KP DELPS1.FP

TOPLED® E1608

The TOPLED E1608 expands OSRAM Opto Semiconductors' low power portfolio by offering one of the smallest LED Industry standard footprints in a highly reliable and well proved package concept.
Its outstanding performance is suitable for a huge variety of applications especially automotive interior where a small package design with excellent reliability is needed. The TOPLED E1608 is available in different colors and brightness levels.

Applications

- Cluster, Button Backlighting
- Electronic Equipment
- Interior Illumination (e.g. Ambient Map)

Features:

- Package: white SMT package, colored diffused silicone resin
- Chip technology: InGaN on Sapphire
- Typ. Radiation: 120° (Lambertian emitter)
- Color: Cx = 0.37, Cy = 0.6 acc. to CIE 1931 (• pure green)
- Corrosion Robustness Class: 1B
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)

Ordering Information

Type	Luminous Intensity [1] I_F = 10 mA I_v	Ordering Code
KP DELPS1.FP-UGVI-34-Z555	450 ... 1120 mcd	Q65112A3998

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	min. max.	1 mA 20 mA
Surge Current t ≤ 10 µs; D = 0.005 ; T_S = 25 °C	I_{FS}	max.	40 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

Characteristics

I_F = 10 mA; T_S = 25 °C

Parameter	Symbol		Values
Chromaticity Coordinate [3]	Cx	typ.	0.37
	Cy	typ.	0.6
Viewing angle at 50 % I_V	2φ	typ.	120 °
Forward Voltage [4]	V_F	min.	2.70 V
I_F = 10 mA		typ.	2.90 V
		max.	3.20 V
Reverse current [2]	I_R	typ.	0.01 µA
V_R = 5 V		max.	10 µA
Real thermal resistance junction/solderpoint [5]	$R_{thJS\ real}$	typ.	120 K / W
		max.	210 K / W

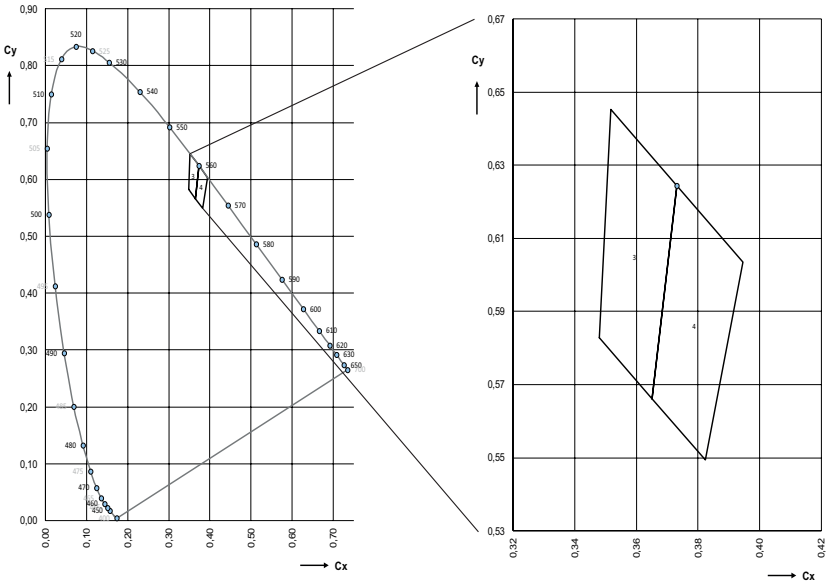
Brightness Groups

Group	Luminous Intensity [1] I_F = 10 mA min. I_v	Luminous Intensity [1] I_F = 10 mA max. I_v	Luminous Flux [6] I_F = 10 mA typ. Φ_V
UG	450 mcd	520 mcd	1500 mlm
UH	520 mcd	610 mcd	1700 mlm
UI	610 mcd	710 mcd	2000 mlm
VG	710 mcd	820 mcd	2300 mlm
VH	820 mcd	970 mcd	2700 mlm
VI	970 mcd	1120 mcd	3100 mlm

Forward Voltage Groups

Group	Forward Voltage [4] I_F = 10 mA min. V_F	Forward Voltage [4] I_F = 10 mA max. V_F
Z5	2.70 V	2.95 V
55	2.95 V	3.20 V

Chromaticity Coordinate Groups [3)]



Color Chromaticity Groups [3)]

