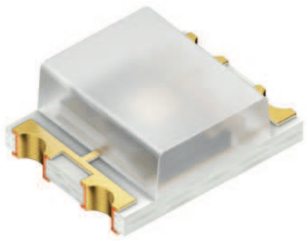
High Accuracy Ambient Light Sensor
Version 1.7

SFH 5711



Features:

- Opto hybrid with logarithmic current output
- Perfect match to Human Eye Sensitivity (V_λ)
- Low temperature coefficient of spectral sensitivity
- High accuracy over wide illumination range
- The product qualification test plan is based on the guidelines of AEC-Q101-REV-C, Stress Test Qualification for Automotive Grade Discrete Semiconductors.

Applications

- Automotive applications
- Sunlight sensor / head lamp control
- Control of display backlighting
- Mobile devices

Ordering Information

Type:	**Output current** I_{OUT} [µA] **E_V = 1000 lx (white LED LW 541C)**	**Ordering Code**
SFH 5711-1/2	25 - 30	on request
SFH 5711-2/3	27 - 32	Q65110A4513
SFH 5711-3/4	29 - 34	on request

Note: Only one bin within one packing unit, see characteristics.

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Maximum Ratings (T_A = 25 °C)

Parameter	Symbol	Values	Unit
Operating and storage temperature range [1) page 13]	T_{op}; T_{stg}	-40 ... 100	°C
Supply voltage	V_{CC}	6	V
Output voltage	V_{OUT}	< V_{CC}	V
Electrostatic discharge (acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM)	V_{ESD}	2000	V

Operating Conditions

Parameter	Symbol	Values			Unit
		min	typ	max	
Supply voltage	V_{CC}	2.3		5.5	V
Illuminance (T_A = -30 °C ... 70 °C)	E_V		3 ... 80 k		lx
Illuminance (T_A = -40 °C ... 100 °C)	E_V		10 ... 80 k		lx

Characteristics (T_A = 25 °C)

Parameter		Symbol	Values	Unit
Current consumption	(typ) (max)	I_{cc} I_{cc}	0.41 0.5	mA mA
Current consumption (E_V = 0, V_{CC} = 5 V)	(typ)	I_{CC}	0.42	mA
Current consumption	(typ) (max)	I_{cc} I_{cc}	0.46 0.55	mA mA
Current consumption (E_V = 1000 lx, V_{CC} = 5 V)	(typ)	I_{CC}	0.47	mA
Wavelength of max. sensitivity	(min) (typ) (max)	$\lambda_{s\,max}$ $\lambda_{S\,max}$ $\lambda_{s\,max}$	540 555 570	nm nm nm
Spectral range of sensitivity	(min) (max)	$\lambda_{10\%}$ $\lambda_{10\%}$	475 650	nm nm
Dimensions of radiant sensitive area	(typ)	L x W	0.4 x 0.4	mm x mm
Output capacitance	(typ)	C_{OUT}	3	pF
Transfer function (Fig.: Circuitry)	(min) (typ) (max)	G G G	9.5 10 10.5	µA / dec µA / dec µA / dec

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Parameter		Symbol	Values	Unit
Deviation of output characteristics from logarithmic function (Fig.: Circuitry)	(min) (max)	L L	-3 3	% %
Output voltage	(typ)	$V_{OUT\ high}$	VCC - 0.5	V
Rise time (R_L = 25 kΩ, C = 1 nF, Fig.: Definition of Response Time, E_V = 100 → 1000 lx)	(typ)	t_r	30	µs
Fall time (R_L = 25 kΩ, C = 1 nF, Fig.: Definition of Response Time, E_V = 1000 → 100 lx)	(typ)	t_f	100	µs
Power on time (E_V = 1000 lx, V_{CC} = 0 V → V_{CC})	(typ) (max)	t_{ON} t_{ON}	0.1 1.2	ms ms
Output accuracy over temperature range (E_V = 1000 lx, T_A = -40 °C ... 100 °C)	(min) (typ) (max)		-2 ±1 2	µA
Output accuracy over temperature range (E_V = 1000 lx, T_A = -30 °C ... 70 °C)	(min) (typ) (max)		-1.5 ±0.6 1.5	µA
Output accuracy over temperature range (E_V = 1000 lx, T_A = 0 °C ... 50 °C)	(min) (typ) (max)		-0.7 ±0.2 0.7	µA
Output dark current (E_V = 0lx)	(typ) (max)	I_{OUT_dark} I_{OUT_dark}	0.1 100	nA nA

