OSRAM LCP E6SC

Datasheet

Discontinued

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Tobelbader Strasse 30, 8141 Premstaetten, Austria
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OSRAM

Power TOPLED®

LCP E6SC

PowerTOPLED, a powerful member of the TOPLED family. Thanks to their high luminous efficacy, the LEDs are ideal for rear light clusters and indicators on vehicles and for display panels for traffic control systems.



Applications

- Ambient Lighting
- Automotive Aftermarket
- Functional Illumination

Features

- Package: white PLCC-4 package, colored diffused silicone resin
- Chip technology: InGaN
- Typ. Radiation: 120° (Lambertian emitter)
- Color: Cx = 0.39, Cy = 0.58 acc. to CIE 1931 (• pure green)
- Corrosion Robustness Class: 1B
- 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)

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AEC-Q102 QUALIFIED

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Ordering Information

Type	Luminous Intensity [1] I_F = 30 mA I_v	Ordering Code
LCP E6SC-S2U1-45-1	224 ... 560 mcd	Q65110A4682
LCP E6SC-T2V1-45-1	355 ... 900 mcd	Q65110A4683

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Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min. max.	-40 °C 110 °C
Storage Temperature	T_{stg}	min. max.	-40 °C 110 °C
Junction Temperature	T_j	max.	125 °C
Forward current T_S = 25 °C	I_F	max.	50 mA
Surge current t ≤ 10 µs; D = 0.005 ; T_S = 25 °C	I_{FS}	max.	300 mA
Reverse voltage [2] T_S = 25 °C	V_R	max.	5 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}		2 kV

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Characteristics

I_F = 30 mA; T_S = 25 °C

Parameter	Symbol		Values
Chromaticity Coordinate [3]	Cx	typ.	0.39
	Cy	typ.	0.58
Viewing angle at 50% I_V	2φ	typ.	120 °
Forward Voltage [4]	V_F	min.	2.90 V
I_F = 30 mA		typ.	3.40 V
		max.	4.35 V
Reverse current [2]	I_R	typ.	0.01 µA
V_R = 5 V		max.	10 µA
Real thermal resistance junction/ambient [5][6]	$R_{thJA\ real}$	max.	300 K / W
Real thermal resistance junction/solderpoint [5]	$R_{thJS\ real}$	max.	180 K / W

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Brightness Groups

Group	Luminous Intensity [1] I_F = 30 mA min. I_v	Luminous Intensity [1] I_F = 30 mA max. I_v	Luminous Flux [7] I_F = 30 mA typ. Φ_V
S2	224 mcd	280 mcd	760 mlm
T1	280 mcd	355 mcd	950 mlm
T2	355 mcd	450 mcd	1210 mlm
U1	450 mcd	560 mcd	1520 mlm
U2	560 mcd	710 mcd	1910 mlm
V1	710 mcd	900 mcd	2420 mlm

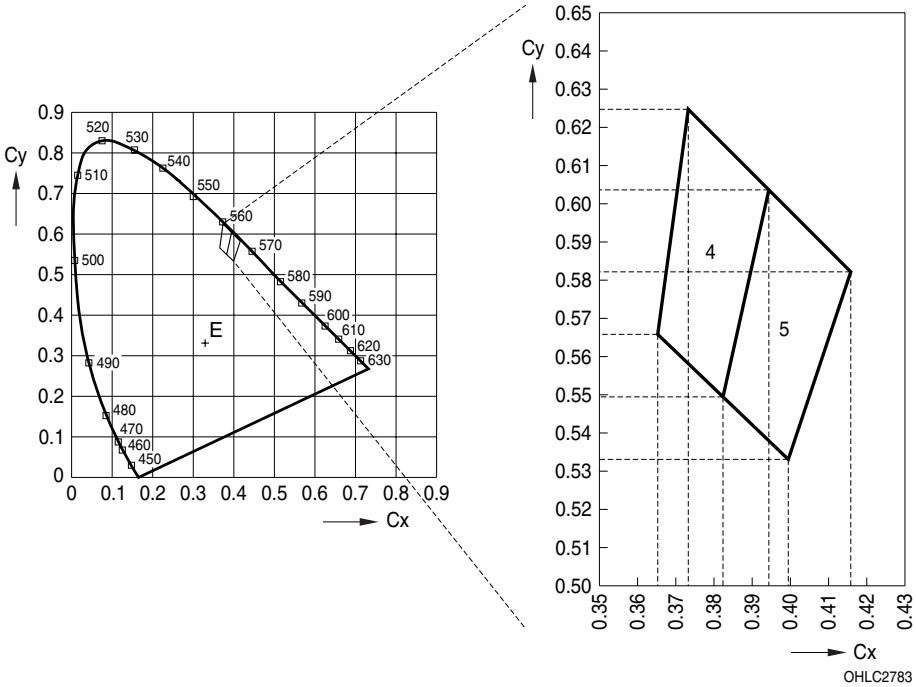
Forward Voltage Groups

Group	Forward Voltage [4] I_F = 30 mA min. V_F	Forward Voltage [4] I_F = 30 mA max. V_F
2	2.90 V	3.25 V
3	3.25 V	3.80 V
4	3.80 V	4.35 V

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Chromaticity Coordinate Groups [3)]



Chromaticity Coordinate Groups [3)]

