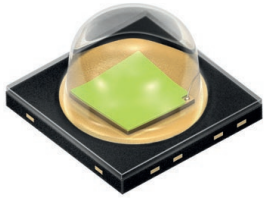
LCW H9GP



OSLON® Black

OSLON Black Series combines thermal stability with high performance and reliability in a compact black package. It has a metal lead frame and a tried and tested lens design. The LED can be used wherever there are large fluctuations in temperature and a large amount of light is needed from a small area.

Applications

- Cluster, Button Backlighting
- Custom Tuning
- Head-Up Display LED & Laser
- Interior Illumination (e.g. Ambient Map)
- Transportation, Plane, Ship

Features:

- Package: SMD epoxy package with silicone lens
- Chip technology: ThinGaN
- Typ. Radiation: 90°
- Color: Cx = 0.42, Cy = 0.4 acc. to CIE 1931 (● warm white)
- 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.
- Color temperature: 2700K - 4500K
- CRI: 80
- ESD: 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)

Ordering Information

Type	Color temperature	Luminous Flux [1] I_F = 350 mA Φ_V	Ordering Code
LCW H9GP-JZKY-4U9X-1	2700 K	61 ... 97 lm	Q65111A0919
LCW H9GP-JZKY-4R9T-1	3000 K	61 ... 97 lm	Q65111A0920
LCW H9GP-JZKZ-4O9Q-1	3500 K	61 ... 112 lm	Q65111A0921
LCW H9GP-JZLX-4L8N-1	4000 K	61 ... 130 lm	Q65111A0922
LCW H9GP-KXLX-4J8K-1	4500 K	71 ... 130 lm	Q65111A0923

Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min. max.	-40 °C 125 °C
Storage Temperature	T_{stg}	min. max.	-40 °C 125 °C
Junction Temperature	T_j	max.	150 °C
Junction Temperature for short time applications*	T_j	max.	175 °C
Forward Current T_S = 25 °C	I_F	min. max.	100 mA 1000 mA
Surge Current t ≤ 10 µs; D = 0.016 ; T_S = 25 °C	I_{FS}	max.	2500 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

*The median lifetime (L70/B50) for Tj =175°C is 100h.

Characteristics

I_F = 350 mA; T_S = 25 °C

Parameter	Symbol		Values
Chromaticity Coordinate [3]	Cx	typ.	0.42
	Cy	typ.	0.4
Viewing angle at 50 % I_V	2φ	typ.	90 °
Forward Voltage [4] I_F = 350 mA	V_F	min.	2.75 V
		typ.	3.20 V
		max.	3.75 V
Reverse voltage (ESD device)	$V_{R\ ESD}$	min.	45 V
Reverse voltage [2] I_R = 20 mA	V_R	max.	1.2 V
Color Rendering Index	CRI	typ.	80
Real thermal resistance junction/solderpoint [5]	$R_{thJS\ real}$	typ.	5.4 K / W
		max.	7.3 K / W

