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SFH 3204



Micro SIDELED®

Silicon NPN Phototransistor

Applications

- Electronic Equipment
- Gesture Recognition

Features:

- Package: clear epoxy
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- Large viewing angle ± 60°
- Spectral range of sensitivity: (typ) 450 ... 1120 nm

Ordering Information

Type	Photocurrent [1]	Photocurrent [2]	Ordering Code
	V_{CE} = 5 V; λ = 950 nm; E_e = 0.1 mW/cm²	typ. V_{CE} = 5 V; λ = 950 nm; E_e = 0.1 mW/cm²	
	I_{PCE}	I_{PCE}	
SFH 3204-Z	≥ 36 µA	50 µA	Q65110A2506

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Maximum Ratings

T_A = 25 °C

Parameter	Symbol		Values
Operating temperature	T_{op}	min. max.	-40 °C 100 °C
Storage temperature	T_{stg}	min. max.	-40 °C 100 °C
Collector-emitter voltage	V_{CE}	max.	15 V
Collector-emitter voltage pulse t ≤ 10 µs; T_A = 25 °C	$V_{CE\ pulse}$	max.	30 V
Collector current	I_C	max.	15 mA
Collector surge current τ ≤ 10 µs	I_{CS}	max.	75 mA
Emitter-collector voltage	V_{EC}	max.	7 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
Wavelength of max sensitivity	$\lambda_{S\ max}$	typ.	920 nm
Spectral range of sensitivity	$\lambda_{10\%}$	typ.	450 ... 1120 nm
Dimensions of chip area	L x W	typ.	0.38 x 0.38 mm x mm
Radiant sensitive area	A	typ.	0.04 mm²
Half angle	φ	typ.	60 °
Dark current V_{CE} = 20 V; E = 0	I_{CE0}	typ. max.	1 nA 50 nA
Rise time I_C = 1 mA; λ = 950 nm; V_{CE} = 5 V; R_L = 1 kΩ	t_r	typ.	7 µs
Fall time I_C = 1 mA; λ = 950 nm; V_{CE} = 5 V; R_L = 1 kΩ	t_f	typ.	7 µs
Collector-emitter saturation voltage [3)] $I_C = I_{PCE,min}$ X 0.3; E_e = 0.1 mW/cm²	V_{CEsat}	typ.	140 mV
Capacitance V_{CE} = 0 V; f = 1 MHz; E = 0	C_{CE}	typ.	2.4 pF

