

LB G6SP

Advanced Power TOPLED®

Advanced Power TOPLED features a compact package with a wide brightness range and high luminous efficiency.



Applications

- Custom Tuning
- Displays (Backlighting)
- Interior Illumination e.g. Ambient Map

Features:

- Package: white SMT package, colorless clear silicone resin
- Chip technology: ThinGaN
- Typ. Radiation: 120° (Lambertian emitter)
- Color: $\lambda_{\text{dom}} = 470 \text{ nm}$ (● blue)
- Optical efficacy: 10 lm/W
- Corrosion Robustness Class: 3B
- Qualifications: The product qualification test plan is based on the guidelines of AEC-Q101-REV-C, Stress Test Qualification for Automotive Grade Discrete Semiconductors.

Ordering Information

Type	Luminous Intensity ¹⁾ $I_F = 140 \text{ mA}$ I_v	Ordering Code
LB G6SP-BACB-35-47	1.8 ... 4.5 cd	Q65111A8888

Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min.	-40 °C
		max.	110 °C
Storage Temperature	T_{stg}	min.	-40 °C
		max.	110 °C
Junction Temperature	T_j	max.	125 °C
Junction Temperature for short time applications*	T_j	max.	150 °C
Forward current $T_s = 25\text{ °C}$	I_F	min.	30 mA
		max.	250 mA
Surge Current $t \leq 10\ \mu\text{s}$; $D = 0.005$; $T_s = 25\text{ °C}$	I_{FS}	max.	750 mA
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}		2kV
Reverse current ²⁾	I_R	max.	Not designed for reverse operation

*The median lifetime (L70/B50) for $T_j = 150\text{ °C}$ is 100h.

Characteristics

$I_F = 140 \text{ mA}$; $T_s = 25 \text{ °C}$

Parameter	Symbol		Values
Peak Wavelength	λ_{peak}	typ.	465 nm
Dominant Wavelength ³⁾ $I_F = 140 \text{ mA}$	λ_{dom}	min. typ. max.	464 nm 470 nm 476 nm
Spectral Bandwidth at 50% $I_{\text{rel,max}}$	$\Delta\lambda$	typ.	25 nm
Viewing angle at 50 % I_V	2ϕ	typ.	120 °
Forward Voltage ⁴⁾ $I_F = 140 \text{ mA}$	V_F	min. typ. max.	2.90 V 3.30 V 4.10 V
Reverse current	I_R		Not designed for reverse operation
Real thermal resistance junction/solderpoint ⁵⁾	$R_{\text{thJS real}}$	typ. max.	35 K / W 40 K / W
Electrical thermal resistance junction/solderpoint ⁵⁾ with efficiency $\eta_e = 17 \%$	$R_{\text{thJS elec.}}$	typ. max.	29 K / W 33 K / W

Brightness Groups

Group	Luminous Intensity ¹⁾ $I_F = 140 \text{ mA}$ min. I_v	Luminous Intensity ¹⁾ $I_F = 140 \text{ mA}$ max. I_v	Luminous Flux ⁶⁾ $I_F = 140 \text{ mA}$ typ. Φ_v
BA	1.8 cd	2.2 cd	6.2 lm
BB	2.2 cd	2.8 cd	7.8 lm
CA	2.8 cd	3.6 cd	10.0 lm
CB	3.6 cd	4.5 cd	12.6 lm

Forward Voltage Groups

Group	Forward Voltage ⁴⁾ $I_F = 140 \text{ mA}$ min. V_F	Forward Voltage ⁴⁾ $I_F = 140 \text{ mA}$ max. V_F
4	2.90 V	3.20 V
5	3.20 V	3.50 V
6	3.50 V	3.80 V
7	3.80 V	4.10 V

Wavelength Groups

Group	Dominant Wavelength ³⁾ $I_F = 140 \text{ mA}$ min. λ_{dom}	Dominant Wavelength ³⁾ $I_F = 140 \text{ mA}$ max. λ_{dom}
3	464 nm	468 nm
4	468 nm	472 nm
5	472 nm	476 nm

