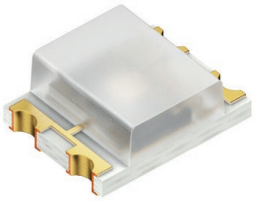
SFH 5711

Chip LED

High Accuracy Ambient Light Sensor



Applications

- Ambient Light Sensors
- Backlighting (Smartphone, Tablet)
- Displays (Backlighting)

Features:

- Qualifications: The product qualification test plan is based on the guidelines of AEC-Q101-REV-C, Stress Test Qualification for Automotive Grade Discrete Semiconductors.
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- 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

Ordering Information

Type	Output current [1] E_v = 1000 lx; (white LED LW541C) I_{OUT}	Ordering Code
SFH 5711-2/3-Z	27.5 ... 31.5 µA	Q65110A4513
SFH 5711-2/3 R33	27.5 ... 31.5 µA	Q65112A2568
SFH 5711-1/2-Z	25.5 ... 29.5 µA	on request (SFH 5711-1/2)
SFH 5711-3/4-Z	29.5 ... 33.5 µA	on request (SFH 5711-3/4)

Only one bin within one packing unit, see characteristics.

Maximum Ratings

Parameter	Symbol		Values
Operating temperature	T_{op}	min. max.	-40 °C 100 °C
Storage temperature	T_{stg}	min. max.	-40 °C 100 °C
Output voltage	V_{OUT}	max.	6 V
Supply voltage	V_{DD}	max.	6 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}	max.	2 kV

Operating Conditions

Parameter	Symbol		Values
Illuminance T_A = -30 °C ... 70 °C	E_V	min. max.	3 lx 80000 lx
Illuminance T_A = -40 °C ... 100 °C	E_V	min. max.	10 lx 80000 lx
Supply voltage	V_{DD}	min. max.	2.3 V 5.5 V

Characteristics

T_A = 25 °C

Parameter	Symbol		Values
Output voltage example: V_{CC} = 5.5 V; general V_{CC}-0.5 V	V_{OUT}	typ.	5 V
Wavelength of maximum sensitivity	$\lambda_{S\ max}$	min. typ. max.	540 nm 555 nm 570 nm
Spectral range of sensitivity	$\lambda_{10\%}$	typ.	475 ... 650 nm
Dimensions of active chip area	L x W	typ.	0.4 x 0.4 mm x mm
Half angle	φ	typ.	60 °
Output dark current E_v = 0 lx	I_{OUT_dark}	max. typ.	100 nA 0.1 nA
Current consumption E_v = 0 lx; V_{CC} = 2.5 V	I_{DD}	typ. max.	0.41 mA 0.5 mA
Current consumption E_v = 0 lx; V_{CC} = 5 V	I_{DD}	typ.	0.42 mA
Current consumption E_v = 1000 lx; V_{CC} = 2.5 V	I_{DD}	typ. max.	0.46 mA 0.55 mA
Current consumption E_v = 1000 lx; V_{CC} = 5 V	I_{DD}	typ.	0.47 mA
Power on time E_v = 1000 lx; V_{CC} = 0; V --> V_{CC}	t_{on}	typ. max.	0.1 1.2
Rise time R_L = 25 kΩ; C = 1000 pF; Fig.: Definition of Response Time, E_V = 100 --> 1000 lx	t_r	typ.	30 µs
Fall time R_L = 25 kΩ; C = 1000 pF; Fig.: Definition of Response Time, E_V = 1000 --> 100 lx	t_f	typ.	100 µs
Output capacitance	C_{Out}	typ.	3 pF
Transfer function	G	min. typ. max.	9.5 µA / dec 10 µA / dec 10.5 µA / dec
Deviation of output characteristics from logarithmic function	L	min. max.	-3 3
Output accuracy over temperature range E_v = 1000 lx; T_A = -30 °C ... 70 °C	ΔI_{OUT}	min. max.	-1.5 µA 1.5 µA
Output accuracy over temperature range E_v = 1000 lx; T_A = -40 °C ... 100 °C	ΔI_{OUT}	min. max.	-2 µA 2 µA