Group	Cx	Cy
3	0.3517	0.6452
	0.3731	0.6244
	0.3651	0.5662
	0.3480	0.5828

Group	Cx	Cy
4	0.3731	0.6244
	0.3945	0.6036
	0.3823	0.5495
	0.3651	0.5662

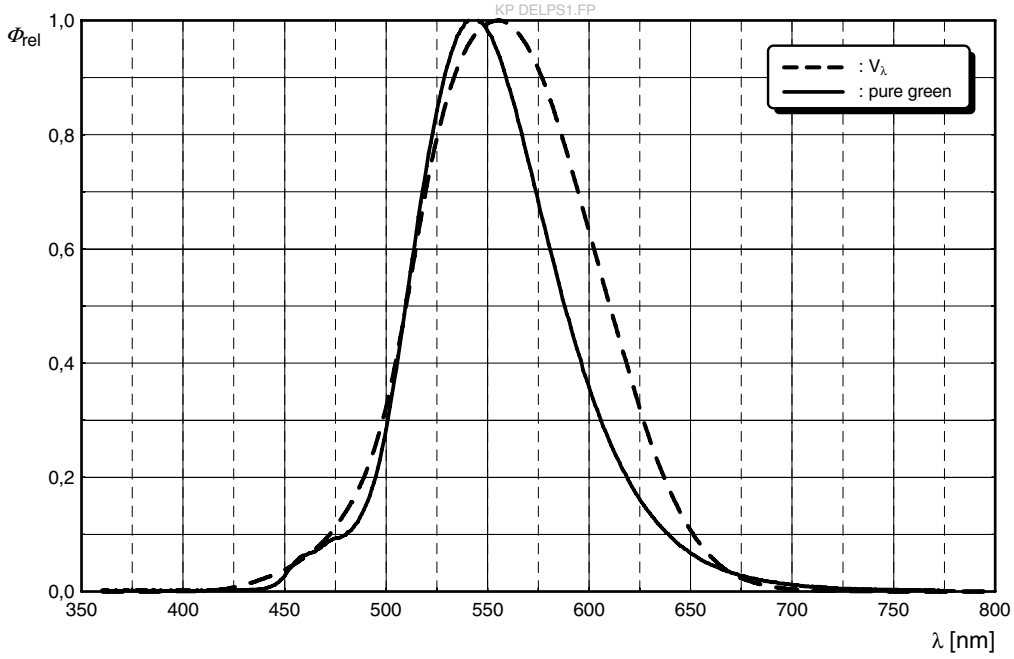
Group Name on Label

Example: UG-3-55

Brightness	Color Chromaticity	Forward Voltage
UG	3	55

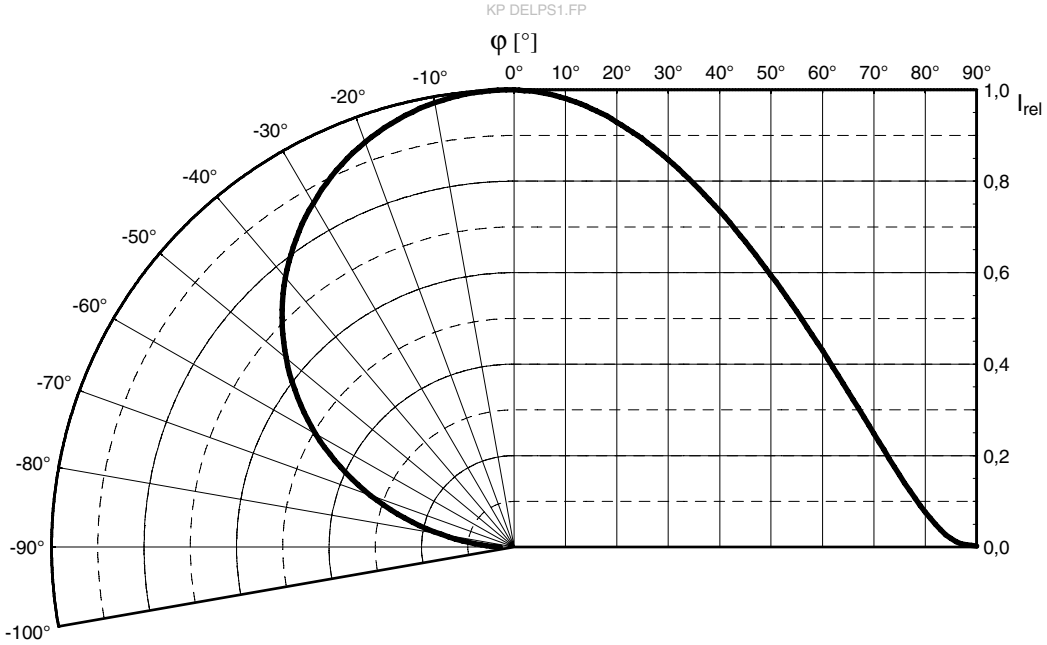
Relative Spectral Emission [6)]

$I_{rel} = f(\lambda)$; I_F = 10 mA; T_S = 25 °C



Radiation Characteristics [6)]

$I_{rel} = f(\phi)$; T_S = 25 °C



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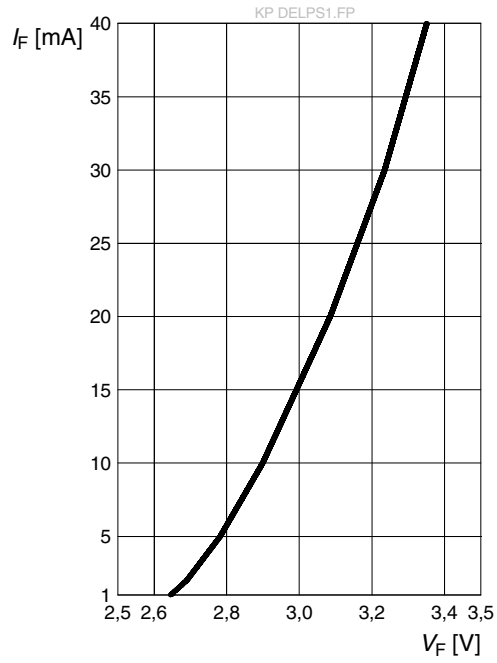
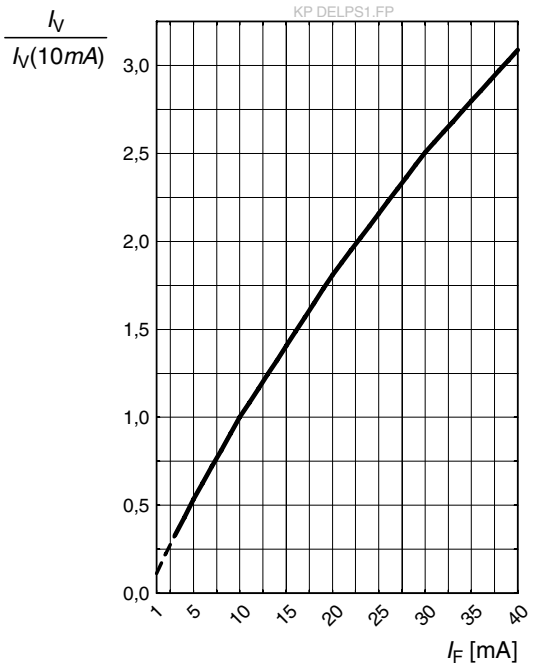
Forward current [6)]