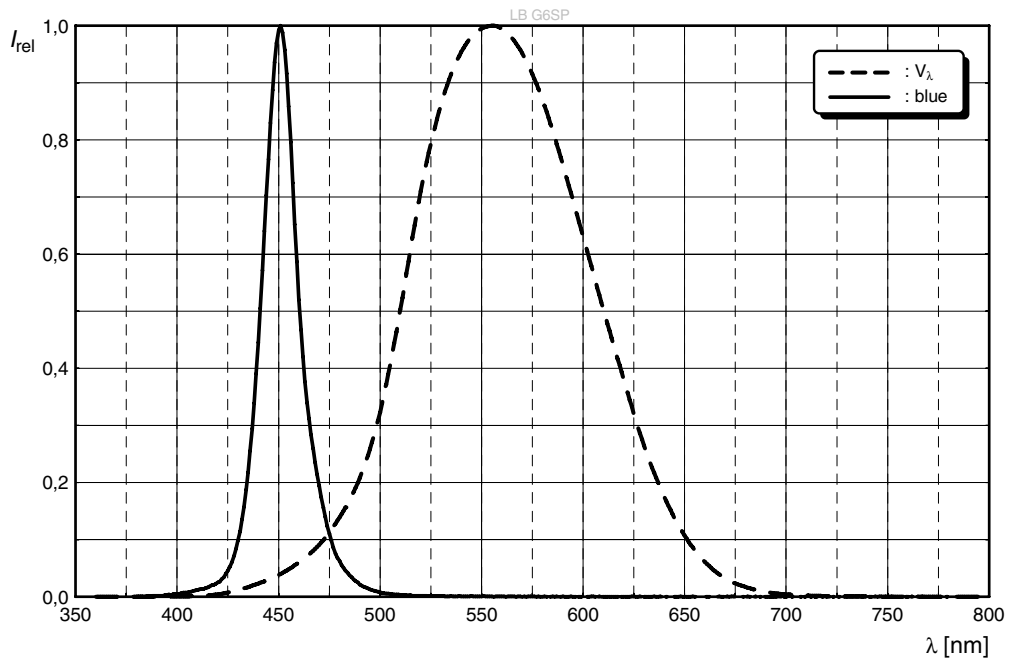
Group Name on Label

Example: BA-3-4

Brightness	Wavelength	Forward Voltage
BA	3	4

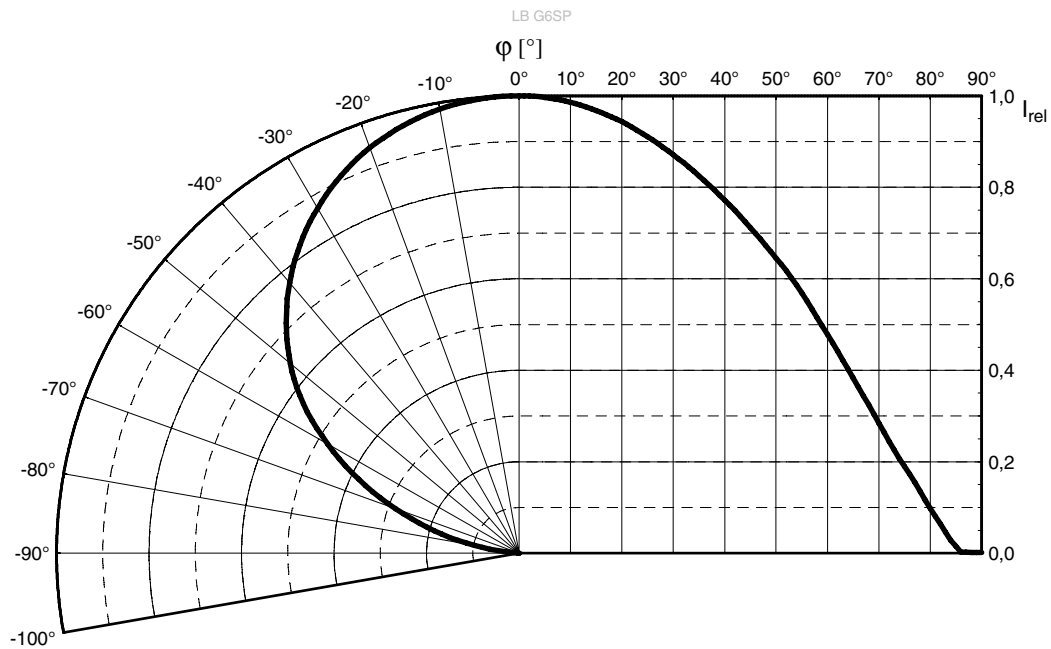
Relative Spectral Emission ⁶⁾

$I_{rel} = f(\lambda); I_F = 140 \text{ mA}; T_S = 25 \text{ }^\circ\text{C}$



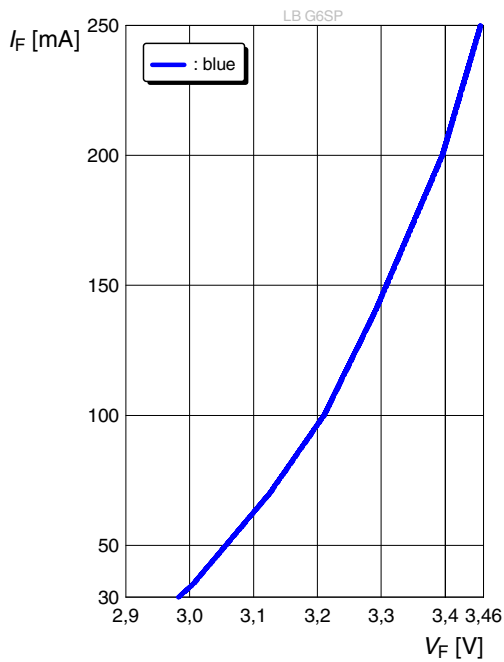