Characteristics

T_A = 25 °C

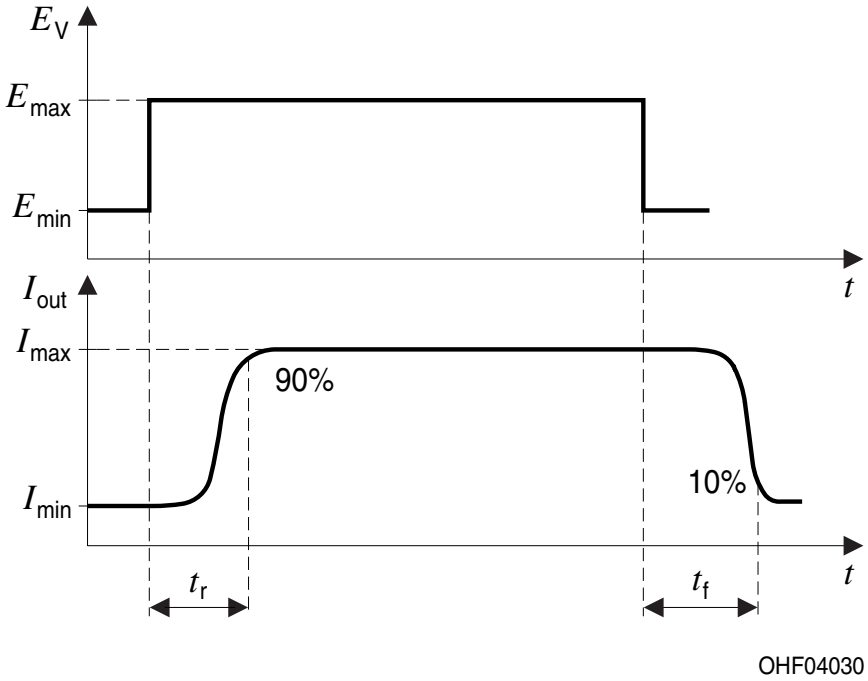
Parameter	Symbol		Values
Output accuracy over temperature range E_v = 1000 lx; T_A = 0 °C ... 50 °C	ΔI_{OUT}	min. max.	-0.7 µA 0.7 µA

Photocurrent Groups

Group

2	27.5 µA	29.5 µA
3	29.5 µA	31.5 µA

Switching Time



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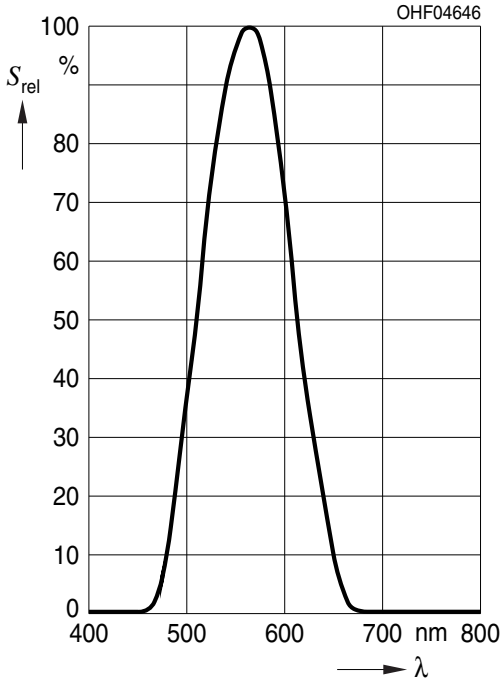
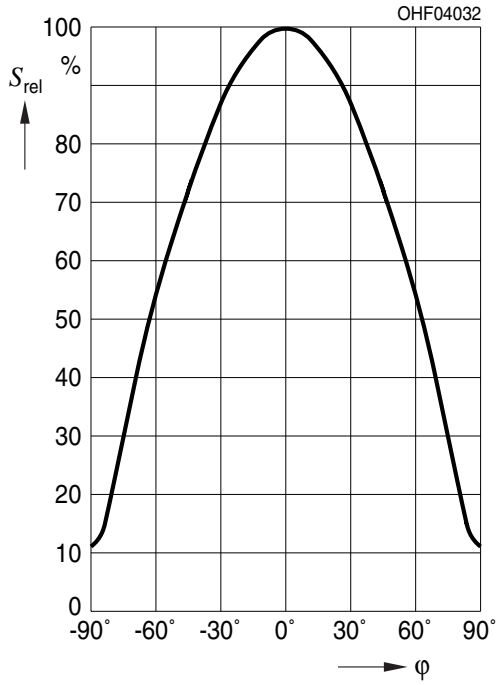
Relative Spectral Sensitivity [2)]