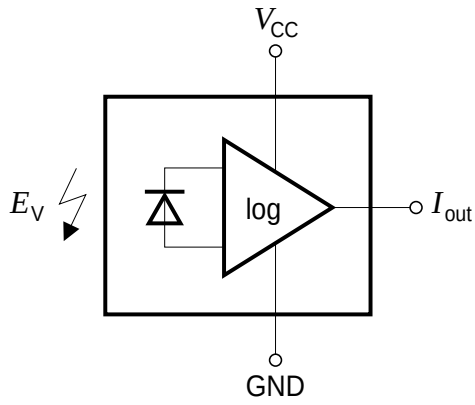
Grouping (T_A = 25 °C)

Group	Output current E_V = 1000 lx (white LED LW 541C) I_{OUT}
SFH 5711-1	25 ... 28
SFH 5711-2	27 ... 30
SFH 5711-3	29 ... 32
SFH 5711-4	31 ... 34

Note: 3 µA bin width is equivalent to a spread of 1:2 of the irradiance.

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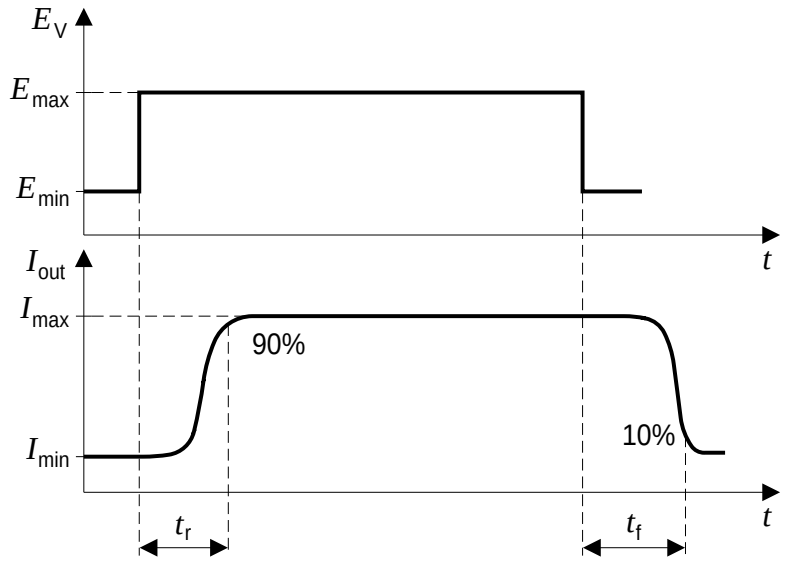
Circuitry



I_{out} = S x log (E_V/E_O)
with E_O = 1lx / Sensitivity S = 10 µA

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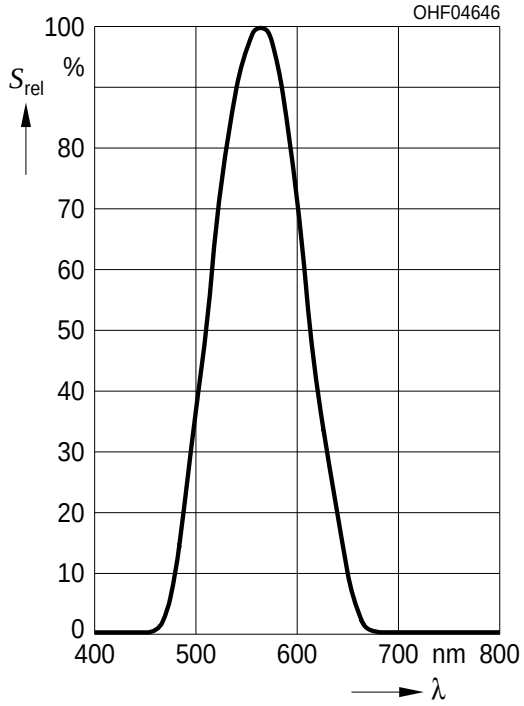
Switching Time Definitions



