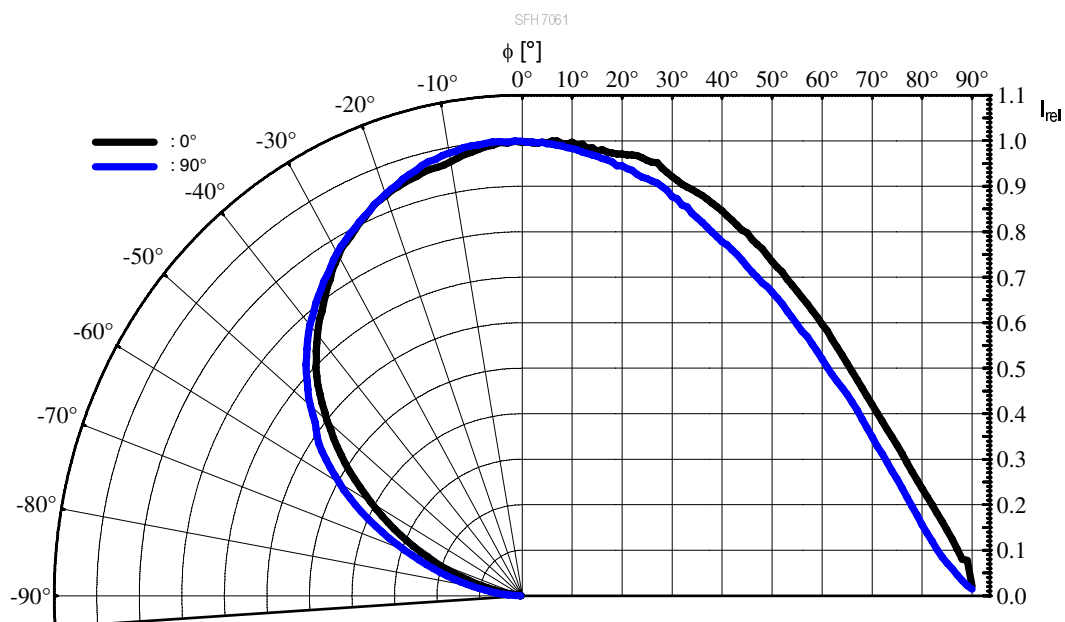
## Relative Spectral Emission <sup>1), 2)</sup>

- infrared (940 nm):  $I_{e,rel} = f(\lambda)$ ;  $I_F = 20 \text{ mA}$ ;  $t_p = 20 \text{ ms}$



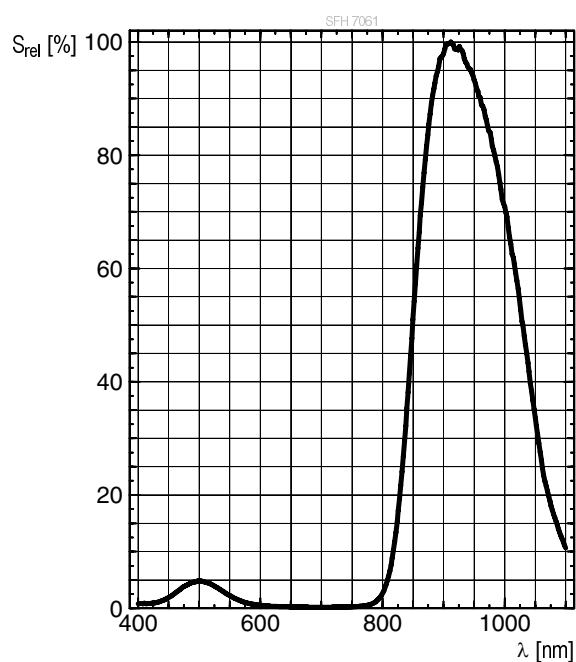
## Radiation Characteristics <sup>1), 2)</sup>

- infrared (940 nm):  $I_{e,rel} = f(\phi)$



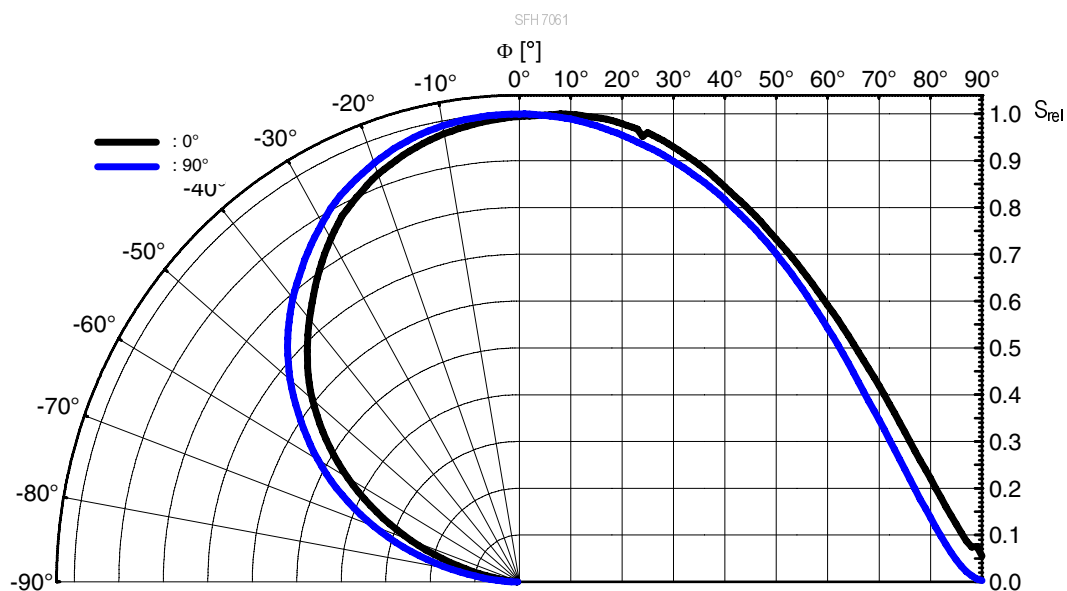
## Relative Spectral Sensitivity <sup>1), 2)</sup>

