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CT DBLP31.12



FIREFLY®

The FIREFLY E2218 family expands OSRAM Opto Semiconductors' portfolio of visible products for use in mobile devices like fitness tracking or health monitoring. It offers the highest efficiency output and lowest forward Voltage (Vf) operation, for longer battery life in portable applications. The compact size of only 1.8 mm x 2.2 mm x 0.6 mm allows customers the benefit of more flexible product designs. The true green CT DBLP31.12 is specially designed for Heart Rate Monitor applications. It features a very high luminous intensity to ideally match these applications.

Applications

- Health Monitoring (Heart Rate Monitoring, Pulse Oximetry)

Features:

- Package: white SMT package
- Chip technology: UX:3
- Typ. Radiation: 120° (Lambertian emitter)
- Color: λ_{dom} = 536 nm (● true green)
- ESD: 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)

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Ordering Information

Type	Luminous Intensity [1] I_F = 20 mA I_v	Ordering Code
CT DBLP31.12-6C5D-56-J6Q4	3150 ... 5000 mcd	Q65112A4607
CT DBLP31.12-6C5D-56-J6U6	3150 ... 5000 mcd	Q65112A6091

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Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min. max.	-40 °C 85 °C
Storage Temperature	T_{stg}	min. max.	-40 °C 85 °C
Junction Temperature	T_j	max.	125 °C
Forward current T_S = 25 °C	I_F	min. max.	2.5 mA 140 mA
Surge Current t ≤ 10 µs; D = 0.005 ; T_S = 25 °C	I_{FS}	max.	500 mA
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)	V_{ESD}		8 kV
Reverse current [2)]	I_R	max.	200 mA

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Characteristics

I_F = 20 mA; T_S = 25 °C

Parameter	Symbol		Values
Peak Wavelength	λ_{peak}	typ.	536 nm
Dominant Wavelength [3] I_F = 20 mA	λ_{dom}	min. typ. max.	526 nm 536 nm 544 nm
Viewing angle at 50% I_V	2φ	typ.	120 °
Forward Voltage [4] I_F = 20 mA	V_F	min. typ. max.	2.00 V 2.30 V 2.80 V
Reverse voltage (ESD device)	$V_{R\ ESD}$	min.	45 V
Reverse voltage [2] I_R = 20 mA	V_R	max.	1.2 V
Real thermal resistance junction/solderpoint [5]	$R_{thJS\ real}$	typ. max.	15 K / W 18 K / W

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Brightness Groups

Group	Luminous Intensity [1] I_F = 20 mA min. I_v	Luminous Intensity. [1] I_F = 20 mA max. I_v	Luminous Flux [6] I_F = 20 mA typ. Φ_V
6C	3150 mcd	3550 mcd	10100 mlm
7C	3550 mcd	4000 mcd	11300 mlm
8C	4000 mcd	4500 mcd	12800 mlm
5D	4500 mcd	5000 mcd	14300 mlm

Forward Voltage Groups

Group	Forward Voltage [4] I_F = 20 mA min. V_F	Forward Voltage [4] I_F = 20 mA max. V_F
J6	2.00 V	2.30 V
Q4	2.30 V	2.50 V
U6	2.50 V	2.80 V

Wavelength Groups

Group	Dominant Wavelength [3] I_F = 20 mA min. λ_{dom}	Dominant Wavelength [3] I_F = 20 mA max. λ_{dom}
5	526 nm	535 nm
6	535 nm	544 nm