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



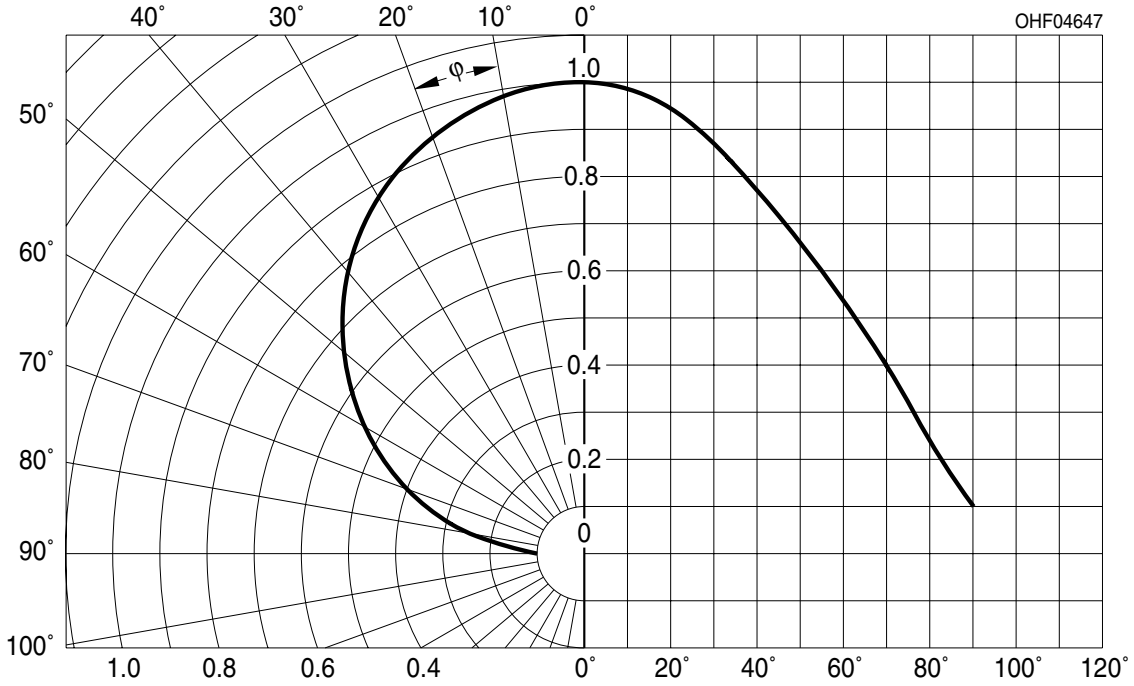
Directional Characteristics [2)]

$S_{rel} = f(\varphi)$; $T_A = 25$ °C



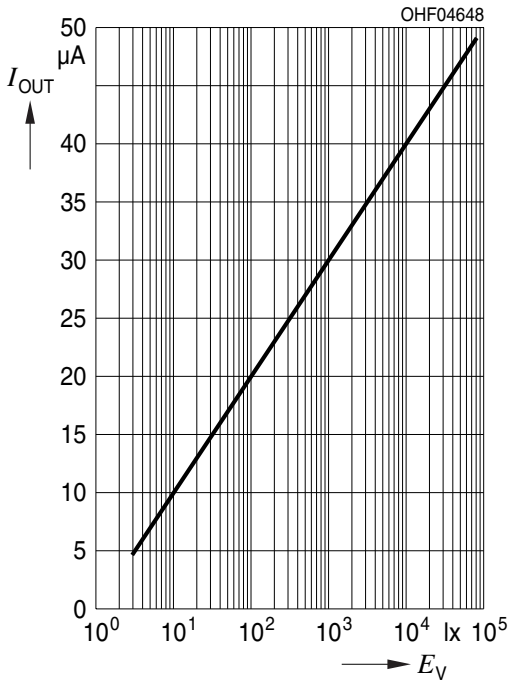
Directional Characteristics (Horizontal) 2)