■ photodiode:  $S_{rel} = f(\lambda)$



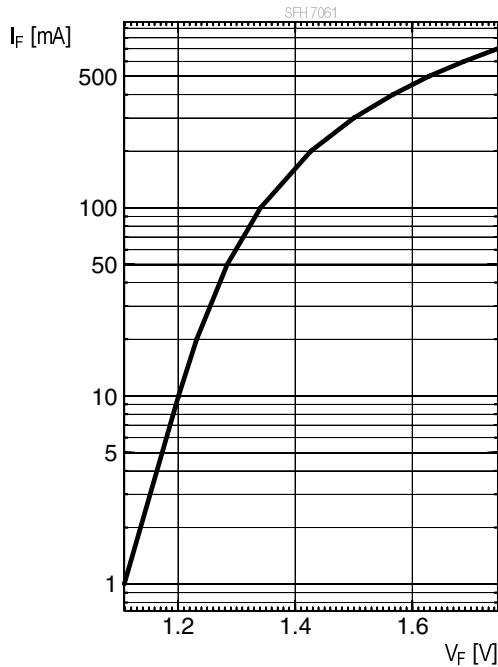
## Directional Characteristics <sup>1), 2)</sup>

■ photodiode:  $S_{rel} = f(\varphi)$



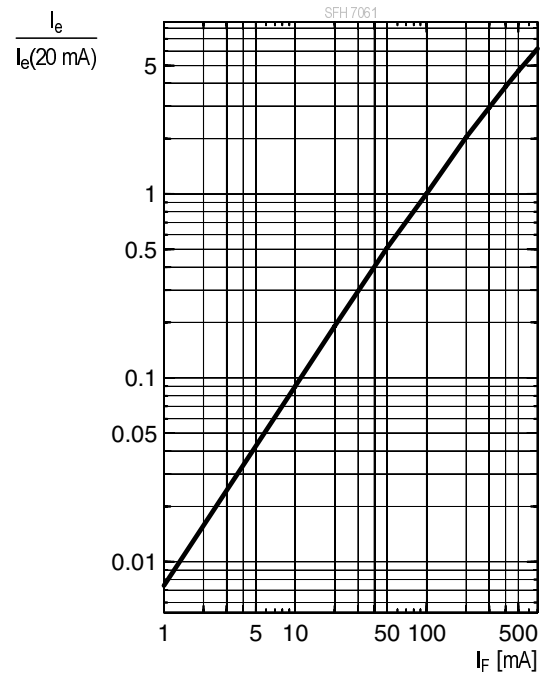
## Forward current <sup>1), 2)</sup>

- infrared (940 nm):  $I_F = f(V_F)$ ;  
single pulse;  $t_p = 100 \mu s$



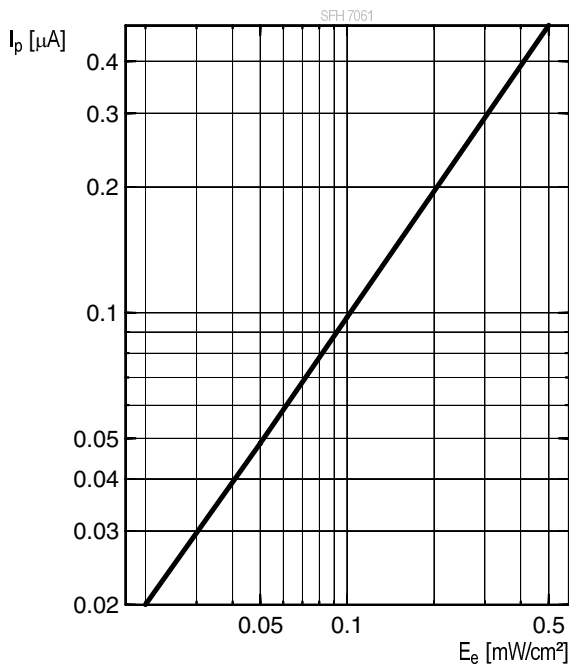
## Relative Radiant Intensity <sup>1), 2)</sup>