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Group Name on Label

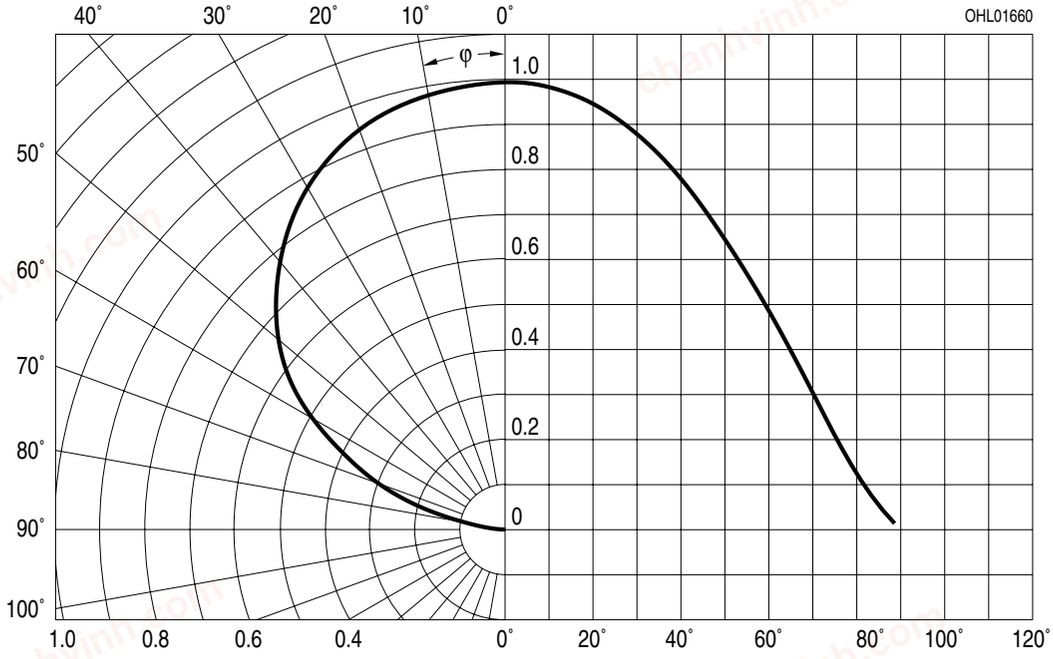
Example: 5D-5-J6

Brightness	Wavelength	Forward Voltage
5D	5	J6

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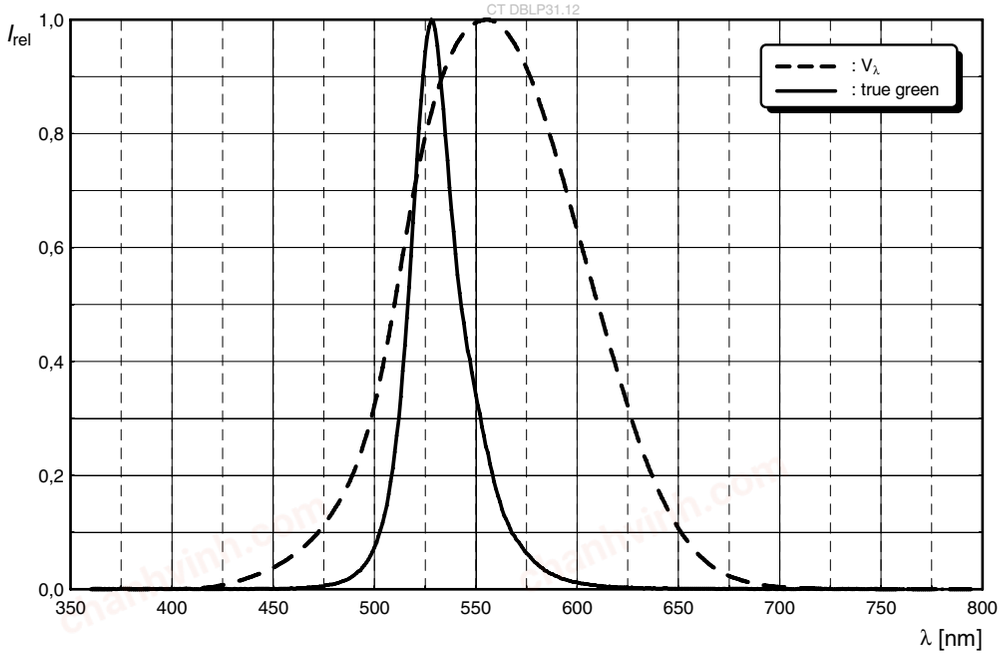
Radiation Characteristics 6), 7)

$I_{rel} = f(\phi)$; $T_S = 25$ °C



Relative Spectral Emission 6)

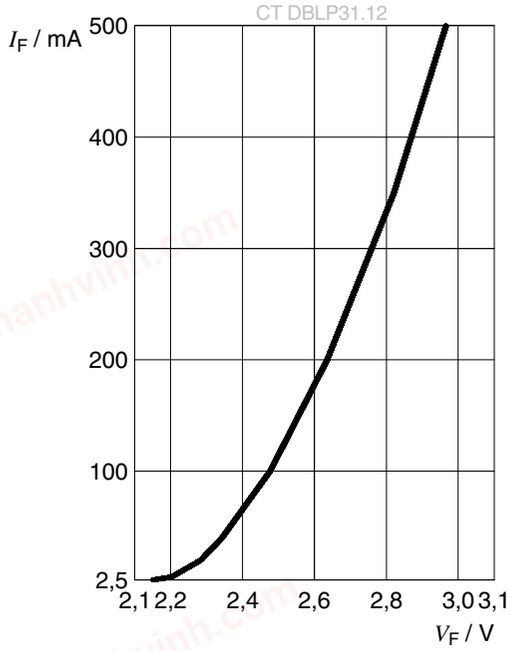
$I_{rel} = f(\lambda)$; $I_F = 20$ mA; $T_S = 25$ °C



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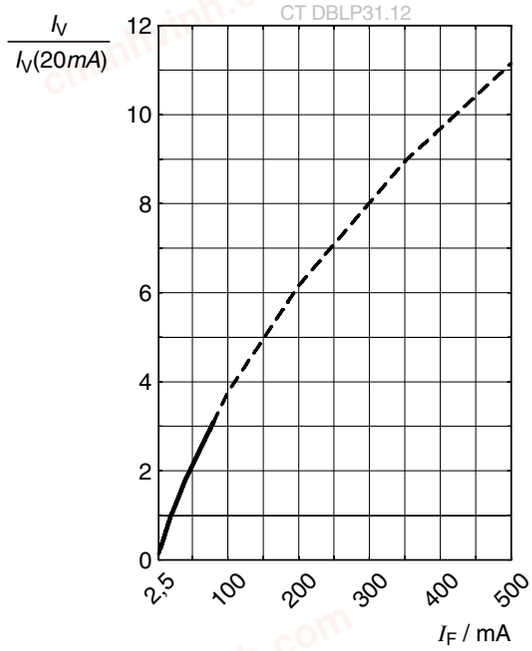
Forward current 6), 8)