Group	Cx	Cy
4	0.3823	0.5495
	0.3651	0.5662
	0.3731	0.6245
	0.3945	0.6036

Group	Cx	Cy
5	0.3993	0.5328
	0.3823	0.5495
	0.3945	0.6036
	0.4158	0.5826

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Group Name on Label

Example: S2-4-2

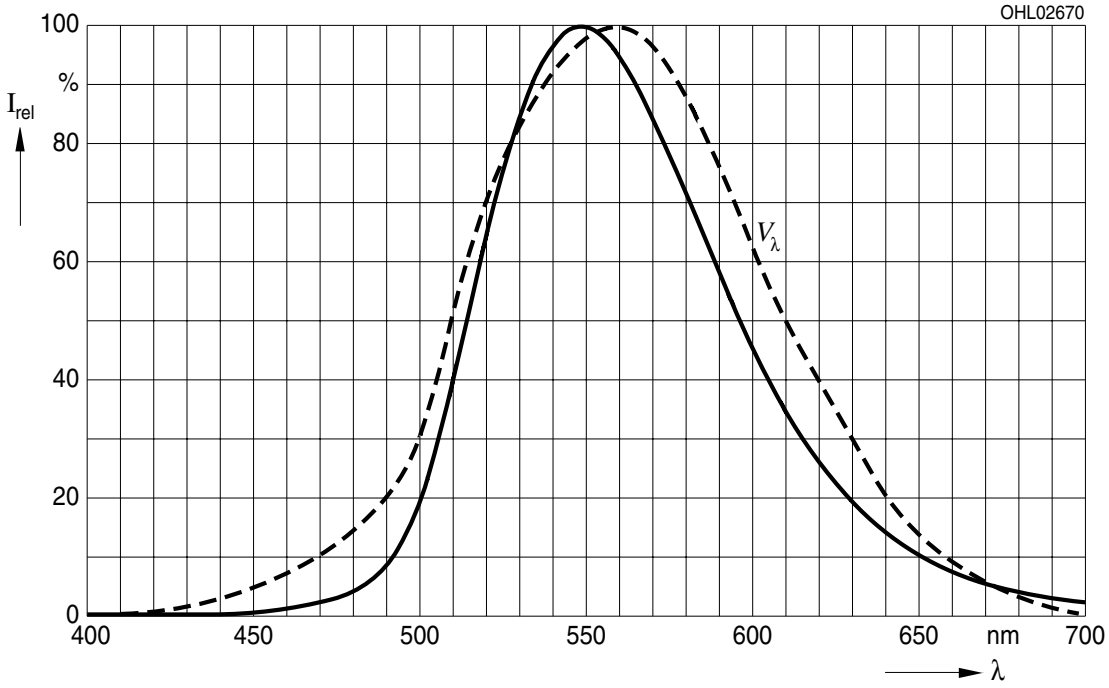
Brightness	Color Chromaticity	Forward Voltage
S2	4	2

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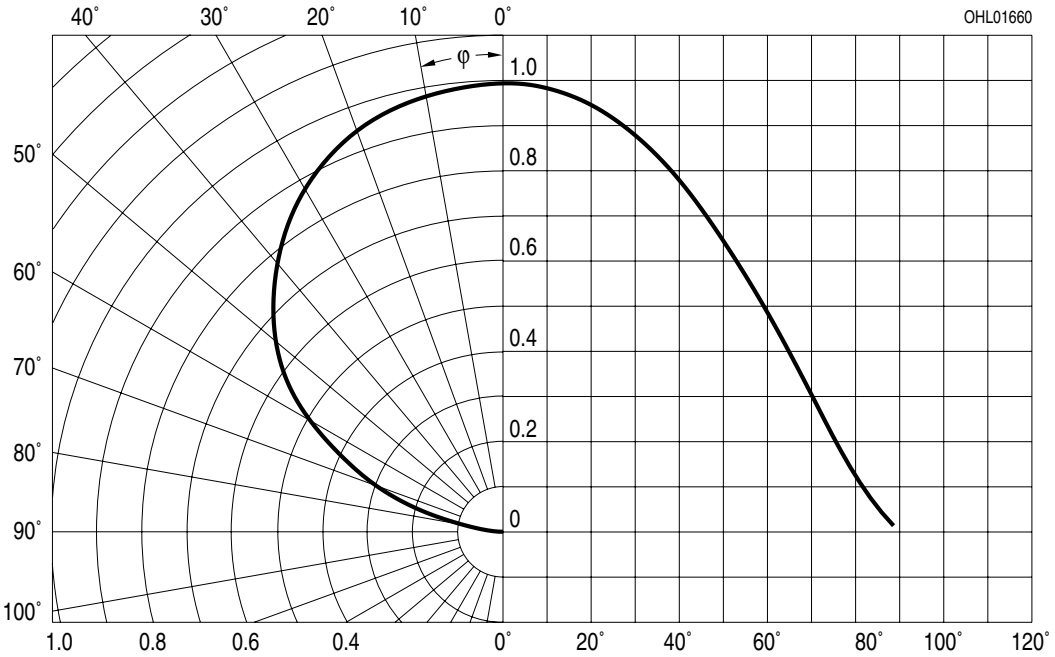
Relative Spectral Emission [7)]

$I_{rel} = f(\lambda)$; $I_F = 30$ mA; $T_S = 25$ °C



Radiation Characteristics [7)]