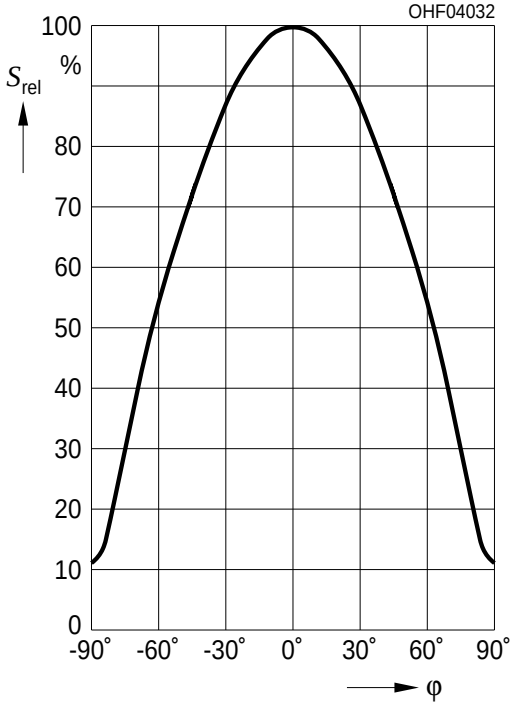
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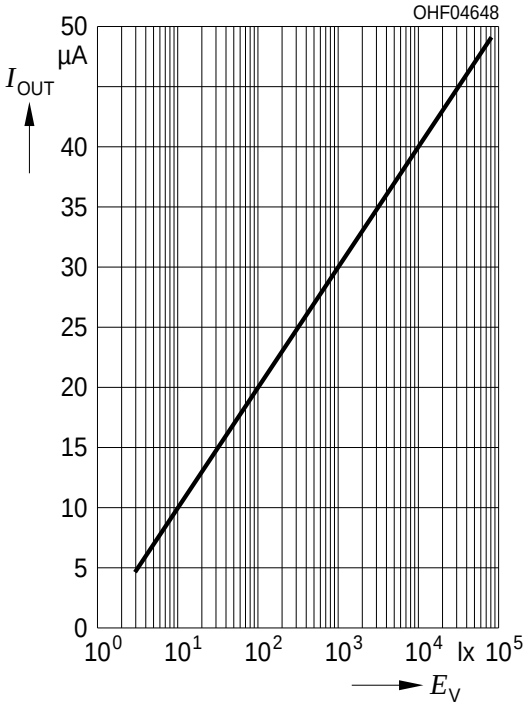
Relative Spectral Sensitivity 2) *page 13*
Photodiode $S_{rel} = f(\lambda)$



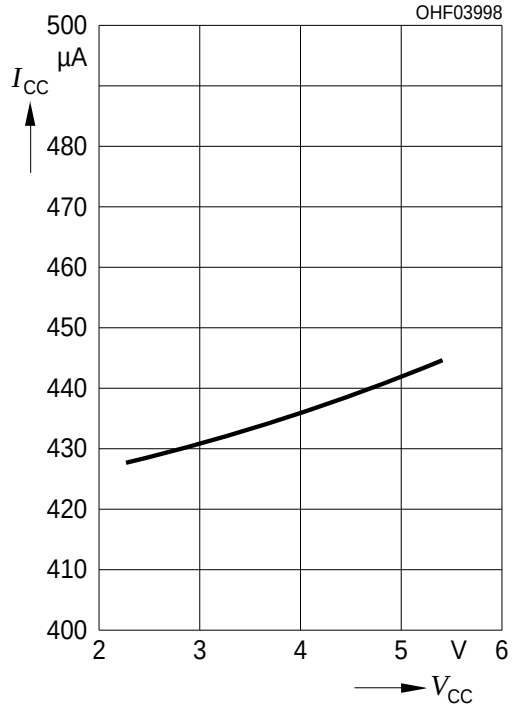
Directional Characteristics 2) *page 13*
Photodiode $S_{rel} = f(\phi)$



