

# Red (655 nm) and Infrared Emitter (940 nm)

## Draft Version α.2

---

### SFH 7015



#### Features:

- SMT package with red (655 nm) and IR emitter (940 nm)
- Suitable for SMT assembly
- Available on tape and reel
- Emitters can be controlled separately
- Emitter 1 = red, Emitter 2 = IR

#### Applications

- Biomonitoring

#### Notes

Depending on the mode of operation, these devices emit highly concentrated non visible infrared 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 and IEC 62471.

#### Ordering Information

Type:	Package:	Ordering Code
SFH 7015	SMT Multi CHIPLED	Q65112A7658

**Maximum Ratings**

Parameter	Symbol	Values	Unit
Operating and storage temperature range	$T_{op}; T_{stg}$	-40 ... 85	°C
Reverse voltage	$V_R$	5	V
ESD withstand voltage (acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM)	$V_{ESD}$	2	kV

**Emitter 1 (red)**

Forward current	$I_F$ (DC)	40	mA
Surge current ( $t_p \leq 400 \mu s$ , $D = 0.005$ )	$I_{FSM}$	0.6	A
Power consumption	$P_{tot}$	120	mW

**Emitter 2 (IR)**

Forward current	$I_F$ (DC)	60	mA
Surge current ( $t_p \leq 200 \mu s$ , $D = 0.005$ )	$I_{FSM}$	1	A
Total power dissipation	$P_{tot}$	110	mW

**Note:** The stated maximum ratings refer to one chip, unless otherwise specified.

**Characteristics ( $T_A = 25 \text{ °C}$ )**

Parameter	Symbol	Values	Unit
<b>Emitter 1 (red)</b>			
Peak wavelength ( $I_F = 20 \text{ mA}$ , $t_p = 20 \text{ ms}$ )	(typ) $\lambda_{peak}$	660	nm
Centroid wavelength ( $I_F = 20 \text{ mA}$ , $t_p = 20 \text{ ms}$ )	(typ) $\lambda_{centroid}$	655	nm
Spectral bandwidth at 50% of $I_{max}$ ( $I_F = 20 \text{ mA}$ , $t_p = 20 \text{ ms}$ )	(typ) $\Delta\lambda$	17	nm
Half angle	(typ) $\varphi$	$\pm 60$	°
Dimensions of active chip area	(typ) L x W	0.3 x 0.3	mm x mm
Rise and fall time of $I_e$ ( 10% and 90% of $I_{e,max}$ ) ( $I_F = 100 \text{ mA}$ , $R_L = 50 \Omega$ )	(typ) $t_r, t_f$	17	ns
Forward voltage ( $I_F = 20 \text{ mA}$ , $t_p = 20 \text{ ms}$ )	max typ min $V_F$	2.80 2.10 1.65	V

Parameter		Symbol	Values	Unit
Reverse current ( $V_R = 5\text{ V}$ )		$I_R$	not designed for reverse operation	$\mu\text{A}$
Total radiant flux ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(typ)	$\Phi_e$	13	mW
Radiant intensity ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(typ)	$I_{e, \text{typ}}$	4	mW/sr
Radiant intensity ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(min)	$I_{e, \text{min}}$	2	mW / sr
Temperature coefficient of $I_e$ or $\Phi_e$ ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(typ)	$TC_I$	-0.7	% / K
Temperature coefficient of $V_F$ ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(typ)	$TC_V$	-1.7	mV / K
Temperature coefficient of wavelength ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(typ)	$TC_\lambda$	0.18	nm / K
Thermal resistance junction - ambient, mounted on PC-board (FR4) <sup>1) page 16</sup>	(max)	$R_{\text{thJA}}$	590	K / W

**Emitter 2 (IR)**

Peak emission wavelength ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(typ)	$\lambda_{\text{peak}}$	950	nm
Centroid wavelength ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(typ)	$\lambda_{\text{centroid}}$	940	nm
Spectral bandwidth at 50% of $I_{\text{max}}$ ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(typ)	$\Delta\lambda$	42	nm
Half angle	(typ)	$\varphi$	$\pm 60$	$^\circ$
Dimensions of active chip area	(typ)	L x W	0.3 x 0.3	mm x mm
Rise and fall times of $I_e$ ( 10% and 90% of $I_{e, \text{max}}$ ) ( $I_F = 100\text{ mA}$ , $R_L = 50\ \Omega$ )	(typ)	$t_r / t_f$	16	ns
Forward voltage ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	max typ min	$V_F$	1.6 1.3 1.0	V
Reverse current	(typ (max))	$I_R$	not designed for reverse operation	$\mu\text{A}$
Total radiant flux ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(typ)	$\Phi_e$	10	mW
Radiant intensity ( $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$ )	(typ)	$I_{e, \text{typ}}$	3	mW/sr