$I_{rel} = f(\phi)$; $T_S = 25$ °C

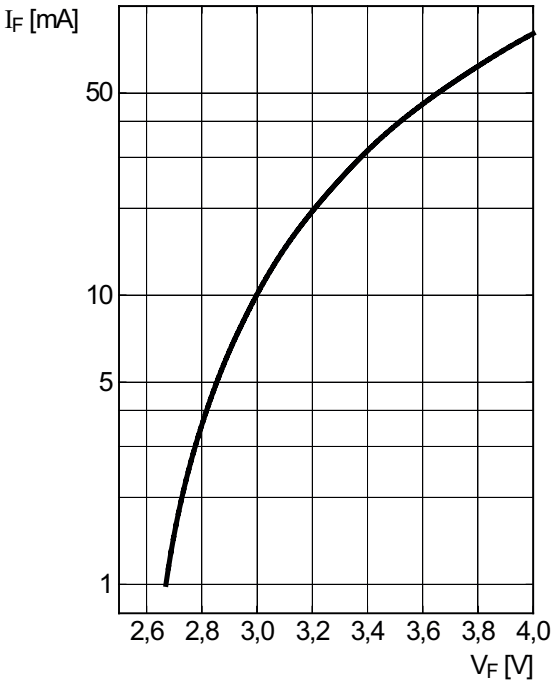


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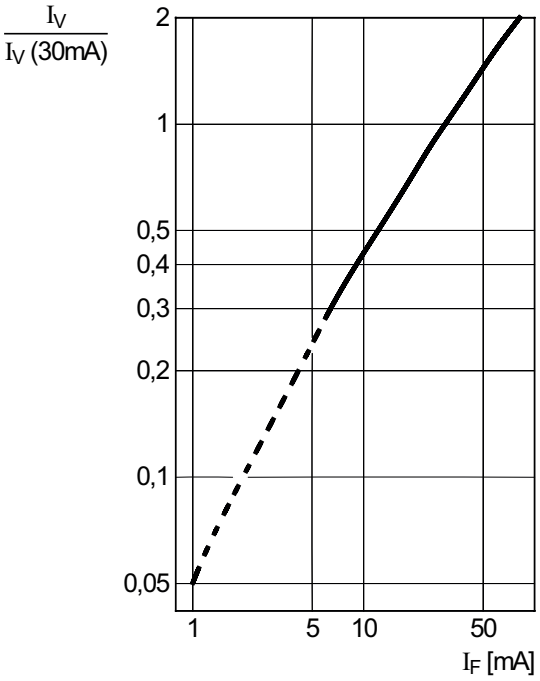
Forward current [7), 8)]

$I_F = f(V_F)$; T_S = 25 °C



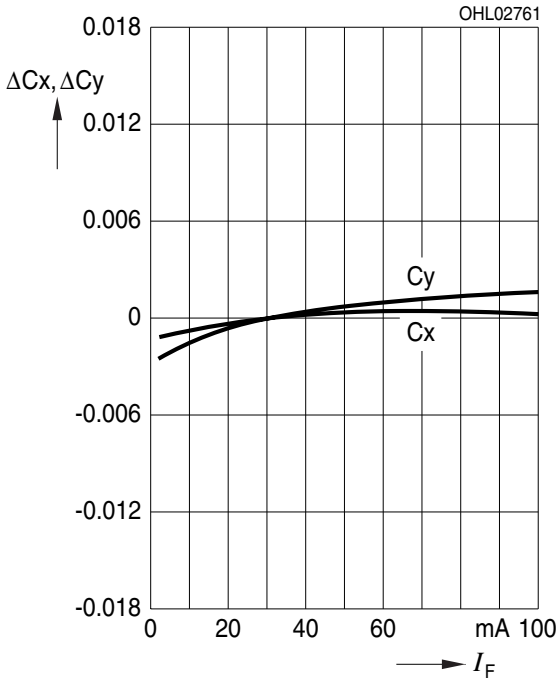
Relative Luminous Intensity [7), 8)]

$I_v/I_v(30\ mA) = f(I_F)$; T_S = 25 °C



Chromaticity Coordinate Shift [7)]