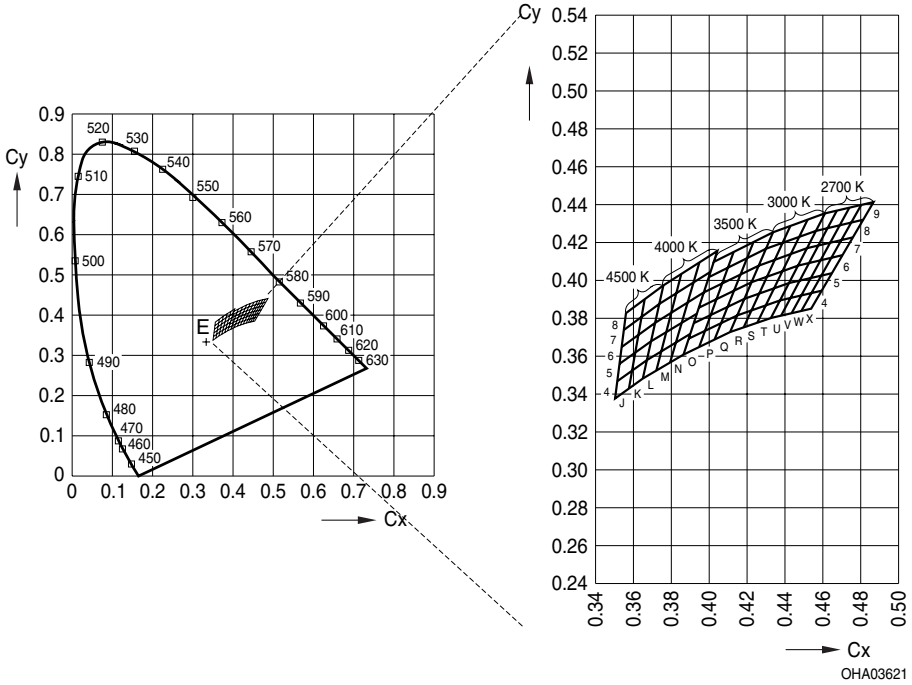
Brightness Groups

Group	Luminous Flux [1] I_F = 350 mA min. Φ_V	Luminous Flux [1] I_F = 350 mA max. Φ_V	Luminous Intensity [6] I_F = 350 mA typ. I_v
JZ	61 lm	71 lm	32 cd
KX	71 lm	82 lm	38 cd
KY	82 lm	97 lm	44 cd
KZ	97 lm	112 lm	51 cd
LX	112 lm	130 lm	59 cd

Forward Voltage Groups

Group	Forward Voltage [4] I_F = 350 mA min. V_F	Forward Voltage [4] I_F = 350 mA max. V_F
8E	2.75 V	3.00 V
8F	3.00 V	3.25 V
8G	3.25 V	3.50 V
8H	3.50 V	3.75 V

Chromaticity Coordinate Groups [3)]



Color Chromaticity Groups [3)]

Group	Cx	Cy	CCT
4J	0.3500	0.3375	4500
	0.3512	0.3465	4500
	0.3591	0.3522	4500
	0.3574	0.3427	4500
4K	0.3574	0.3427	4500
	0.3591	0.3522	4500
	0.3670	0.3578	4500
	0.3648	0.3479	4500
4L	0.3648	0.3479	4500
	0.3670	0.3578	4500
	0.3746	0.3624	4500
	0.3719	0.3522	4500
4M	0.3719	0.3522	4500
	0.3746	0.3624	4500
	0.3822	0.3670	4500
	0.3791	0.3564	4500

Group	Cx	Cy	CCT
4N	0.3791	0.3564	4500
	0.3822	0.3670	4500
	0.3898	0.3716	4500
	0.3862	0.3607	4500
4O	0.3863	0.3609	4500
	0.3890	0.3690	4500
	0.3975	0.3731	4500
	0.3945	0.3648	4500
4P	0.3945	0.3648	4500
	0.3975	0.3731	4500
	0.4061	0.3773	4500
	0.4027	0.3687	4500
4Q	0.4027	0.3687	4500
	0.4061	0.3773	4500
	0.4147	0.3814	4500
	0.4109	0.3726	4500

Group	Cx	Cy	CCT
4R	0.4109	0.3726	4500
	0.4147	0.3814	4500
	0.4222	0.3840	4500
	0.4181	0.3751	4500
4S	0.4181	0.3751	4500
	0.4222	0.3840	4500
	0.4298	0.3867	4500
	0.4254	0.3776	4500
4T	0.4254	0.3776	4500
	0.4298	0.3867	4500
	0.4373	0.3893	4500
	0.4326	0.3801	4500
4U	0.4326	0.3801	4500
	0.4373	0.3893	4500
	0.4428	0.3906	4500
	0.4379	0.3814	4500