$S_{rel} = f(\varphi)$; $T_A = 25$ °C



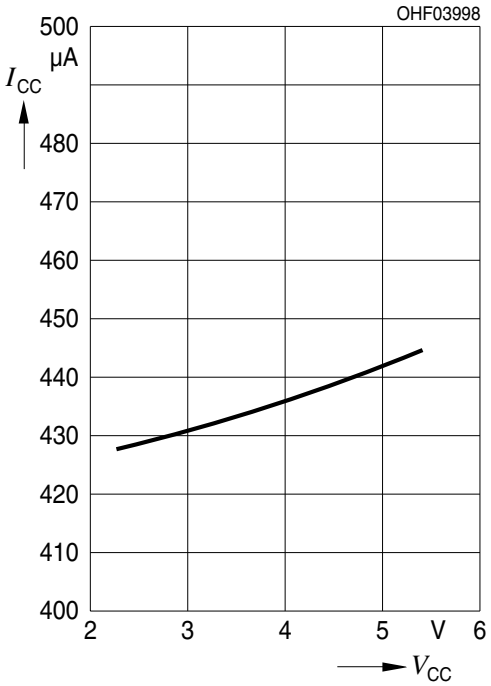
Output Current 2)

$I_{OUT} = f(E_v)$

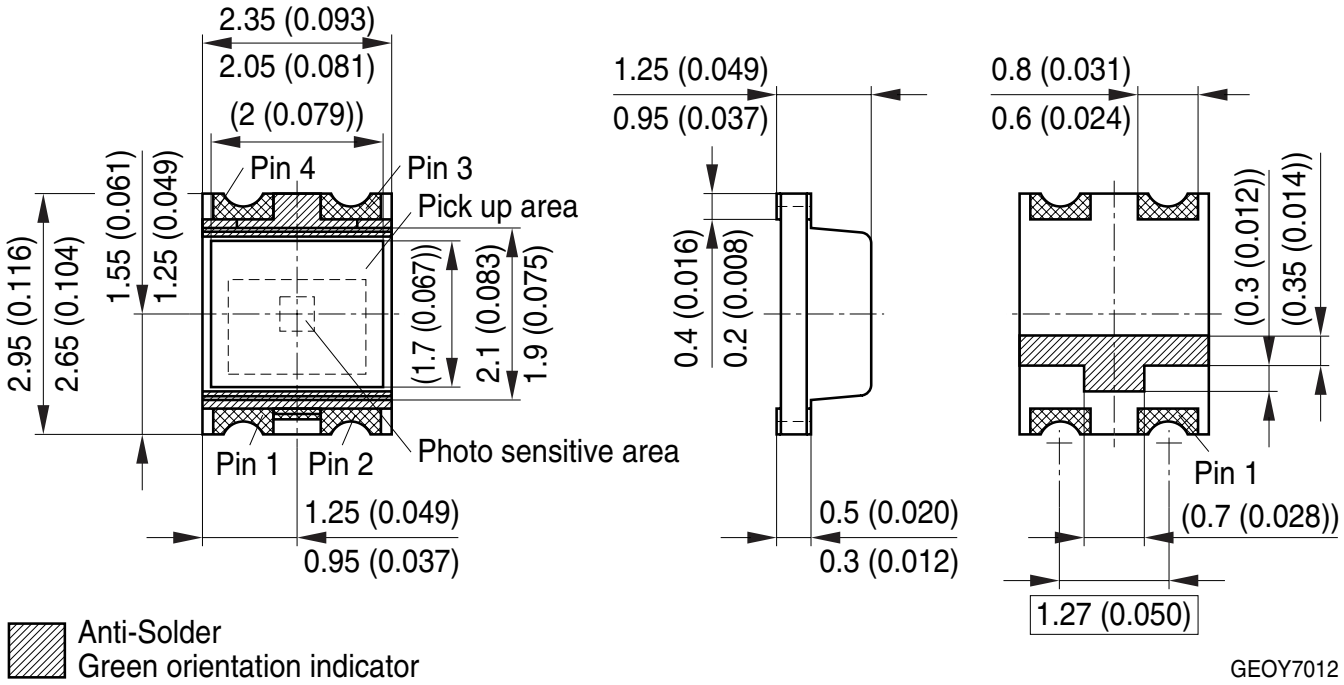