$I_F = f(V_F)$; T_S = 25 °C



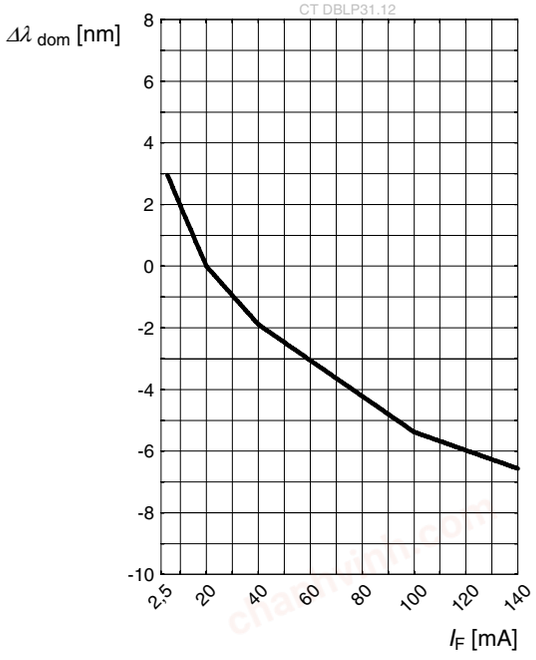
Relative Luminous Flux 6), 8)

$I_V/I_V(20\,mA) = f(I_F)$; T_S = 25 °C



Dominant Wavelength 6)

$\Delta\lambda_{dom} = f(I_F)$; T_S = 25 °C

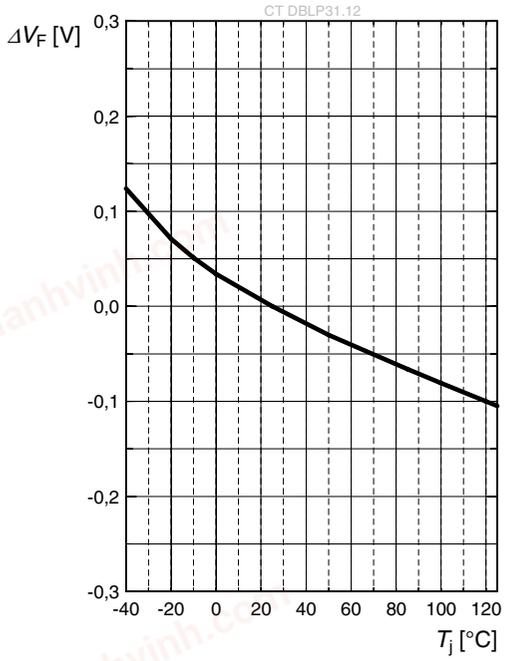


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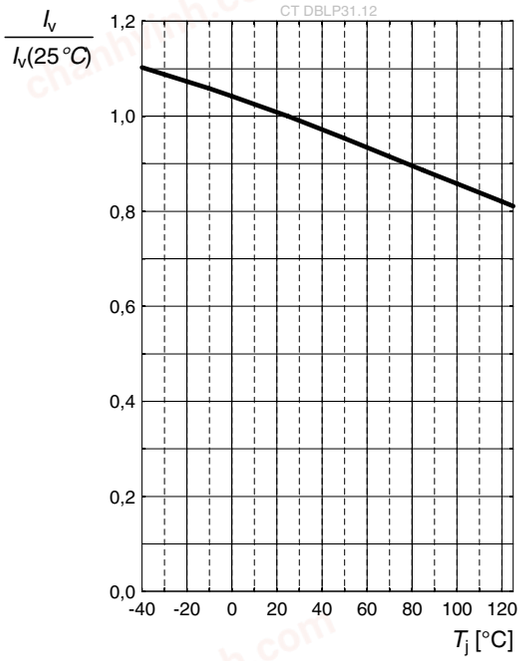
Forward Voltage [6]

$\Delta V_F = V_F - V_F(25\ °C) = f(T_j)$; $I_F = 20$ mA



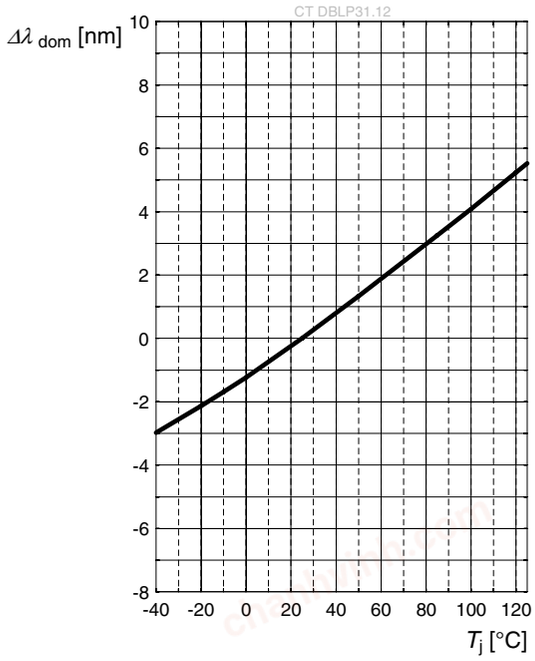
Relative Luminous Intensity [6]

$I_v/I_v(25\ °C) = f(T_j)$; $I_F = 20$ mA



Dominant Wavelength [6]

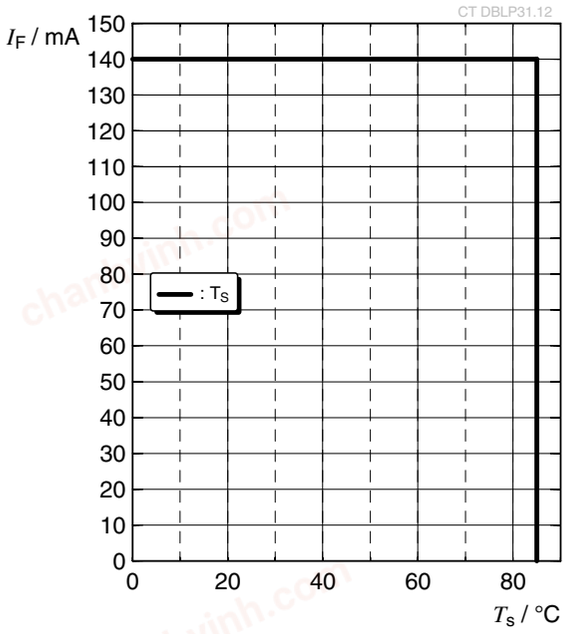
$\Delta\lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25\ °C) = f(T_j)$; $I_F = 20$ mA