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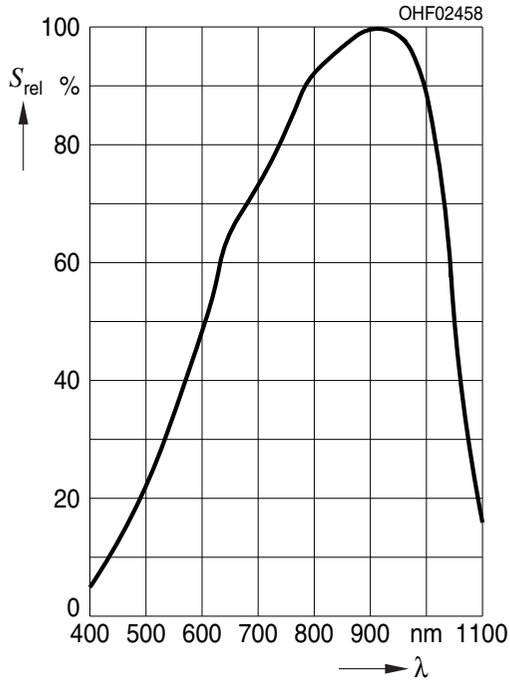
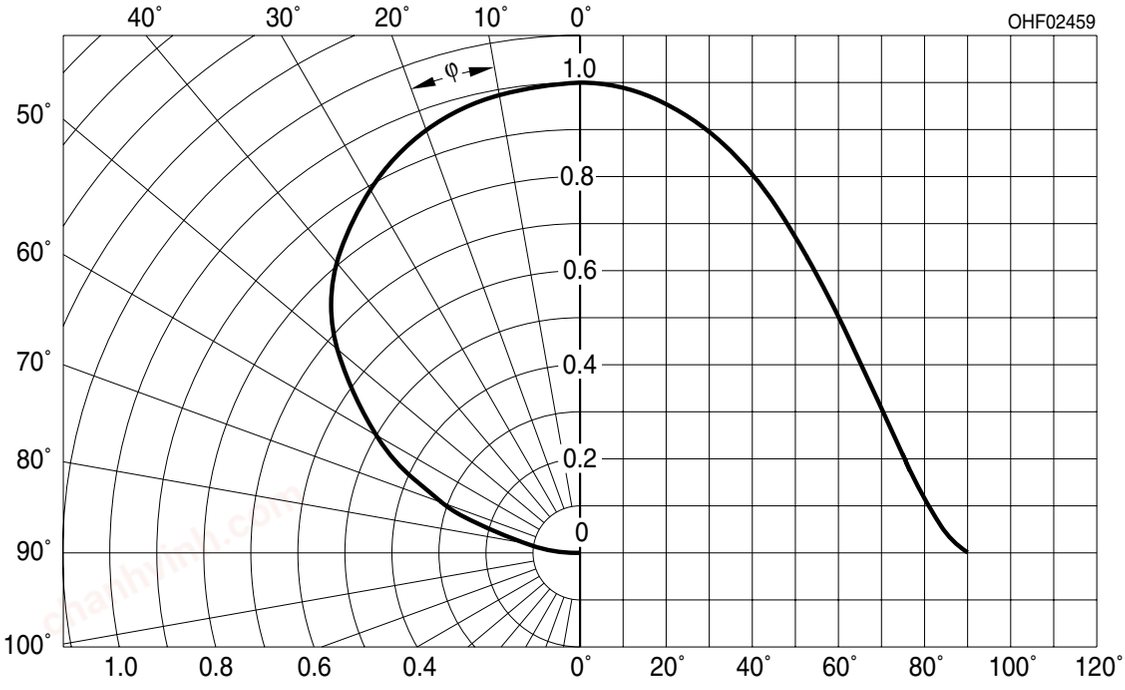
Relative Spectral Sensitivity [4), 5)]

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



Directional Characteristics [4), 5)]

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



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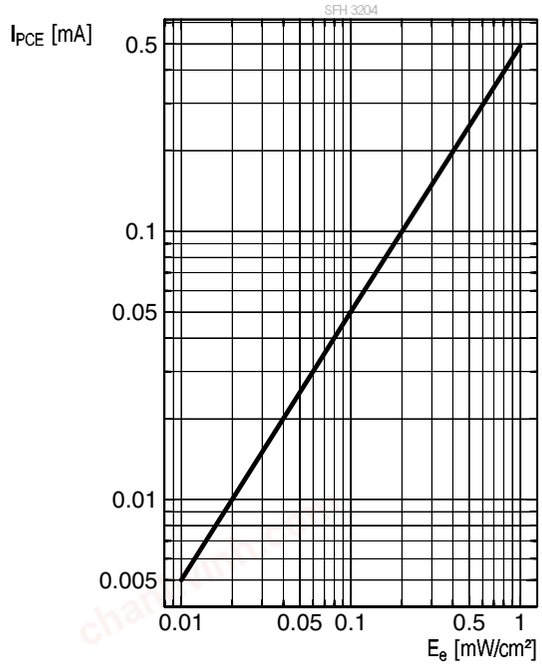
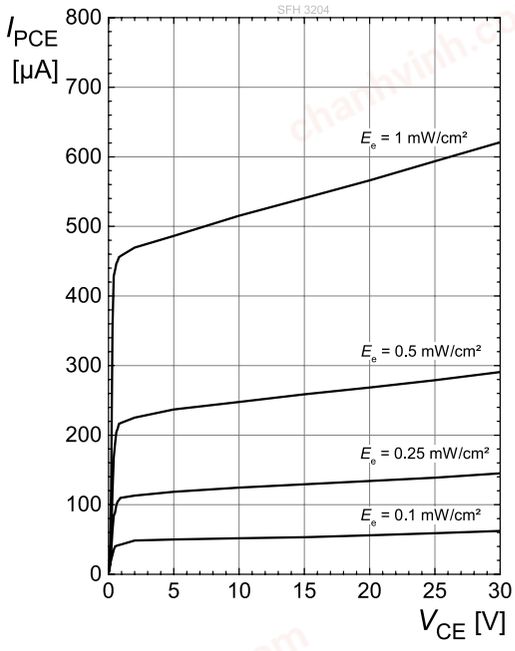
Photocurrent 4), 5)

