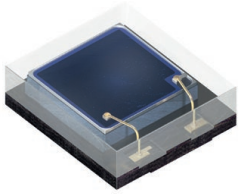
SFH 2704

CHIPLED®

Silicon PIN Photodiode



Applications

- Health Monitoring (Heart Rate Monitoring, Pulse Oximetry)

Features:

- Package: clear epoxy
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- Suitable for reflow soldering
- Especially suitable for applications from 400 nm to 1100 nm
- Small package (LxWxH): 2.0 mm x 1.8 mm x 0.6 mm (WxDxH)

Ordering Information

Type	Photocurrent E_e = 0.1 mW/cm²; λ = 535 nm I_P	Photocurrent typ. E_e = 0.1 mW/cm²; λ = 535 nm I_P	Ordering Code
SFH 2704	≥ 0.35 µA	0.51 µA	Q65112A7214

Preliminary datasheet version

Maximum Ratings

T_A = 25 °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	V_R	max.	6 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}	max.	2 kV

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Characteristics

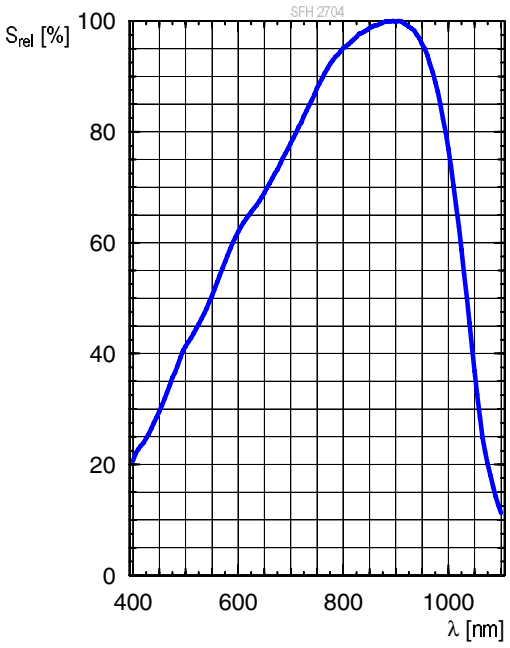
T_A = 25 °C

Parameter	Symbol		Values
Photocurrent E_e = 0.1 mW/cm²; λ = 535 nm; V_R = 5 V	I_P	min. typ.	0.35 µA 0.51 µA
Photocurrent E_e = 0.1 mW/cm²; λ = 940 nm; V_R = 5 V	I_P	min. typ.	0.85 µA 1.22 µA
Wavelength of max sensitivity	$\lambda_{S\ max}$	typ.	900 nm
Spectral range of sensitivity	$\lambda_{10\%}$	typ.	400 ... 1100 nm
Radiant sensitive area	A	typ.	1.51 mm²
Dimensions of active chip area	L x W	typ.	1.23 x 1.23 mm x mm
Half angle	φ	typ.	60 °
Dark current V_R = 5 V	I_R	typ. max.	0.1 nA 25 nA
Spectral sensitivity of the chip λ = 535 nm	S_λ	typ.	0.34 A / W
Quantum yield of the chip λ = 535 nm	η	typ.	0.79 Electrons / Photon
Open-circuit voltage E_e = 0.1 mW/cm²; λ = 535 nm; V_R = 5 V	V_O	min. typ.	490 mV 510 mV
Rise time V_R = 5 V; R_L = 50 Ω; λ = 525 nm; I_P = 600 µA	t_r	typ.	47 ns
Fall time V_R = 5 V; R_L = 50 Ω; λ = 525 nm; I_P = 600 µA	t_f	typ.	67 ns
Forward voltage I_F = 10 mA; E = 0	V_F	typ.	0.95 V
Capacitance V_R = 0 V; f = 1 MHz; E = 0	C_0	typ.	13.4 pF
Noise equivalent power V_R = 5 V; λ = 535 nm	NEP	typ.	0.017 pW / $Hz^{1/2}$
Detection limit V_R = 5 V; λ = 535 nm	D*	typ.	7.4e12 cm x $Hz^{1/2}$ / W

