SFH 2200

TOPLED®

Silicon PIN Photodiode



Applications

- Electronic Equipment

Features:

- Package: clear silicone
- 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 (WxDxH): 4 mm x 5.1 mm x 0.85mm
- Solder control structure

Ordering Information

Type	Photocurrent [1] E_v = 1000 lx; white LED; V_R = 5 V I_P	Photocurrent typ. E_v = 1000 lx; white LED; V_R = 5 V I_P	Ordering Code
SFH 2200	≥ 6 µA	8 µA	Q65112A0250

Maximum Ratings

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.	20 V
Total power dissipation	P_{tot}	max.	150 mW
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}	max.	2 kV

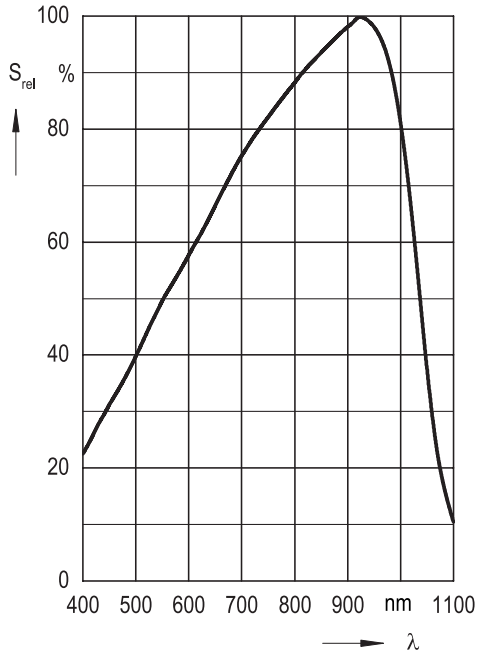
Characteristics

T_A = 25 °C

Parameter	Symbol		Values
Spectral sensitivity V_R = 5 V; Std. Light A; T = 2856 K	S	typ.	71 nA/lx
Wavelength of max sensitivity	$\lambda_{S\ max}$	typ.	940 nm
Spectral range of sensitivity	$\lambda_{10\%}$	typ.	300 ... 1100 nm
Radiant sensitive area	A	typ.	7.02 mm²
Dimensions of active chip area	L x W	typ.	2.65 x 2.65 mm x mm
Half angle	φ	typ.	60 °
Dark current V_R = 10 V	I_R	typ. max.	1 nA 25 nA
Spectral sensitivity of the chip λ = 950 nm	S_λ	typ.	0.7 A / W
Quantum yield of the chip λ = 950 nm	η	typ.	0.91 Electrons / Photon
Open-circuit voltage E_v = 1000 lx; Std. Light A; V_R = 0 V	V_O	min. typ.	300 mV 365 mV
Short-circuit current E_v = 1000 lx; Std. Light A; V_R = 0 V	I_{SC}	typ.	71 µA
Rise time V_R = 5 V; R_L = 50 Ω; λ = 850 nm; I_P = 800 µA	t_r	typ.	0.04 µs
Fall time V_R = 5 V; R_L = 50 Ω; λ = 850 nm; I_P = 800 µA	t_f	typ.	0.04 µs
Forward voltage I_F = 100 mA; E = 0 ; 0	V_F	typ.	1 V
Capacitance V_R = 0 V; f = 1 MHz; E = 0	C_0	typ.	60 pF
Temperature coefficient of voltage	TC_V	typ.	-2.6 mV / K
Temperature coefficient of short-circuit current E_v = 1000 lx; Std. Light A; V_R = 0 V	TC_I	typ.	0.18 % / K
Noise equivalent power V_R = 10 V; λ = 950 nm	NEP	typ.	0.026 pW / $Hz^{1/2}$
Detection limit V_R = 5 V; λ = 950 nm	D*	typ.	1.0e13 cm x $Hz^{1/2}$ / W
Thermal resistance junction ambient real	R_{thJA}	max.	280 K / W