Output Current 2) *page 13*
$I_{OUT} = f(E_V)$



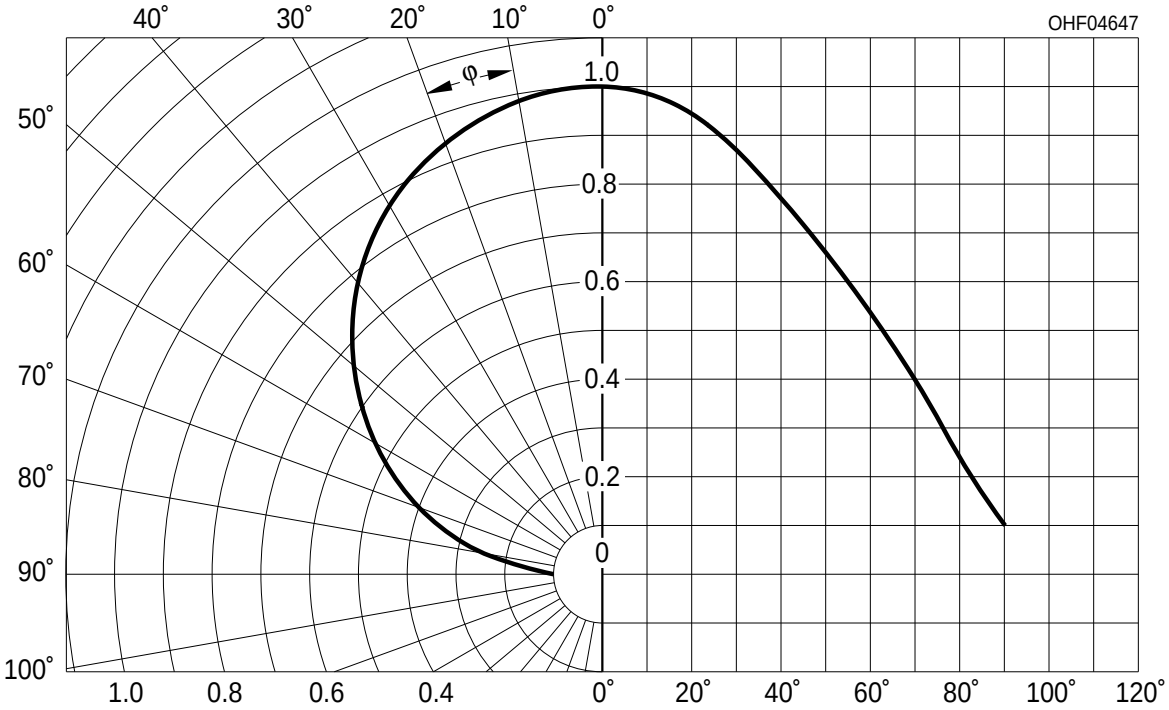
Current Consumption 2) *page 13*
$I_{CC} = f(V_{CC})$



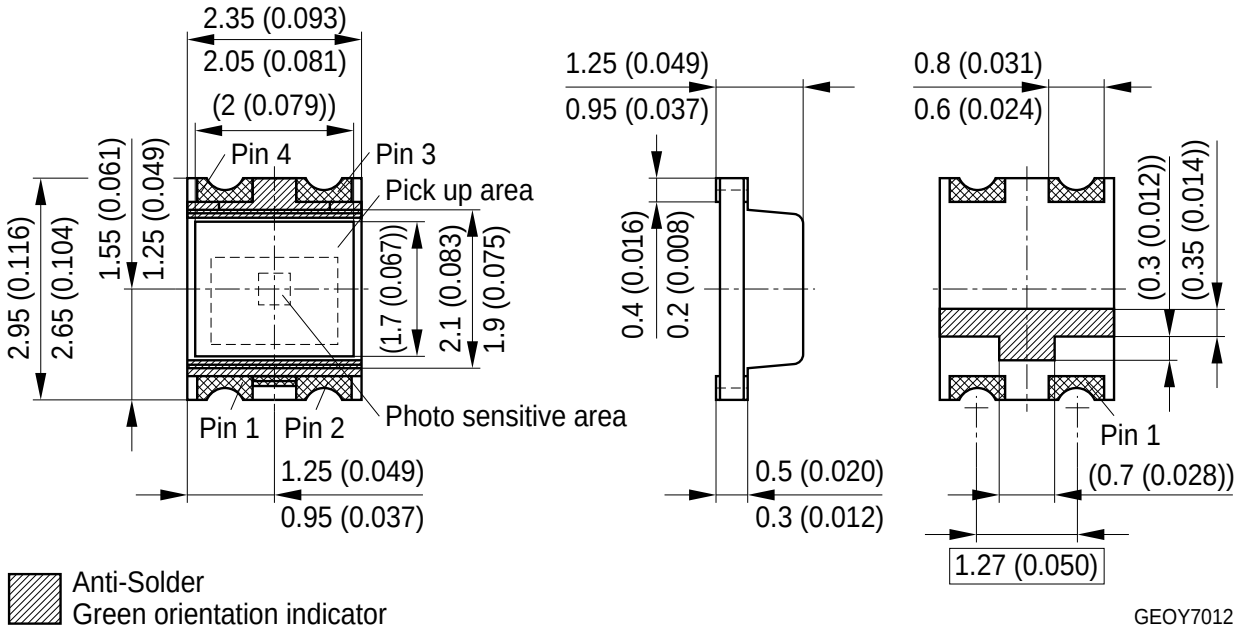
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Directional Characteristics (Horizontal) 2) *page 13*

