LSG T676

Multi TOPLED®

Two chip LEDs for indicators that allow to display red, green and yellow by color mixing

Applications

- Electronic Equipment

Features:

- Package: white PLCC-4 package, colorless clear resin
- Chip technology: InGaAlP
- Typ. Radiation: 120° (Lambertian emitter)
- Color: λ_{dom} = 633 nm (● super red); λ_{dom} = 570 nm (● green)
- Optical efficacy: 7 lm/W; 5 lm/W
- Corrosion Robustness Class: 3B
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)

Ordering Information

Type	Brightness [1]	Ordering Code
LSG T676-P7R-1-0+N7P9-24		Q65111A1615
• super red	• I_v = 56 ... 180 mcd (I_F = 20 mA)	
• green	• I_v = 36 ... 100 mcd (I_F = 20 mA)	

Maximum Ratings

Parameter	Symbol		Values ● super red	Values ● green
Operating Temperature	T_{op}	min. max.	-40 °C 100 °C	-40 °C 100 °C
Storage Temperature	T_{stg}	min. max.	-40 °C 100 °C	-40 °C 100 °C
Junction Temperature	T_j	max.	125 °C	125 °C
Forward Current T_A = 25 °C	I_F	max.	30 mA	30 mA
Surge Current t ≤ 10 µs; D = 0.005 ; T_A = 25 °C	I_{FS}	max.	1 A	0.5 A
Reverse voltage [2)] T_A = 25 °C	V_R	max.	12 V	12 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}		2 kV	2 kV

Characteristics

I_F = 20 mA; T_A = 25 °C

Parameter	Symbol		Values ● super red	Values ● green
Peak Wavelength	λ_{peak}	typ.	645 nm	572 nm
Dominant Wavelength [3]	λ_{dom}	min. typ. max.	627 nm 633 nm 639 nm	566 nm 570 nm 575 nm
Spectral bandwidth at 50% $I_{rel,max}$	$\Delta\lambda$	typ.	16 nm	22 nm
Viewing angle at 50 % I_V	2φ	typ.	120 °	120 °
Forward Voltage [4] I_F = 20 mA	V_F	min. typ. max.	1.80 V 2.00 V 2.30 V	1.80 V 2.00 V 2.40 V
Reverse current [2] V_R = 12 V	I_R	max.	10 µA	10 µA
Temperature Coefficient of Peak Wavelength	$TC_{\lambda peak}$	typ.	0.14 nm / K	0.12 nm / K
Temperature Coefficient of Dominant Wavelength	$TC_{\lambda dom}$	typ.	0.05 nm / K	0.10 nm / K
Temperature Coefficient of Forward Voltage	TC_{VF}	typ.	-2.0 mV / K	-2.5 mV / K
Real thermal resistance junction/ambient [5][6] 1 chip on	$R_{thJA\ real}$	max.	580 K / W	580 K / W
Real thermal resistance junction/solderpoint [5] 1 chip on	$R_{thJS\ real}$	max.	340 K / W	340 K / W

Brightness Groups

Color of emission	Group	Luminous Intensity [1] I_F = 20 mA min. I_v	Luminous Intensity [1] I_F = 20 mA max. I_v	
● super red	P7	56 mcd	90 mcd	220 mlm
● super red	P9	63 mcd	100 mcd	240 mlm
● super red	Q	71 mcd	112 mcd	270 mlm
● super red	Q5	80 mcd	125 mcd	310 mlm
● super red	Q7	90 mcd	140 mcd	350 mlm
● super red	Q9	100 mcd	159 mcd	390 mlm
● super red	R	112 mcd	180 mcd	440 mlm
● green	N7	36 mcd	56 mcd	140 mlm
● green	N9	40 mcd	63 mcd	150 mlm
● green	P	45 mcd	71 mcd	170 mlm
● green	P5	50 mcd	80 mcd	200 mlm
● green	P7	56 mcd	90 mcd	220 mlm
● green	P9	63 mcd	100 mcd	240 mlm

Wavelength Groups

● super red

Group	Dominant Wavelength [3] min. λ_{dom}	Dominant Wavelength [3] max. λ_{dom}
1	627 nm	639 nm

Wavelength Groups

● green

Group	Dominant Wavelength [3] min. λ_{dom}	Dominant Wavelength [3] max. λ_{dom}
2	566 nm	569 nm
3	569 nm	572 nm
4	572 nm	575 nm