Group	Cx	Cy	CCT
4V	0.4379	0.3814	4500
	0.4428	0.3906	4500
	0.4483	0.3919	4500
	0.4432	0.3826	4500
4W	0.4432	0.3826	4500
	0.4483	0.3919	4500
	0.4538	0.3931	4500
	0.4485	0.3838	4500
4X	0.4485	0.3838	4500
	0.4538	0.3931	4500
	0.4593	0.3944	4500
	0.4538	0.3850	4500
5J	0.3512	0.3465	4500
	0.3524	0.3555	4500
	0.3608	0.3616	4500
	0.3591	0.3522	4500
5K	0.3591	0.3522	4500
	0.3608	0.3616	4500
	0.3692	0.3677	4500
	0.3670	0.3578	4500
5L	0.3670	0.3578	4500
	0.3692	0.3677	4500
	0.3773	0.3726	4500
	0.3746	0.3624	4500
5M	0.3746	0.3624	4500
	0.3773	0.3726	4500
	0.3853	0.3776	4500
	0.3822	0.3670	4500
5N	0.3822	0.3670	4500
	0.3853	0.3776	4500
	0.3934	0.3825	4500
	0.3898	0.3716	4500
5O	0.3890	0.3690	4500
	0.3916	0.3772	4500
	0.4006	0.3815	4500
	0.3975	0.3731	4500
5P	0.3975	0.3731	4500
	0.4006	0.3815	4500
	0.4095	0.3858	4500
	0.4061	0.3773	4500
5Q	0.4061	0.3773	4500
	0.4095	0.3858	4500
	0.4185	0.3902	4500
	0.4147	0.3814	4500
5R	0.4147	0.3814	4500
	0.4185	0.3902	4500
	0.4263	0.3929	4500
	0.4222	0.3840	4500
5S	0.4222	0.3840	4500
	0.4263	0.3929	4500
	0.4342	0.3957	4500
	0.4298	0.3867	4500
5T	0.4298	0.3867	4500
	0.4342	0.3957	4500
	0.4420	0.3985	4500
	0.4373	0.3893	4500
5U	0.4373	0.3893	4500
	0.4420	0.3985	4500
	0.4477	0.3998	4500
	0.4428	0.3906	4500
5V	0.4428	0.3906	4500
	0.4477	0.3998	4500
	0.4534	0.4011	4500
	0.4483	0.3919	4500
5W	0.4483	0.3919	4500
	0.4534	0.4011	4500
	0.4591	0.4025	4500
	0.4538	0.3931	4500
5X	0.4538	0.3931	4500
	0.4591	0.4025	4500
	0.4648	0.4038	4500
	0.4593	0.3944	4500
6J	0.3524	0.3555	4500
	0.3536	0.3646	4500
	0.3625	0.3711	4500
	0.3608	0.3616	4500
6K	0.3608	0.3616	4500
	0.3625	0.3711	4500
	0.3714	0.3775	4500
	0.3692	0.3677	4500
6L	0.3692	0.3677	4500
	0.3714	0.3775	4500
	0.3799	0.3828	4500
	0.3773	0.3726	4500
6M	0.3773	0.3726	4500
	0.3799	0.3828	4500
	0.3885	0.3882	4500
	0.3853	0.3776	4500
6N	0.3853	0.3776	4500
	0.3885	0.3882	4500
	0.3970	0.3935	4500
	0.3934	0.3825	4500
6O	0.3916	0.3772	4500
	0.3943	0.3853	4500
	0.4036	0.3898	4500
	0.4006	0.3815	4500

Group	Cx	Cy	CCT
6P	0.4006	0.3815	4500
	0.4036	0.3898	4500
	0.4130	0.3944	4500
	0.4095	0.3858	4500
6Q	0.4095	0.3858	4500
	0.4130	0.3944	4500
	0.4223	0.3990	4500
	0.4185	0.3902	4500
6R	0.4185	0.3902	4500
	0.4223	0.3990	4500
	0.4305	0.4019	4500
	0.4263	0.3929	4500
6S	0.4263	0.3929	4500
	0.4305	0.4019	4500
	0.4386	0.4048	4500
	0.4342	0.3957	4500
6T	0.4342	0.3957	4500
	0.4386	0.4048	4500
	0.4468	0.4077	4500
	0.4420	0.3985	4500
6U	0.4420	0.3985	4500
	0.4468	0.4077	4500
	0.4526	0.4090	4500
	0.4477	0.3998	4500
6V	0.4477	0.3998	4500
	0.4526	0.4090	4500
	0.4585	0.4104	4500
	0.4534	0.4011	4500
6W	0.4534	0.4011	4500
	0.4585	0.4104	4500
	0.4644	0.4118	4500
	0.4591	0.4025	4500

Group	Cx	Cy	CCT
6X	0.4591	0.4025	4500
	0.4644	0.4118	4500
	0.4703	0.4132	4500
	0.4648	0.4038	4500
7J	0.3536	0.3646	4500
	0.3548	0.3736	4500
	0.3642	0.3805	4500
	0.3625	0.3711	4500
7K	0.3625	0.3711	4500
	0.3642	0.3805	4500
	0.3736	0.3874	4500
	0.3714	0.3775	4500
7L	0.3714	0.3775	4500
	0.3736	0.3874	4500
	0.3826	0.3931	4500
	0.3799	0.3828	4500
7M	0.3799	0.3828	4500
	0.3826	0.3931	4500
	0.3916	0.3987	4500
	0.3885	0.3882	4500
7N	0.3885	0.3882	4500
	0.3916	0.3987	4500
	0.4006	0.4044	4500
	0.3970	0.3935	4500
7O	0.3943	0.3853	4500
	0.3970	0.3934	4500
	0.4067	0.3982	4500
	0.4036	0.3898	4500
7P	0.4036	0.3898	4500
	0.4067	0.3982	4500
	0.4164	0.4029	4500
	0.4130	0.3944	4500