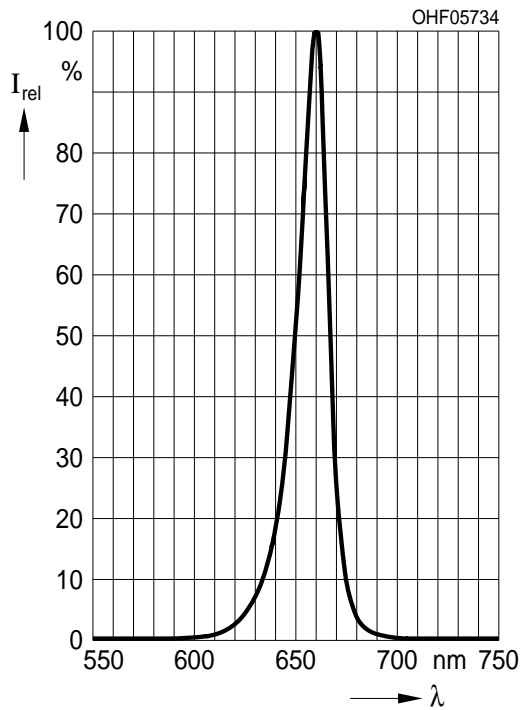
Parameter		Symbol	Values	Unit
Radiant intensity ( $I_F = 20 \text{ mA}$ , $t_p = 20 \text{ ms}$ )	(min)	$I_{e, \text{min}}$	1.5	mW/sr
Temperature coefficient of $I_e$ or $\Phi_e$ ( $I_F = 20 \text{ mA}$ , $t_p = 20 \text{ ms}$ )	(typ)	$TC_I$	-0.3	% / K
Temperature coefficient of $V_F$ ( $I_F = 20 \text{ mA}$ , $t_p = 20 \text{ ms}$ )	(typ)	$TC_V$	-0.8	mV / K
Temperature coefficient of wavelength ( $I_F = 20 \text{ mA}$ , $t_p = 20 \text{ ms}$ )	(typ)	$TC_\lambda$	0.3	nm / K
Thermal resistance junction - ambient, mounted on PC-board (FR4) <sup>1) page 16</sup>	(max)	$R_{\text{thJA}}$	670	K / W

Diagrams

Emitter 1 (red)

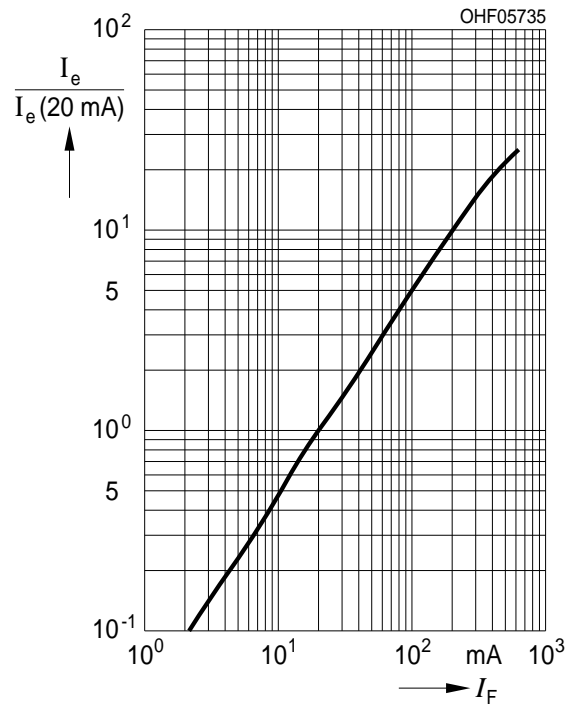
Relative Spectral Emission <sup>2) page 16</sup>

$I_{rel} = f(\lambda), T_A = 25^\circ\text{C}$



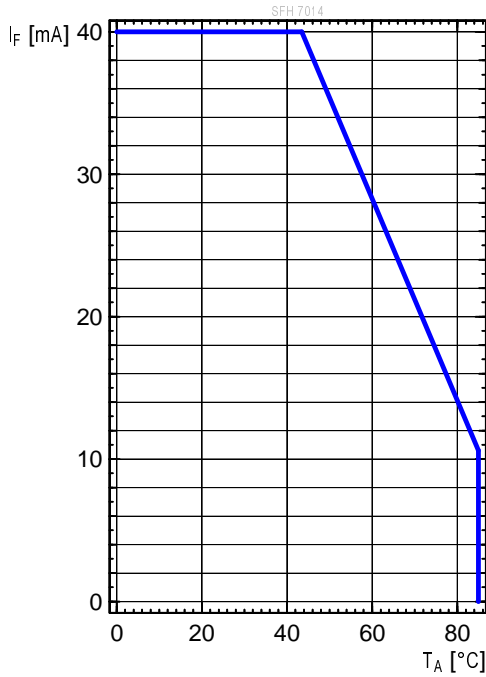
Radiant Intensity <sup>2) page 16</sup>

$I_e / I_e(20\text{ mA}) = f(I_F), \text{ single pulse, } t_p = 25\ \mu\text{s}, T_A = 25^\circ\text{C}$