$I_{PCE} = f(E_e)$; $V_{CE} = 5$ V



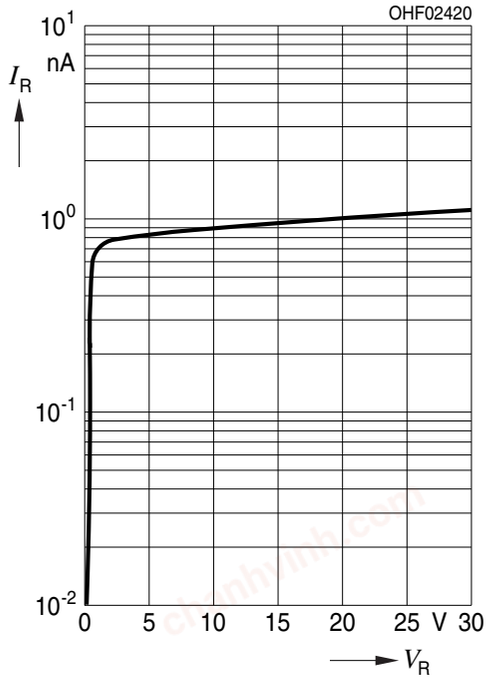
Photocurrent 4), 5)

$I_{PCE} = f(V_{CE})$; E_e = Parameter



Dark Current 4), 5)

$I_{CE0} = f(V_{CE})$; E = 0



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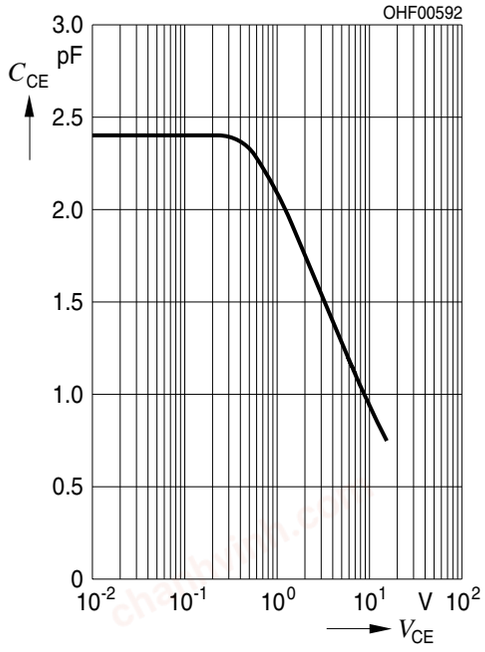
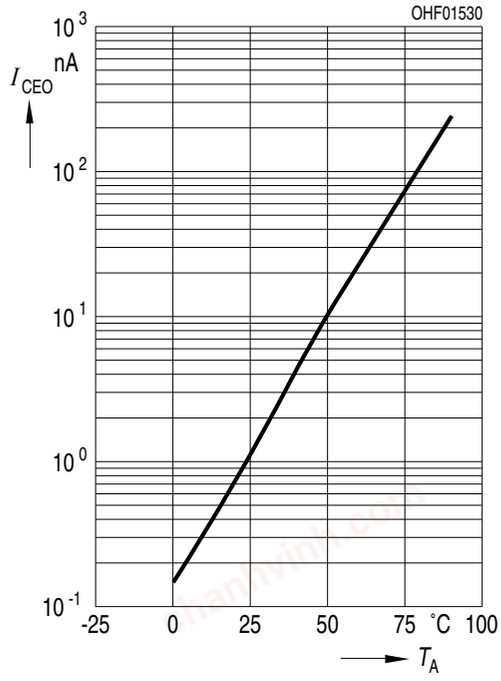
Collector-Emitter Capacitance [4), 5)]