$I_F = f(V_F)$; T_S = 25 °C



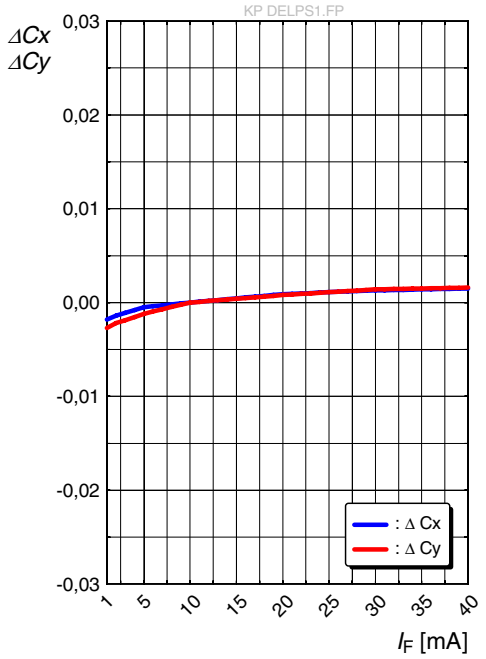
Relative Luminous Intensity [6), 7)]

$I_v/I_v(10\ mA) = f(I_F)$; T_S = 25 °C



Chromaticity Coordinate Shift [6)]

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



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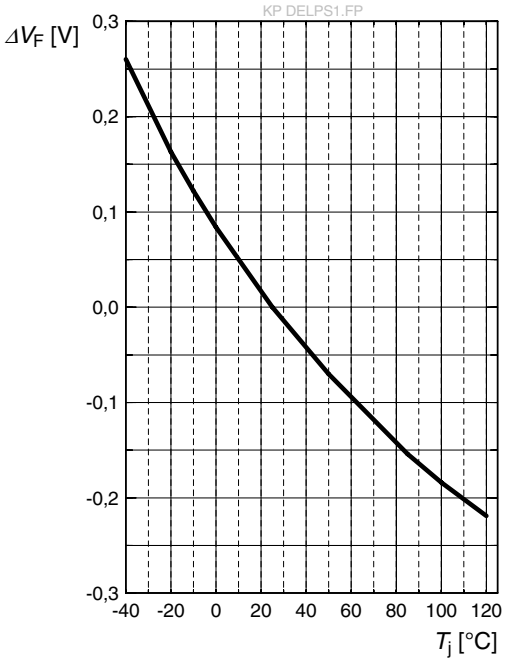
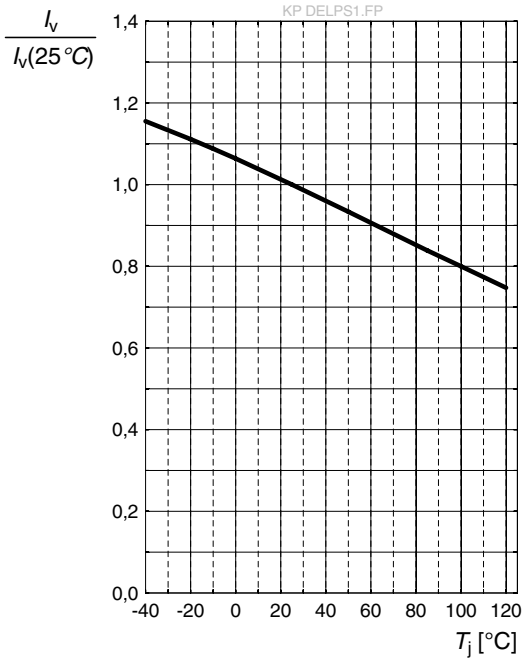
Forward Voltage [6)]

$\Delta V_F = V_F - V_F(25\ °C) = f(T_j);\ I_F = 10\ mA$



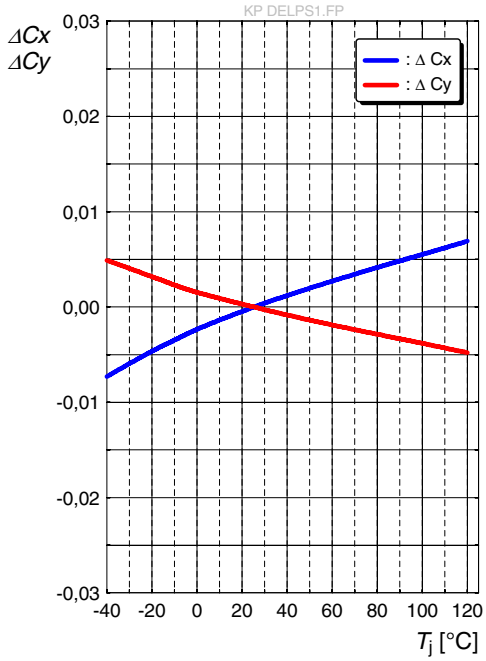
Relative Luminous Intensity [6)]

$I_v/I_v(25\ °C) = f(T_j);\ I_F = 10\ mA$



Chromaticity Coordinate Shift [6)]