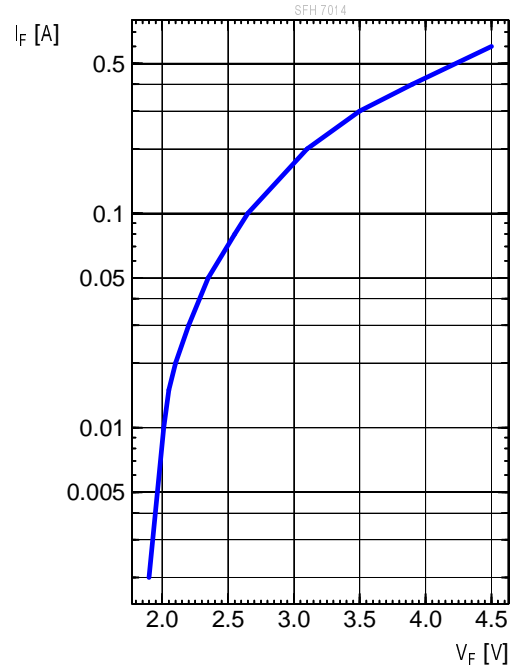
**Max. Permissible Forward Current**

$I_{F, \max} = f(T_A), R_{thJA} = 590 \text{ K/W}$



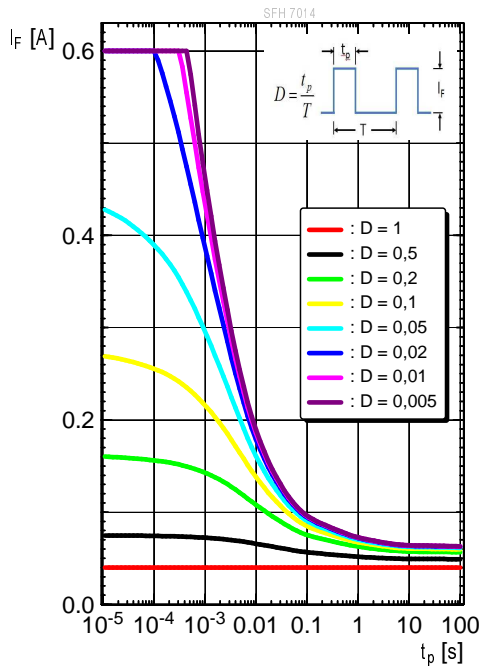
**Forward Current** <sup>2) page 16</sup>

$I_F = f(V_F)$ , single pulse,  $t_p = 100 \mu\text{s}$ ,  $T_A = 25^\circ\text{C}$



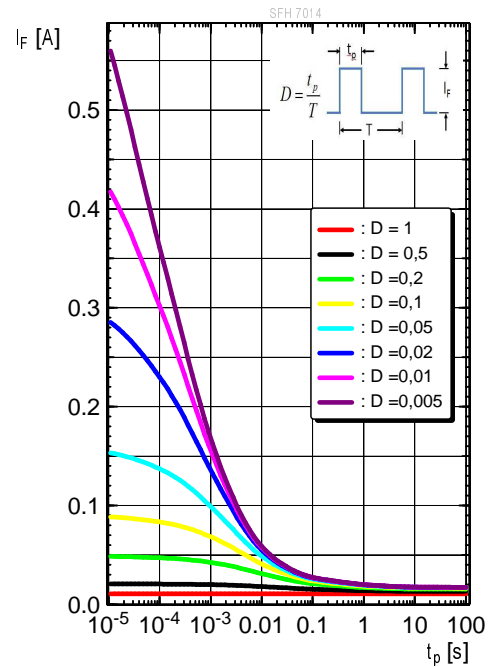
**Permissible Pulse Handling Capability**

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



**Permissible Pulse Handling Capability**

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

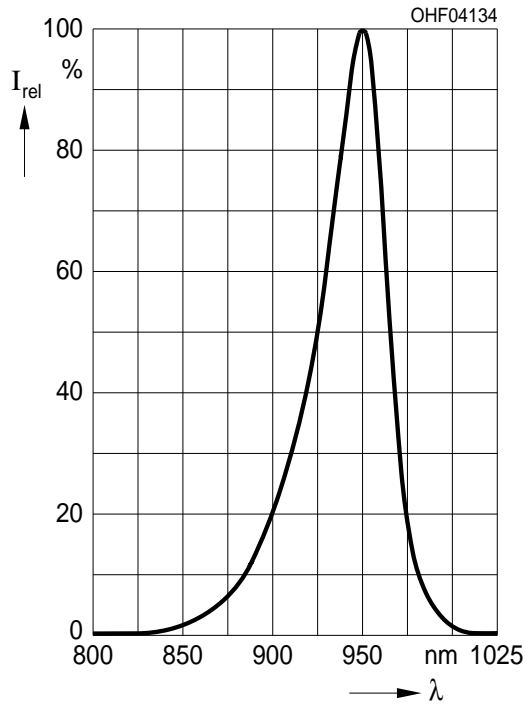


Diagrams

Emitter 2 (IR)

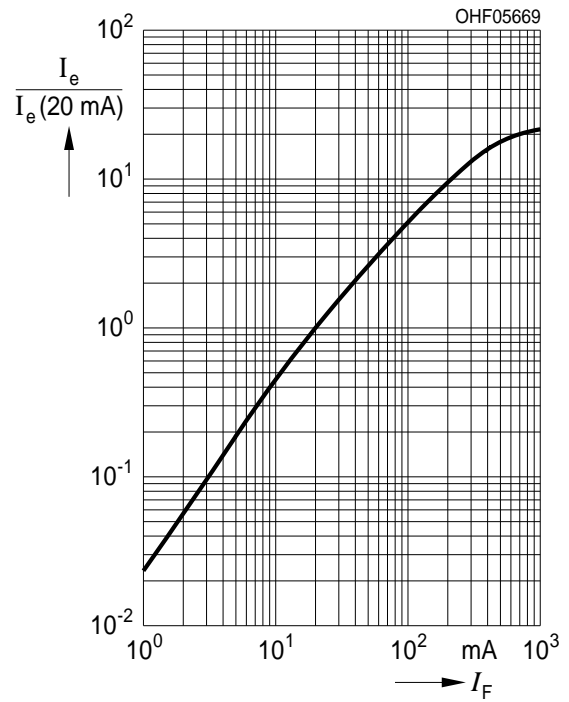
Relative Spectral Emission <sup>2) page 16</sup>