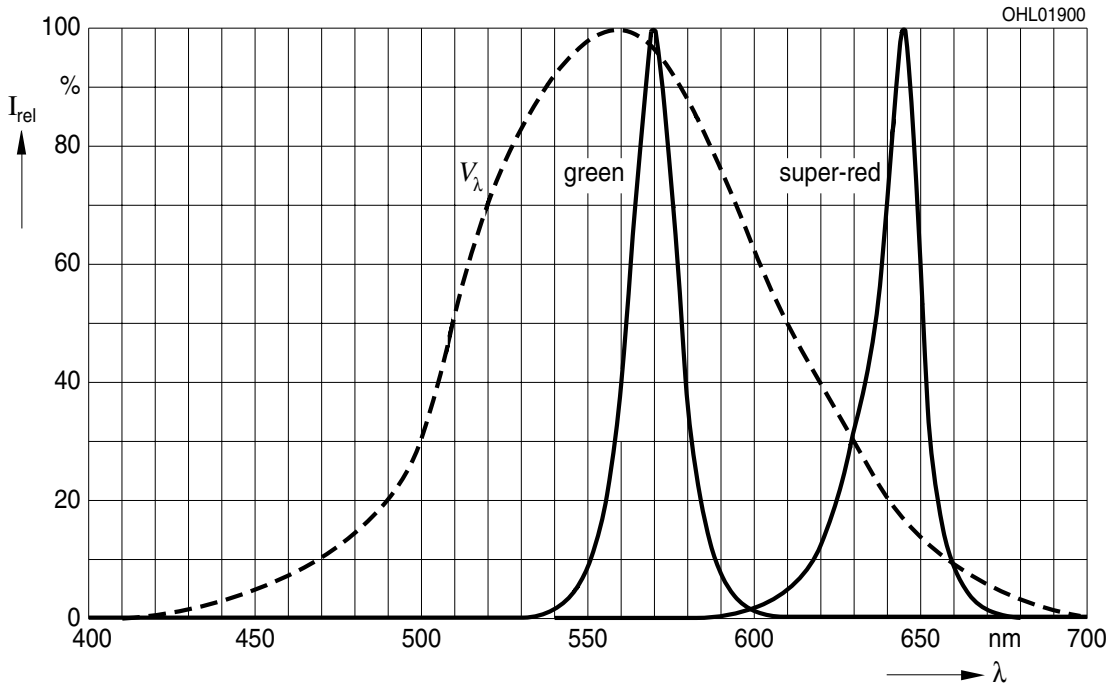
Group Name on Label

Example: P7-1+N7-2

Color	Brightness	Wavelength
● super red	P7	1
● green	N7	2

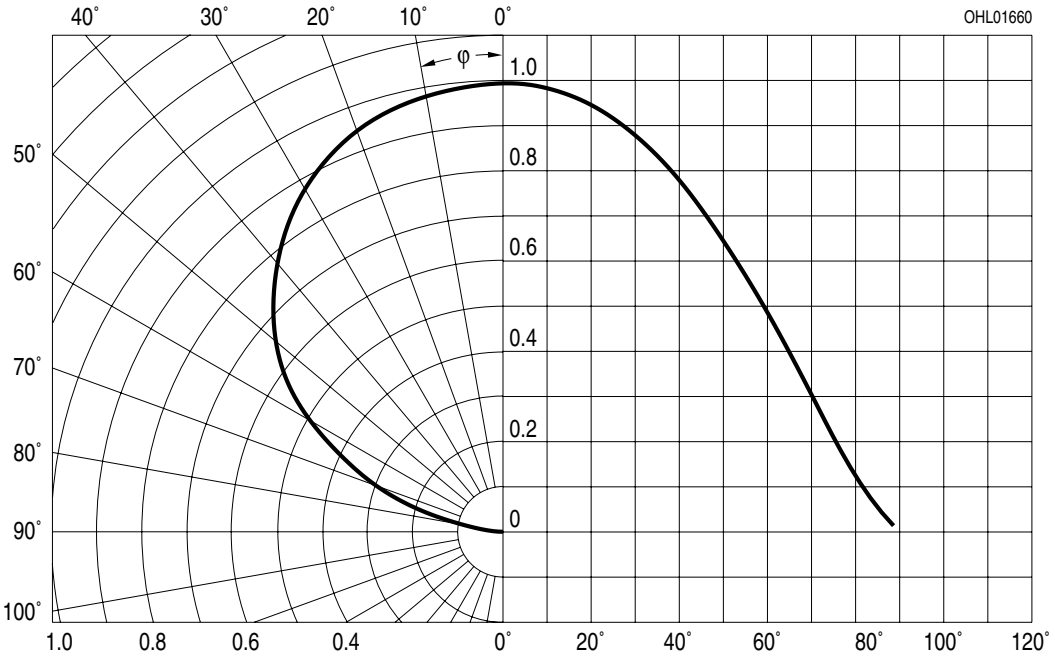
Relative Spectral Emission [7)]

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



Radiation Characteristics [7)]