$\Delta Cx, \Delta Cy = f(T_j);\ I_F = 10\ mA$



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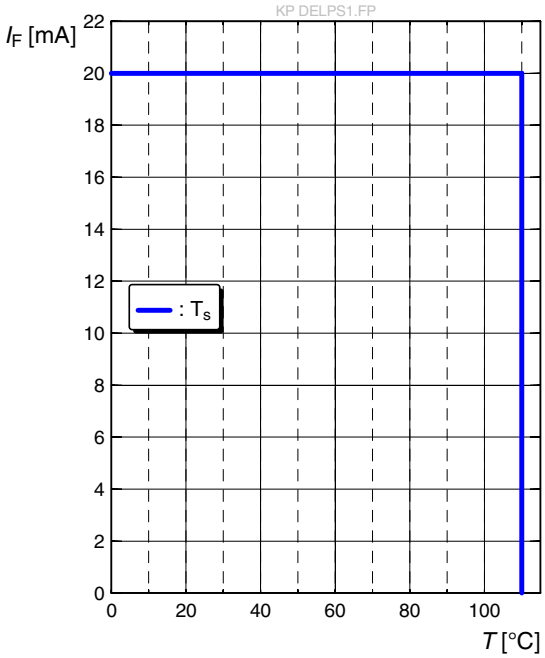
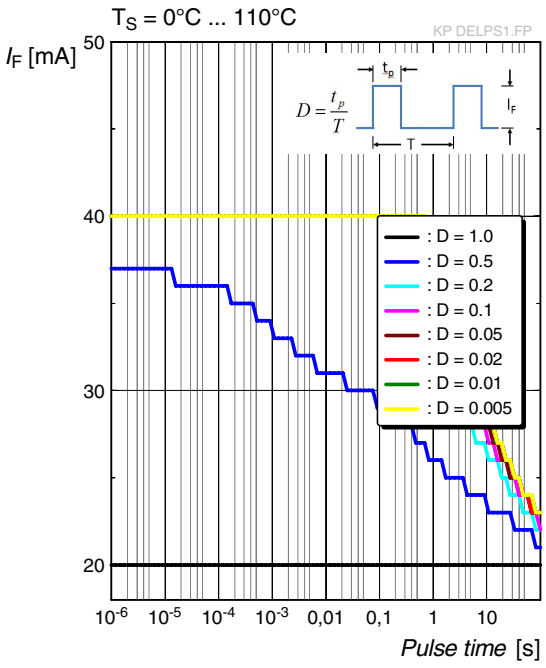
Max. Permissible Forward Current

$I_F = f(T)$

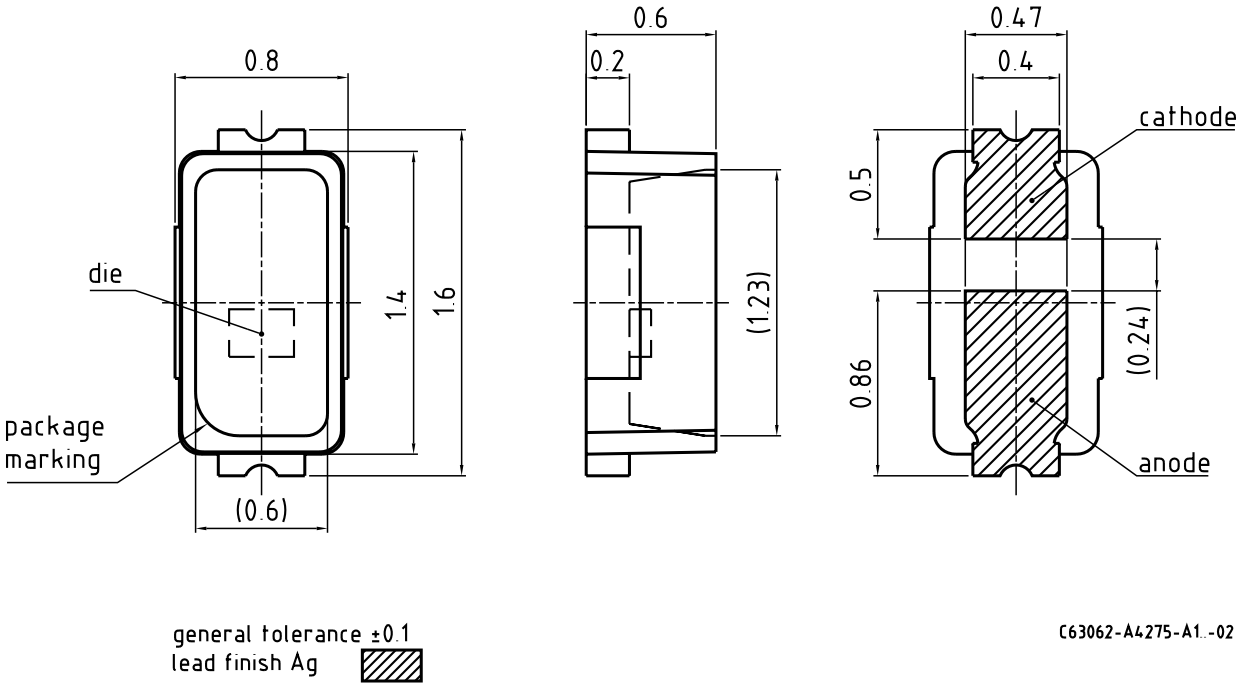


Permissible Pulse Handling Capability

$I_F = f(t_p)$; D: Duty cycle



Dimensional Drawing [8)]