$I_{rel} = f(\lambda), T_A = 25^\circ C$



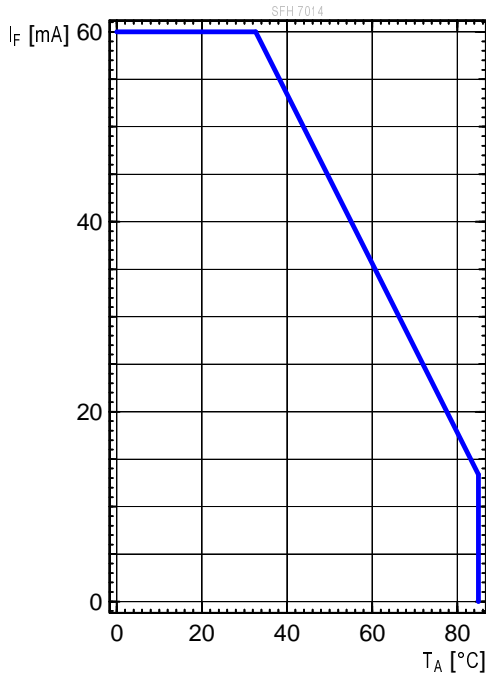
Radiant Intensity <sup>2) page 16</sup>

$I_e / I_e(20 \text{ mA}) = f(I_F), \text{ single pulse, } t_p = 100 \mu s, T_A = 25^\circ C$



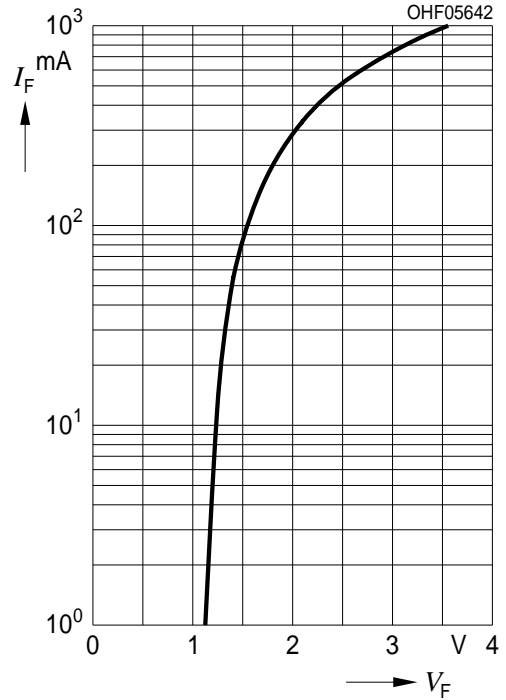
**Max. Permissible Forward Current**

$I_{F,max} = f(T_A), R_{thJA} = 670 \text{ K/W}$



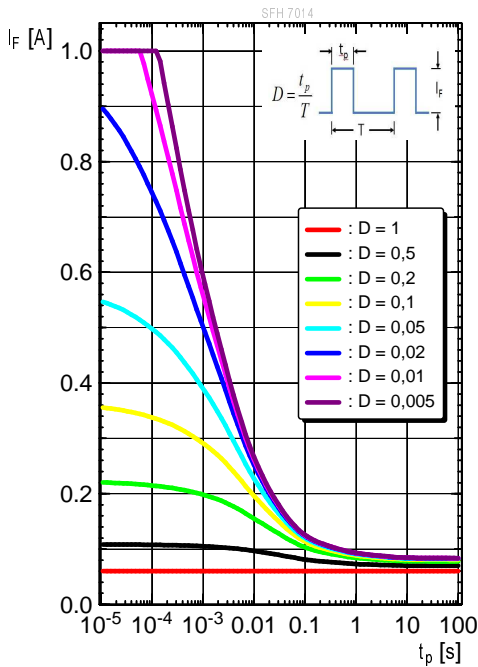
**Forward Current** <sup>2) page 16</sup>

$I_F = f(V_F), \text{ single pulse, } t_p = 100 \mu\text{s}, T_A = 25^\circ\text{C}$



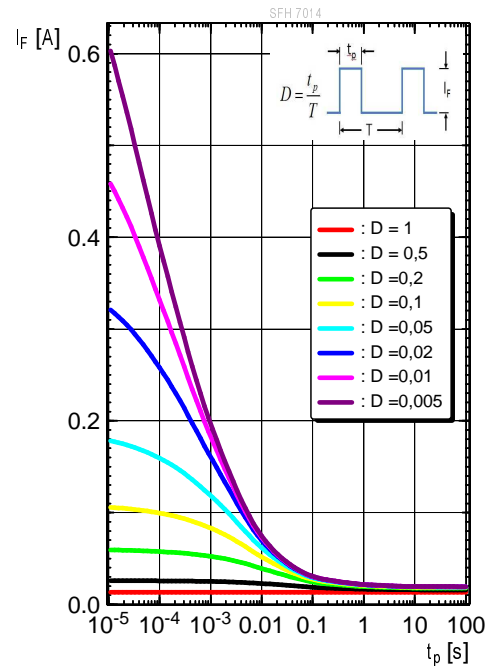
**Permissible Pulse Handling Capability**