- infrared (940 nm):  $I_e/I_e(20mA) = f(I_F)$ ;  
single pulse;  $t_p = 100 \mu s$



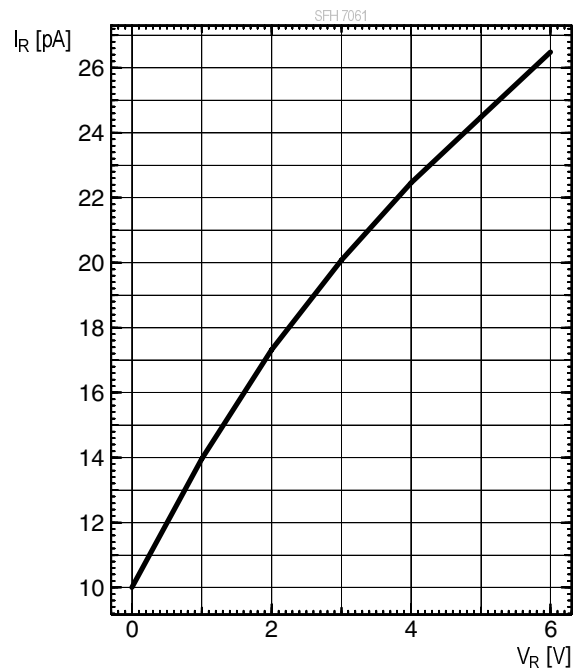
## Photocurrent <sup>1), 2)</sup>

- photodiode:  $I_p = f(E_e)$ ;  $V_R = 5 V$



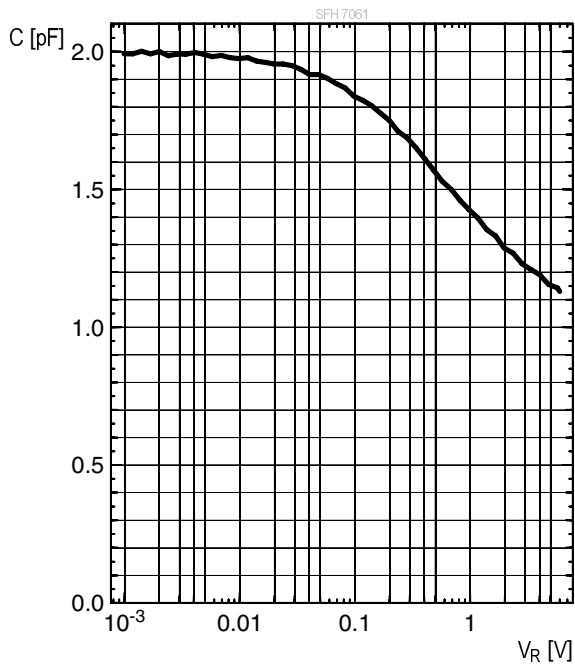
## Dark Current <sup>1), 2)</sup>

- photodiode:  $I_R = f(V_R)$ ;  $E = 0$



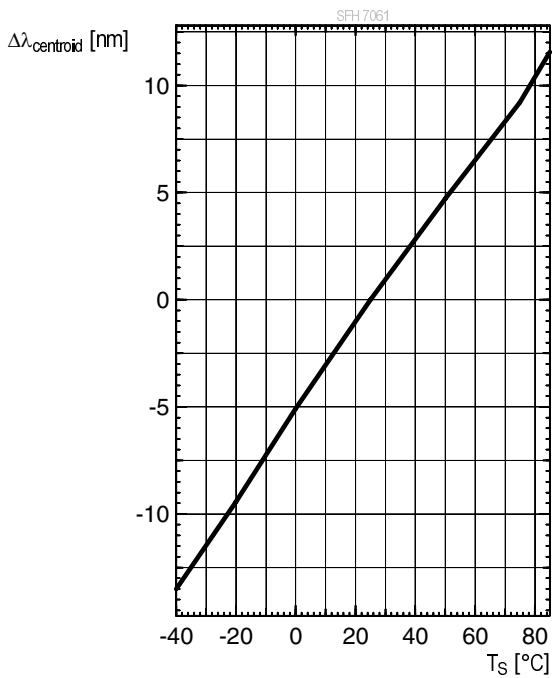
## Capacitance <sup>1), 2)</sup>

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



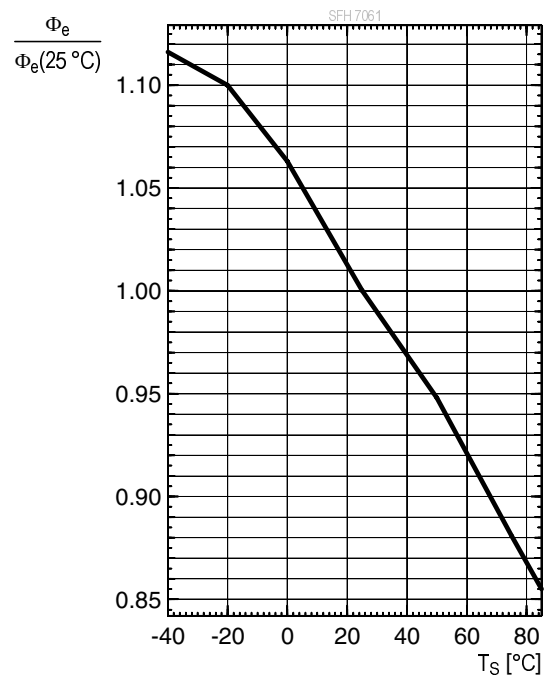