Radiation Characteristics ⁶⁾

$I_{rel} = f(\phi); T_S = 25 \text{ }^\circ\text{C}$



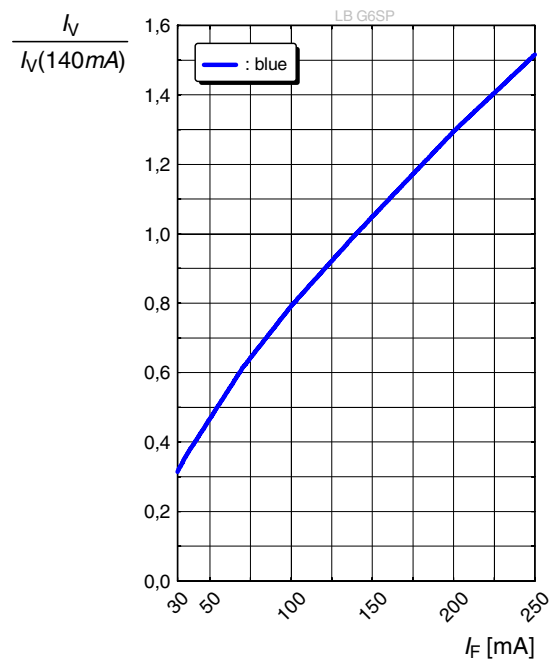
Forward current ^{6), 7)}

$$I_F = f(V_F); T_S = 25 \text{ }^\circ\text{C}$$



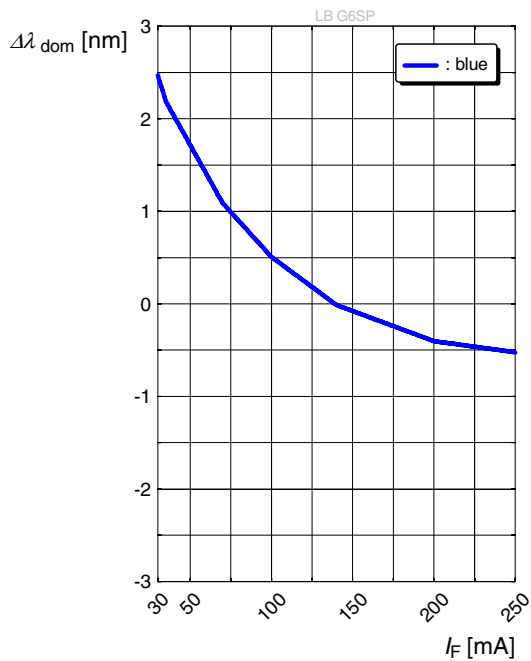
Relative Luminous Intensity ^{6), 7)}