Photodiode $S_{rel} = f(\phi)$



Package Outline



Dimensions in mm (inch).

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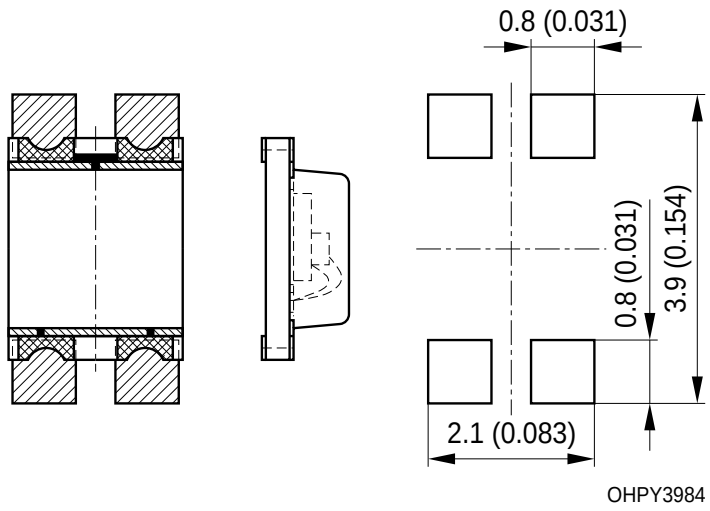
Pinning