$\Delta Cx, \Delta Cy = f(I_F)$; T_S = 25 °C

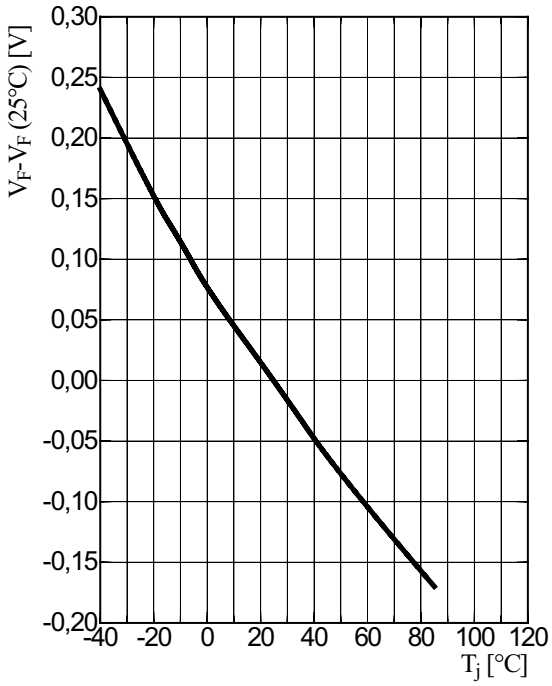


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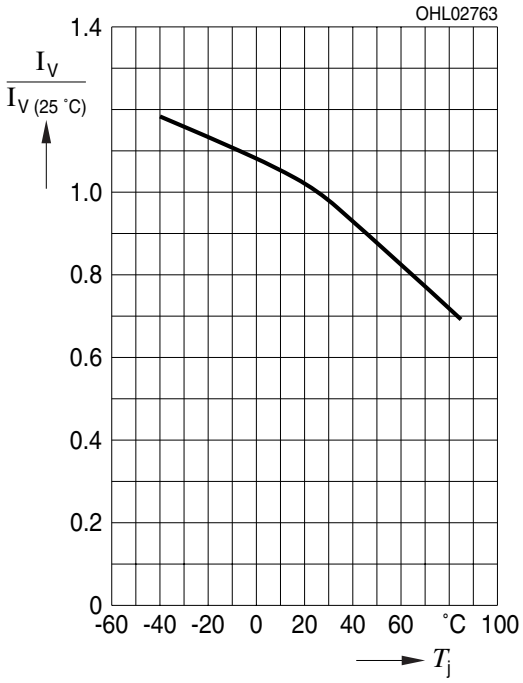
Forward Voltage [7)]

$\Delta V_F = V_F - V_F(25\ °C) = f(T_j)$; $I_F = 30$ mA



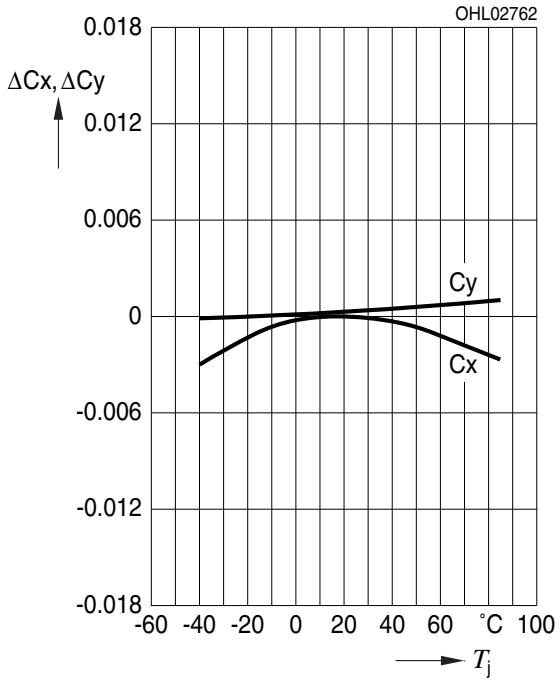
Relative Luminous Intensity [7)]

$I_v/I_v(25\ °C) = f(T_j)$; $I_F = 30$ mA



Chromaticity Coordinate Shift [7)]

$\Delta Cx, \Delta Cy = f(T_j)$; $I_F = 30$ mA

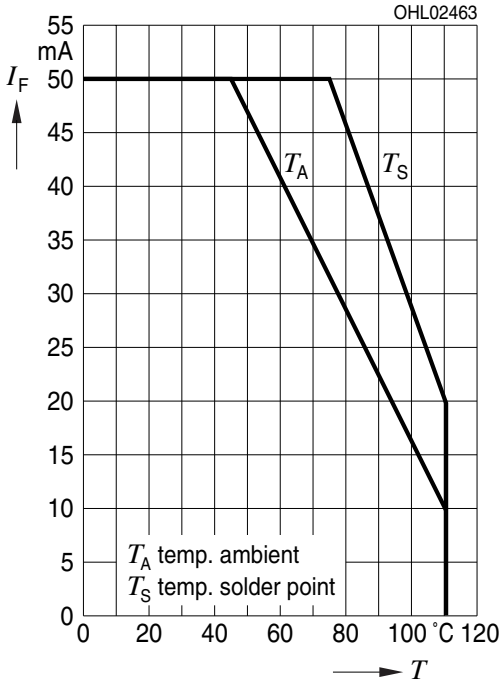


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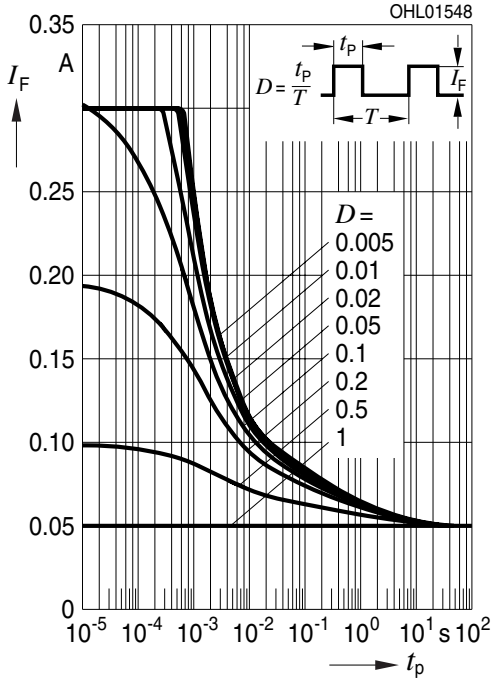
Max. Permissible Forward Current