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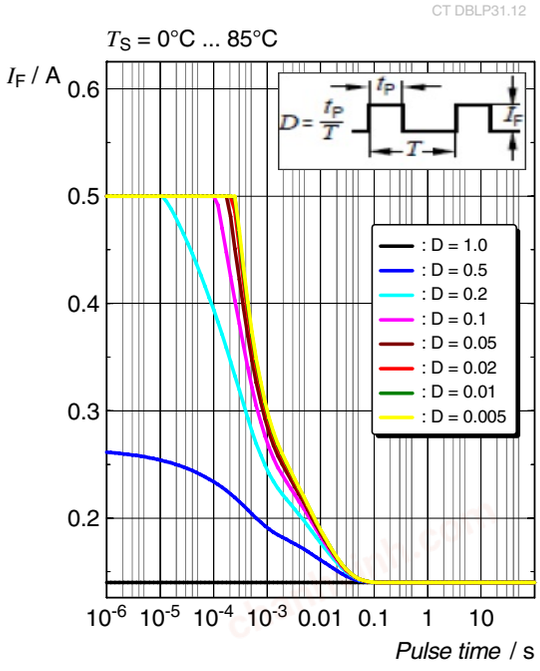
Max. Permissible Forward Current

$I_F = f(T)$



Permissible Pulse Handling Capability

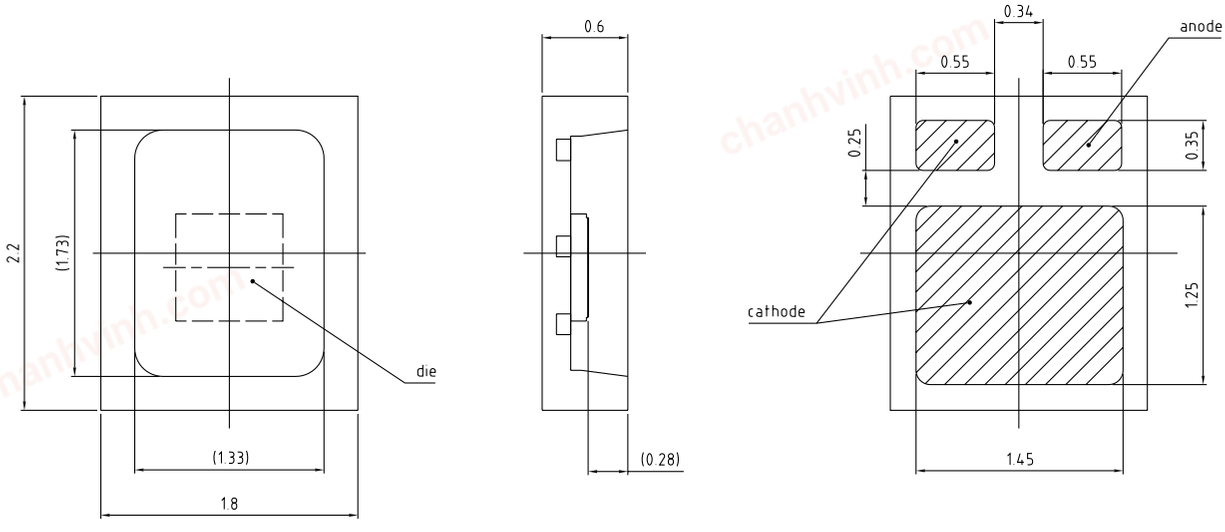
$I_F = f(t_p)$; D: Duty cycle



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Dimensional Drawing [9)]



general tolerance ±0.1

lead finish Ag

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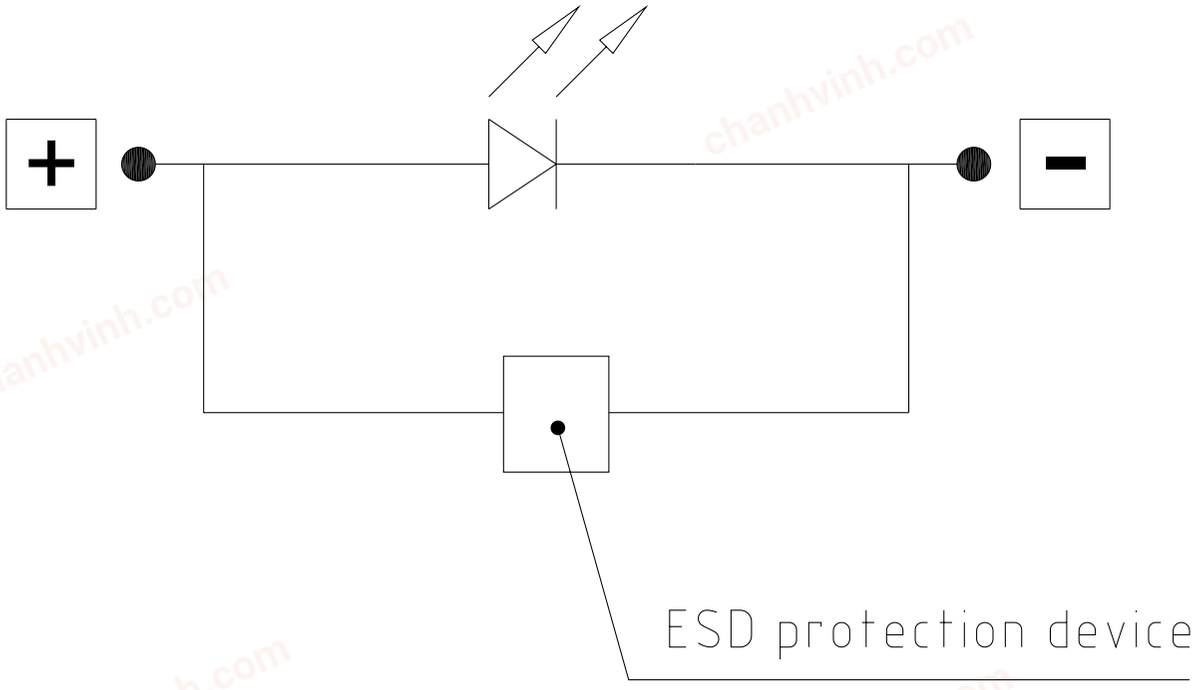
Further Information:

Approximate Weight: 6.0 mg

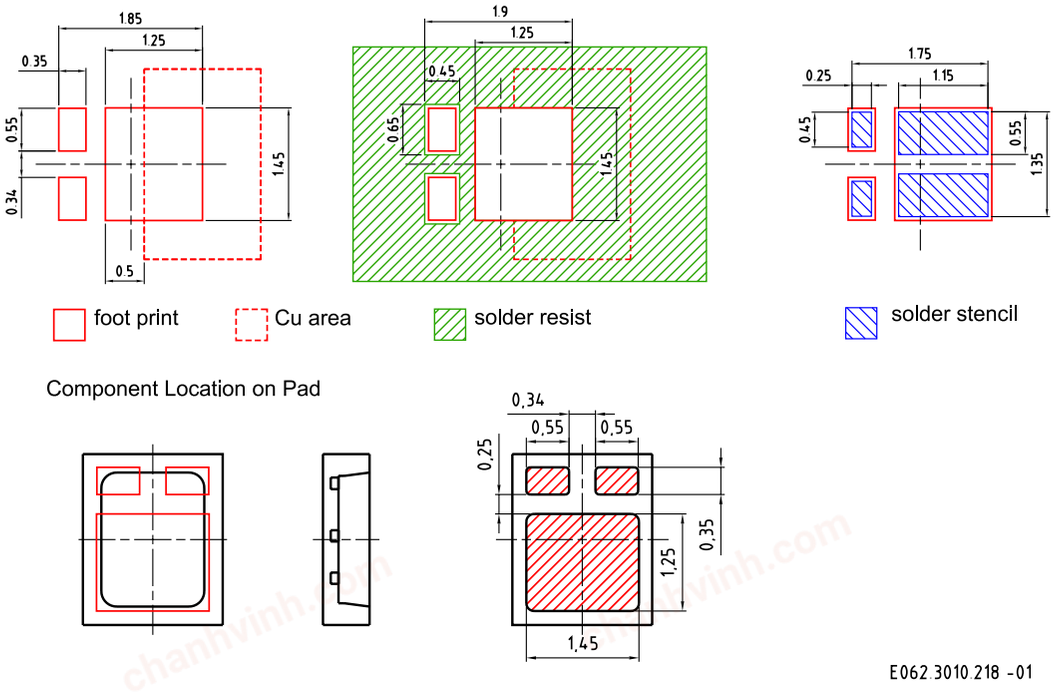
ESD advice: The device is protected by ESD device which is connected in parallel to the Chip.

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Electrical Internal Circuit



Recommended Solder Pad 9)

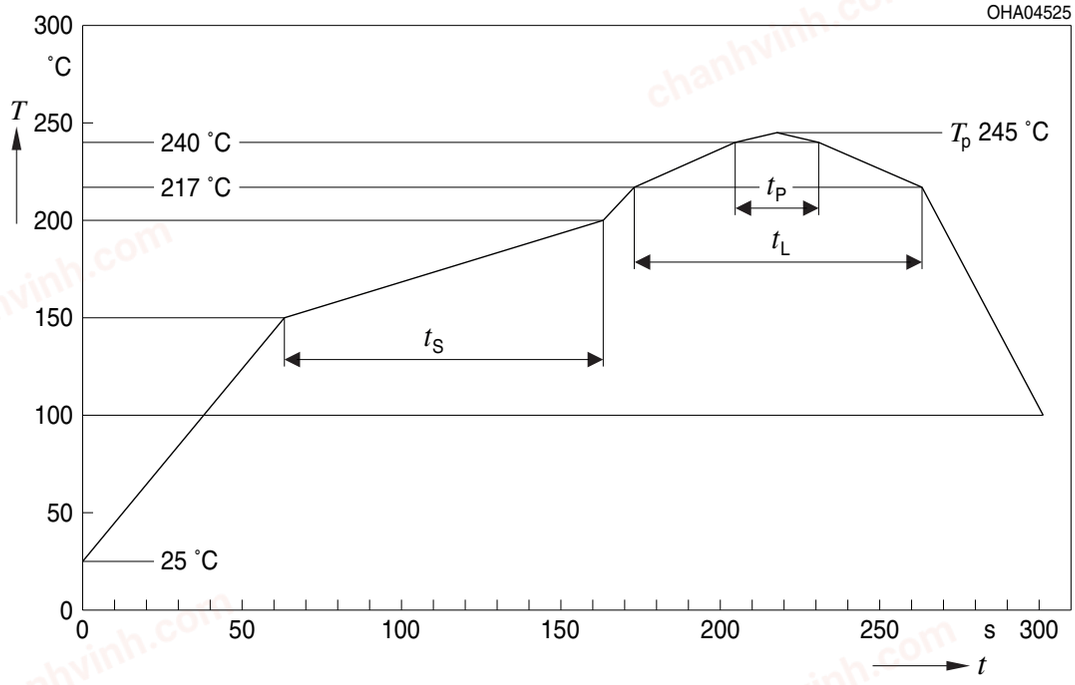


For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for ultra sonic cleaning.