Pin	Description
1	GND
2	GND
3	V_{CC}
4	I_{OUT}

Package
Chipled

Approximate Weight:
10 mg

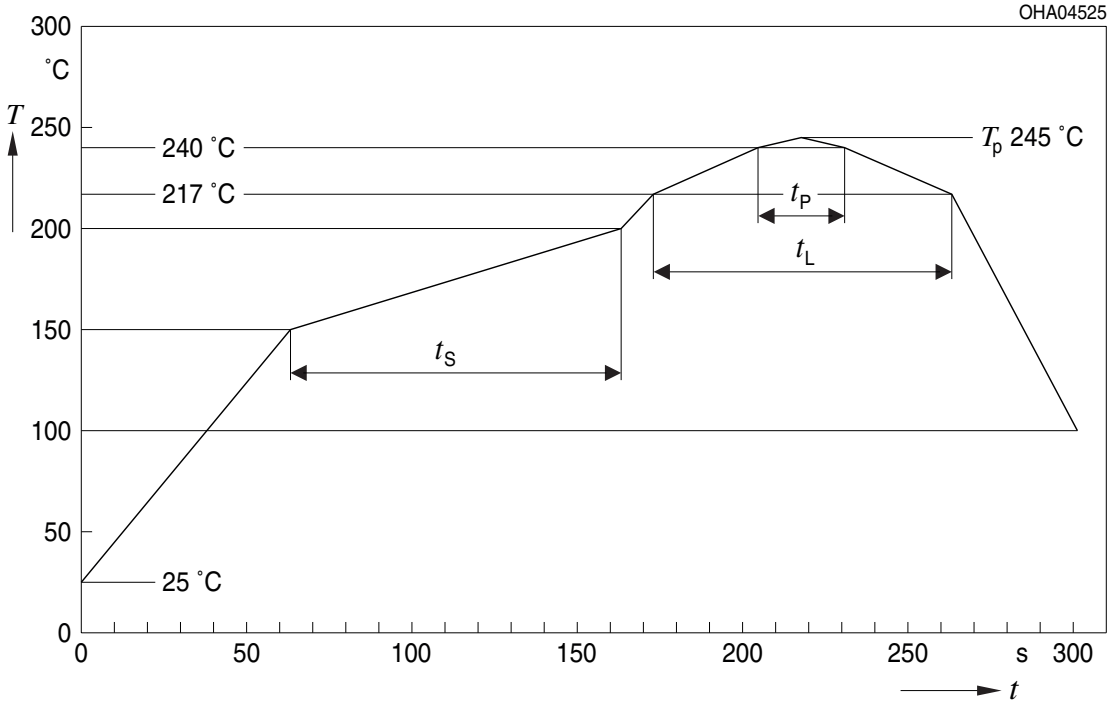
Recommended Solder Pad



Dimensions in mm (inch).