$$I_V/I_V(140 \text{ mA}) = f(I_F); T_S = 25 \text{ }^\circ\text{C}$$



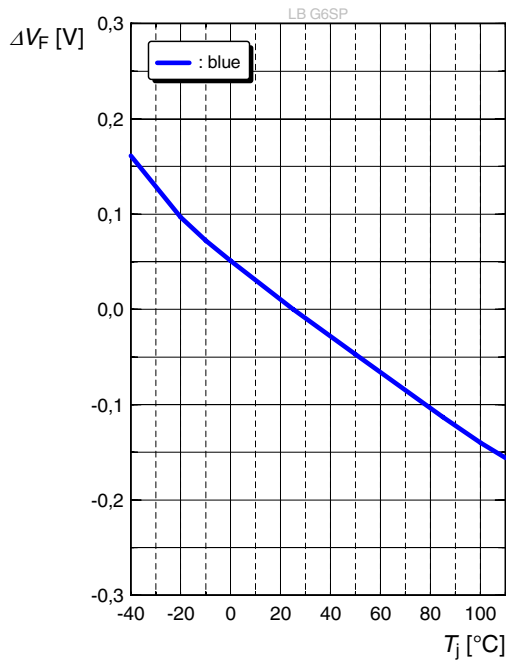
Dominant Wavelength ⁶⁾

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



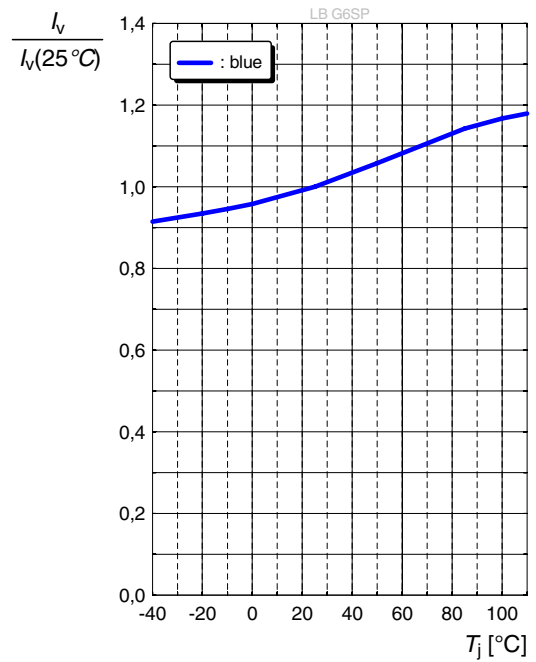
Forward Voltage ⁶⁾

$$\Delta V_F = V_F - V_F(25\text{ }^\circ\text{C}) = f(T_j); I_F = 140\text{ mA}$$