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



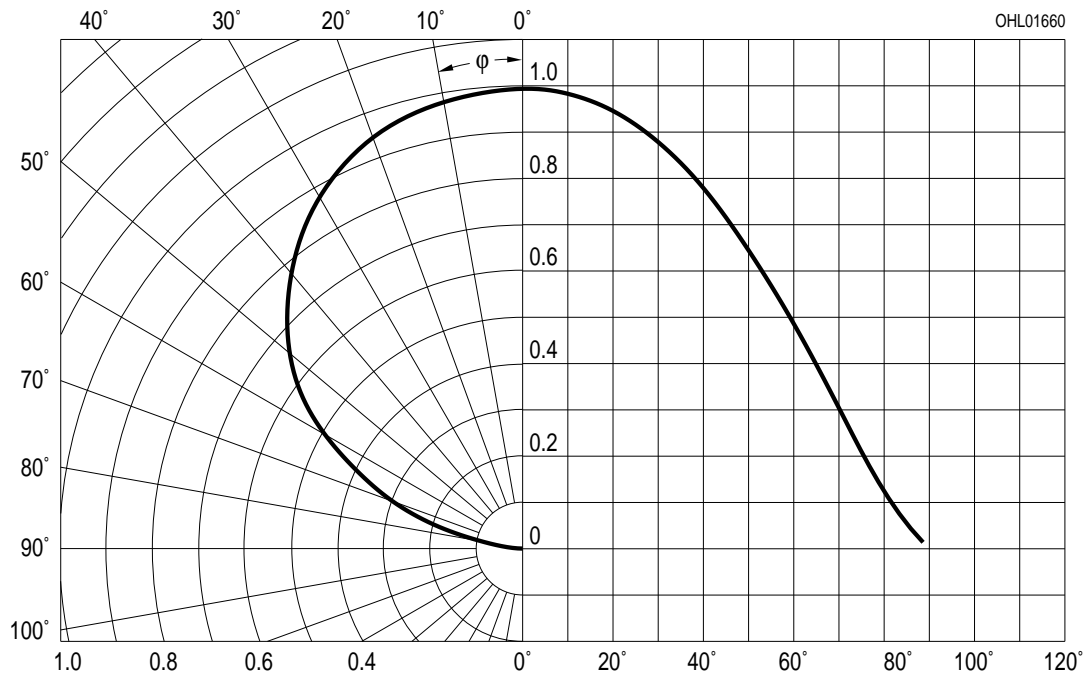
**Permissible Pulse Handling Capability**

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

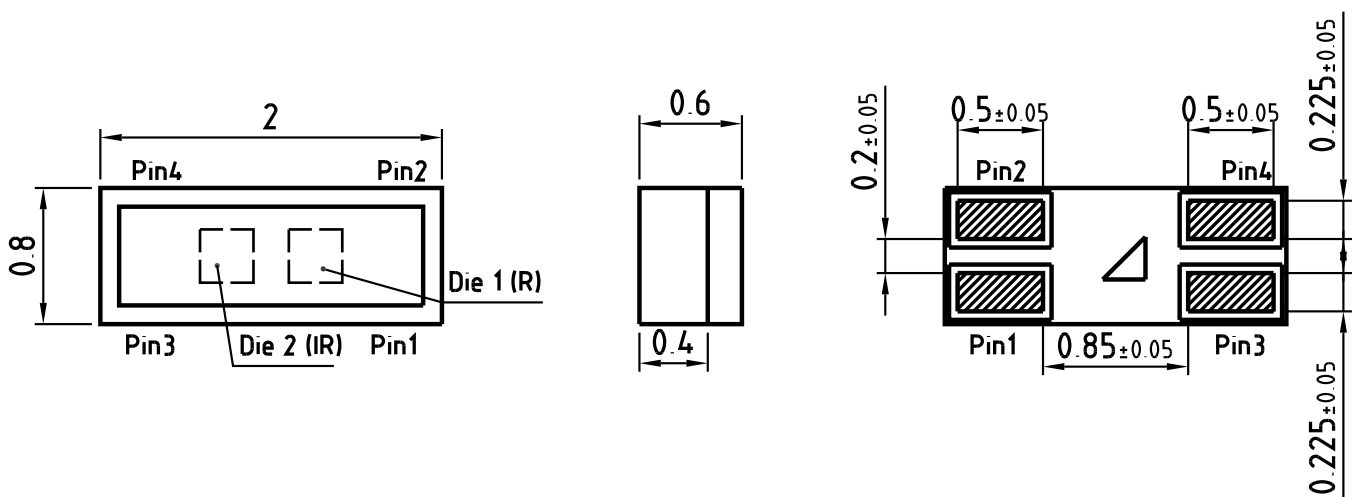


**Radiation Characteristics** <sup>2) page 16</sup>

$I_{rel} = f(\phi), T_A = 25^\circ\text{C}$



**Package Outline**



general tolerance  $\pm 0.1$   
lead finish Au

C67062-A0309-A1-01

Dimensions in mm.