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Reflow Soldering Profile

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

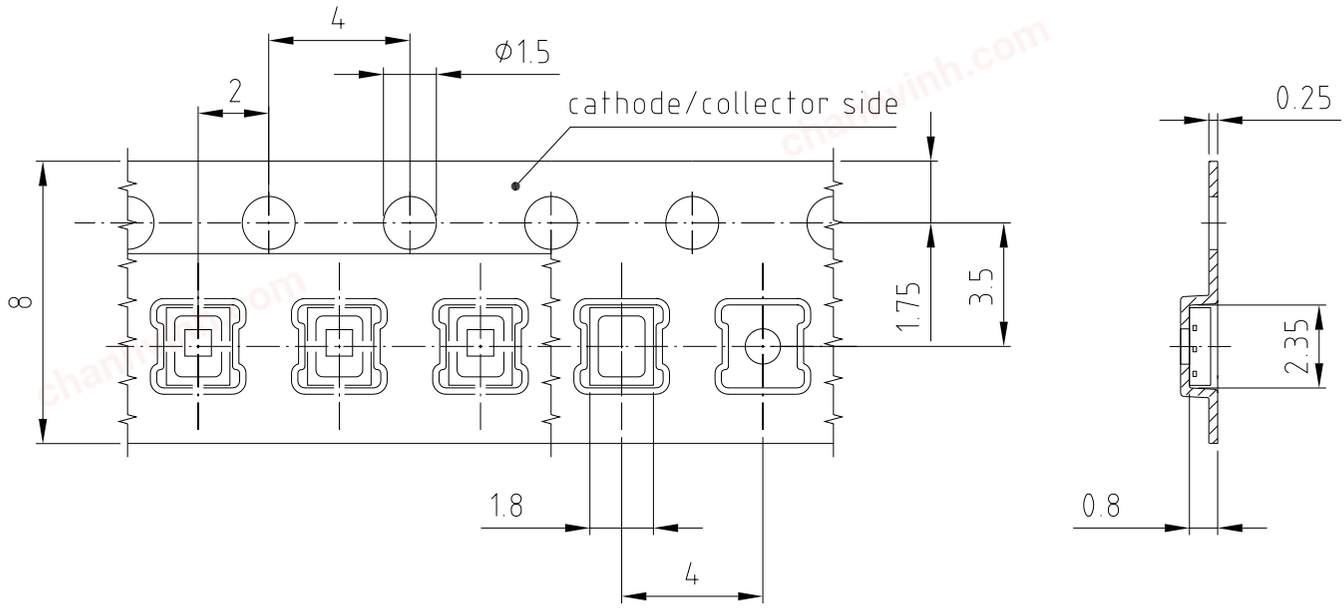


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature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

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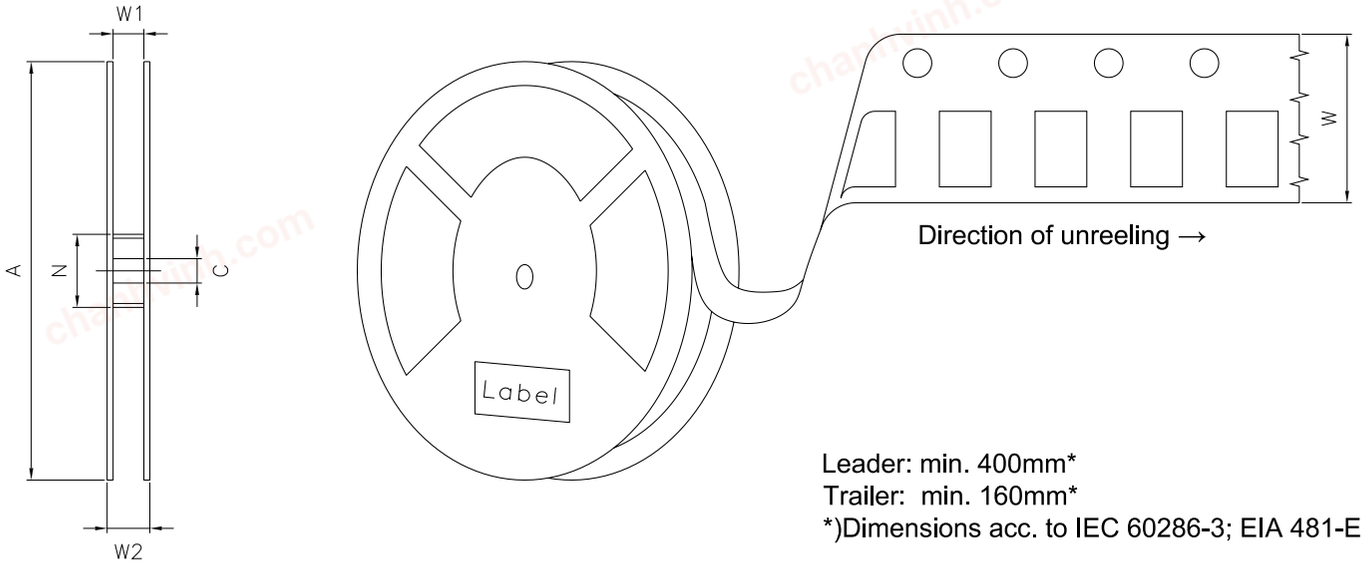
Taping [9)]