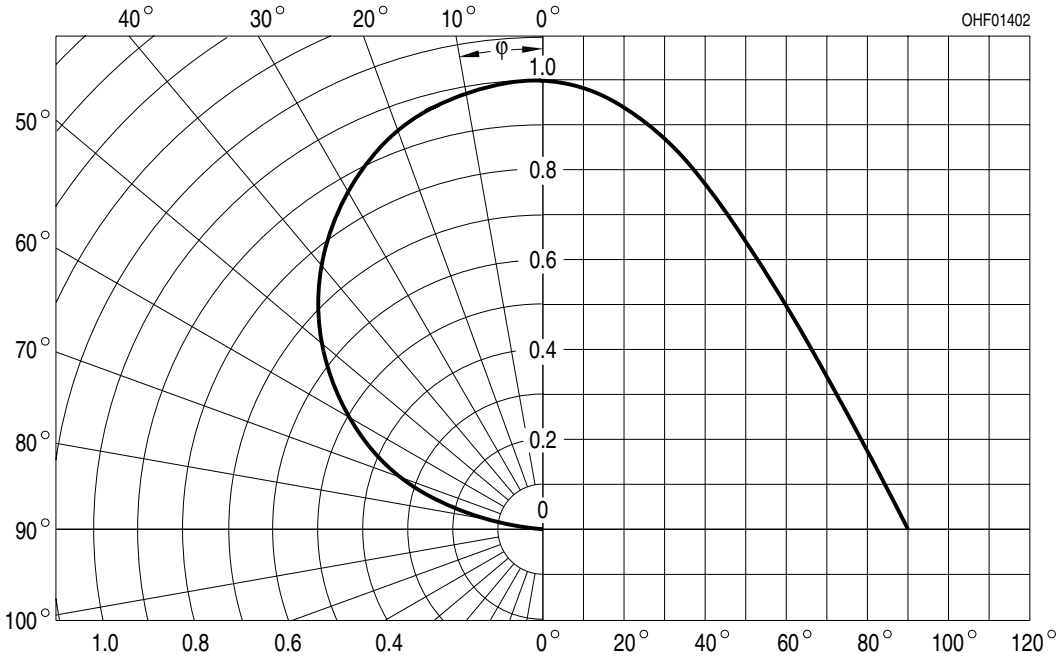
Relative Spectral Sensitivity [2), 3)]

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



Directional Characteristics [2), 3)]