$C_{CE} = f(V_{CE})$; f = 1 MHz; E = 0



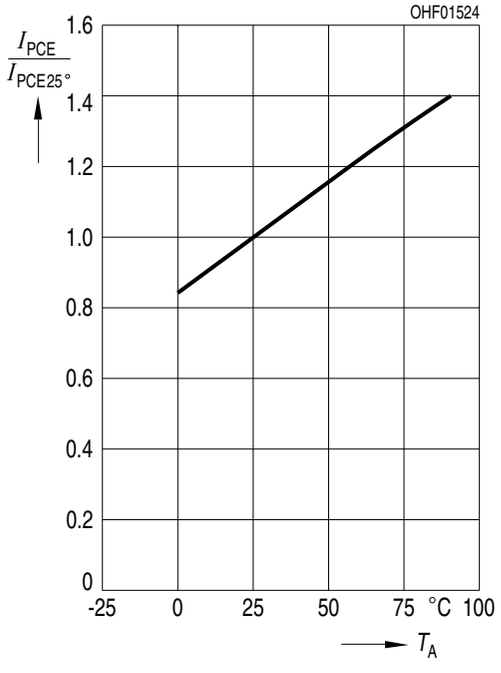
Dark Current [4)]

$I_{CE0} = f(T_A)$; V_{CE} = 20 V; E_e = 0 mW/cm²



Photocurrent [4)]

$I_{PCE,rel} = f(T_A)$; V_{CE} = 5 V



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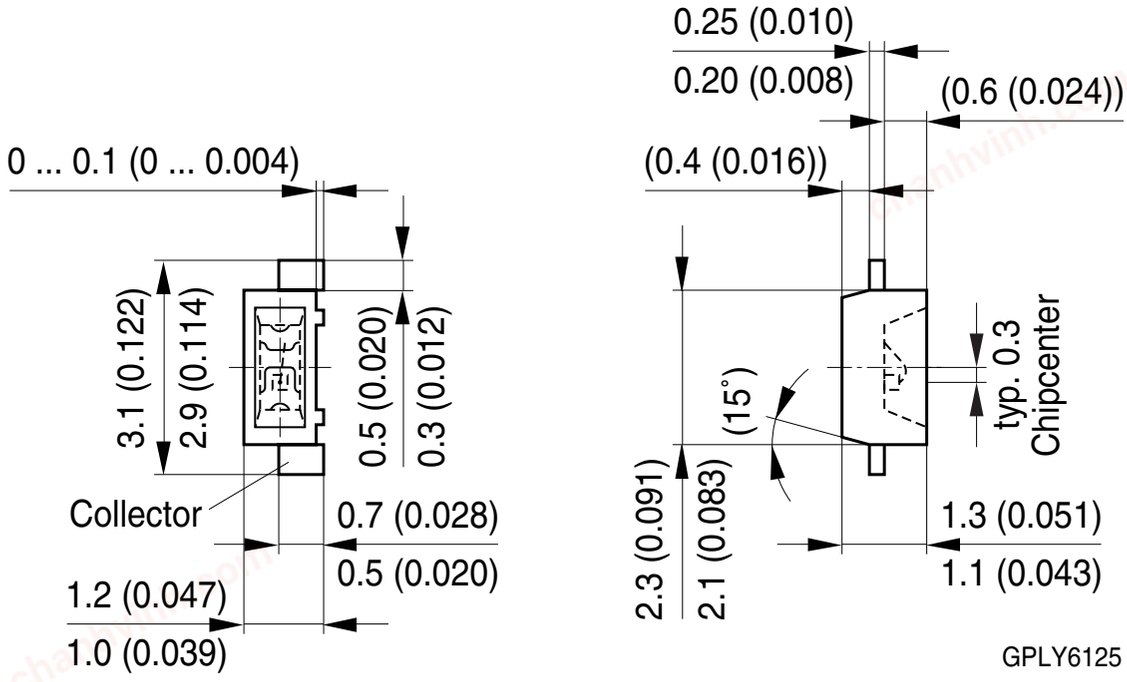
Dimensional Drawing [6]



Further Information:

Approximate Weight: 6.0 mg

Package marking: Collector

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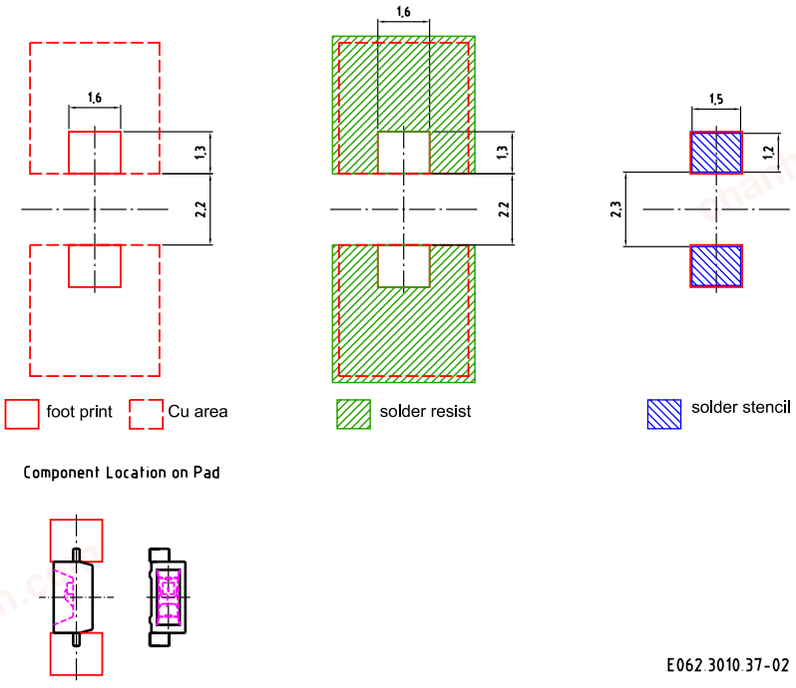
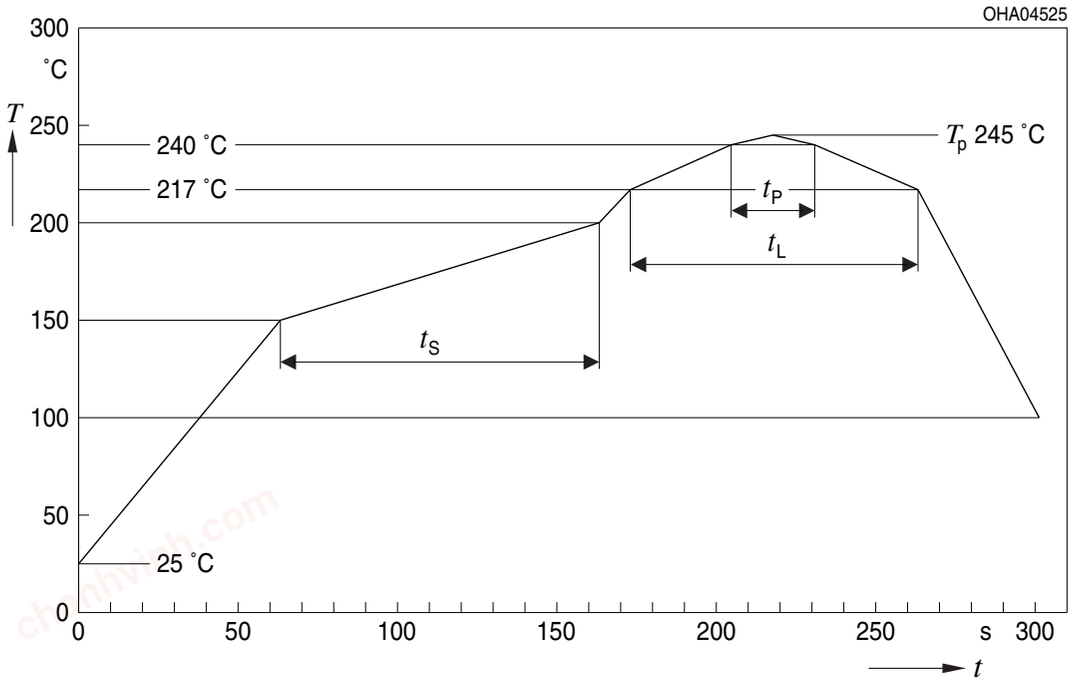
Recommended Solder Pad 6)