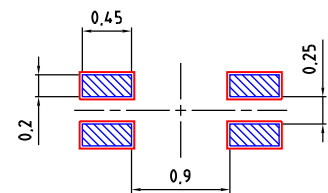
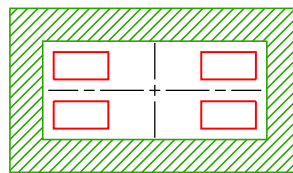
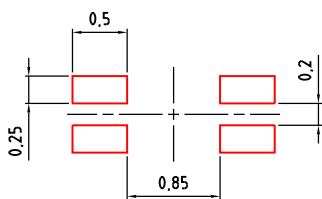
**Pinning**

Pin	Description
1	NC
2	Cathode Emitter 1 (655 nm)
3	Anode Emitter 1/2
4	Cathode Emitter 2 (940 nm)


**Approximate Weight:**


3 mg

**Recommended Solder Pad**

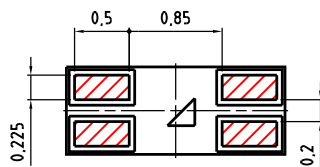
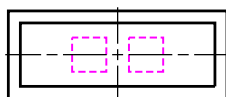


 foot print

 solder resist

 solder stencil

Component Location on Pad

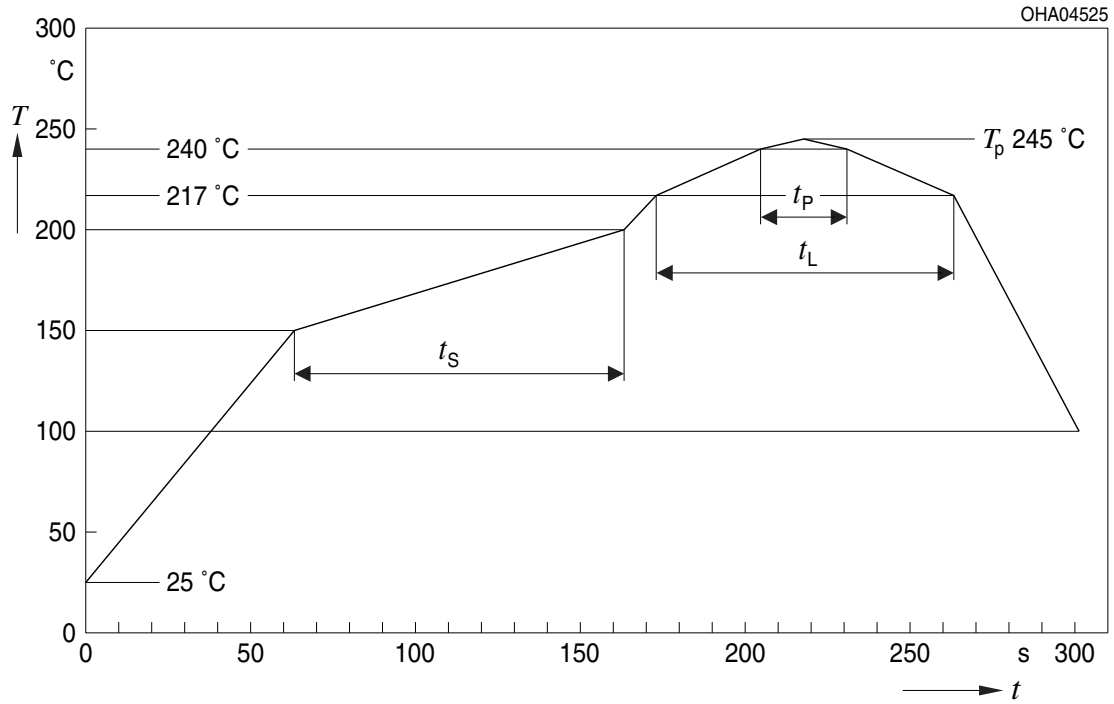


E062.3010.260 -02

Dimensions in mm.