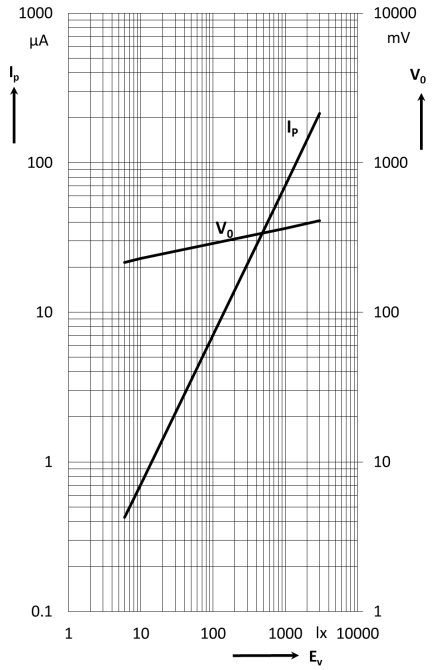
$S_{rel} = f(\varphi)$



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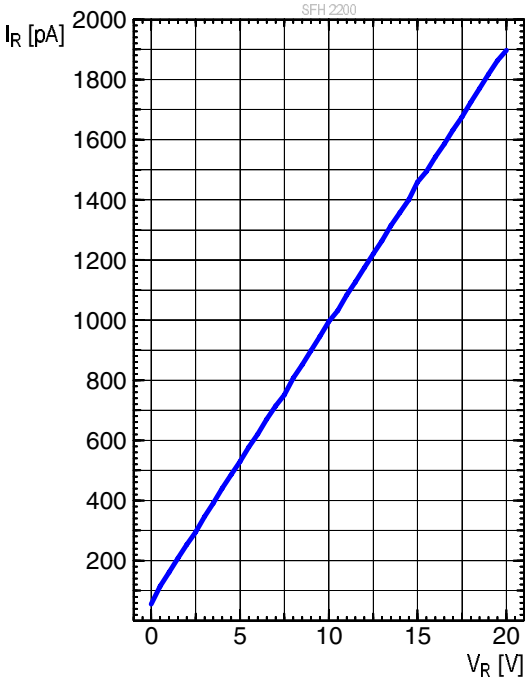
Photocurrent/Open-Circuit Voltage [2), 3)]

I_P (V_R = 5 V) / V_O = f (E_v)



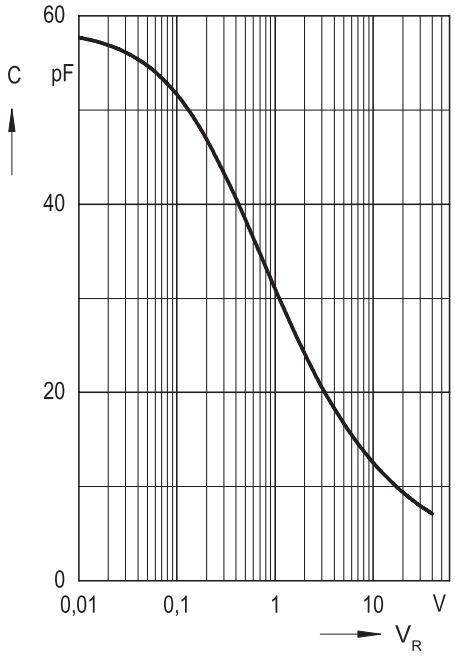
Dark Current [2), 3)]

I_R = f (V_R); E = 0



Capacitance [2), 3)]

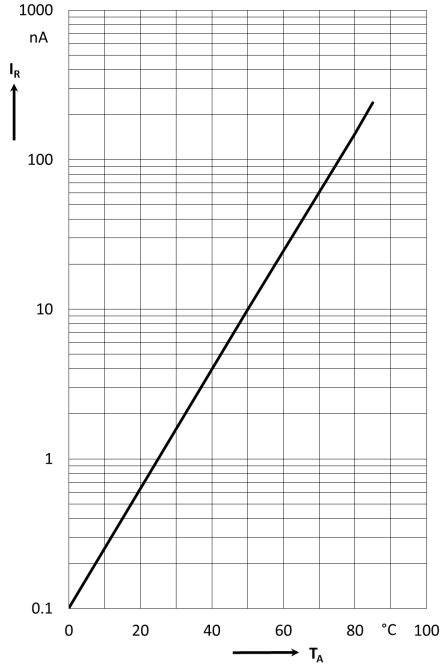
C = f (V_R); f = 1MHz; E = 0; T_A = 25°C



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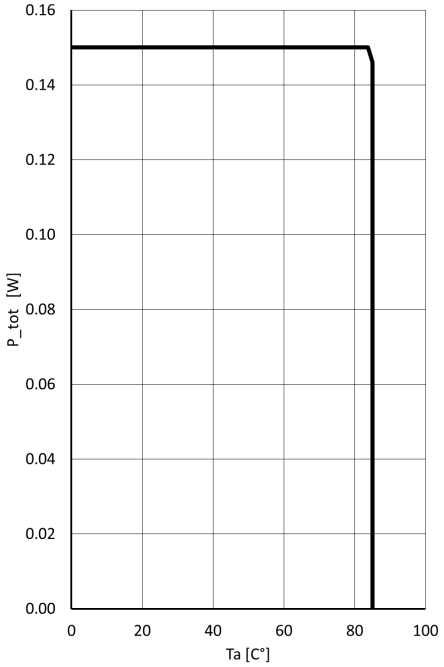
Dark Current [2)]