Reflow Soldering Profile

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



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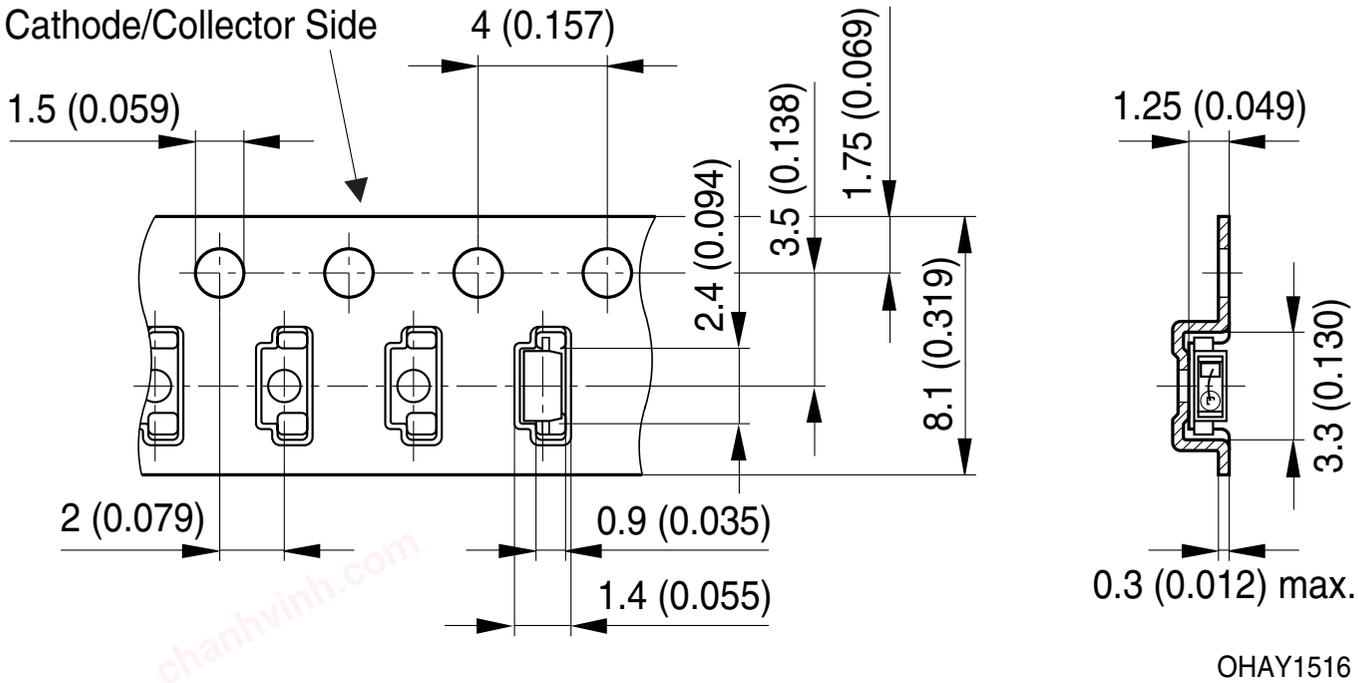
Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature	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 6)