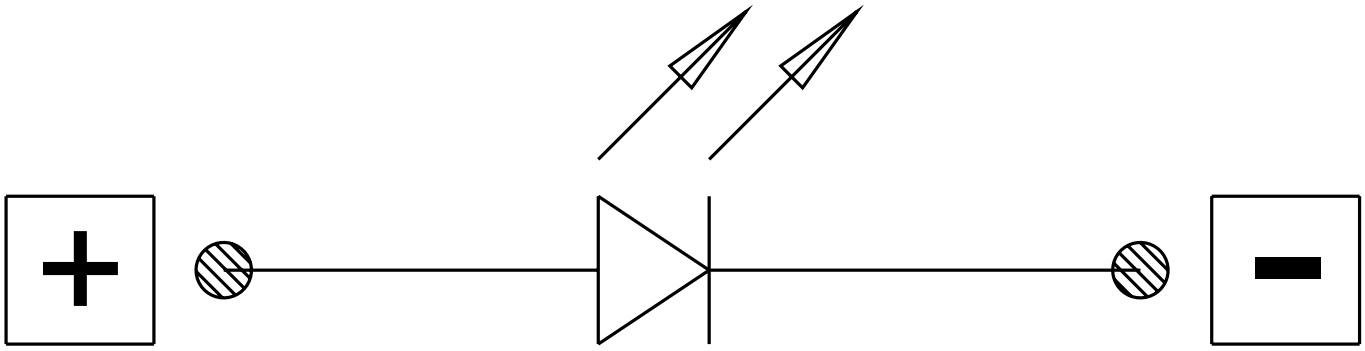


Approximate Weight: 2.0 mg

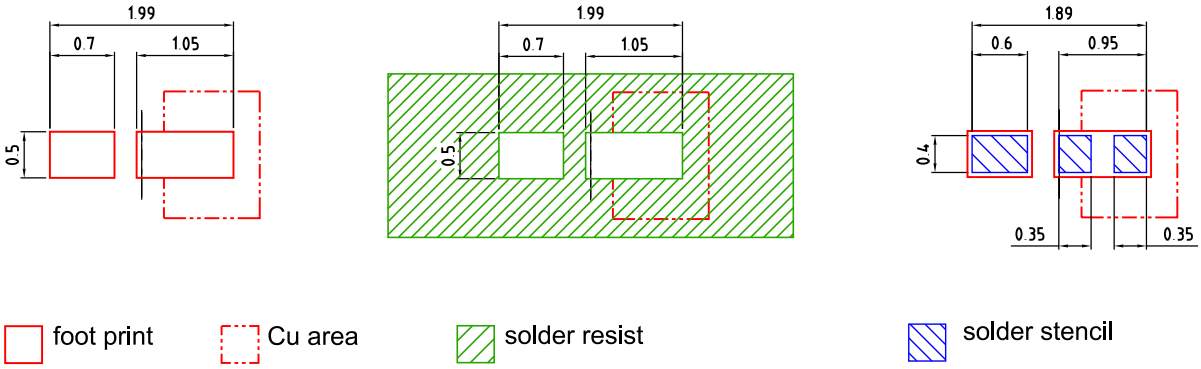
Package marking: Anode

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))

Electrical internal circuit

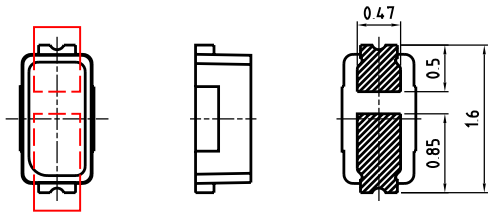


Recommended Solder Pad [8)]



The usage of solder resist between anode and cathode pads is mandatory for applications where water may condense

Component Location on Pad

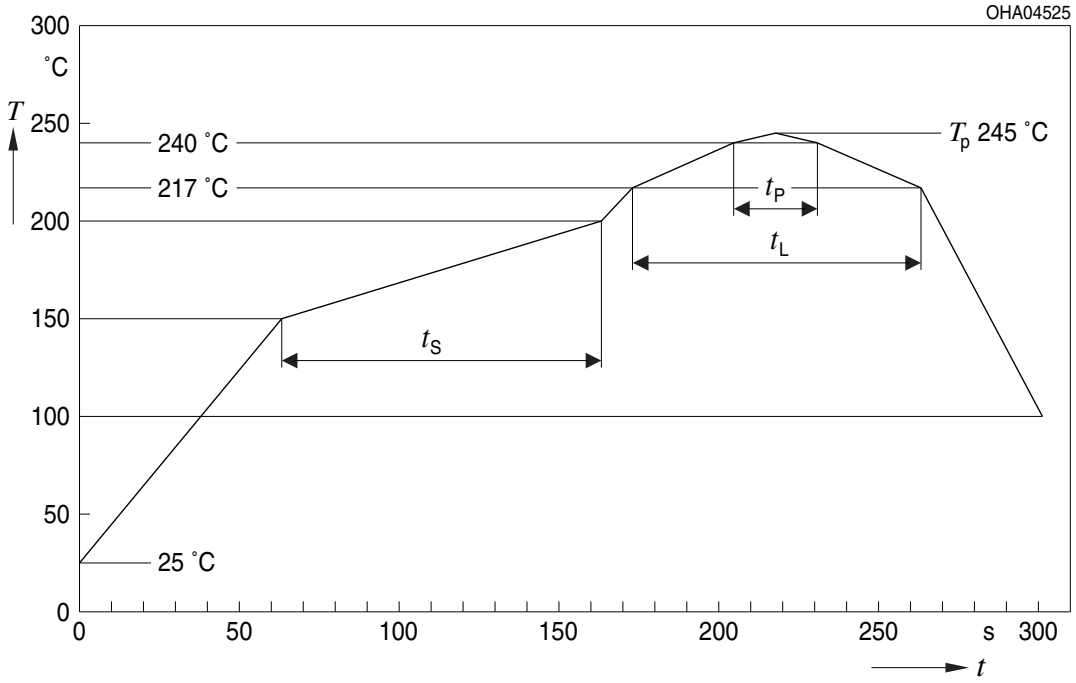


E062.3010.187 -02

All products are packed in a dry pack bag (Moisture Barrier Bag, MBB) according MIL-PRF-81705, after opening the MBB the products should go to reflow soldering process. Unused remaining LEDs should be protected from environment due to silver plated soldering terminal. In order to maintain solderability it is recommended to protect the silver plated solder terminals from corrosive environment before soldering. For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere.