$I_R = f(T_A)$; E = 0; V_R = 10 V

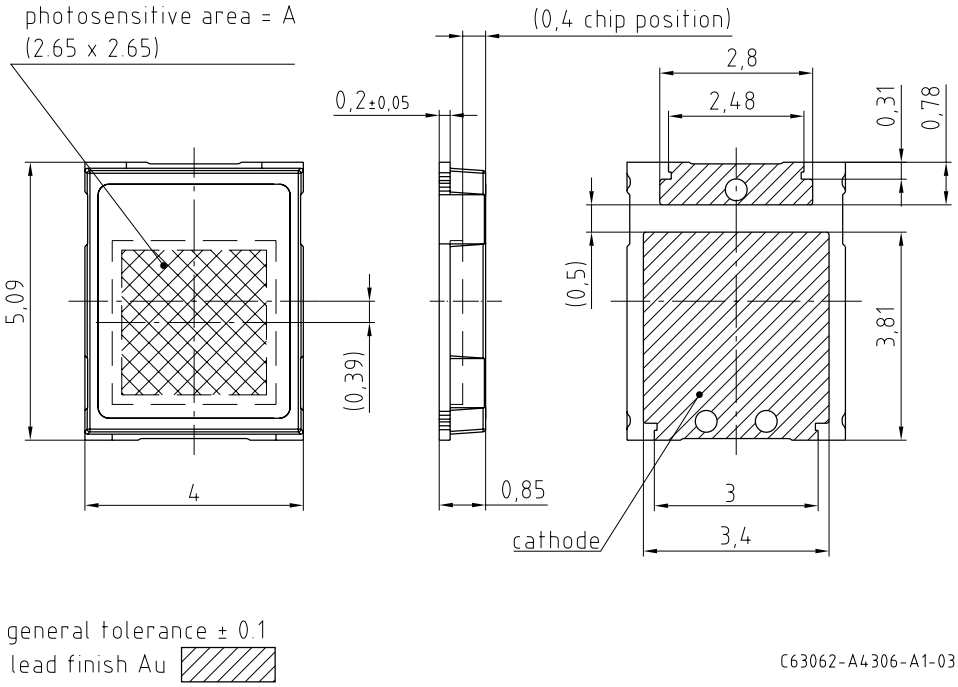


Power Consumption

$P_{tot} = f(T_A)$; R_{thJA} = 280 K / W



Dimensional Drawing [4)]

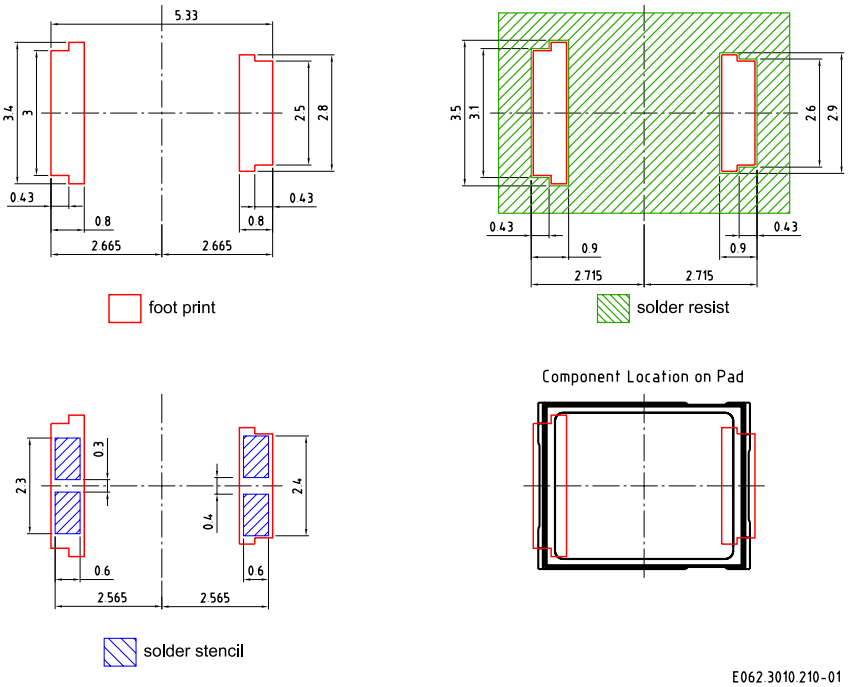


Further Information:

Approximate Weight: 46.0 mg

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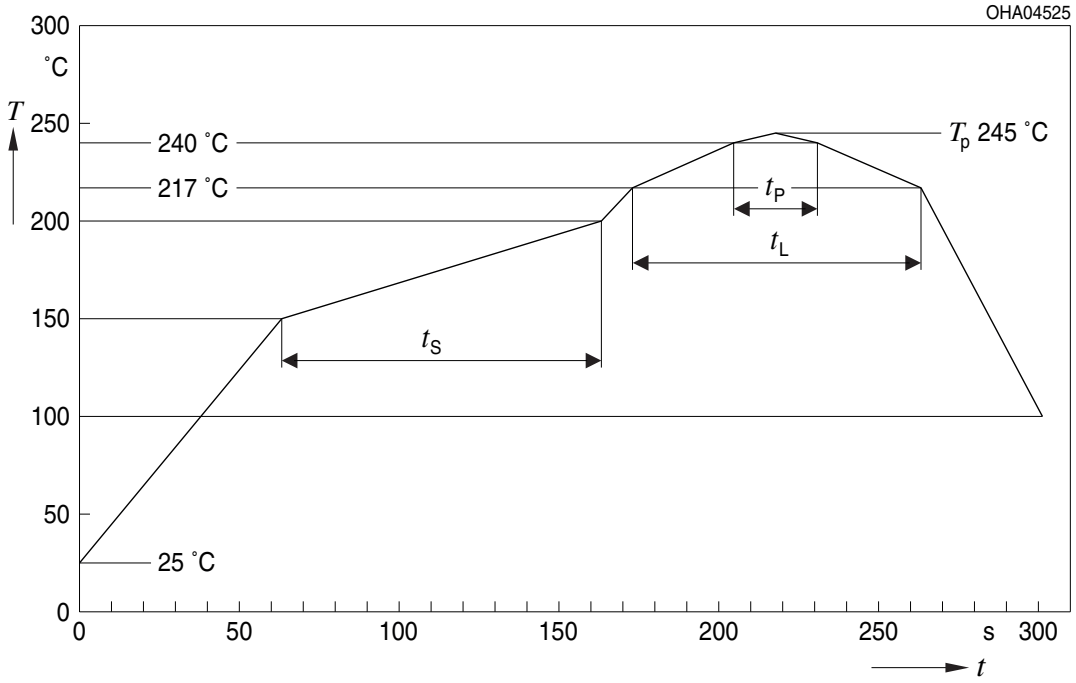
Recommended Solder Pad [4)]



Handling Indication: The package is casted with silicone. Mechanical stress at the silicone surface of the unit should be avoided. Pickup the device at the plastic frame.