Preliminary datasheet version

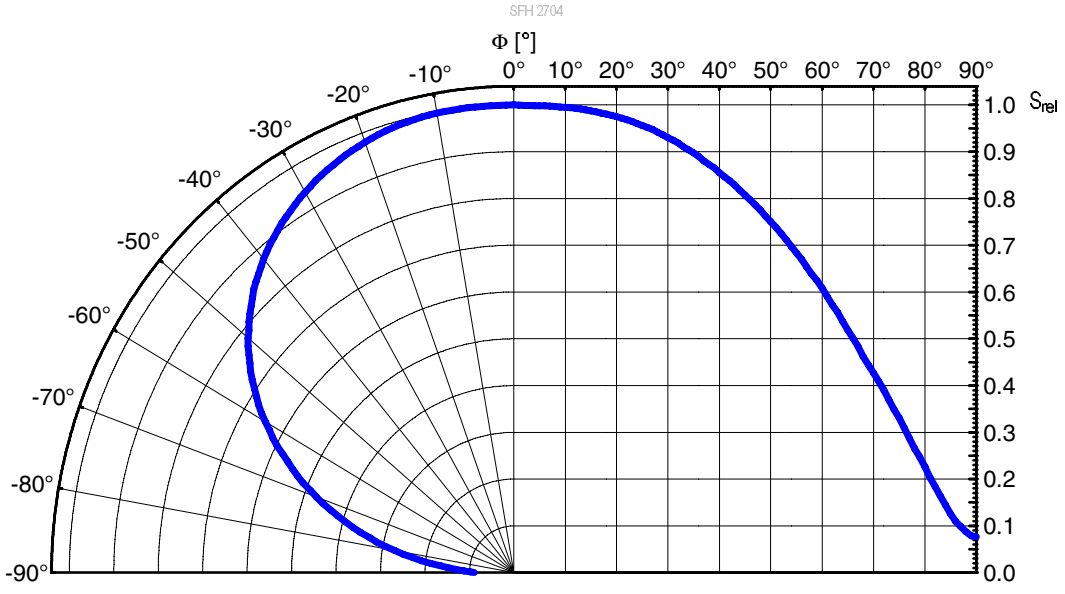
Relative Spectral Sensitivity [1), 2)]

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



Directional Characteristics [1), 2)]