Reflow Soldering Profile

Product complies to MSL Level 3 or 4 acc. to JEDEC J-STD-020D.01



OHA04612

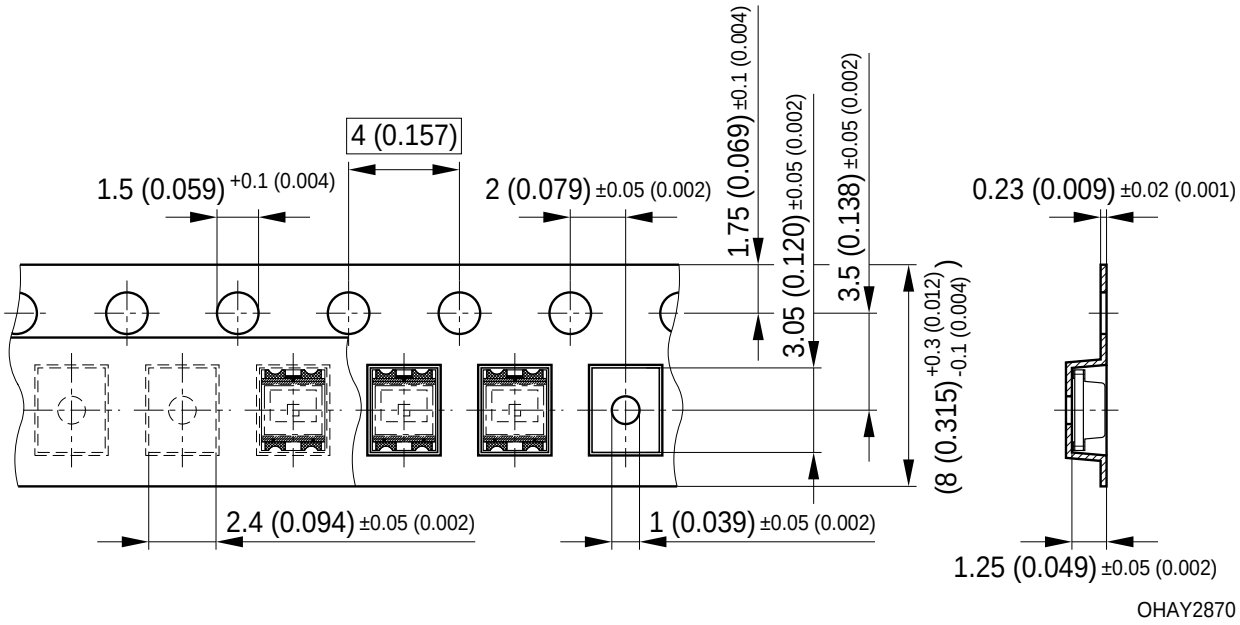
Profile Feature Profil-Charakteristik	Symbol Symbol	Pb-Free (SnAgCu) Assembly			Unit Einheit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L	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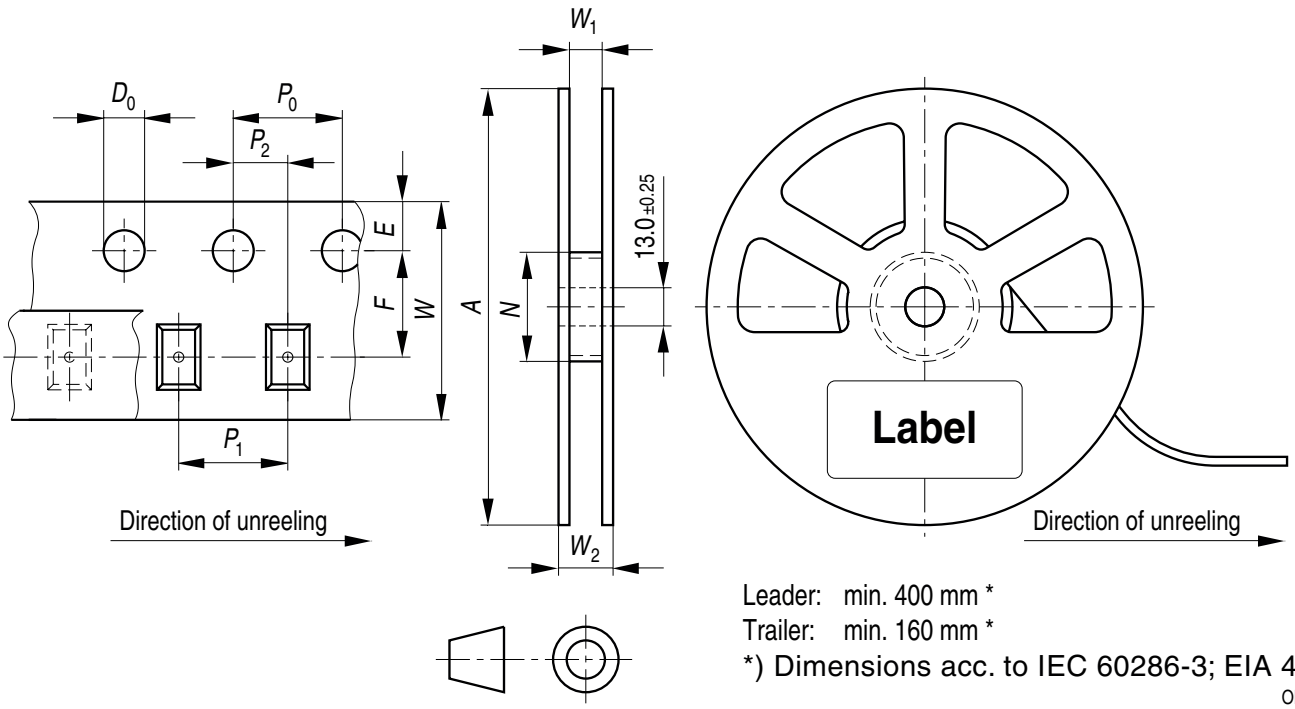
Taping



Dimensions in mm (inch).

Tape and Reel

8 mm tape with 2000 pcs. on ∅ 180 mm reel



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

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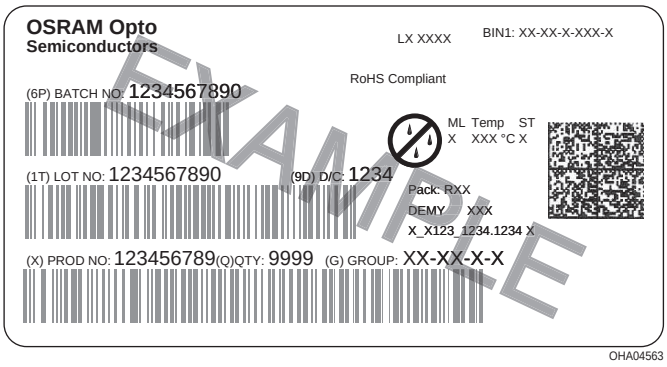
Tape dimensions [mm]