Reflow Soldering Profile

Product complies to MSL Level 2 acc. to JEDEC J-STD-020E

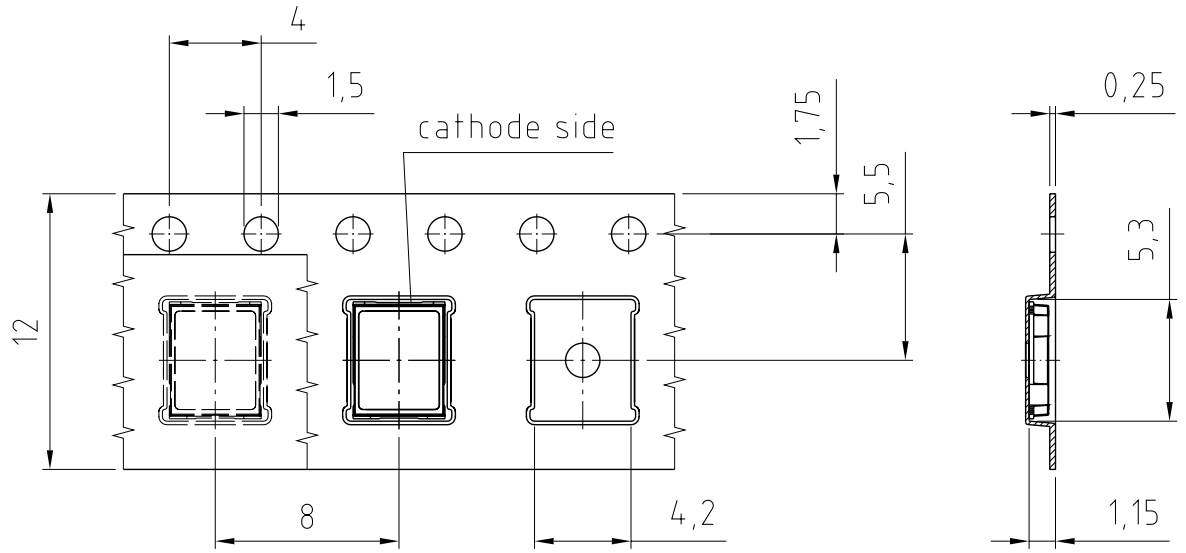


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature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

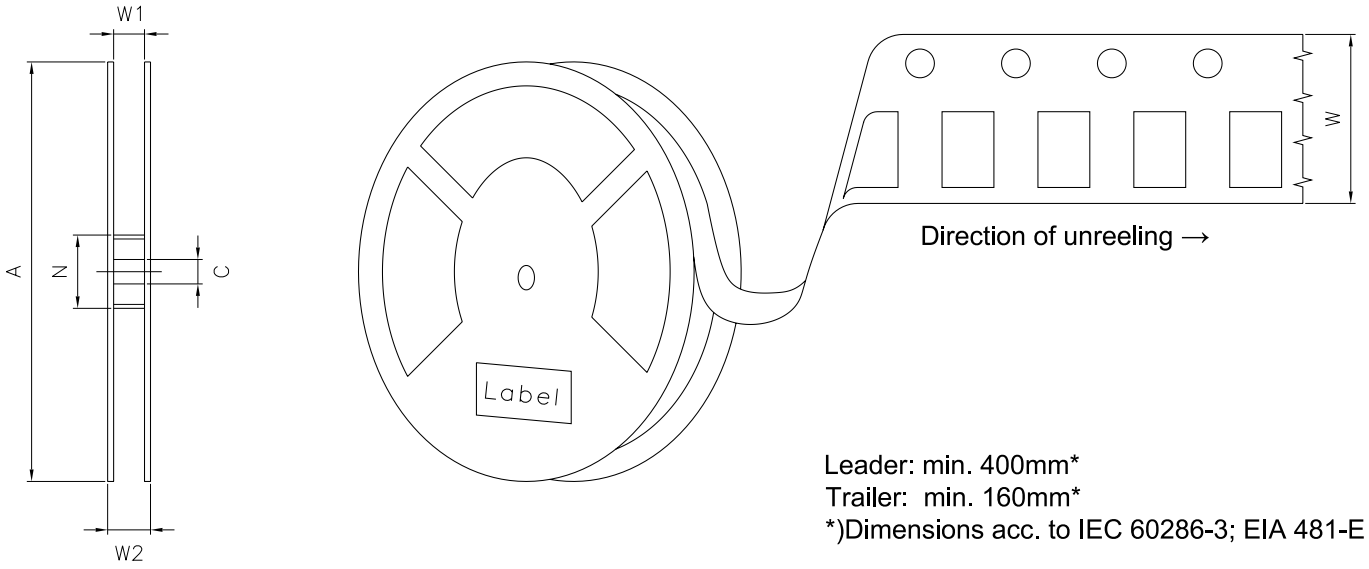
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Taping [4)]