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Tape and Reel [10)]



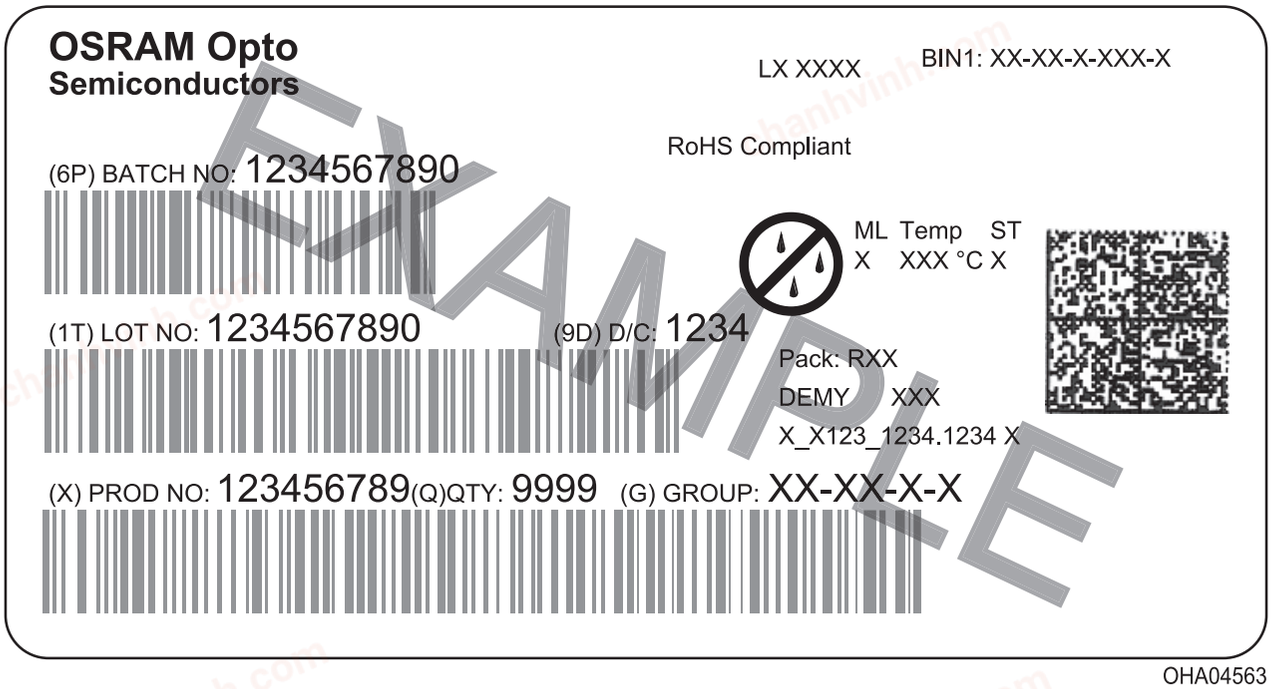
Leader: min. 400mm*
Trailer: min. 160mm*
*)Dimensions acc. to IEC 60286-3; EIA 481-E

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	4000

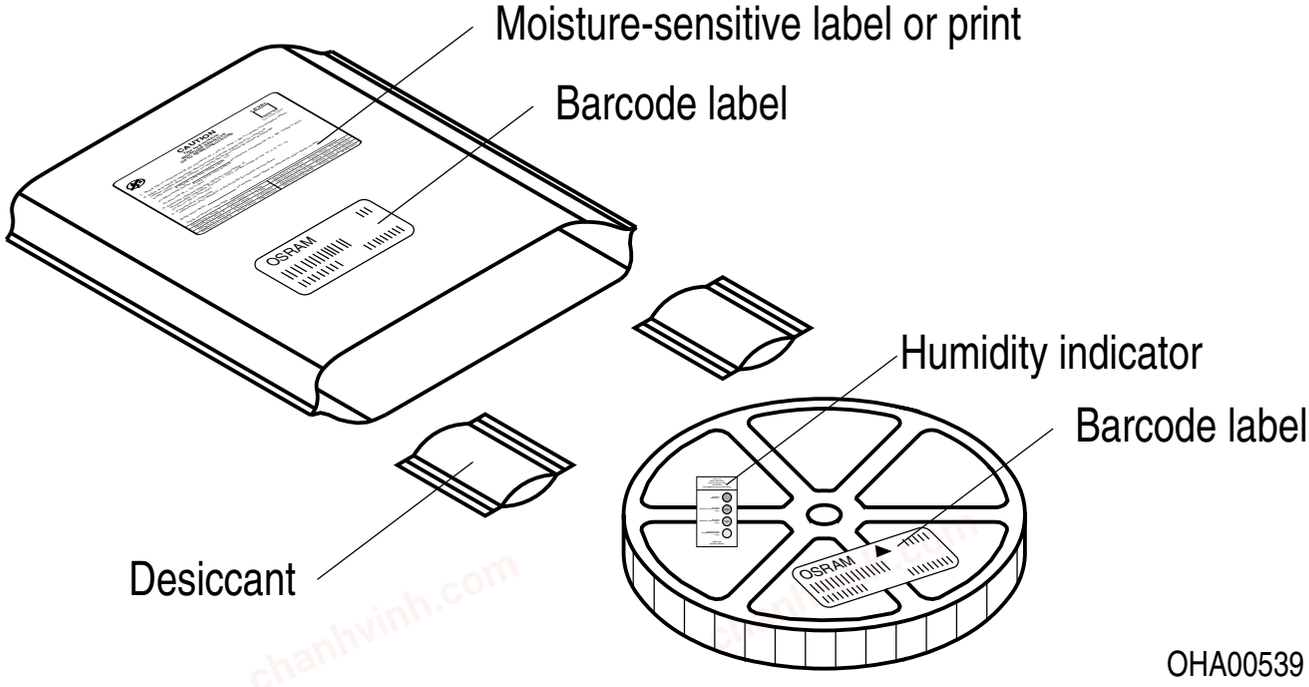
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Barcode-Product-Label (BPL)