$I_{rel} = f(\phi)$; $T_A = 25$ °C



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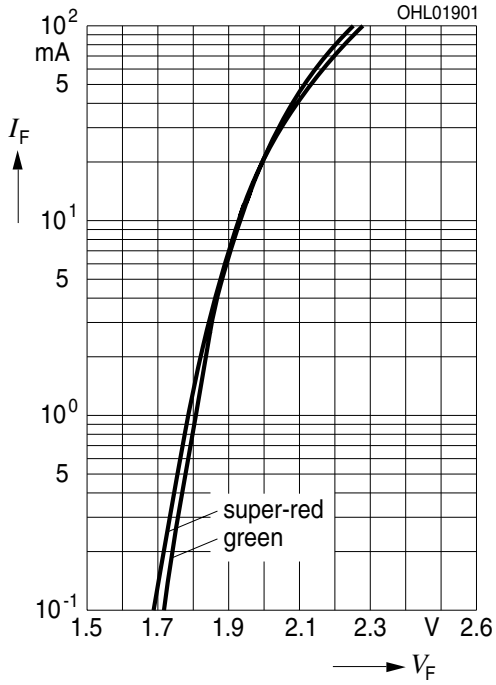
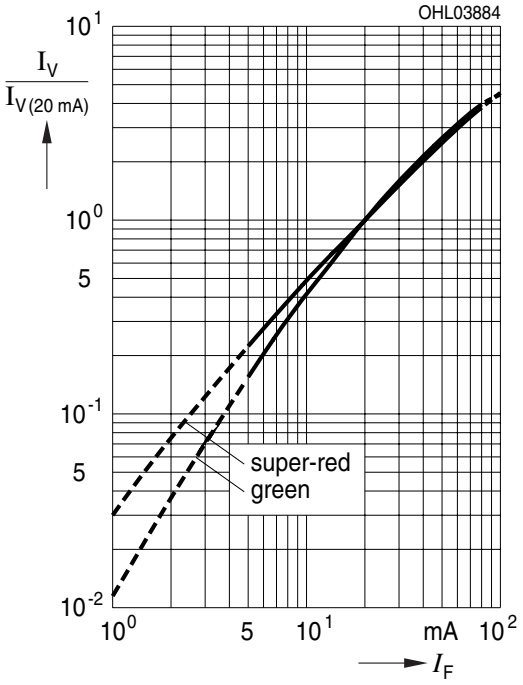
Forward current [7), 8)]

$I_F = f(V_F)$; T_A = 25 °C



Relative Luminous Intensity [7), 8)]

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



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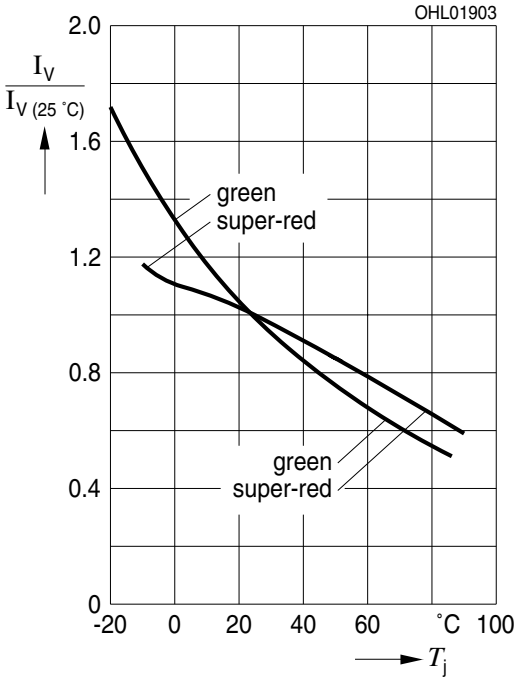
Relative Luminous Intensity [7)]

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



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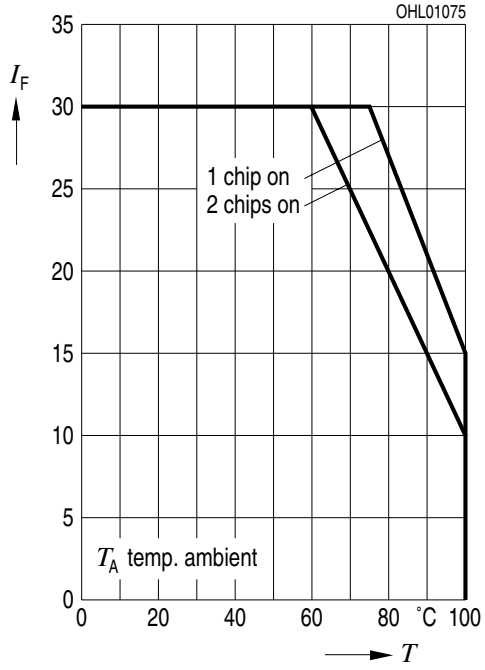
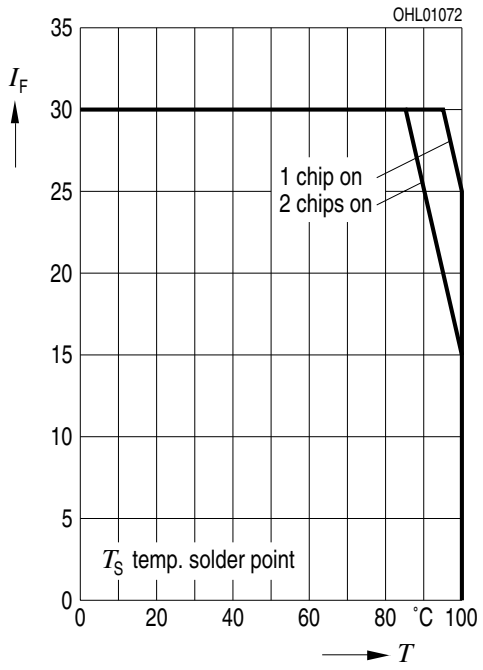
Max. Permissible Forward Current