OHAY1516

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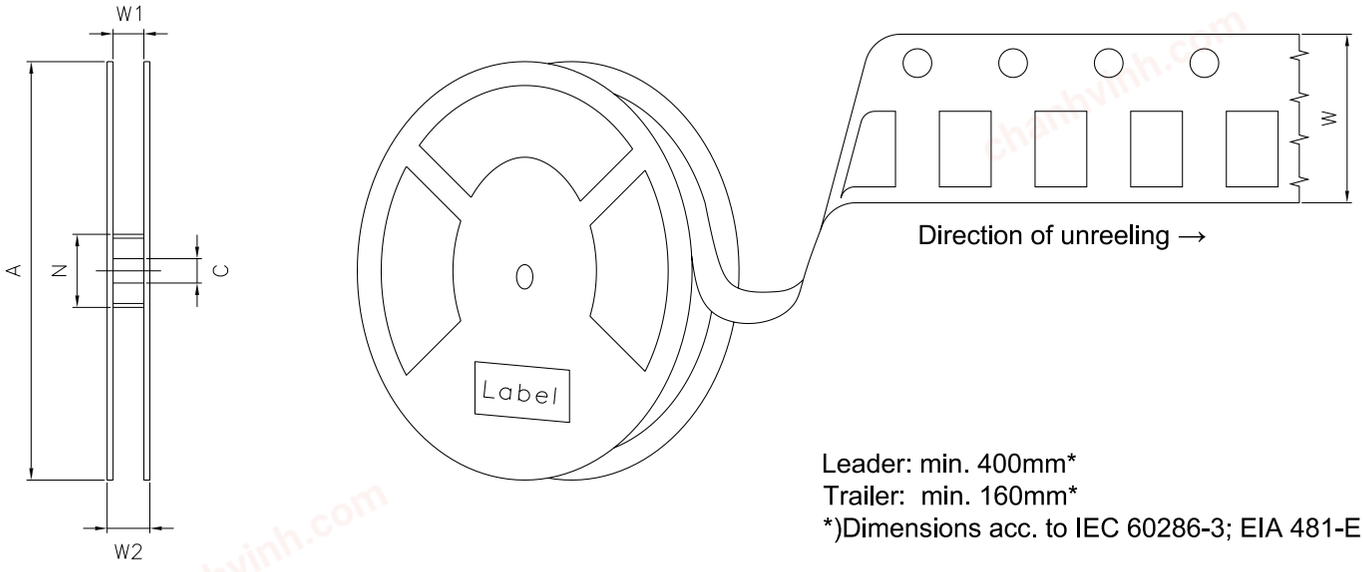
Tape and Reel [7)]