OHA04563

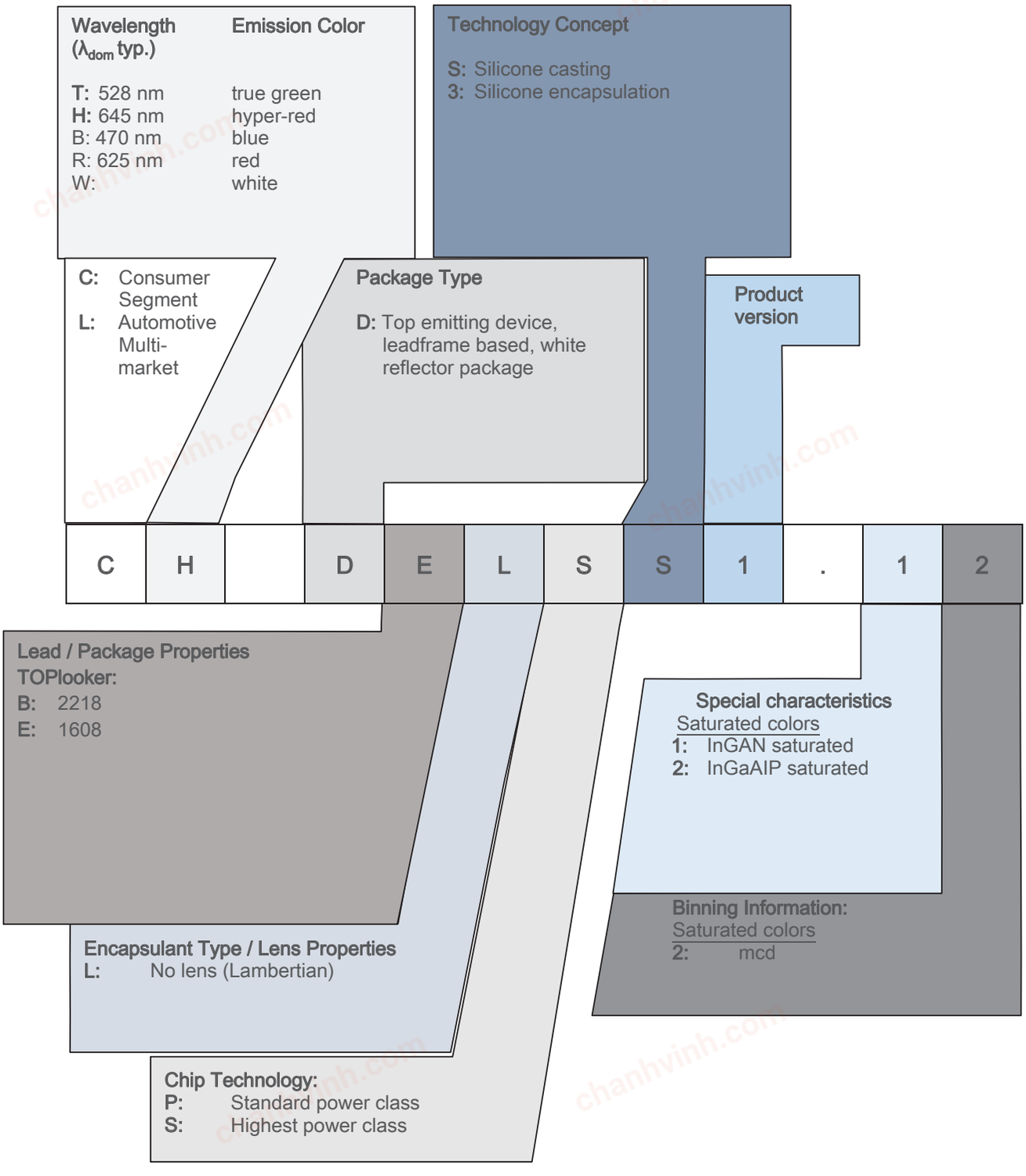
Dry Packing Process and Materials [9)]



OHA00539

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

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 fall into the class **moderate risk (exposure time 0.25 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.

Product and functional safety devices/applications or medical devices/applications
OSRAM OS components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.
OSRAM OS products are not qualified at module and system level for such application.

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) **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) **Wavelength:** The wavelength is measured at a current pulse of typically 25 ms, with an internal reproducibility of ±0.5 nm and an expanded uncertainty of ±1 nm (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) **Testing temperature:** TA = 25°C (unless otherwise specified)

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
1.2	2019-09-17	Derating (Diagrams) Maximum Ratings
1.3	2021-03-29	Electro - Optical Characteristics (Diagrams)

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