$I_F = f(T)$



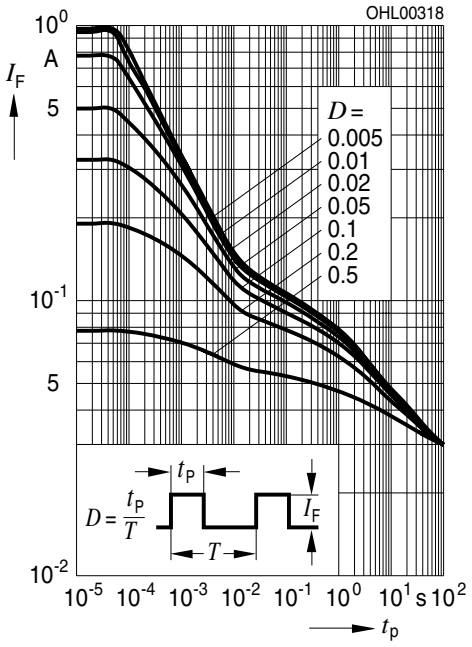
Max. Permissible Forward Current

$I_F = f(T)$



Permissible Pulse Handling Capability

$I_F = f(tp)$; D: Duty cycle; T_A = 25 °C (Super red)



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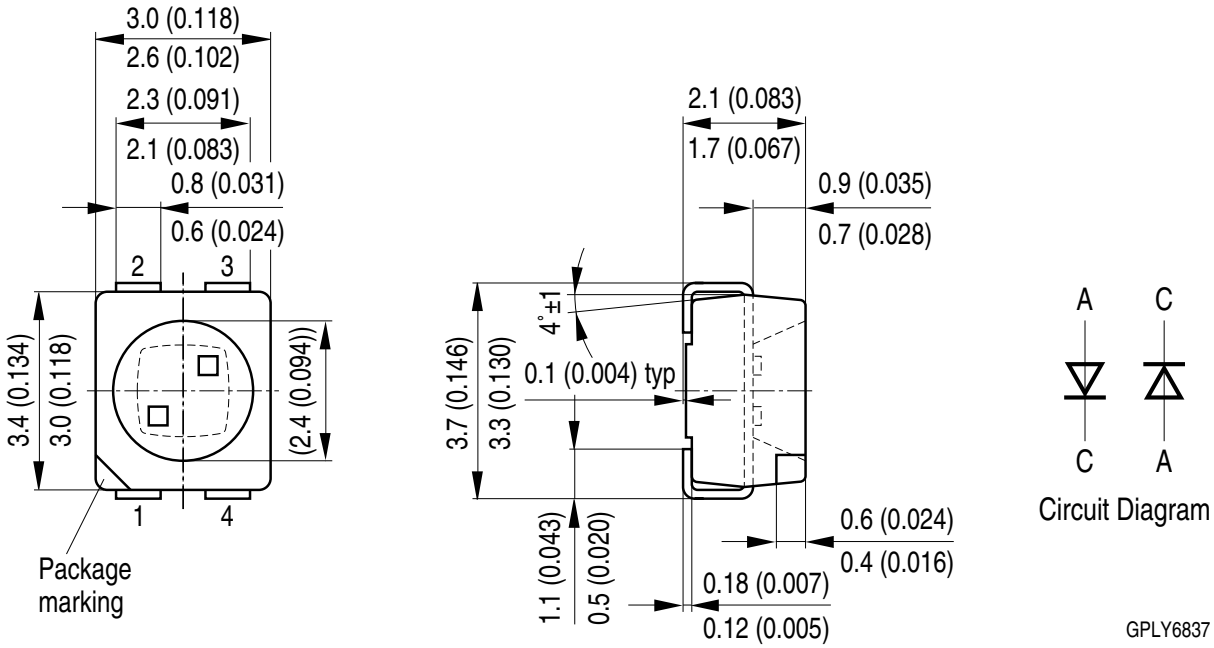
Dimensional Drawing [9)]



Approximate Weight: 31.0 mg

Corrosion test: Class: 3B
Test condition: 40°C / 90 % RH / 15 ppm H_2S / 14 days (stricter then IEC 60068-2-43)

Pin	Description
Pin 1	Cathode super red
Pin 2	Anode super red
Pin 3	Cathode green
Pin 4	Anode green