W	P_0	P_1	P_2	D_0	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

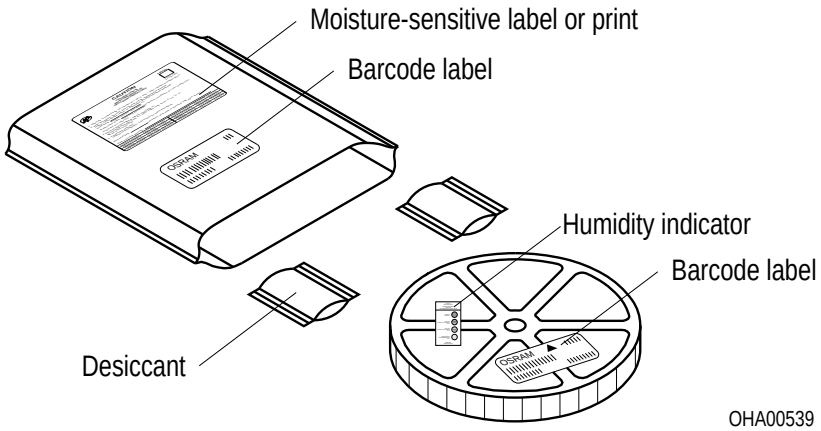
Reel dimensions [mm]

A	W	N_{min}	W_1	W_{2max}
180	8	60	8.4 + 2	14.4

Barcode-Product-Label (BPL)

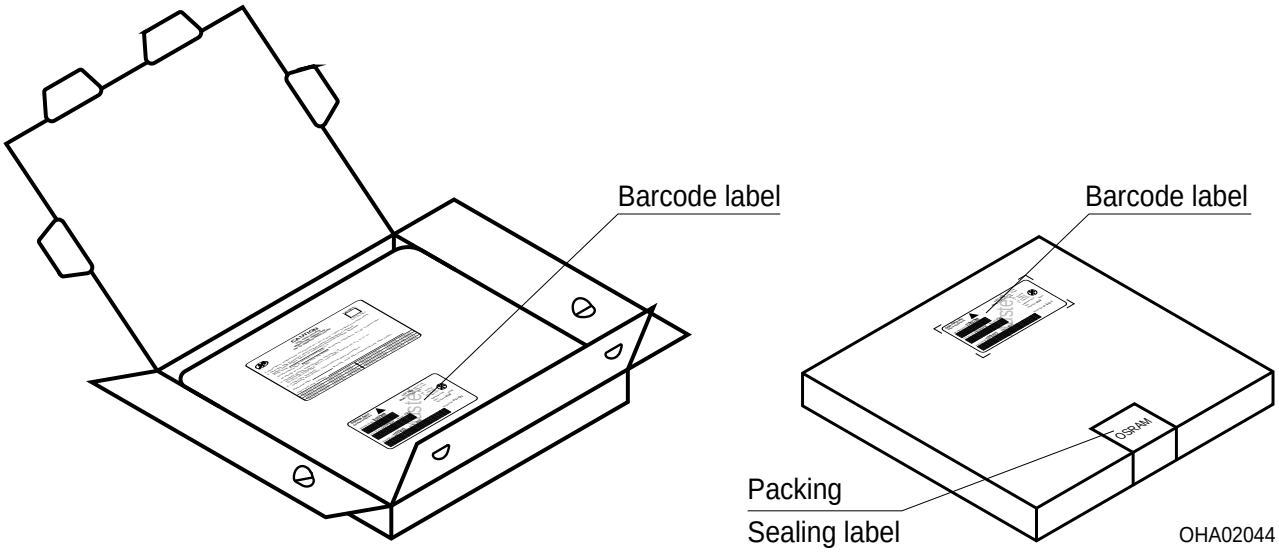


Dry Packing Process and Materials



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
200 ± 5	195 ± 5	30 ± 5

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 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.

Glossary

[1] **Operating and storage temperature range:** Maximum operating and storage temperature of 100 °C is only valid with storage conditions according to JEDEC Moisture Sensitivity Level (MSL) 4. With storage conditions according to JEDEC MSL 3, the max. operating and storage temperature is 85 °C.

[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.

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