Reflow Soldering Profile

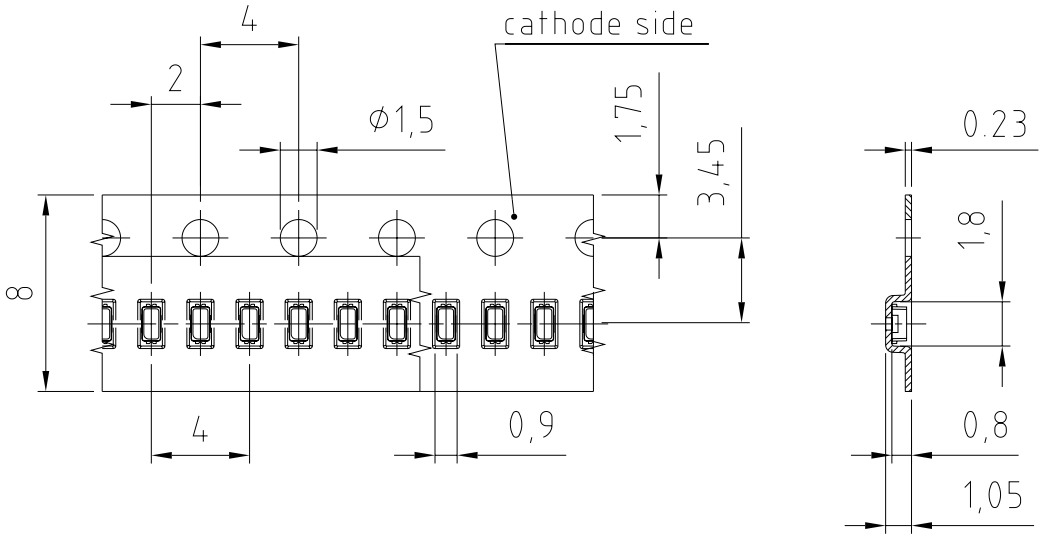
Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



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

Taping [8)]



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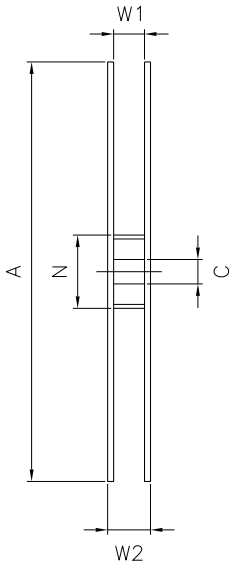
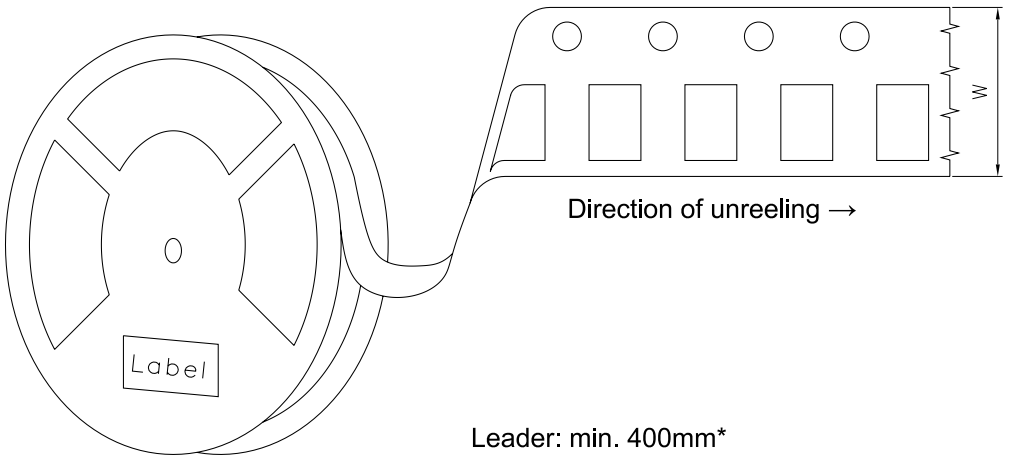
Tape and Reel [9)]