## Centroid Wavelength <sup>1)</sup>

• infrared (940 nm):  $\lambda_{\text{centroid}} = f(T_S)$ ;  $I_F = 20\text{mA}$ ;  $t_p = 20\text{ms}$



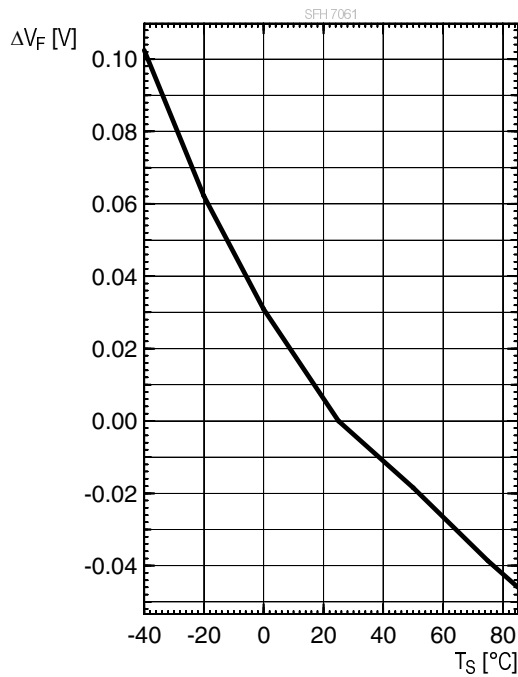
## Relative Total Radiant Flux <sup>1)</sup>

• infrared (940 nm):  $\Phi_{\text{rel}} = f(T_S)$ ;  $I_F = 20\text{mA}$ ;  $t_p = 20\text{ms}$



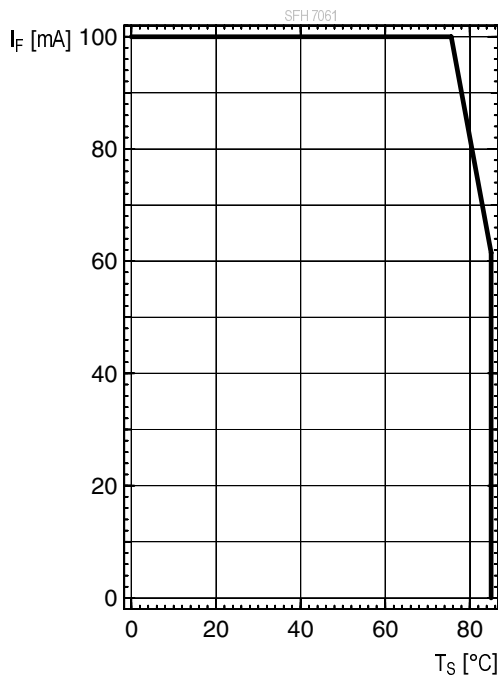
## Forward Voltage <sup>1)</sup>

- infrared (940 nm):  $V_F = f(T_S)$ ;  $I_F = 20\text{mA}$ ;  $t_p = 20\text{ms}$