$I_F = f(T)$



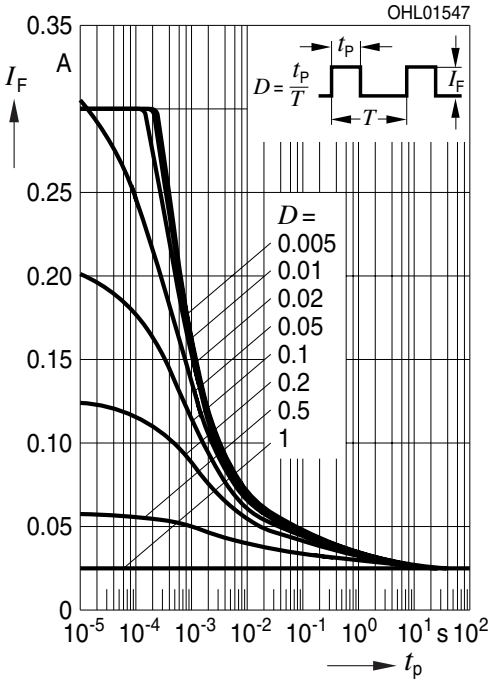
Permissible Pulse Handling Capability

$I_F = f(t_p)$; D: Duty cycle; T_A = 25 °C



Permissible Pulse Handling Capability

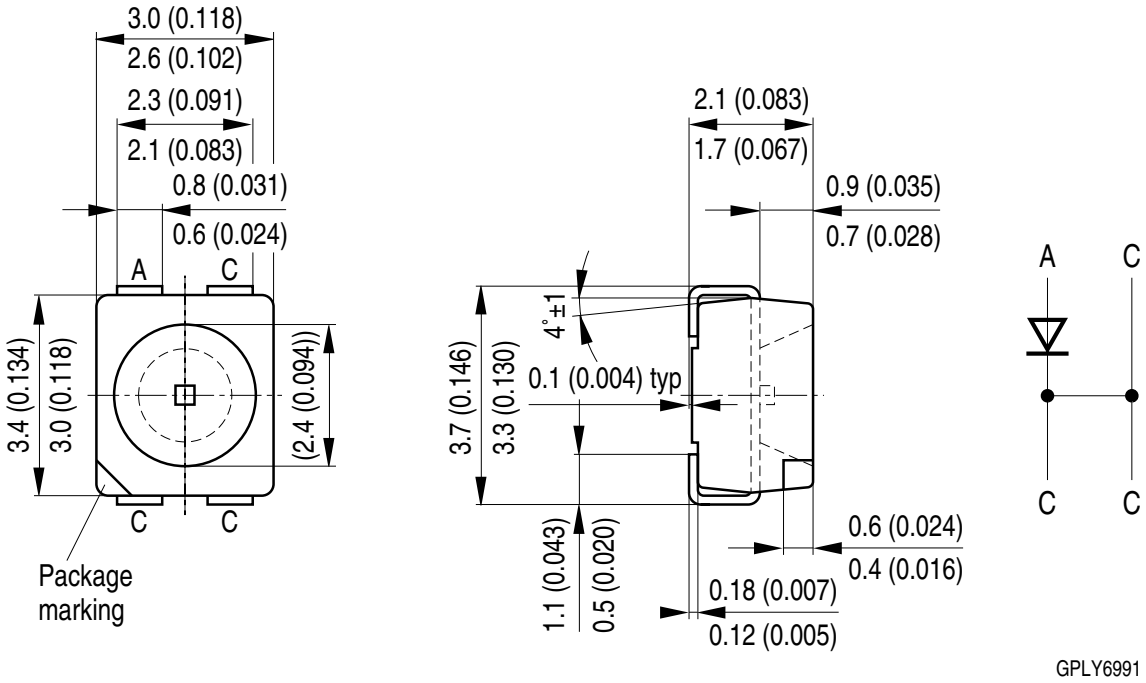
$I_F = f(t_p)$; D: Duty cycle; T_A = 85 °C



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Dimensional Drawing [9)]



Further Information:

Approximate Weight: 30.0 mg

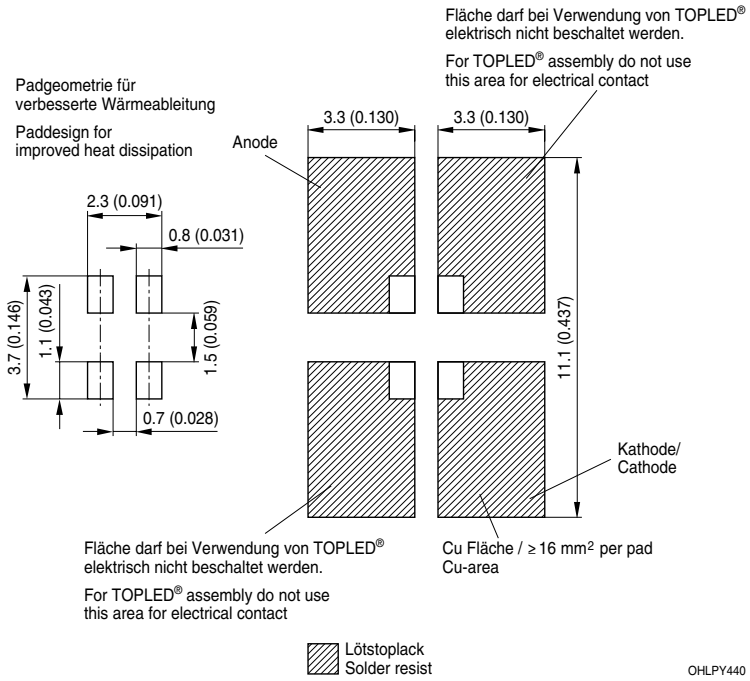
Package marking: Cathode

Corrosion test: Class: 1B
Test condition: 25°C / 75 % RH / 200ppb SO_2, 200ppb NO_2, 10ppb H_2S, 10ppb Cl_2 / 21 days (EN 60068-2-60 (Method 4))