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Tape and Reel [5)]

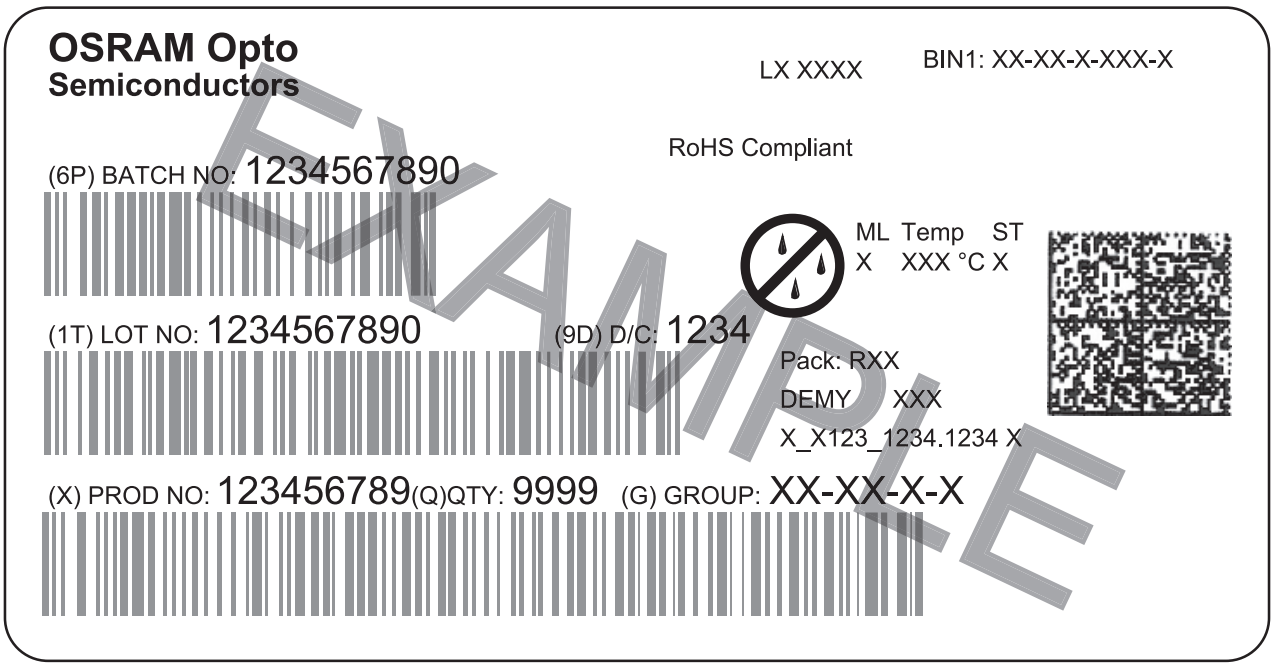


Leader: min. 400mm*
Trailer: min. 160mm*
*)Dimensions acc. to IEC 60286-3; EIA 481-E