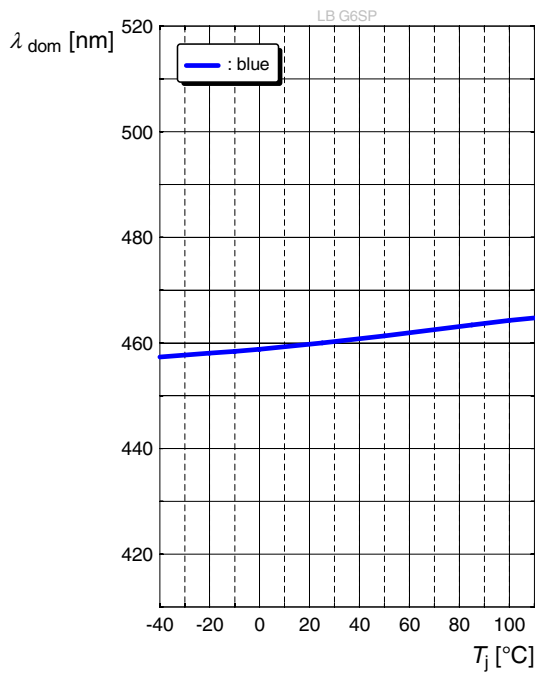
Relative Luminous Intensity ⁶⁾

$$I_V/I_V(25\text{ }^\circ\text{C}) = f(T_j); I_F = 140\text{ mA}$$



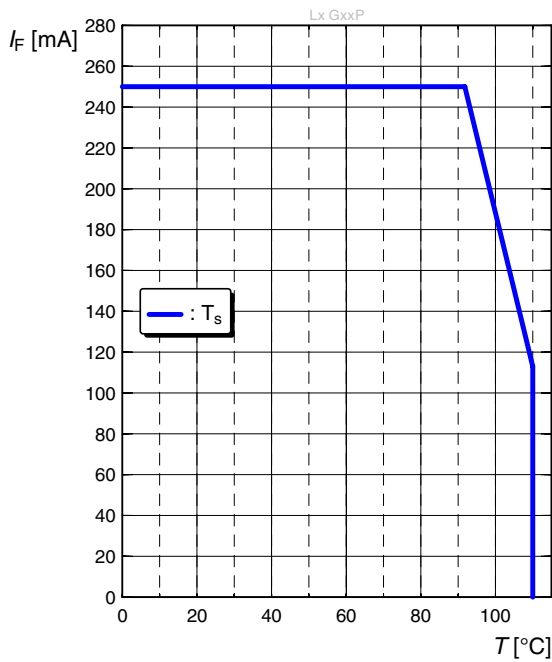
Dominant Wavelength ⁶⁾

$$\Delta \lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25\text{ }^\circ\text{C}) = f(T_j); I_F = 140\text{ mA}$$