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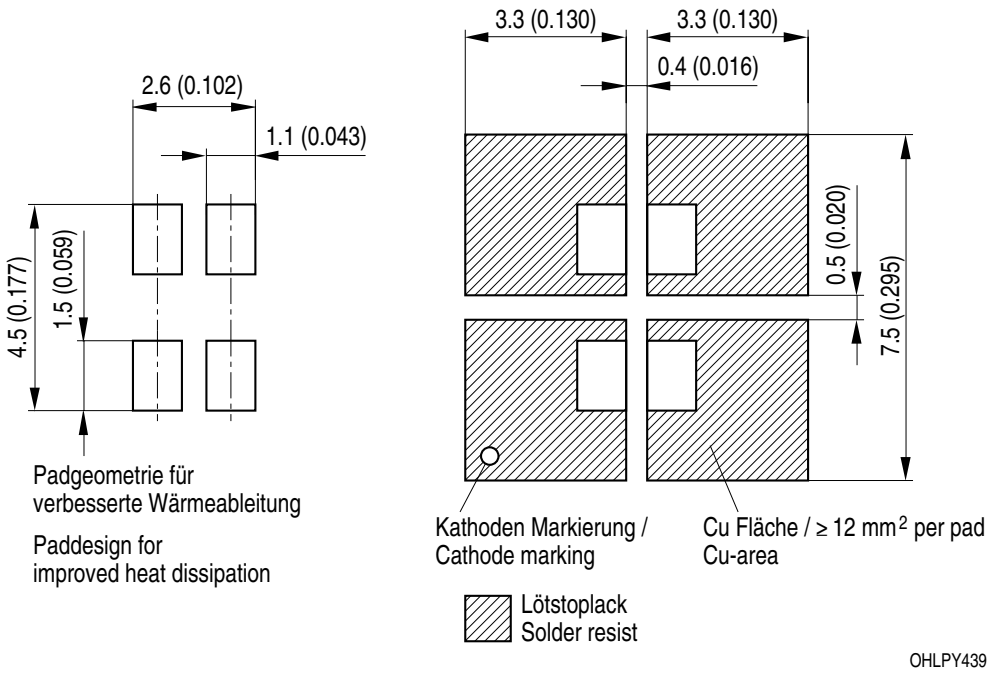
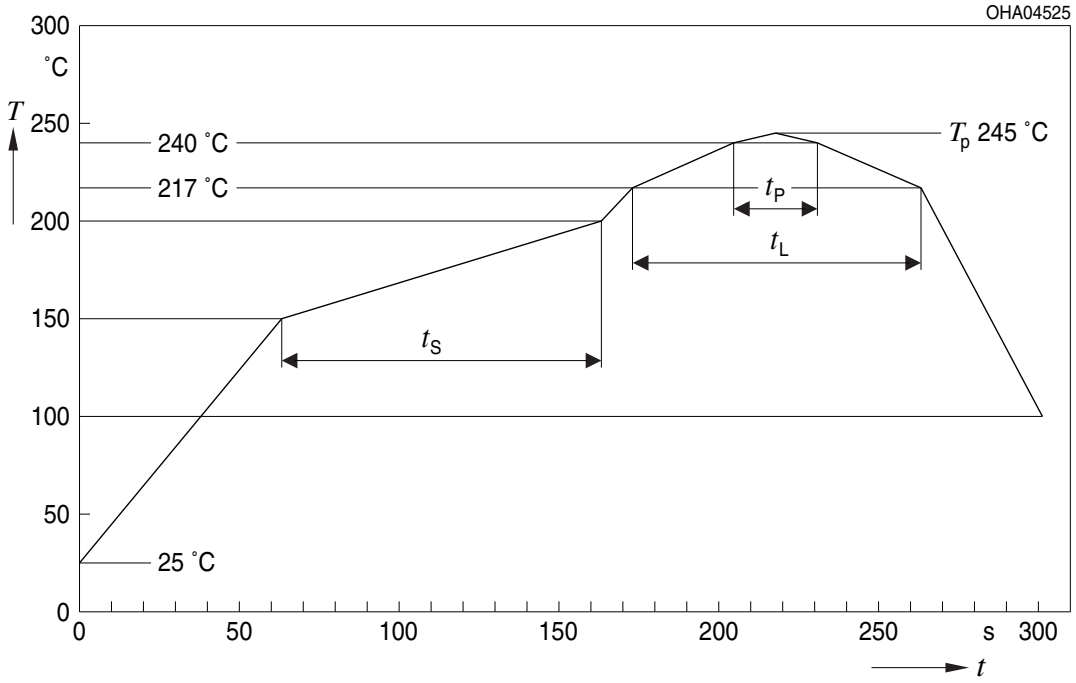
Recommended Solder Pad [9)]



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

Reflow Soldering Profile

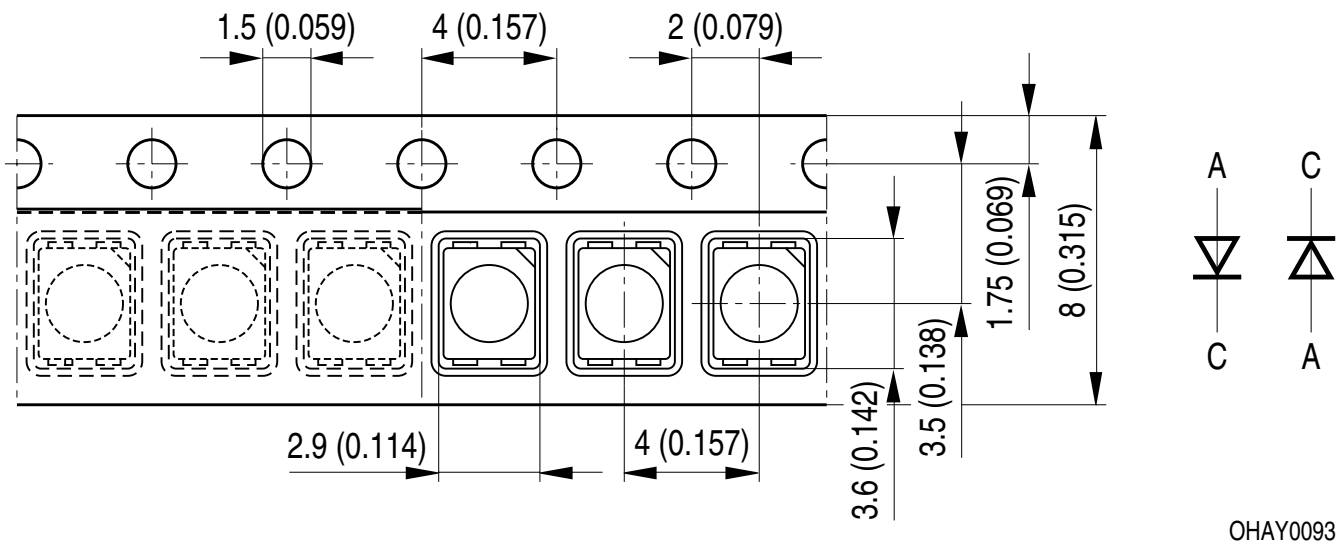
Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