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	3000

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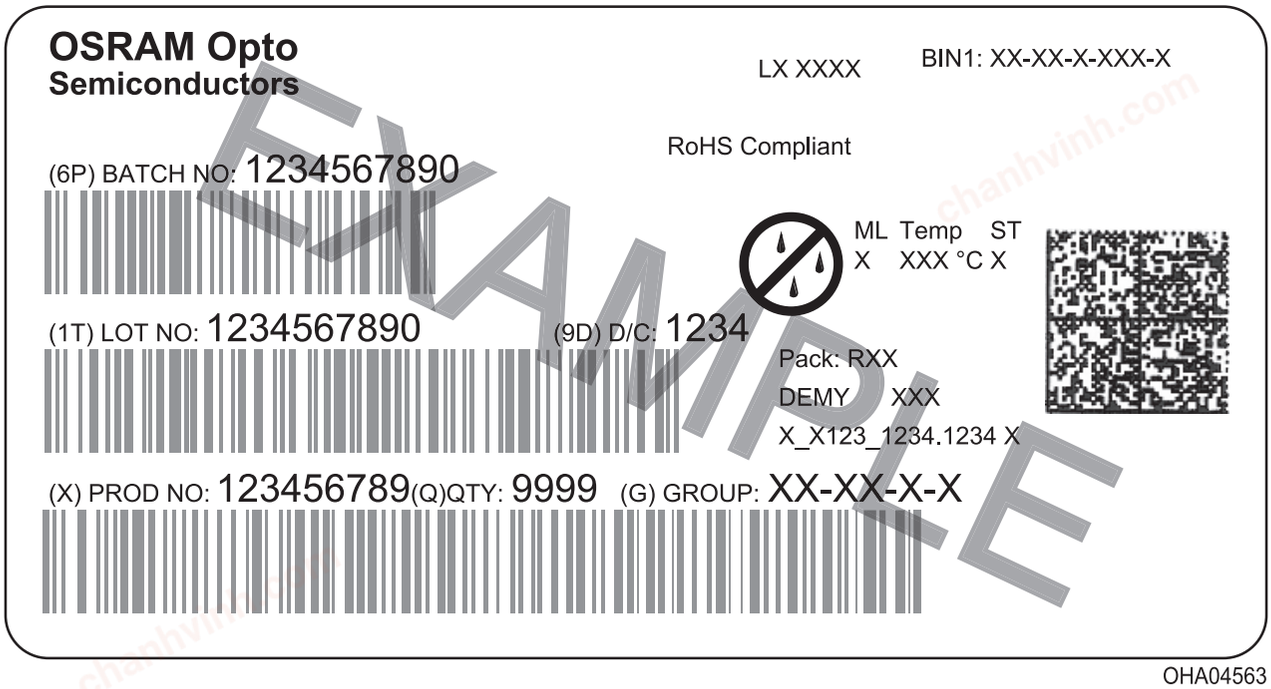
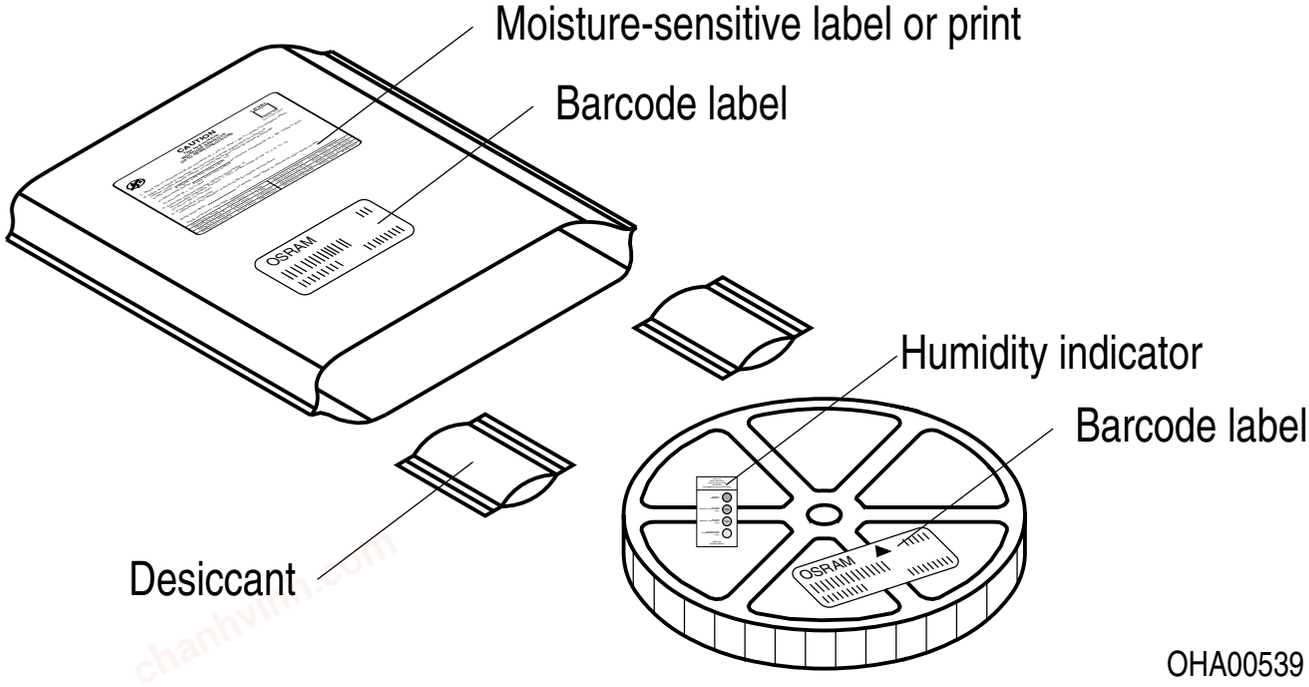
Barcode-Product-Label (BPL)



OHA04563

Dry Packing Process and Materials [6)]



OHA00539

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

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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 falls 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

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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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In case buyer – or customer supplied by buyer – considers using OSRAM OS components in product safety devices/applications or medical devices/applications, buyer and/or customer has to inform the local sales partner of OSRAM OS immediately and OSRAM OS and buyer and /or customer will analyze and coordinate the customer-specific request between OSRAM OS and buyer and/or customer.

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

3) **IPCEmin:** IPCEmin is the min. photocurrent of the specified group.

4) **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.

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

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

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

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Revision History

Version	Date	Change
1.4	2020-11-19	Schematic Transportation Box Dimensions of Transportation Box Electro - Optical Characteristics (Diagrams)

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