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Recommended Solder Pad [9)]



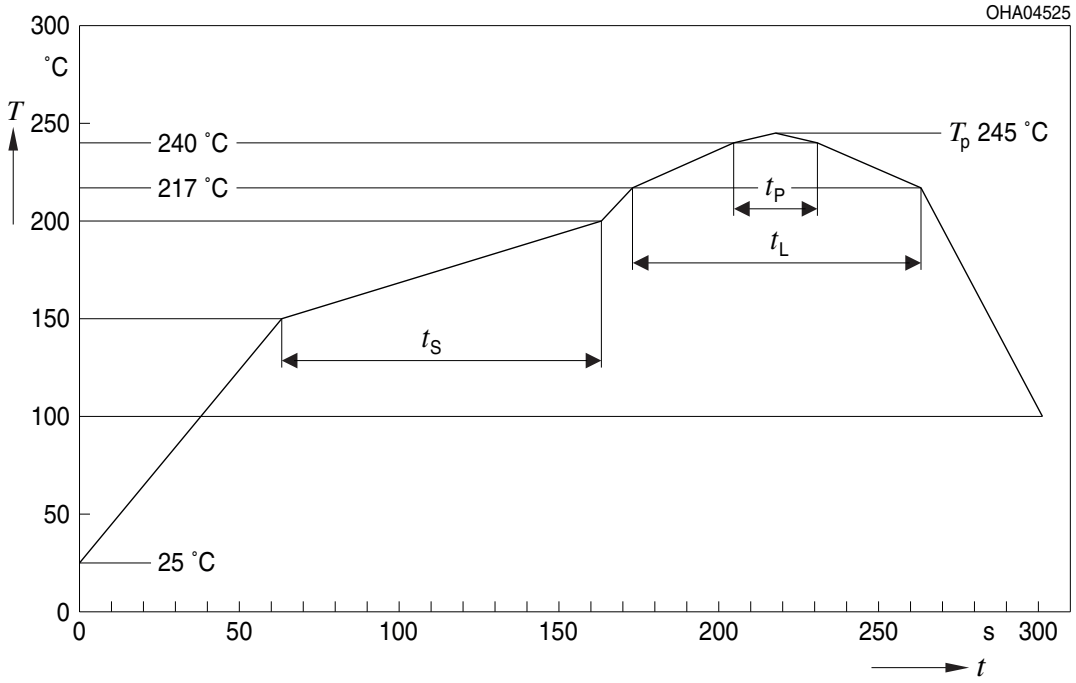
For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for ultra sonic cleaning.