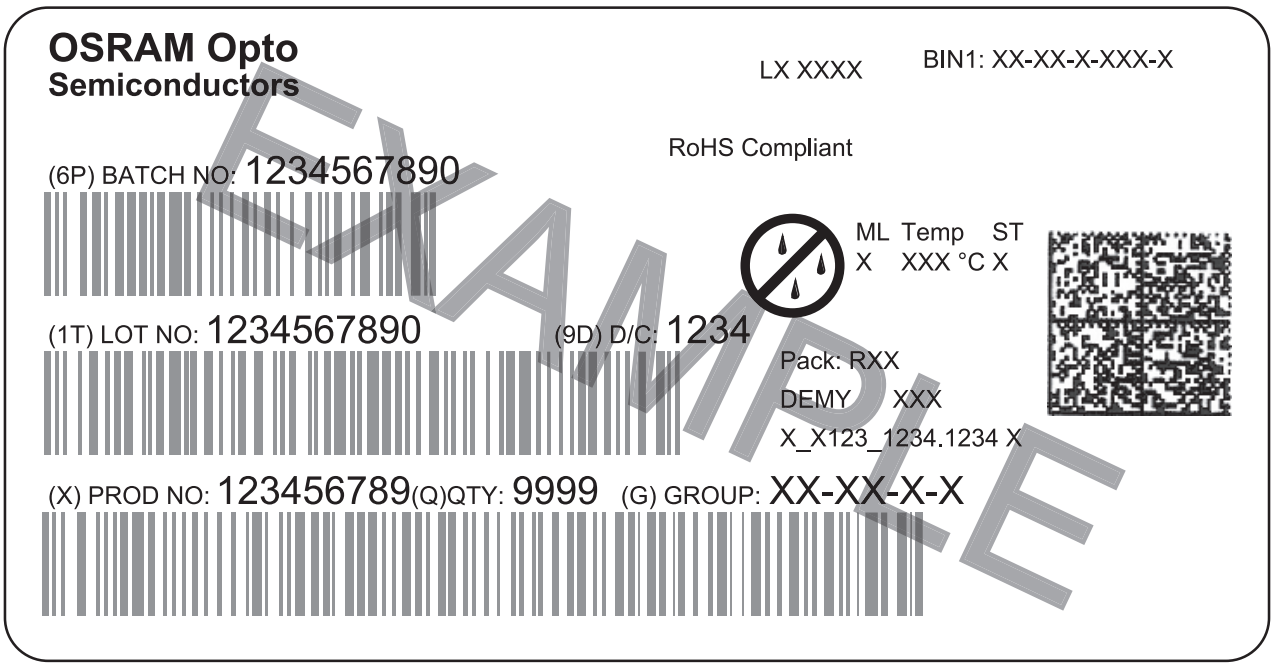


Leader: min. 400mm*
Trailer: min. 160mm*
*)Dimensions acc. to IEC 60286-3; EIA 481-E

Reel dimensions [mm]

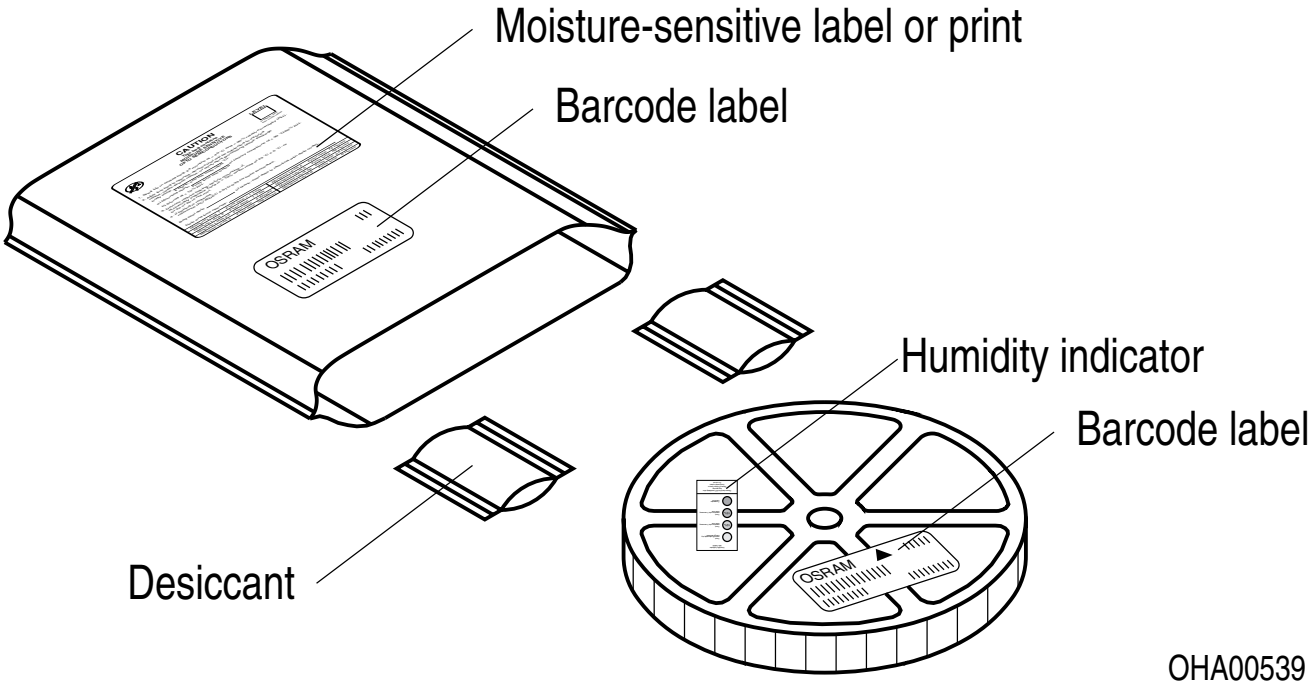
A	W	N_{min}	W_1	$W_{2\,max}$	Pieces per PU
180 mm	8 + 0.3 / - 0.1	60	8.4 + 2	14.4	5000

Barcode-Product-Label (BPL)