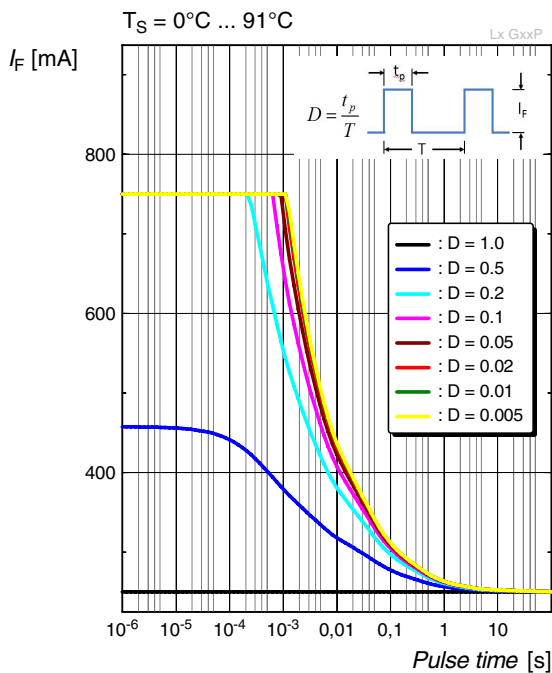
Max. Permissible Forward Current

$I_F = f(T)$



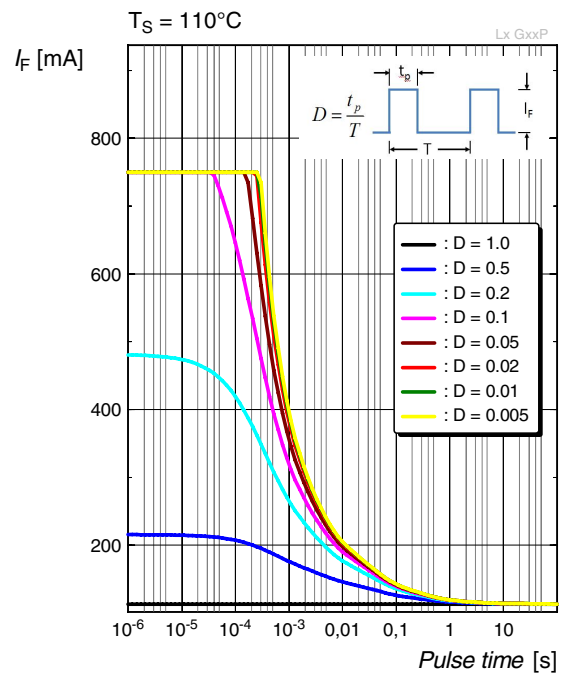
Permissible Pulse Handling Capability

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

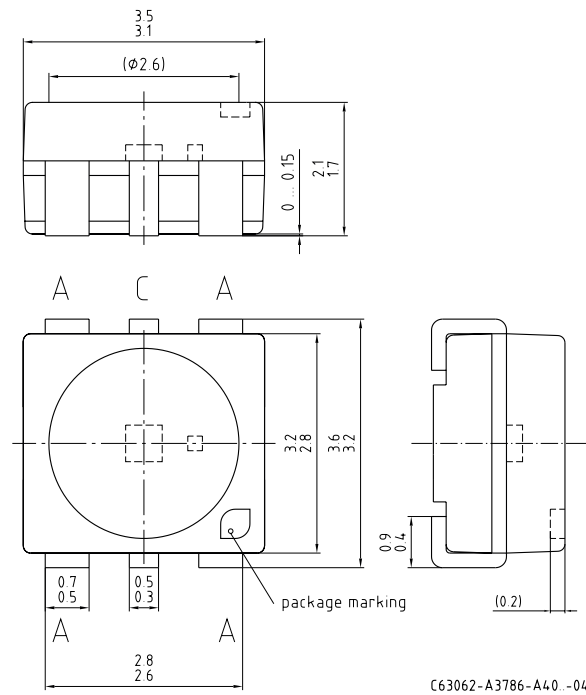


Permissible Pulse Handling Capability

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



Dimensional Drawing ⁸⁾

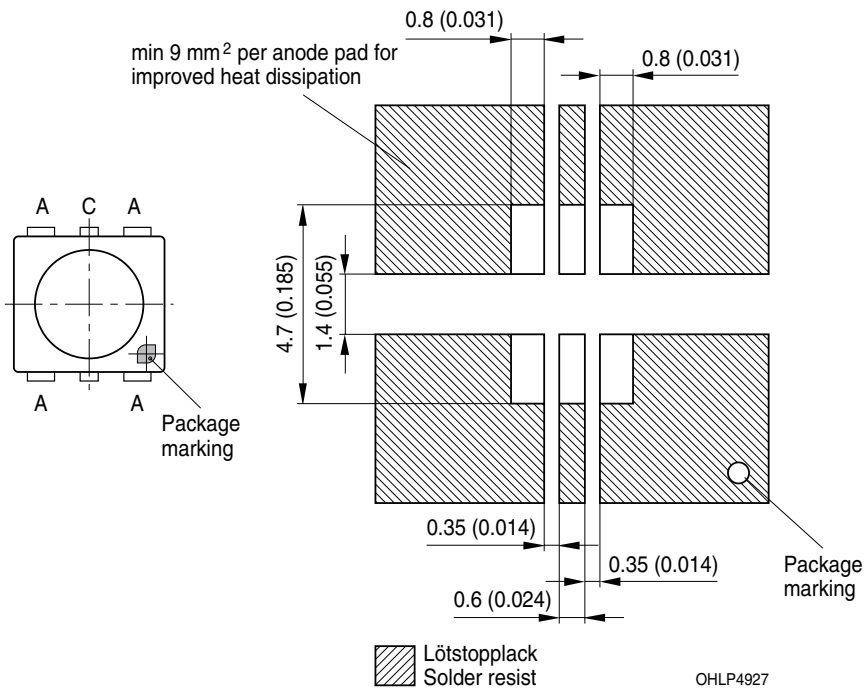


Approximate Weight: 40.0 mg

Package marking: Anode

Corrosion test: Class: 3B
 Test condition: 40°C / 90 % RH / 15 ppm H₂S / 14 days (stricter than IEC 60068-2-43)