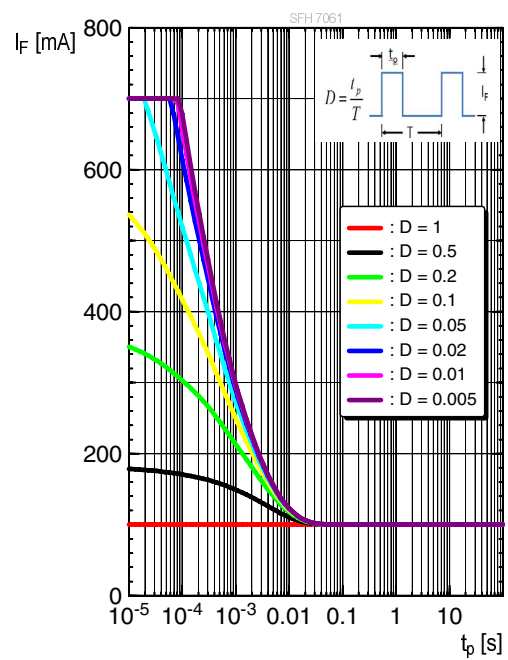
## Max. Permissible Forward Current

- infrared (940 nm):  $I_F = f(T_S)$ ;  $R_{th_{js}} = 145\text{ K/W}$



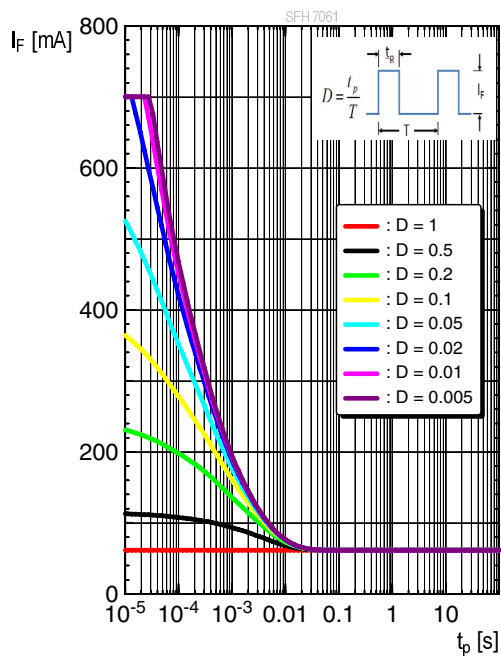
## Permissible Pulse Handling Capability

- infrared (940 nm):  $I_F = f(t_p)$ ;  $D = \text{parameter}$ ;  $T_S = 25\text{ °C}$

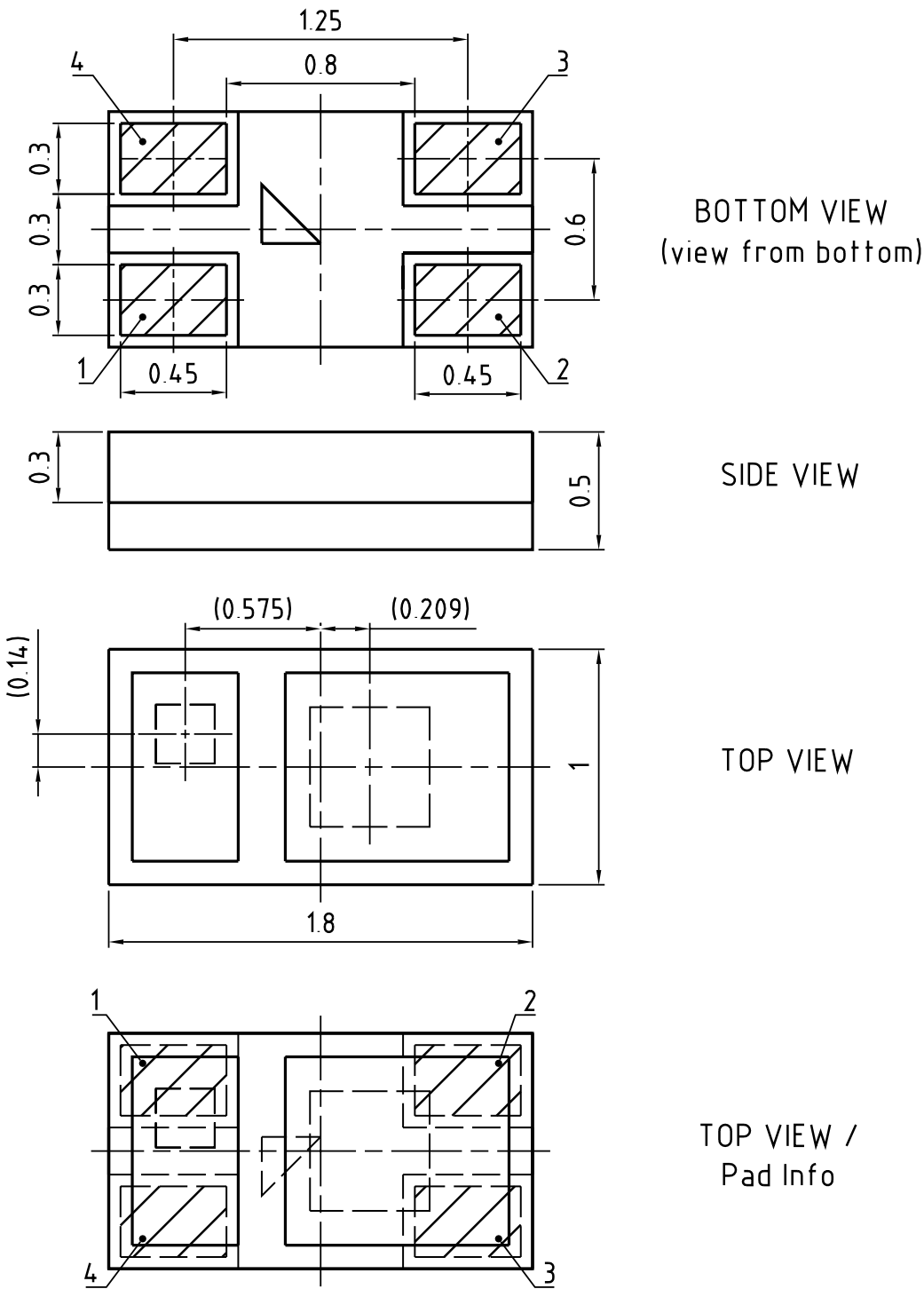


## Permissible Pulse Handling Capability

- infrared (940 nm):  $I_F = f(t_p)$ ;  $D = \text{parameter}$ ;  $T_s = 85\text{ °C}$