Current Consumption 2)

$I_{CC} = f(V_{CC})$;



Dimensional Drawing [3)]

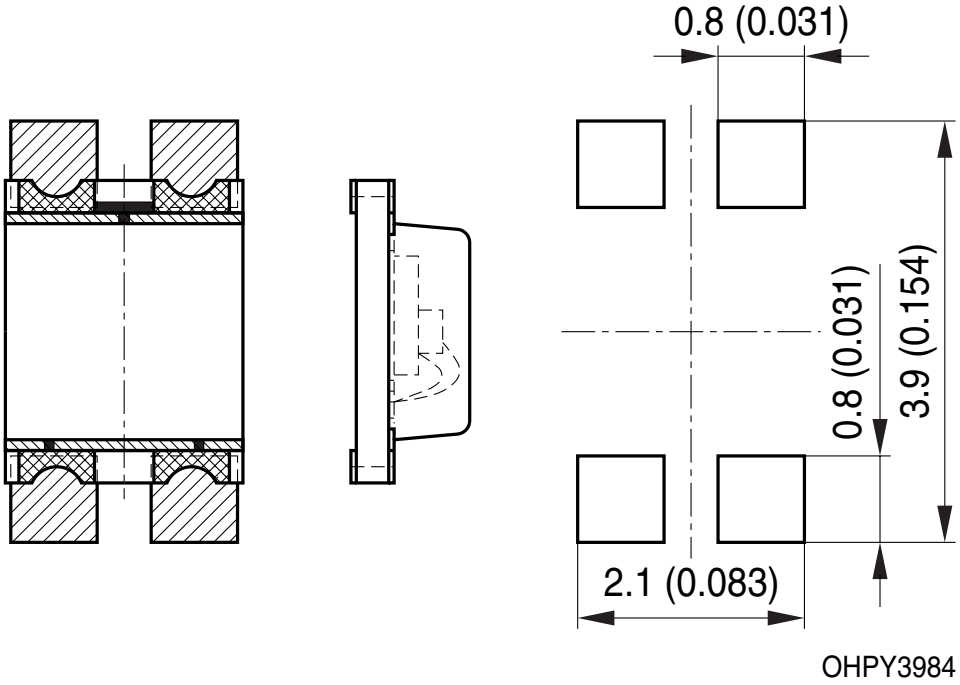


Further Information:

Approximate Weight: 9.8 mg

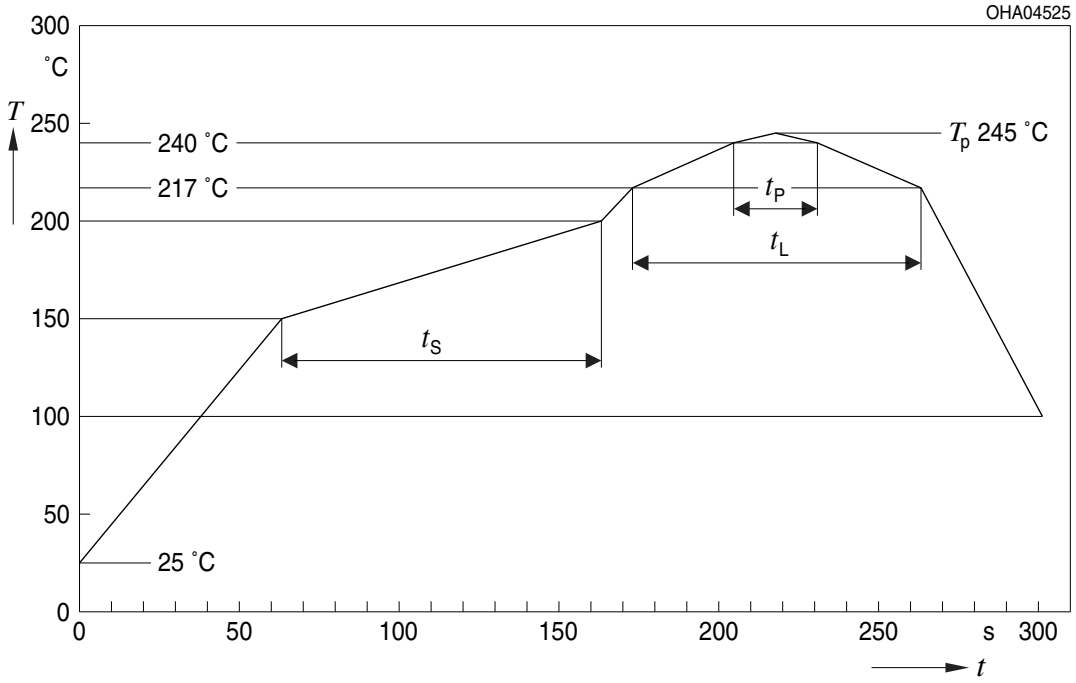
Pin	Description
1	GND
2	GND
3	V_{CC}
4	I_{OUT}

Recommended Solder Pad [3)]



Reflow Soldering Profile

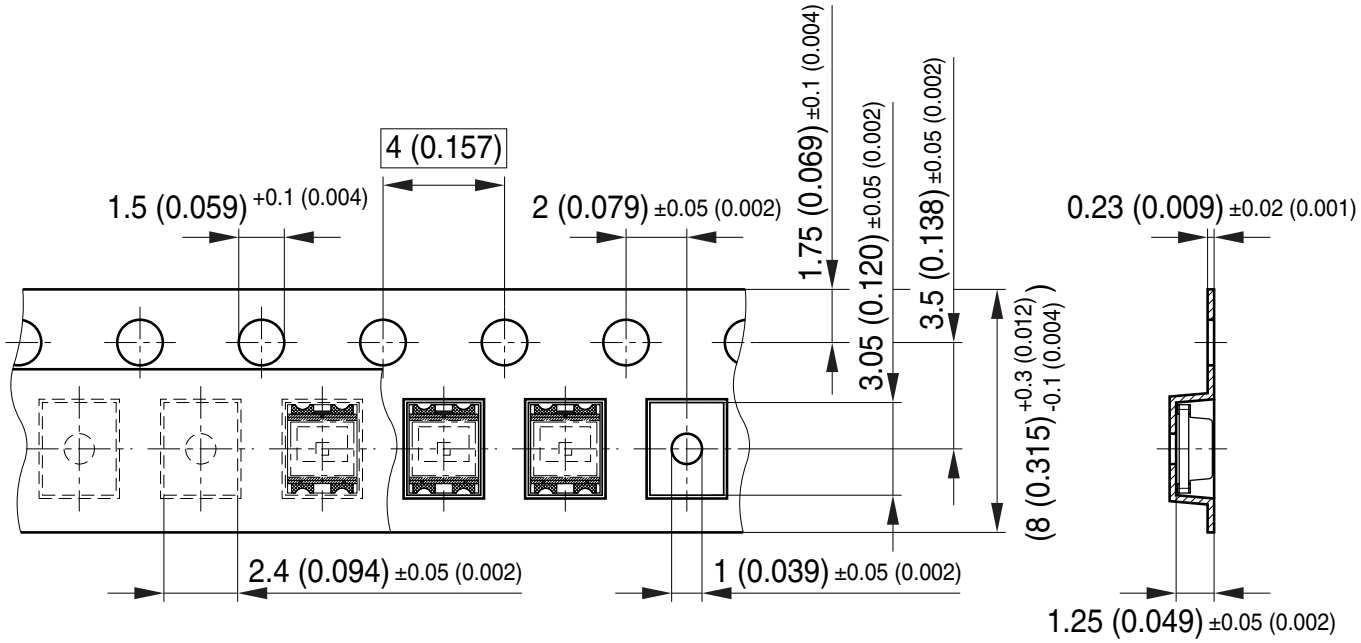
Product complies to MSL Level 3 acc. to JEDEC J-STD-020E