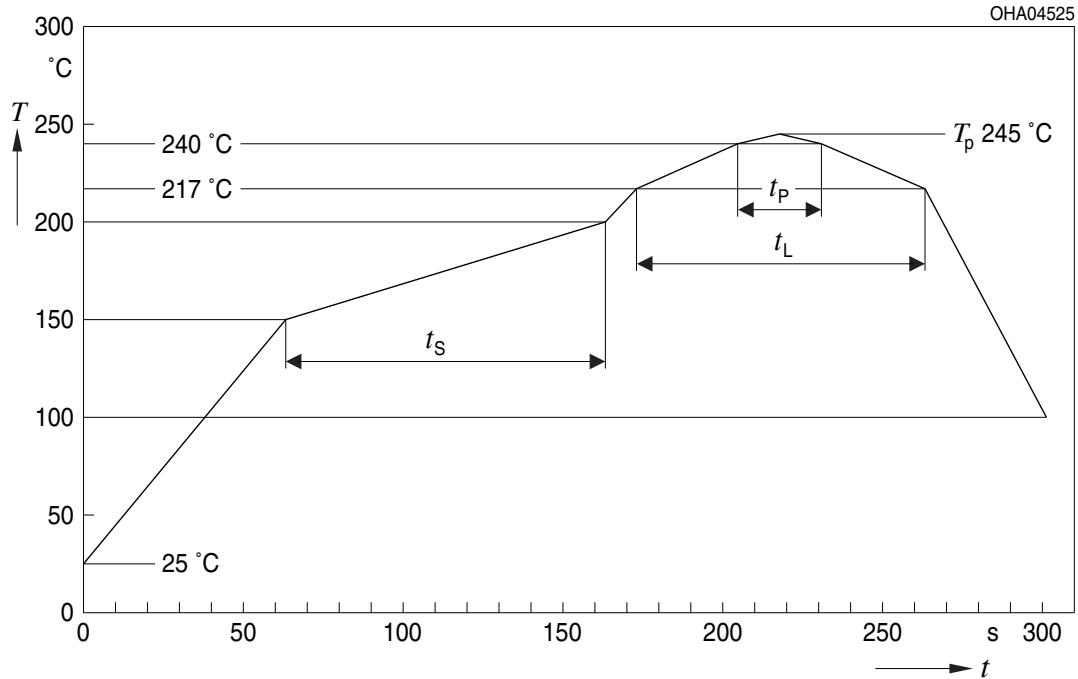
Recommended Solder Pad ⁸⁾



For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere.