**Reflow Soldering Profile**

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



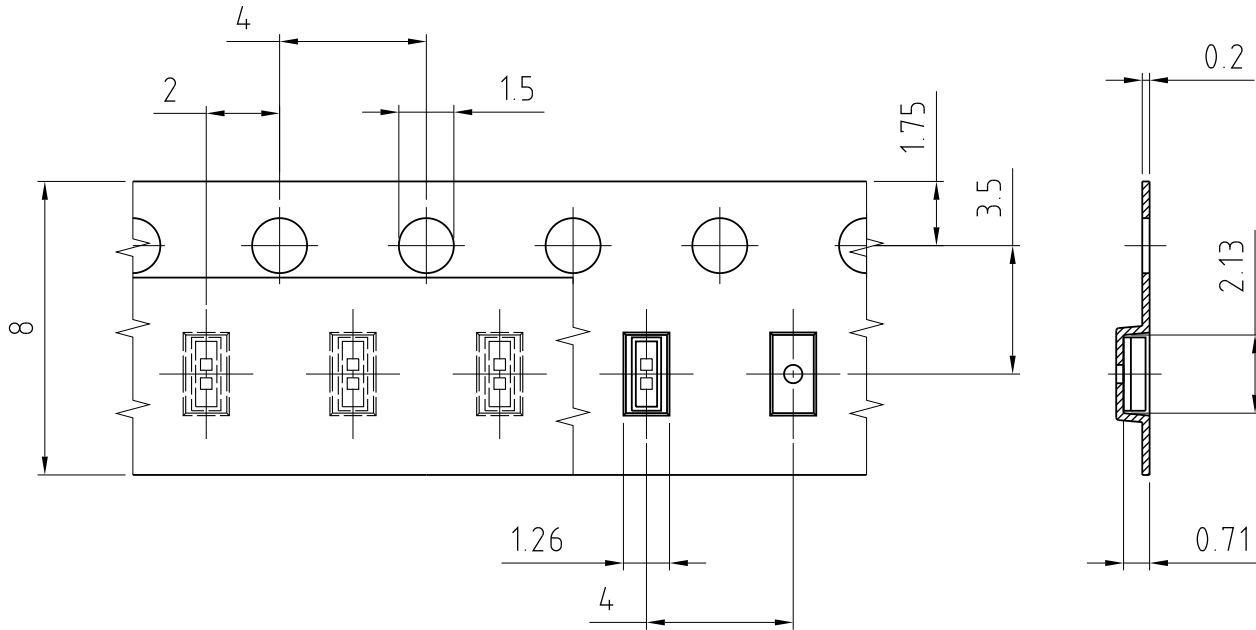
OHA04612

Profil-Charakteristik Profile Feature	Symbol Symbol	Pb-Free (SnAgCu) Assembly			Einheit 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

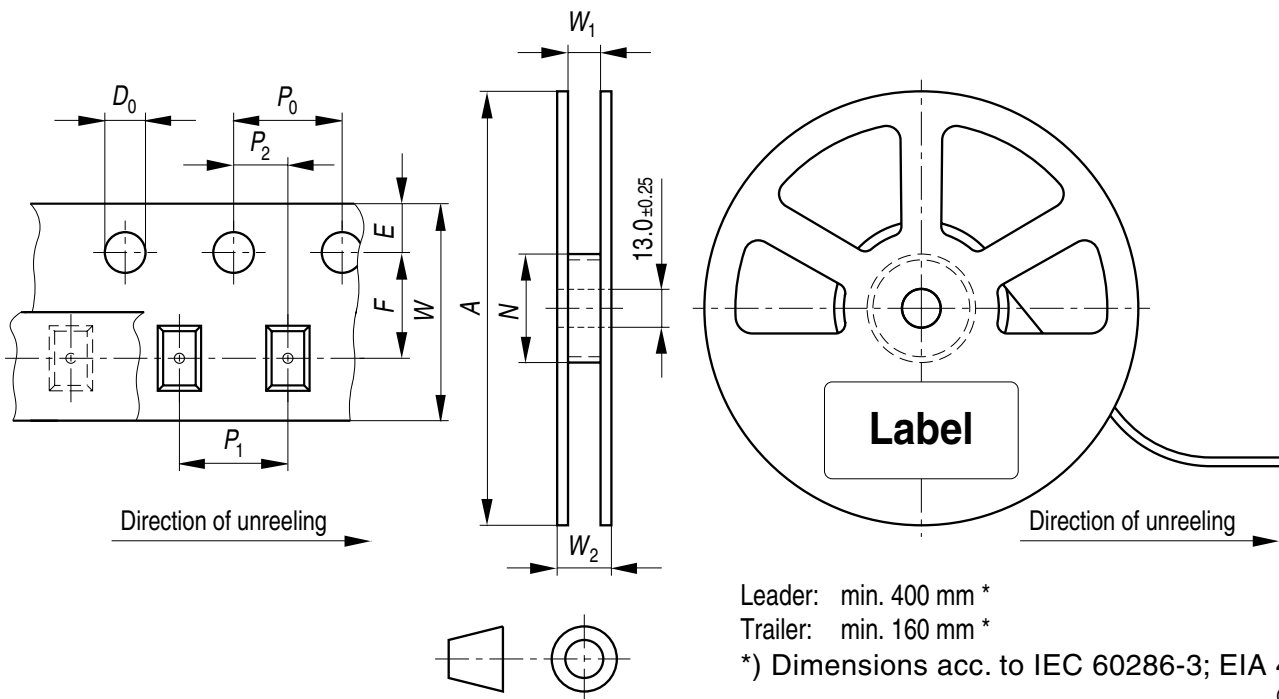


C67062-A0309-B1-01

Dimensions in mm.