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 [9)]



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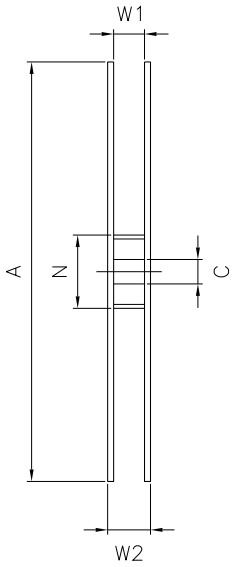
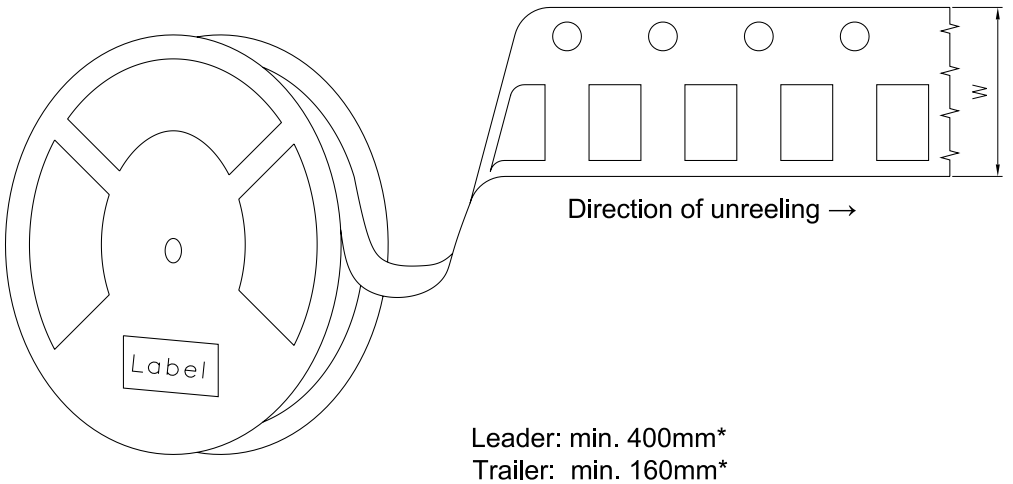
Tape and Reel [10)]



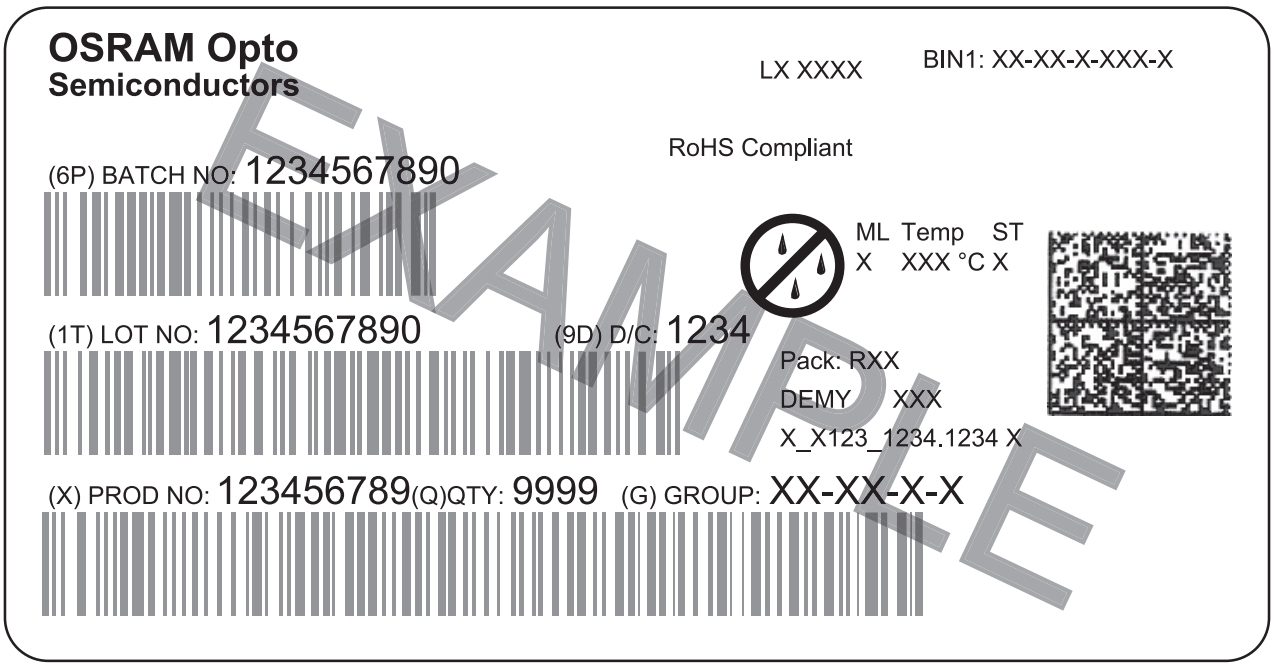


Leader: min. 400mm*
Trailer: min. 160mm*
*)Dimensions acc. to IEC 60286-3; EIA 481-E