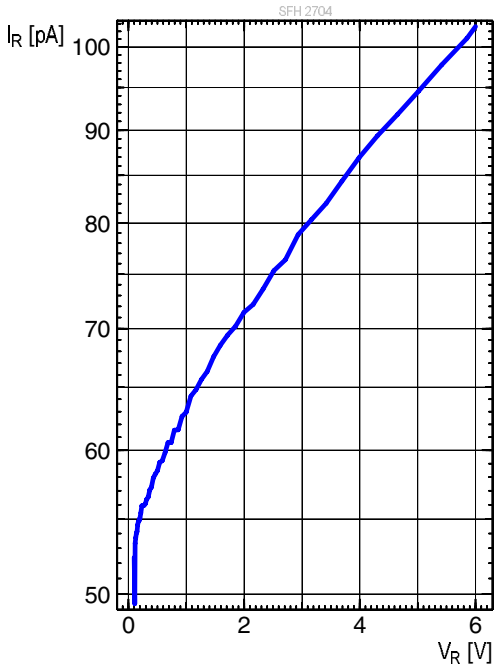
$S_{rel} = f(\varphi)$



Preliminary datasheet version

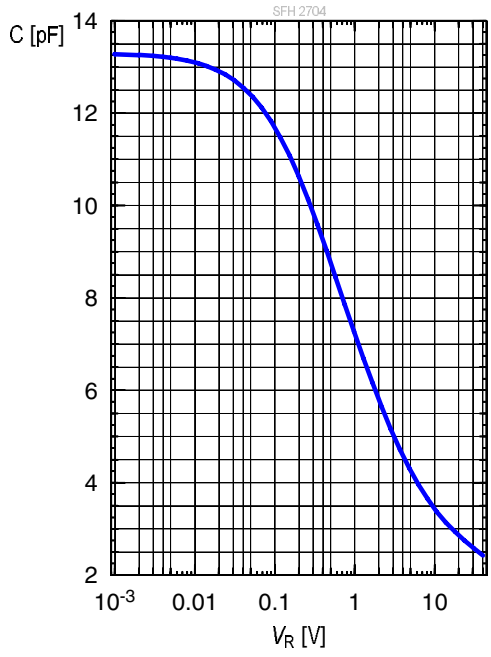
Dark Current [1), 2)]

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



Capacitance [1), 2)]

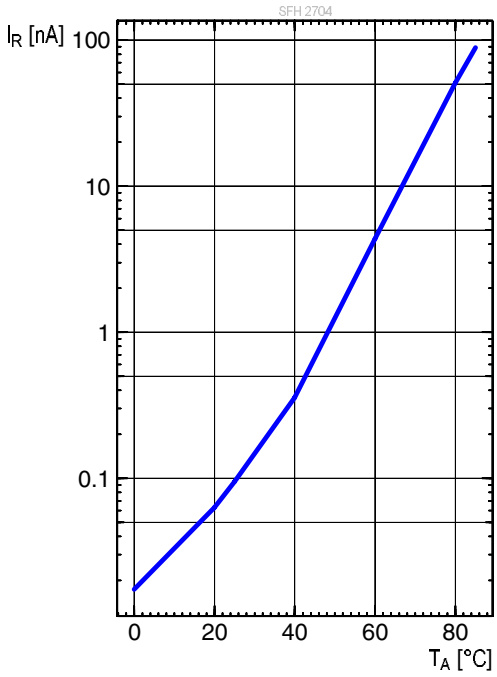
$C = f(V_R)$; f = 1 MHz; E = 0;



Preliminary datasheet version

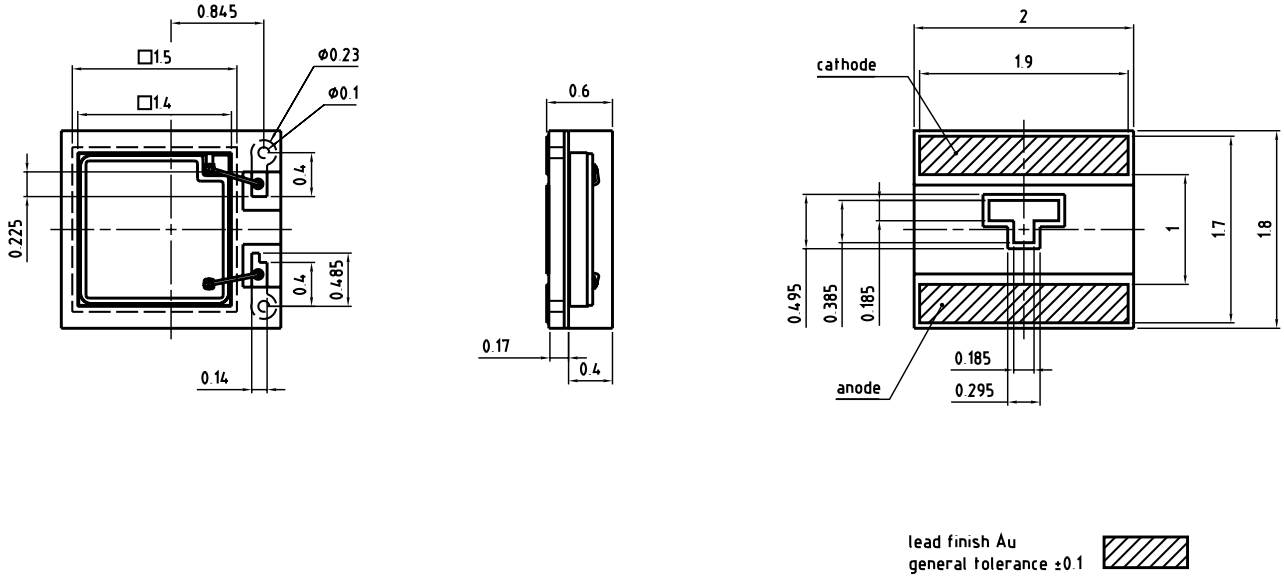
Dark Current [1)]