OHA04563

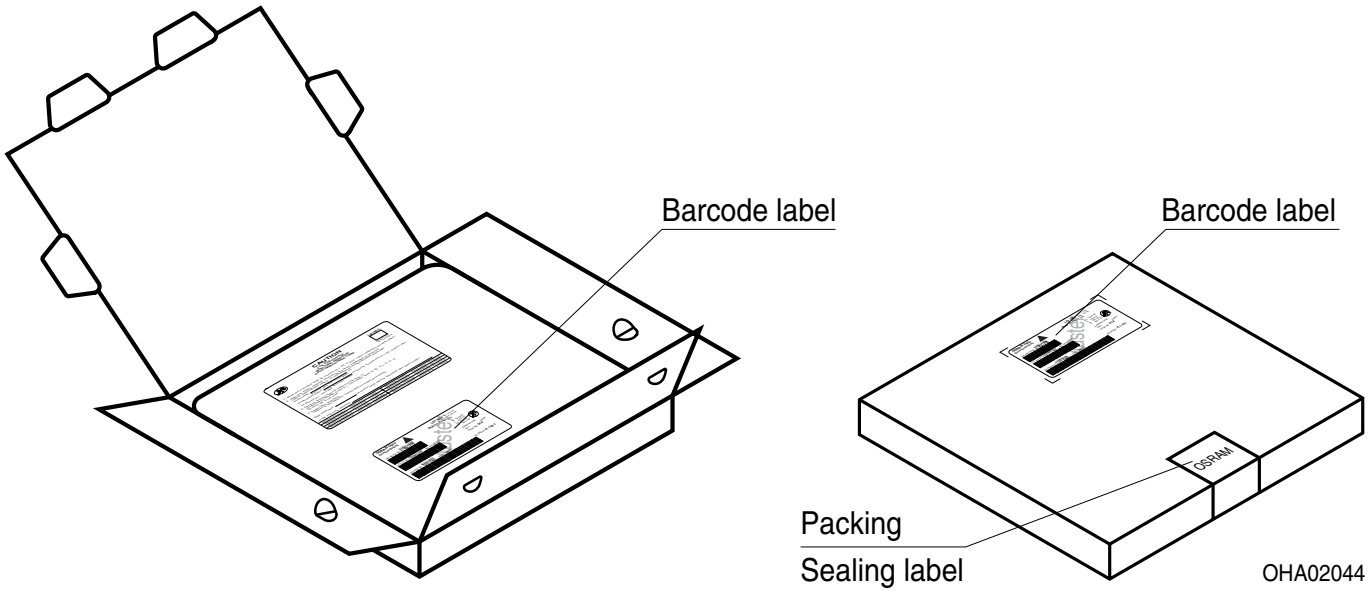
Dry Packing Process and Materials [8)]



OHA00539

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

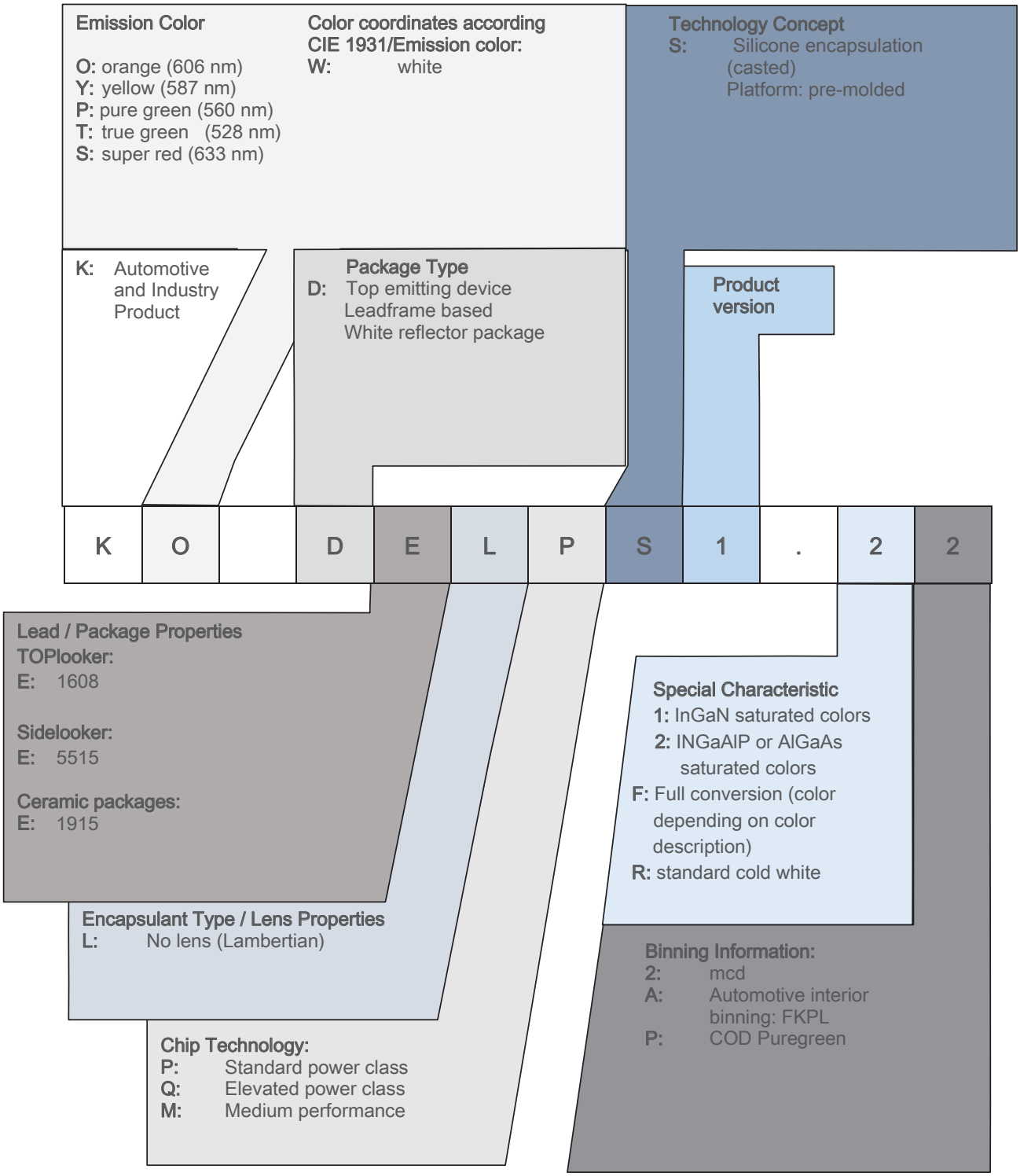
Transportation Packing and Materials [8)]



Dimensions of transportation box in mm

Width	Length	Height
200 ± 5 mm	195 ± 5 mm	30 ± 5 mm

Type Designation System



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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 informations please visit www.osram-os.com/appnotes

Disclaimer

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 on the OSRAM OS webside.

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) **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:** Reverse Operation of 10 hours is permissible in total. Continuous reverse operation is not allowed.

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) **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.

7) **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.

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

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

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。