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Reflow Soldering Profile

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



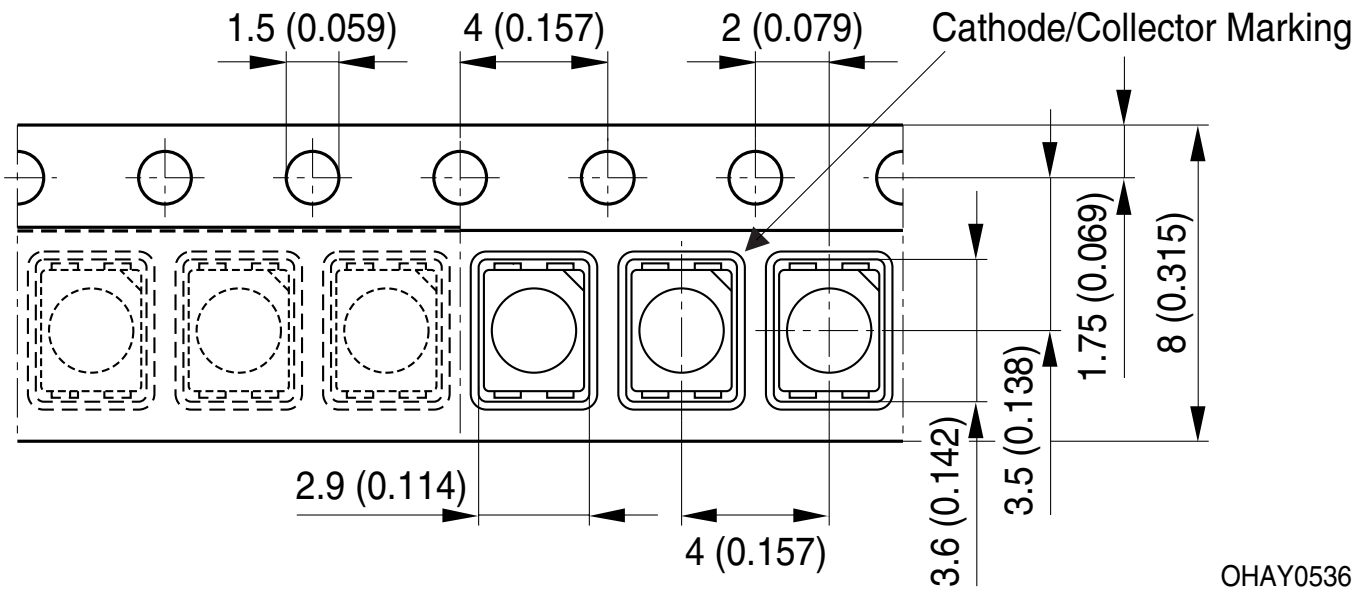
Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature	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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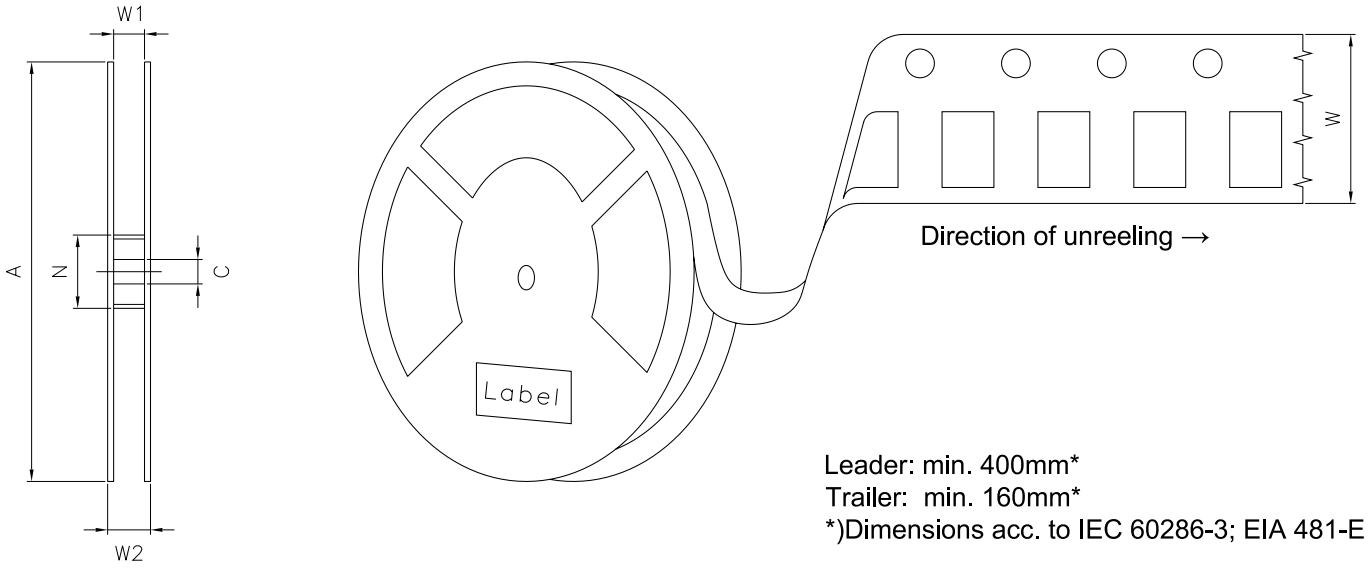
Taping [9)]



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Tape and Reel [10)]



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

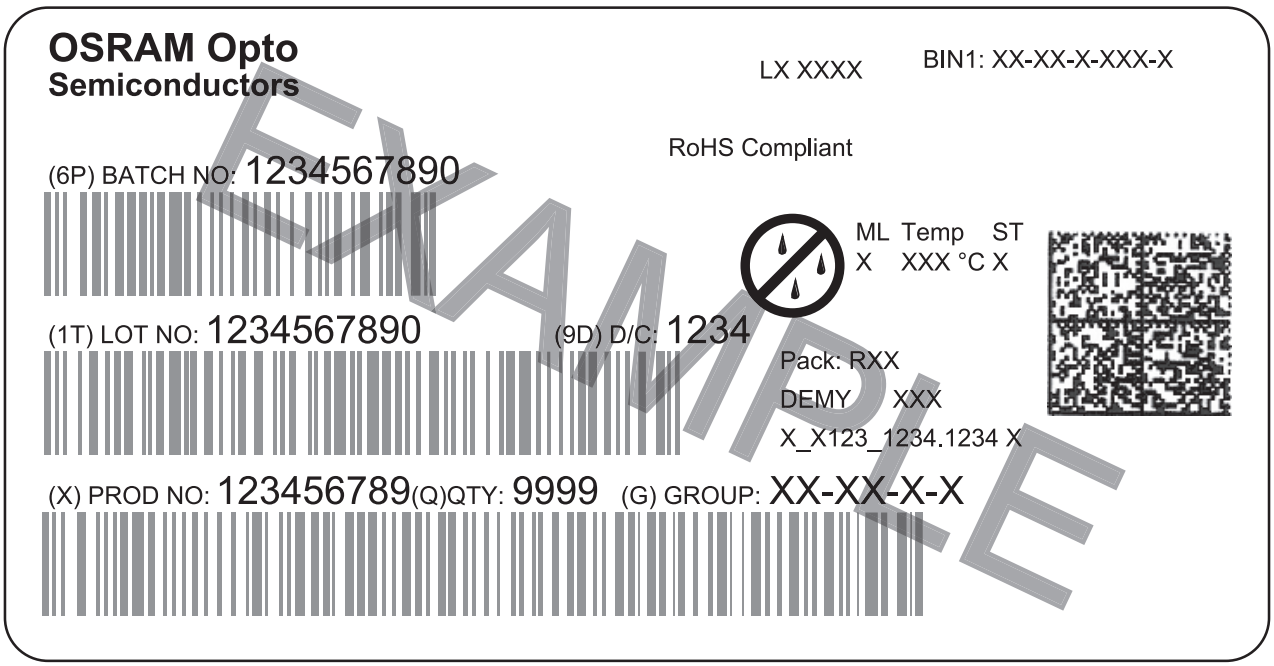
Reel Dimensions

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
330 mm	8 + 0.3 / - 0.1 mm	60 mm	8.4 + 2 mm	14.4 mm	8000