$I_R = f(T_A)$; E = 0; V_R = 5 V



Preliminary datasheet version

Dimensional Drawing [3)]

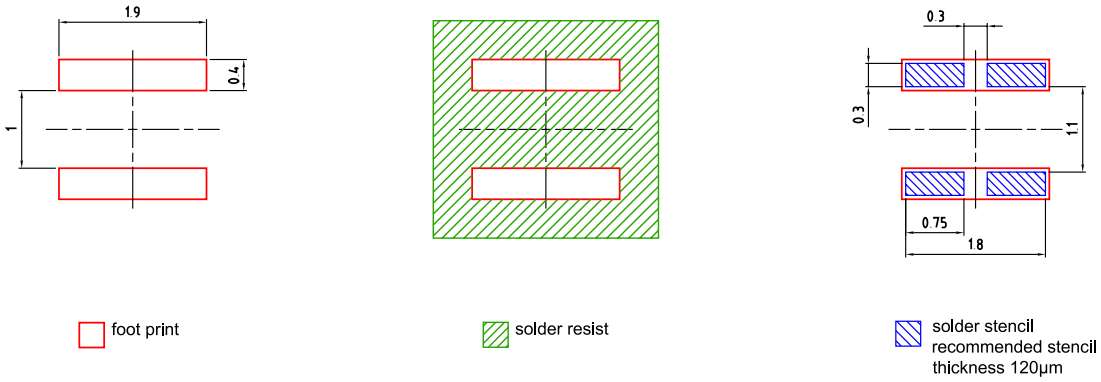


Approximate Weight: 4.4 mg

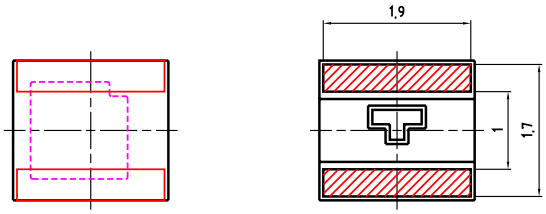
Package marking: Cathode

Preliminary datasheet version

Recommended Solder Pad [3)]