Tape and Reel

8 mm tape with 3000 pcs. on Ø 180 mm reel



Leader: min. 400 mm \*

Trailer: min. 160 mm \*

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

OHAY0324

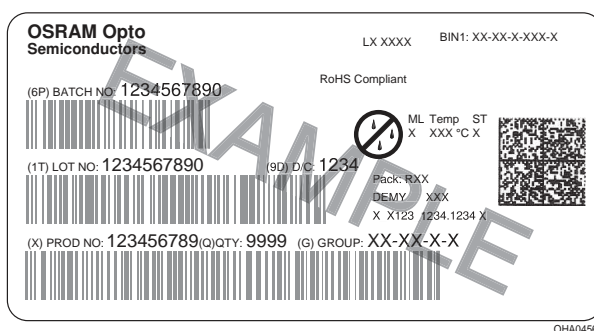
Tape dimensions [mm]

W	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	D <sub>0</sub>	E	F
8 + 0.3 / -0.1	4 ± 0.1	2 ± 0.05 or 4 ± 0.1	2 ± 0.05	1.5 ± 0.1	1.75 ± 0.1	3.5 ± 0.05

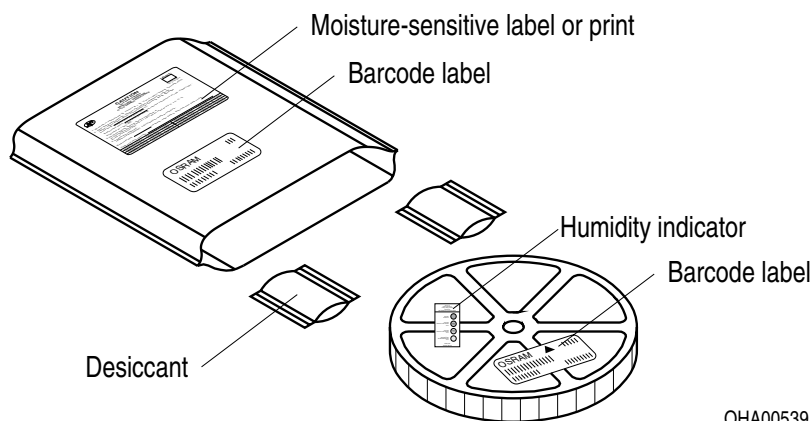
Reel dimensions [mm]

A	W	N <sub>min</sub>	W <sub>1</sub>	W <sub>2max</sub>
180	8	60	9	11.4

Barcode-Product-Label (BPL)



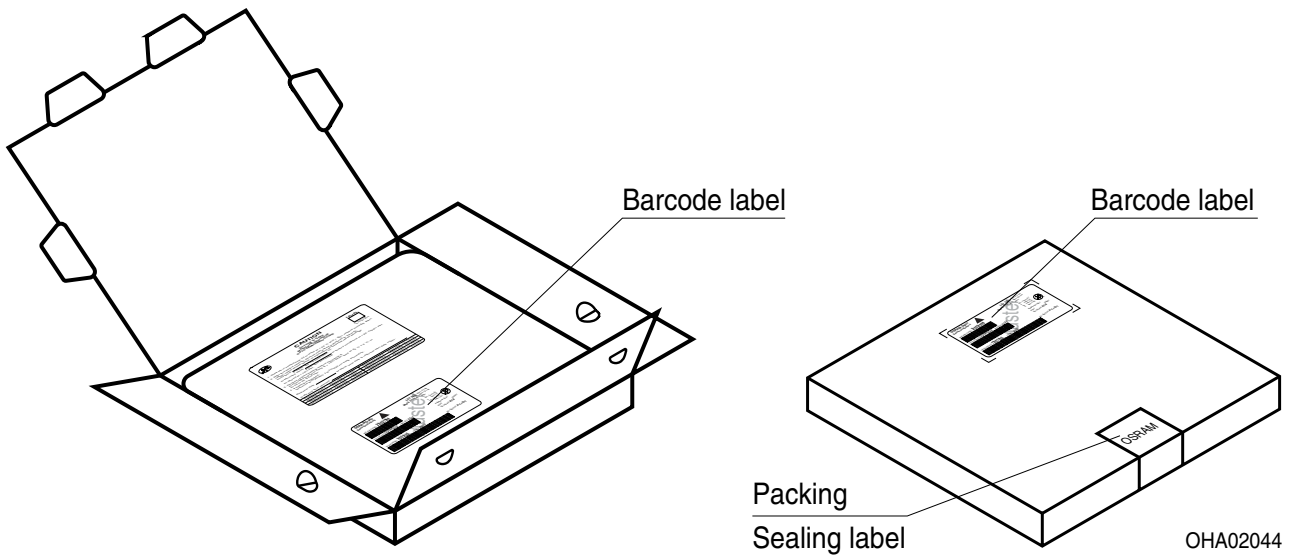
Dry Packing Process and Materials



Note:

Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card. Regarding dry pack you will find further information in the internet. Here you will also find the normative references like JEDEC.

Transportation Packing and Materials



Dimensions of transportation box in mm

Width	Length	Height
191 ± 5	195 ± 5	30 ± 5

**Disclaimer**

OSRAM OS assumes no liability whatsoever for any use of this document or its content by recipient including, but not limited to, for any design in activities based on this preliminary draft version. OSRAM OS may e.g. decide at its sole discretion to stop developing and/or finalising the underlying design at any time.

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 Internet.

**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.

**Components used in life-support devices or systems must be expressly authorized for such purpose!**

Critical components\* may only be used in life-support devices\*\* or systems with the express written approval of OSRAM OS.

\*) A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or the effectiveness of that device or system.

\*\*) Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health and the life of the user may be endangered.

DRAFT - Subject to Review

## Glossary

- 1) only one chip on
- 2) **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.

Published by OSRAM Opto Semiconductors GmbH  
Leibnizstraße 4, D-93055 Regensburg  
www.osram-os.com © All Rights Reserved.

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。