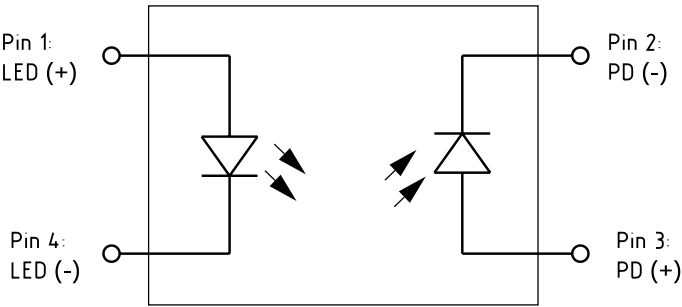


Dimensional Drawing <sup>3)</sup>



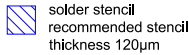
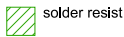
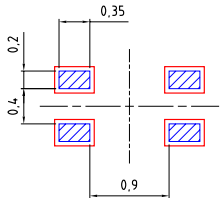
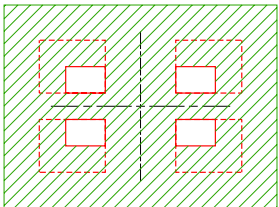
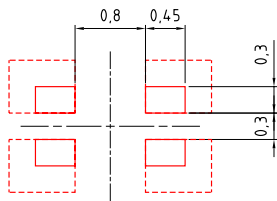
C67062-A0545-A1 -01

Electrical Internal Circuit

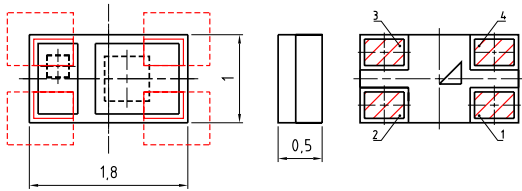


| Pin | Description   |
|-----|---------------|
| 1   | LED (Anode)   |
| 2   | PD (Cathode)  |
| 3   | PD (Anode)    |
| 4   | LED (Cathode) |