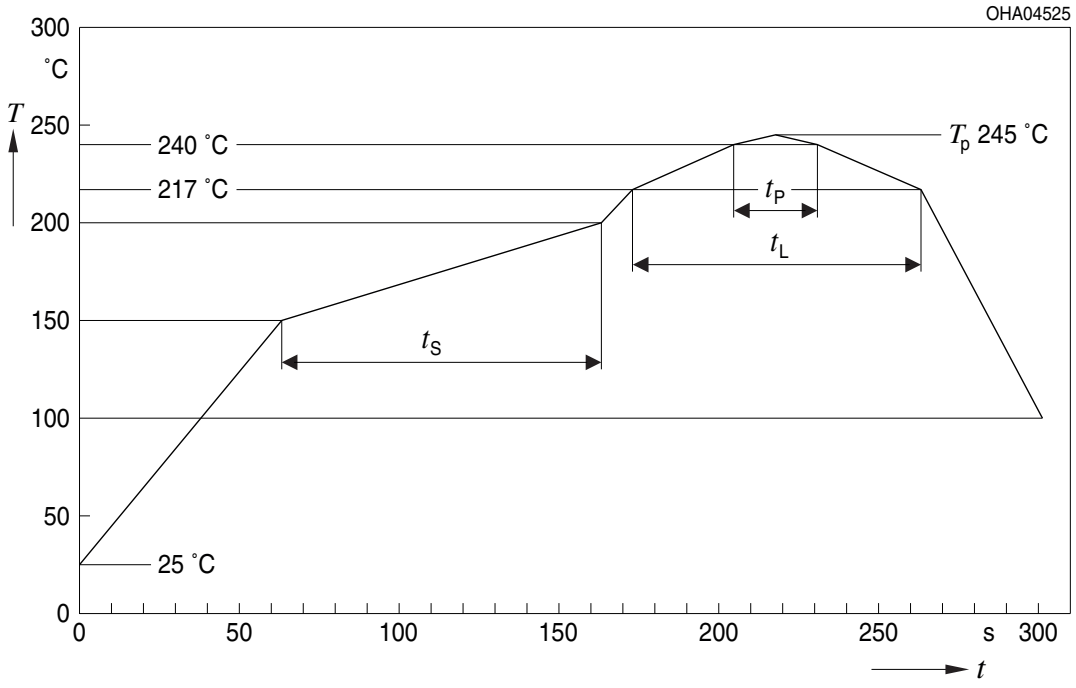
Component Location on Pad



E062.3010.241 -02

Reflow Soldering Profile

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



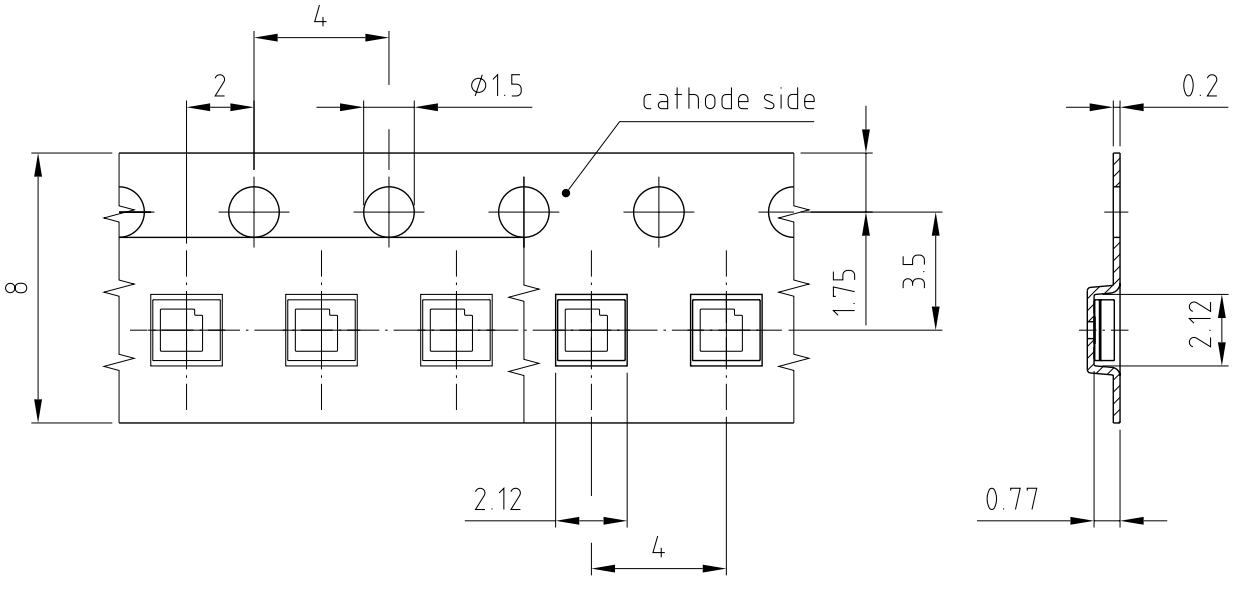
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Opto Semiconductors