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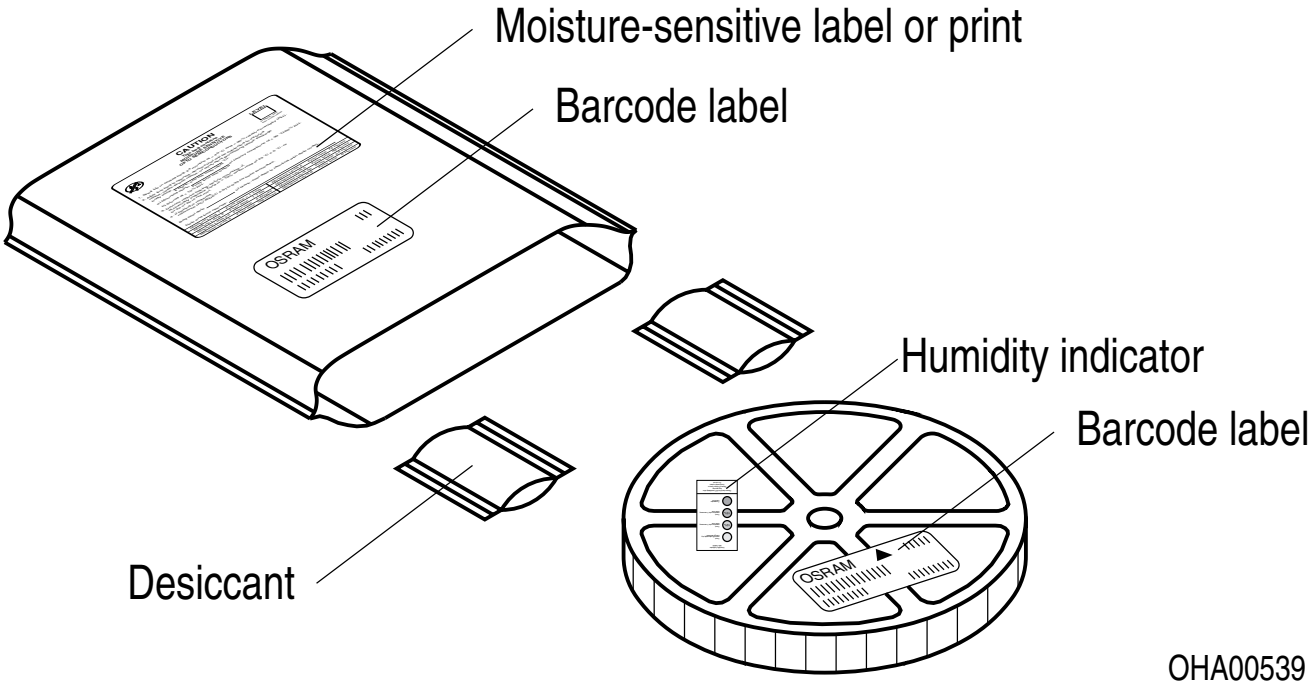
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Barcode-Product-Label (BPL)



OHA04563

Dry Packing Process and Materials [9)]



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 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

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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 our 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.

Product and functional safety devices/applications or medical devices/applications

Our components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.
Our products are not qualified at module and system level for such application.

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

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Glossary

1) **Brightness:** Brightness values are measured during a current pulse of typically 25 ms, with an internal reproducibility of ±8 % and an expanded uncertainty of ±11 % (acc. to GUM with a coverage factor of k = 3).

2) **Reverse Operation:** This product is intended to be operated applying a forward current within the specified range. Applying any continuous reverse bias or forward bias below the voltage range of light emission shall be avoided because it may cause migration which can change the electro-optical characteristics or damage the LED.

3) **Chromaticity coordinate groups:** Chromaticity coordinates are measured during a current pulse of typically 25 ms, with an internal reproducibility of ±0.005 and an expanded uncertainty of ±0.01 (acc. to GUM with a coverage factor of k = 3).

4) **Forward Voltage:** The forward voltage is measured during a current pulse of typically 8 ms, with an internal reproducibility of ±0.05 V and an expanded uncertainty of ±0.1 V (acc. to GUM with a coverage factor of k = 3).

5) **Thermal Resistance:** Rth max is based on statistic values (6σ).

6) **Thermal Resistance:** RthJA results from mounting on PC board FR 4 (pad size 16 mm² per pad)

7) **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.

8) **Characteristic curve:** In the range where the line of the graph is broken, you must expect higher differences between single devices within one packing unit.

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

10) **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	2019-10-24	Features Disclaimer
1.5	2022-04-21	Not for new design New Layout
1.6	2022-08-04	Discontinued Applications

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