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



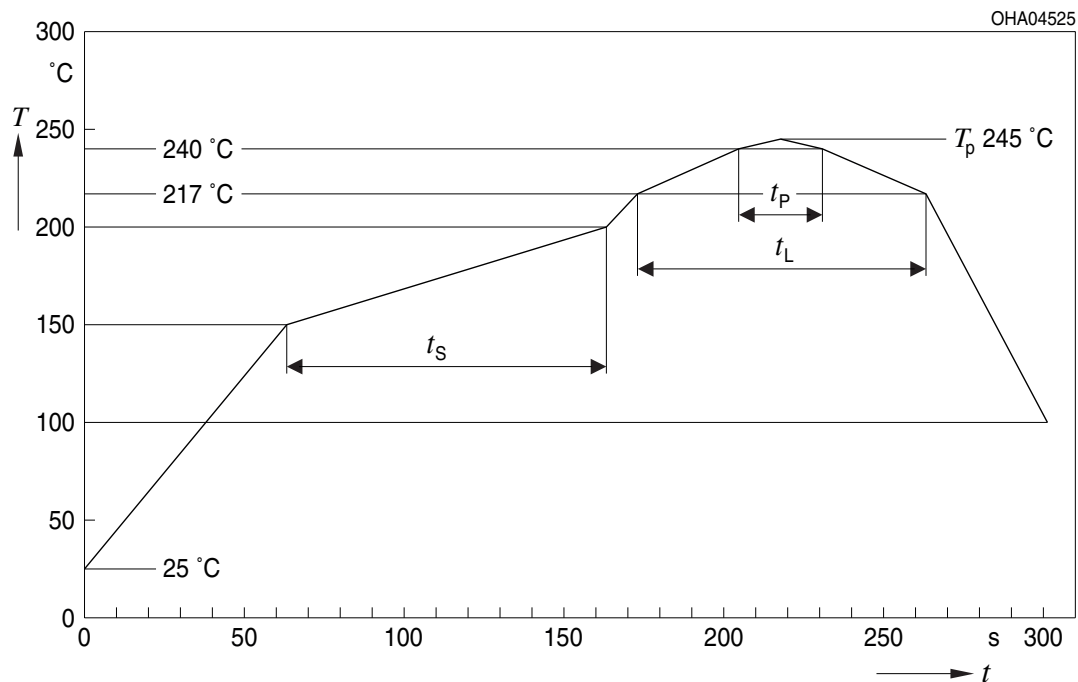
Component Location on Pad



E062.3010.342 -01

## Reflow Soldering Profile

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

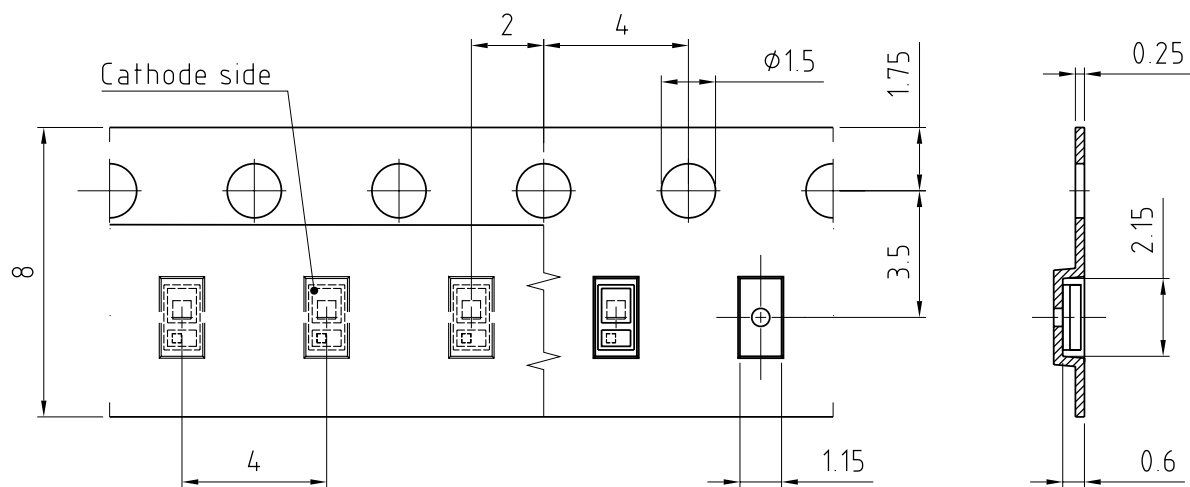


| Profile Feature                                                   | Symbol | Pb-Free (SnAgCu) Assembly |                |         | Unit |
|-------------------------------------------------------------------|--------|---------------------------|----------------|---------|------|
|                                                                   |        | Minimum                   | Recommendation | Maximum |      |
| Ramp-up rate to preheat <sup>*)</sup><br>25 °C to 150 °C          |        |                           | 2              | 3       | K/s  |
| Time $t_s$<br>$T_{Smin}$ to $T_{Smax}$                            | $t_s$  | 60                        | 100            | 120     | s    |
| Ramp-up rate to peak <sup>*)</sup><br>$T_{Smax}$ 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<br>temperature $T_p - 5$ K | $t_p$  | 10                        | 20             | 30      | s    |
| Ramp-down rate*<br>$T_p$ to 100 °C                                |        |                           | 3              | 6       | K/s  |
| Time<br>25 °C to $T_p$                                            |        |                           |                | 480     | s    |

All temperatures refer to the center of the package, measured on the top of the component

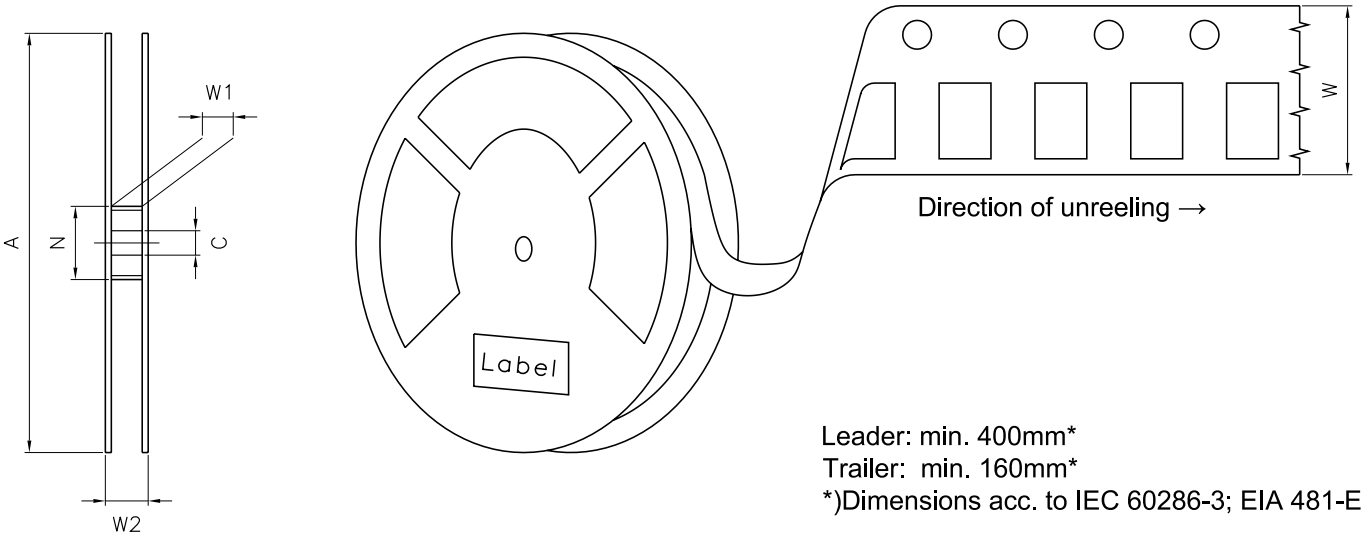
\* slope calculation  $DT/Dt$ :  $Dt$  max. 5 s; fulfillment for the whole T-range