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

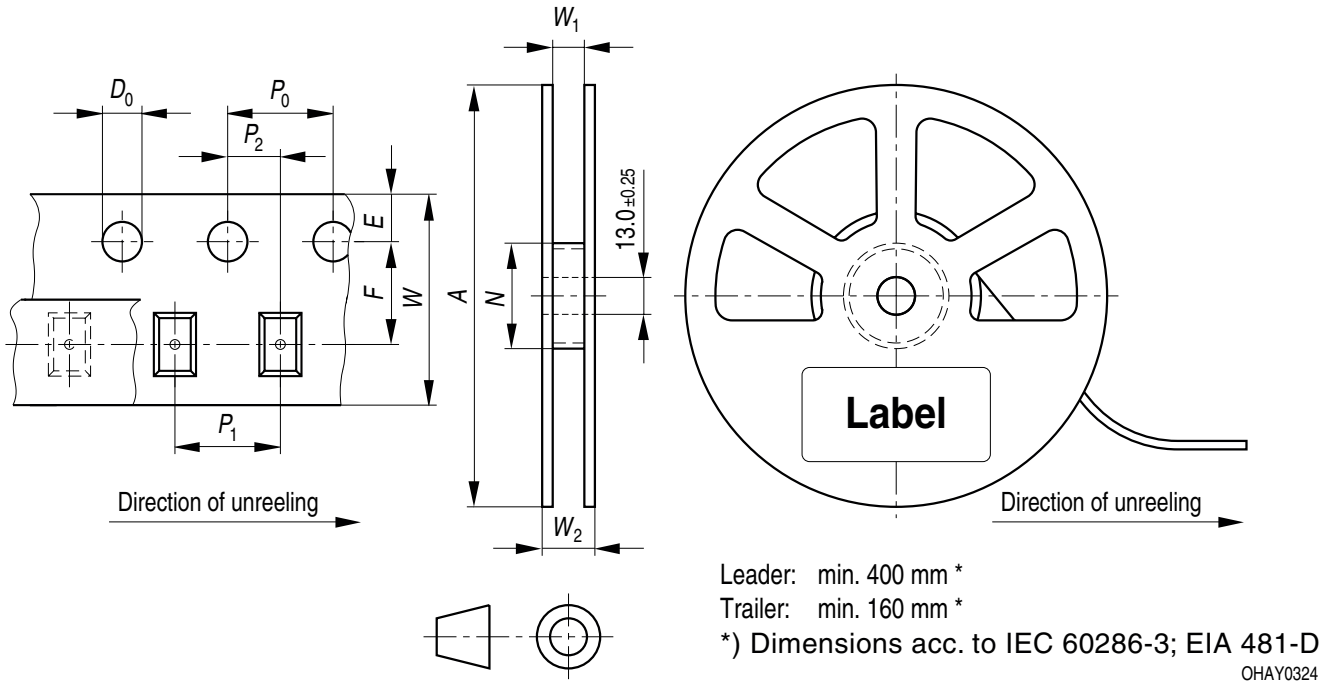
Taping 3)



C63062-A4367-B1-02

Preliminary datasheet version

Tape and Reel [4)]



Leader: min. 400 mm *
Trailer: min. 160 mm *
*) Dimensions acc. to IEC 60286-3; EIA 481-D