Reflow Soldering Profile

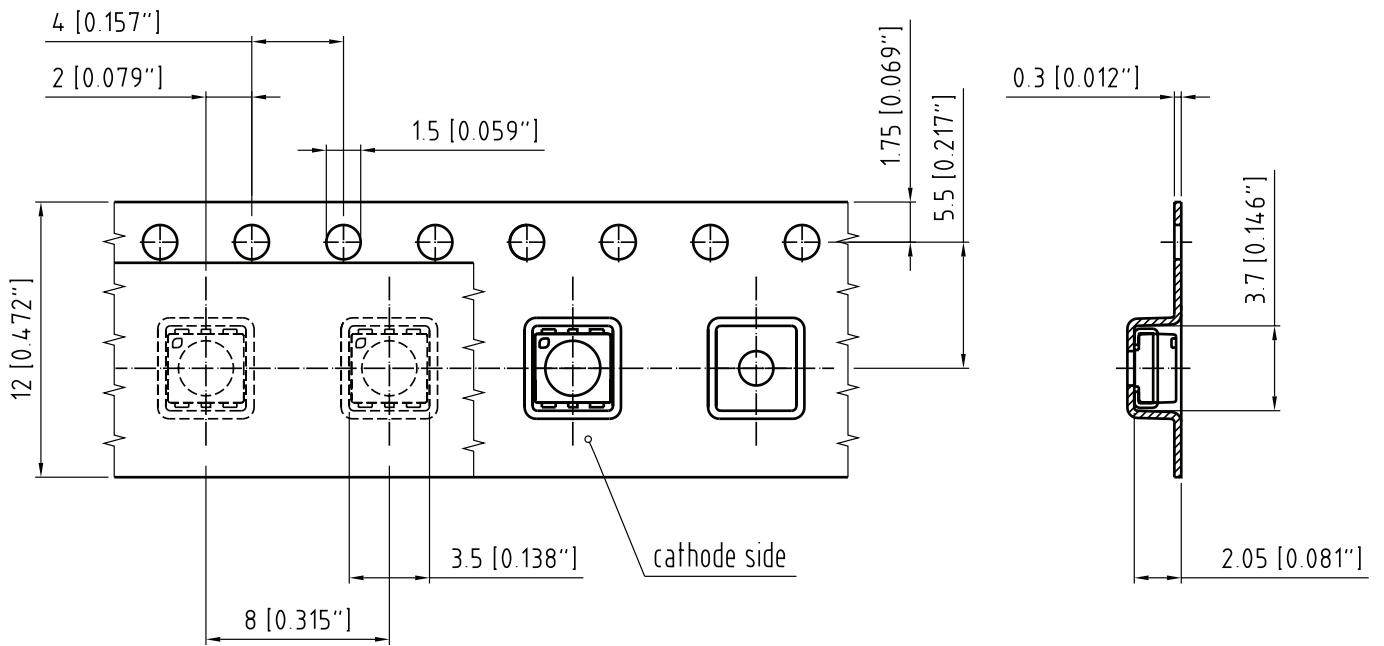
Product complies to MSL Level 2 acc. to JEDEC J-STD-020D.01



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 ⁹⁾



C63062-A3786-B9 -03

Tape and Reel ⁹⁾



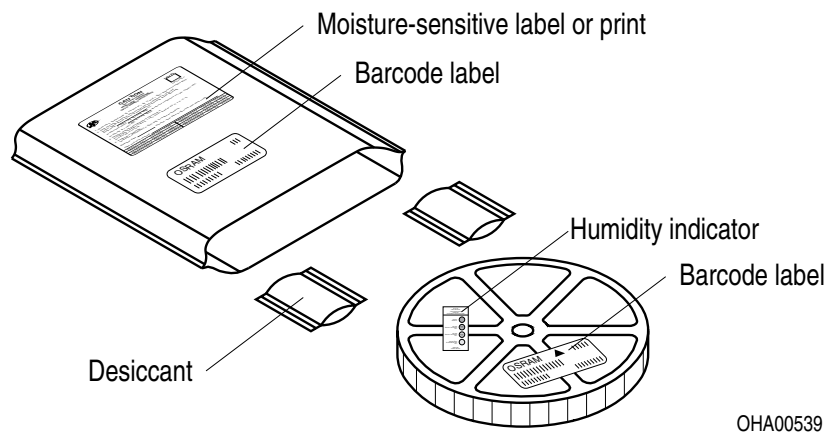
Reel dimensions [mm]

A	W	N _{min}	W ₁	W _{2max}	Pieces per PU
180 mm	12 + 0.3 / - 0.1	60	12.4 + 2	18.4	1000

Barcode-Product-Label (BPL)



Dry Packing Process and Materials ⁸⁾



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
195 ± 5 mm	195 ± 5 mm	30 ± 5 mm

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 LED specified in this data sheet fall into the class **moderate risk (exposure time 0.25 s)**. Under real circumstances (for exposure time, 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. As is also true when viewing other 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 LED 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 LED exposure to aggressive substances during storage, production, and use. LEDs 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

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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 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 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.

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.

Glossary

- 1) **Brightness:** Brightness values are measured during a current pulse of typically 25 ms, with an internal reproducibility of $\pm 8\%$ and an expanded uncertainty of $\pm 11\%$ (acc. to GUM with a coverage factor of $k = 3$).
- 2) **Reverse Operation:** Not designed for reverse operation. Continuous reverse operation can cause migration and damage of the device.
- 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:** $R_{th\ max}$ is based on statistic values (6σ).
- 6) **Typical Values:** Due to the special conditions of the manufacturing processes of LED, 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 LEDs 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.

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