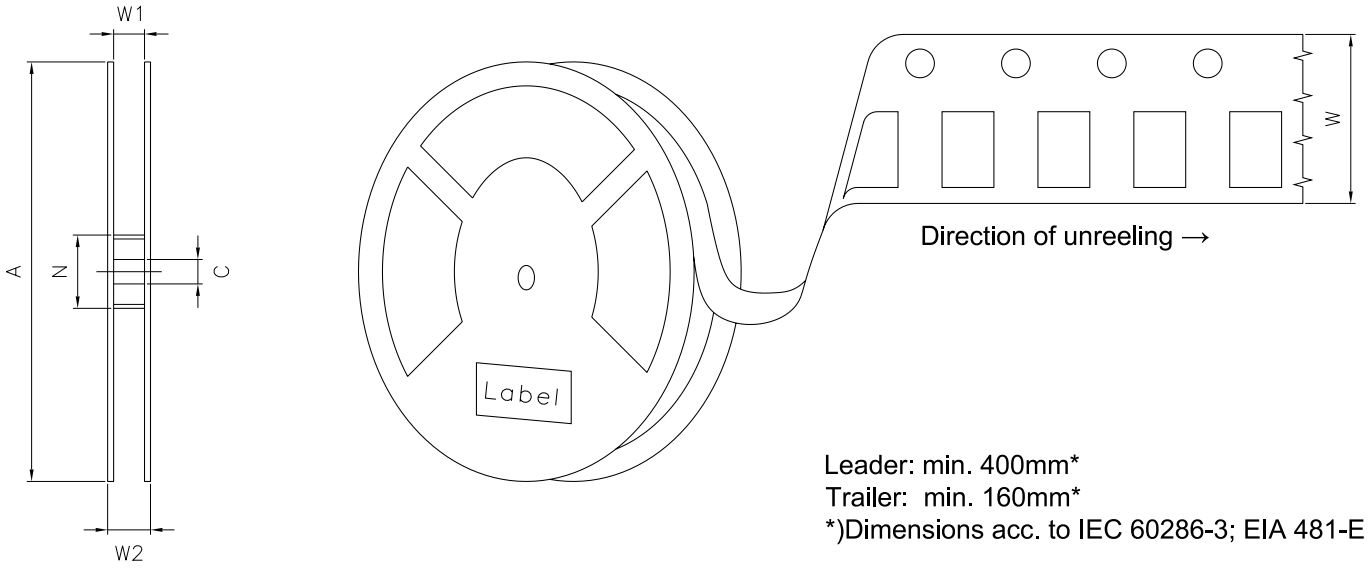
Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature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


4 (0.157)
1.5 (0.059) +0.1 (0.004)
2 (0.079) ±0.05 (0.002)
1.75 (0.069) ±0.1 (0.004)
3.05 (0.120) ±0.05 (0.002)
3.5 (0.138) ±0.05 (0.002)
(8 (0.315) +0.3 (0.012) -0.1 (0.004))
0.23 (0.009) ±0.02 (0.001)
2.4 (0.094) ±0.05 (0.002)
1 (0.039) ±0.05 (0.002)
1.25 (0.049) ±0.05 (0.002)
OHAY2870

Tape and Reel [4)]

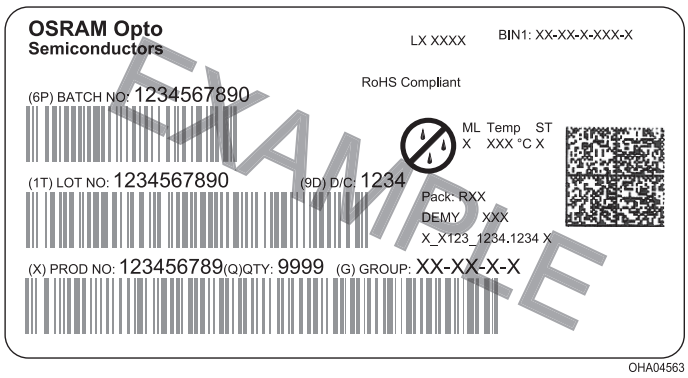


Leader: min. 400mm*
Trailer: min. 160mm*
*)Dimensions acc. to IEC 60286-3; EIA 481-E