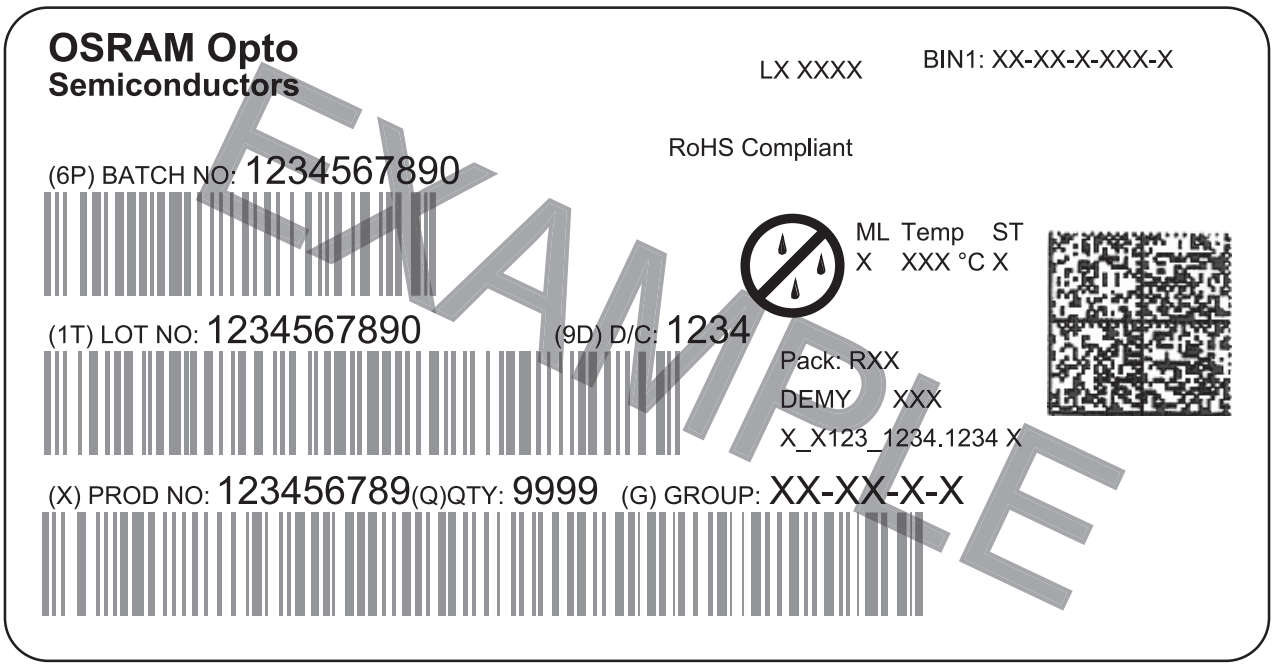
OHAY0324

Reel dimensions [mm]

A	W	N_{min}	W_1	$W_{2\,max}$	Pieces per PU
180 mm	8 + 0.3 / - 0.1	60	8.4 + 2	14.4	3000