Reel Dimensions

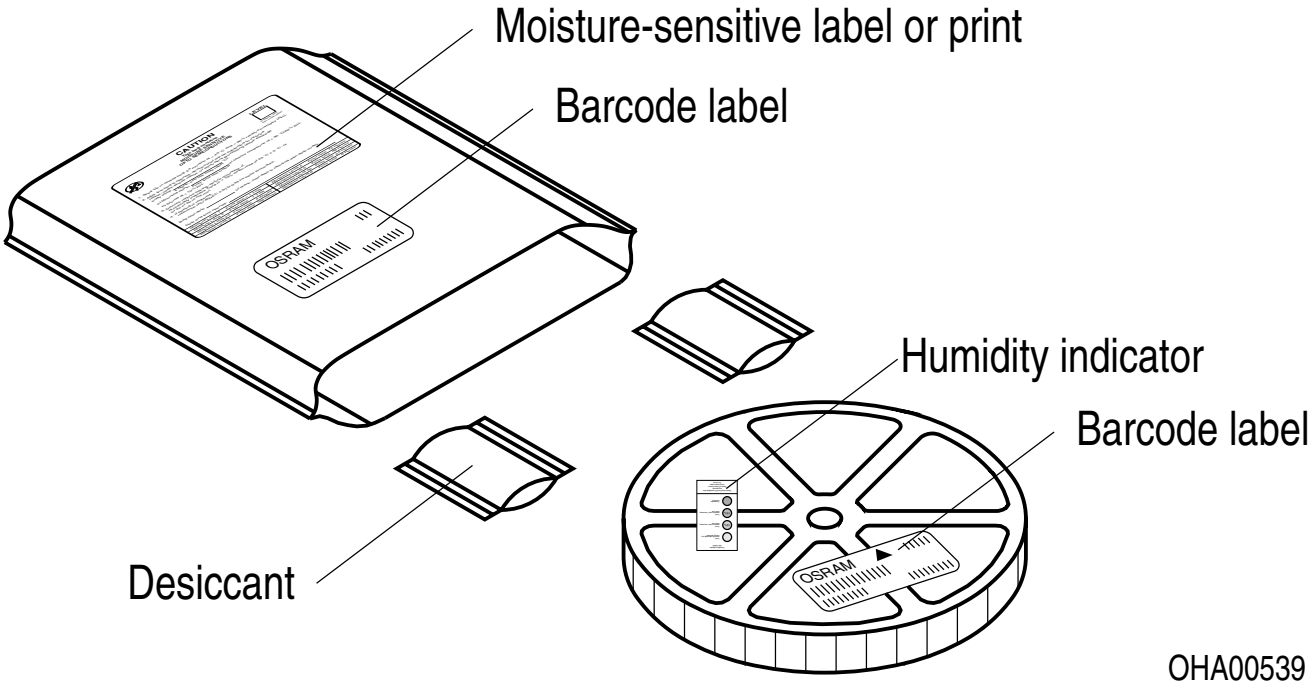
A	W	N_{min}	W_1	$W_{2\,max}$	Pieces per PU
180 mm	12 + 0.3 / - 0.1 mm	60 mm	12.4 + 2 mm	18.4 mm	1500

Barcode-Product-Label (BPL)



OHA04563

Dry Packing Process and Materials [4)]



OHA00539

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

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 information please visit 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.

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Glossary

1) **Photocurrent:** The photocurrent values are measured (by irradiating the devices with a homogenous light source and applying a voltage to the device) with a tolerance of ±11 %.

2) **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.

3) **Testing temperature:** TA = 25°C (unless otherwise specified)

4) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ±0.1 and dimensions are specified in mm.

5) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

Revision History

Version	Date	Change
1.4	2021-06-08	Schematic Transportation Box Dimensions of Transportation Box

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OT-FIT-30/220-240/800-CS-T-W OT-WI-15/220-240/1A0-NFC-BL-LPI SFH-4243B
BA-LIN-Z3-1550-840-560X20-HV KB DDLM32.13-DUFR-7A-K1M2 LW T673-P1S1-FKPL-0-10-R18-Z
OT-WI-40/220-240/1A0-NFC-BL-LPI SFH 3710 BF400S-G3-827-05 GA CSHPM1.23-KSKU-W3
KW DDLM32.EH-HSJQ-A636-K1M2 LF-LTS COVER SHORTPITCH OTE 10/220-240/700 PC
TFP2000S-G1-927-04 GR CS8PM1.23-KPKR-1 LW TVSG.CB-BXCX-JKPL-Z486
OTDX165/220-240/1A0DIMALT2E SFH 4546 TF600S-G1-865-05 4058075559318 TFP2000S-G1-940-04
SFH309 TF600S-G1-827-05 BA-LIN-Z3-770-840-280X20-HV DALIECO-BT-RTC-CONTROL
HNS-L-55W-2G11 EASYFIT-EWSDB OTE 13/220-240/350 PC PL-CP-Z3--2500-740
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