Reel dimensions [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	2000
330 mm	8 + 0.3 / - 0.1	60	8.4 + 2	14.4	8000

Barcode-Product-Label (BPL)



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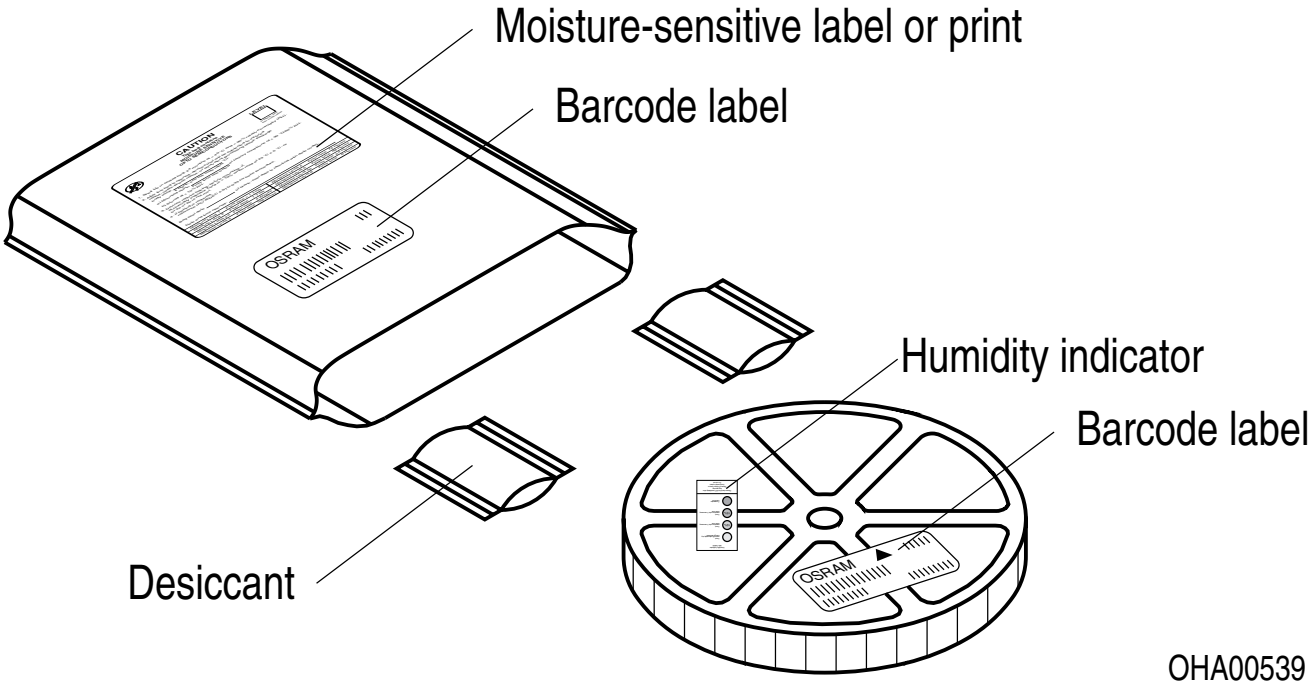
Dry Packing Process and Materials [9)]



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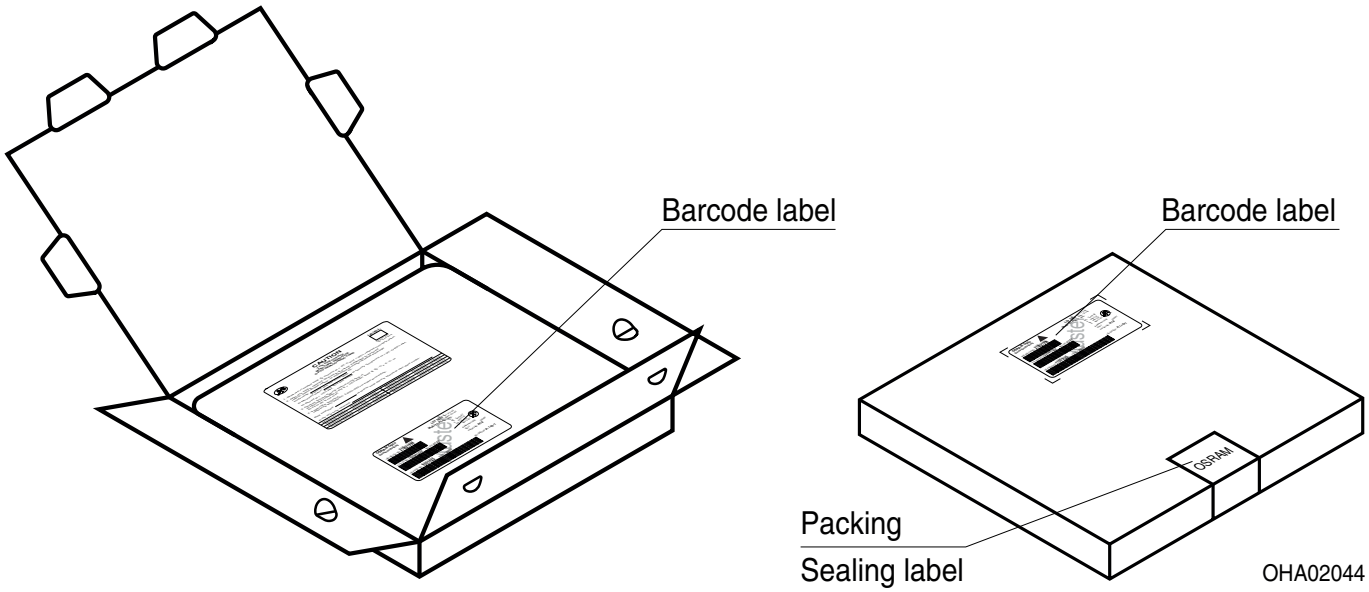
Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card according JEDEC-STD-033.