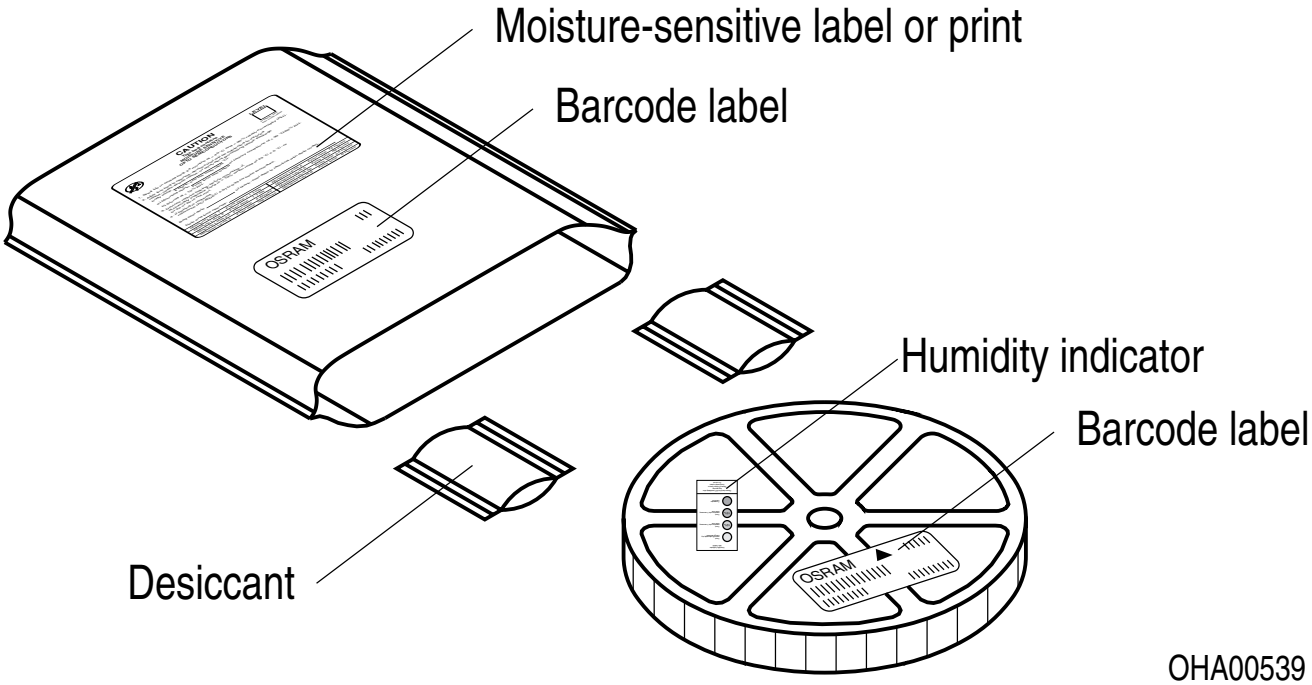
Preliminary datasheet version

Barcode-Product-Label (BPL)



OHA04563

Dry Packing Process and Materials [3)]

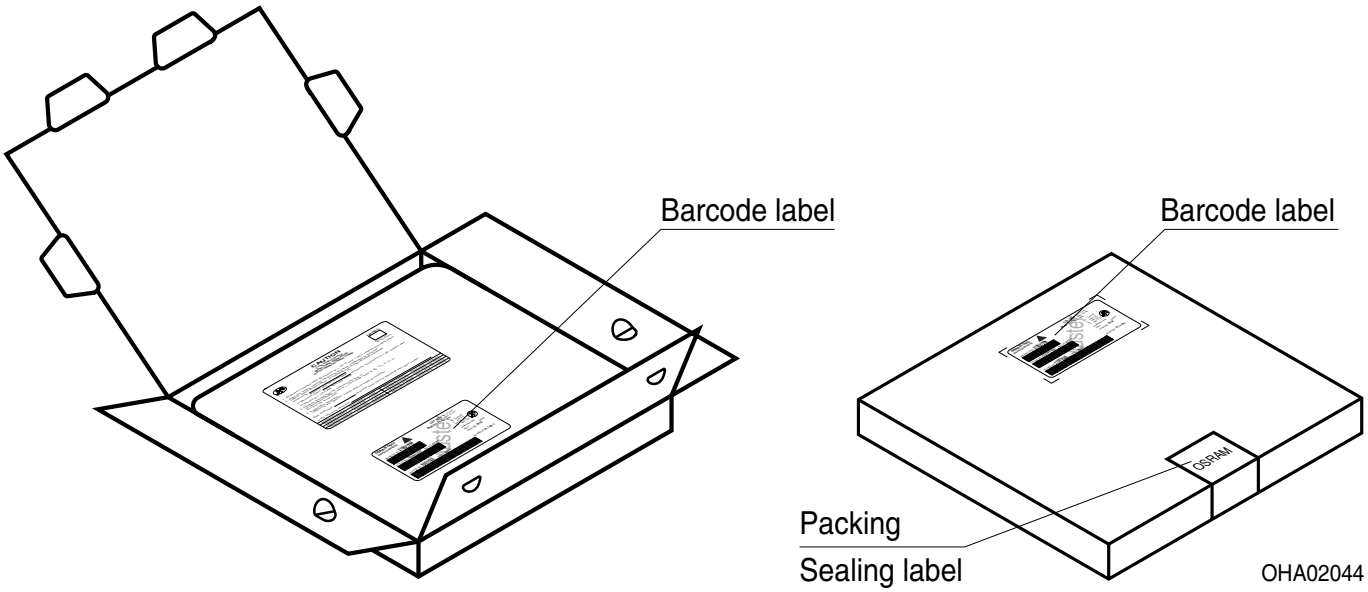


OHA00539

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

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Schematic transportation box [3)]



Dimensions of transportation box in mm

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

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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 fall 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 informations please visit www.osram-os.com/appnotes

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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:** TA = 25°C

3) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ±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.

Preliminary datasheet version

Revision History

Version	Date	Change
0.0	2018-11-28	Additional Information
0.0	2018-11-28	Additional Information
0.0	2018-12-12	Description

Preliminary datasheet version

Preliminary datasheet version

Published by OSRAM Opto Semiconductors GmbH
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