## Taping <sup>3)</sup>



C67062-A0545-B1 -01

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



Reel Dimensions

| A      | W                   | N <sub>min</sub> | W <sub>1</sub> | W <sub>2max</sub> | Pieces per PU |
|--------|---------------------|------------------|----------------|-------------------|---------------|
| 180 mm | 12 + 0.3 / - 0.1 mm | 60 mm            | 12.4 + 2 mm    | 18.4 mm           | 3000          |

## Barcode-Product-Label (BPL)

OSRAM

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

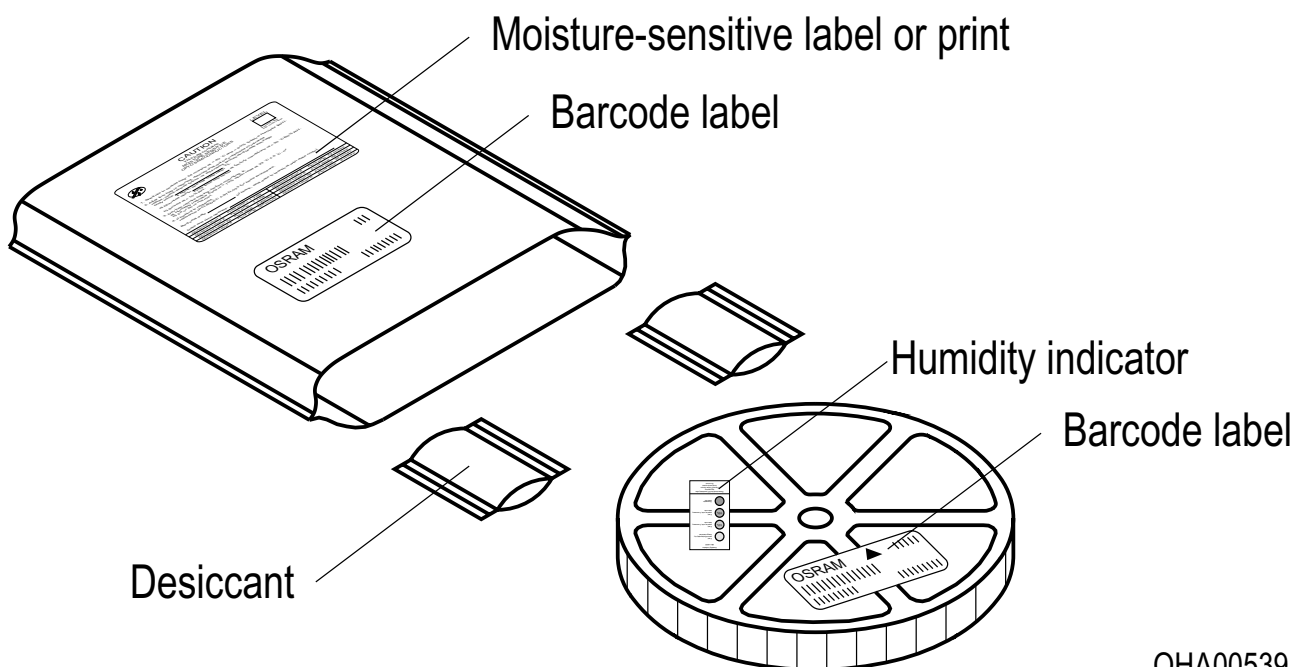
Pack: RXX  
DEMY XXX  
X\_X123\_1234.1234 X






OHA04563

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



OHA00539

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## 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 our 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

Our components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.

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

In case buyer – or customer supplied by buyer – considers using our components in product safety devices/ applications or medical devices/applications, buyer and/or customer has to inform our local sales partner immediately and we and buyer and /or customer will analyze and coordinate the customer-specific request between us and buyer and/or customer.

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## Glossary

- 1) **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.
- 2) **Testing temperature:**  $T_A = 25^{\circ}\text{C}$  (unless otherwise specified)
- 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.
- 5) **Reverse Operation:** This product is intended to be operated applying a forward current within the specified range. Applying any continuous reverse bias or forward bias below the voltage range of light emission shall be avoided because it may cause migration which can change the electro-optical characteristics or damage the LED.
- 6) **Wavelength:** The wavelengths are measured with a tolerance of  $\pm 1$  nm.
- 7) **Brightness:** The brightness values are measured with a tolerance of  $\pm 11\%$ .
- 8) **Forward Voltage:** The forward voltages are measured with a tolerance of  $\pm 0.1$  V.

Revision History

| Version | Date       | Change          |
|---------|------------|-----------------|
| 1.0     | 2025-12-05 | Initial Version |
| 1.1     | 2025-12-17 | Brand           |



EU RoHS and China RoHS compliant product

此产品符合欧盟 RoHS 指令的要求；  
按照中国的相关法规和标准，  
不含有毒有害物质或元素。

**Published by ams-OSRAM AG**

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