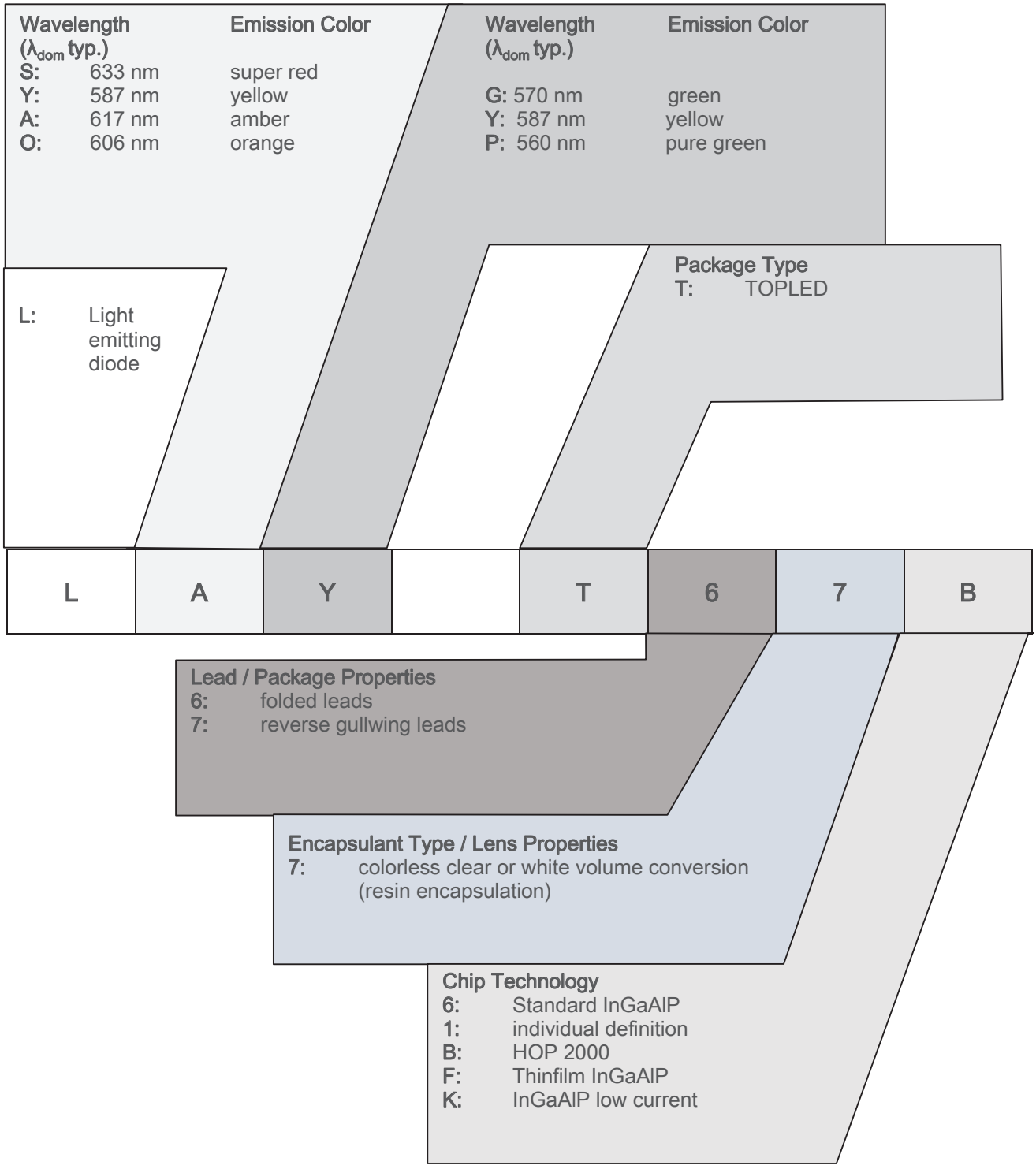
Transportation Packing and Materials [9)]



Dimensions of transportation box in mm

Width	Length	Height
200 ± 5 mm	195 ± 5 mm	30 ± 5 mm
352 ± 5 mm	352 ± 5 mm	33 ± 5 mm

Type Designation System



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

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.

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.

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Glossary

1) **Brightness:** Brightness groups are tested at a current pulse duration of 25 ms and a tolerance of ±11 %.

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

3) **Wavelength:** Wavelengths are tested at a current pulse duration of 25 ms and a tolerance of ±1 nm.

4) **Forward Voltage:** Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of ±0.1 V.

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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Данный компонент на территории Российской Федерации

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