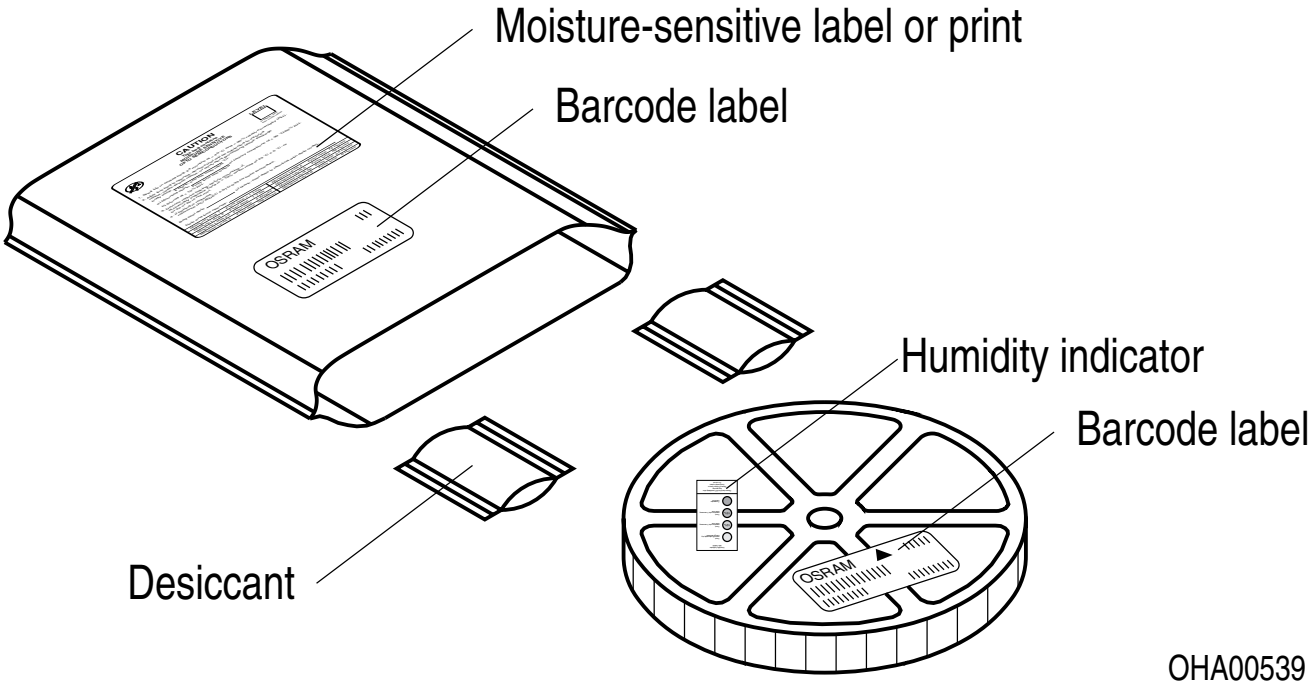
Reel Dimensions

A	W	N_{min}	W_1	$W_{2\,max}$	Pieces per PU
180 mm	8 + 0.3 / - 0.1 mm	60 mm	8.4 + 2 mm	14.4 mm	2000

Barcode-Product-Label (BPL)



Dry Packing Process and Materials [3)]



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

Disclaimer

Attention please!
The information describes the type of component and shall not be considered as assured characteristics.
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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) **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.

Revision History

Version	Date	Change
1.9	2021-05-04	New Layout
1.10	2021-09-30	Brand

Published by OSRAM Opto Semiconductors GmbH
Leibnizstraße 4, D-93055 Regensburg

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。