Group	Cx	Cy	CCT
7Q	0.4130	0.3944	4500
	0.4164	0.4029	4500
	0.4261	0.4077	4500
	0.4223	0.3990	4500
7R	0.4223	0.3990	4500
	0.4261	0.4077	4500
	0.4346	0.4108	4500
	0.4305	0.4019	4500
7S	0.4305	0.4019	4500
	0.4346	0.4108	4500
	0.4430	0.4138	4500
	0.4386	0.4048	4500
7T	0.4386	0.4048	4500
	0.4430	0.4138	4500
	0.4515	0.4168	4500
	0.4468	0.4077	4500
7U	0.4468	0.4077	4500
	0.4515	0.4168	4500
	0.4576	0.4183	4500
	0.4526	0.4090	4500
7V	0.4526	0.4090	4500
	0.4576	0.4183	4500
	0.4636	0.4197	4500
	0.4585	0.4104	4500
7W	0.4585	0.4104	4500
	0.4636	0.4197	4500
	0.4697	0.4211	4500
	0.4644	0.4118	4500
7X	0.4644	0.4118	4500
	0.4697	0.4211	4500
	0.4758	0.4225	4500
	0.4703	0.4132	4500

Group	Cx	Cy	CCT
8J	0.3548	0.3736	4500
	0.3560	0.3826	4500
	0.3659	0.3900	4500
	0.3642	0.3805	4500
8K	0.3642	0.3805	4500
	0.3659	0.3900	4500
	0.3758	0.3973	4500
	0.3736	0.3874	4500
8L	0.3736	0.3874	4500
	0.3758	0.3973	4500
	0.3853	0.4033	4500
	0.3826	0.3931	4500
8M	0.3826	0.3931	4500
	0.3853	0.4033	4500
	0.3947	0.4093	4500
	0.3916	0.3987	4500
8N	0.3916	0.3987	4500
	0.3947	0.4093	4500
	0.4042	0.4153	4500
	0.4006	0.4044	4500
8O	0.3970	0.3934	4500
	0.3997	0.4015	4500
	0.4097	0.4065	4500
	0.4067	0.3982	4500
8P	0.4067	0.3982	4500
	0.4097	0.4065	4500
	0.4198	0.4115	4500
	0.4164	0.4029	4500
8Q	0.4164	0.4029	4500
	0.4198	0.4115	4500
	0.4299	0.4165	4500
	0.4261	0.4077	4500
8R	0.4261	0.4077	4500
	0.4299	0.4165	4500
	0.4387	0.4197	4500
	0.4346	0.4108	4500
8S	0.4346	0.4108	4500
	0.4387	0.4197	4500
	0.4474	0.4228	4500
	0.4430	0.4138	4500
8T	0.4430	0.4138	4500
	0.4474	0.4228	4500
	0.4562	0.4260	4500
	0.4515	0.4168	4500
8U	0.4515	0.4168	4500
	0.4562	0.4260	4500
	0.4625	0.4275	4500
	0.4576	0.4183	4500
8V	0.4576	0.4183	4500
	0.4625	0.4275	4500
	0.4688	0.4290	4500
	0.4636	0.4197	4500
8W	0.4636	0.4197	4500
	0.4688	0.4290	4500
	0.4750	0.4304	4500
	0.4697	0.4211	4500
8X	0.4697	0.4211	4500
	0.4750	0.4304	4500
	0.4813	0.4319	4500
	0.4758	0.4225	4500
9O	0.3997	0.4015	4500
	0.4023	0.4097	4500
	0.4128	0.4148	4500
	0.4097	0.4065	4500
9P	0.4097	0.4065	4500
	0.4128	0.4148	4500
	0.4232	0.4201	4500
	0.4198	0.4115	4500
9Q	0.4198	0.4115	4500
	0.4232	0.4201	4500
	0.4337	0.4253	4500
	0.4299	0.4165	4500
9R	0.4299	0.4165	4500
	0.4337	0.4253	4500
	0.4428	0.4286	4500
	0.4387	0.4197	4500
9S	0.4387	0.4197	4500
	0.4428	0.4286	4500
	0.4519	0.4319	4500
	0.4474	0.4228	4500
9T	0.4474	0.4228	4500
	0.4519	0.4319	4500
	0.4609	0.4352	4500
	0.4562	0.4260	4500
9U	0.4562	0.4260	4500
	0.4609	0.4352	4500
	0.4674	0.4367	4500
	0.4625	0.4275	4500
9V	0.4625	0.4275	4500
	0.4674	0.4367	4500
	0.4739	0.4382	4500
	0.4688	0.4290	4500
9W	0.4688	0.4290	4500
	0.4739	0.4382	4500
	0.4803	0.4398	4500
	0.4750	0.4304	4500

Group	Cx	Cy	CCT
9X	0.4750	0.4304	4500
	0.4803	0.4398	4500
	0.4868	0.4413	4500
	0.4813	0.4319	4500

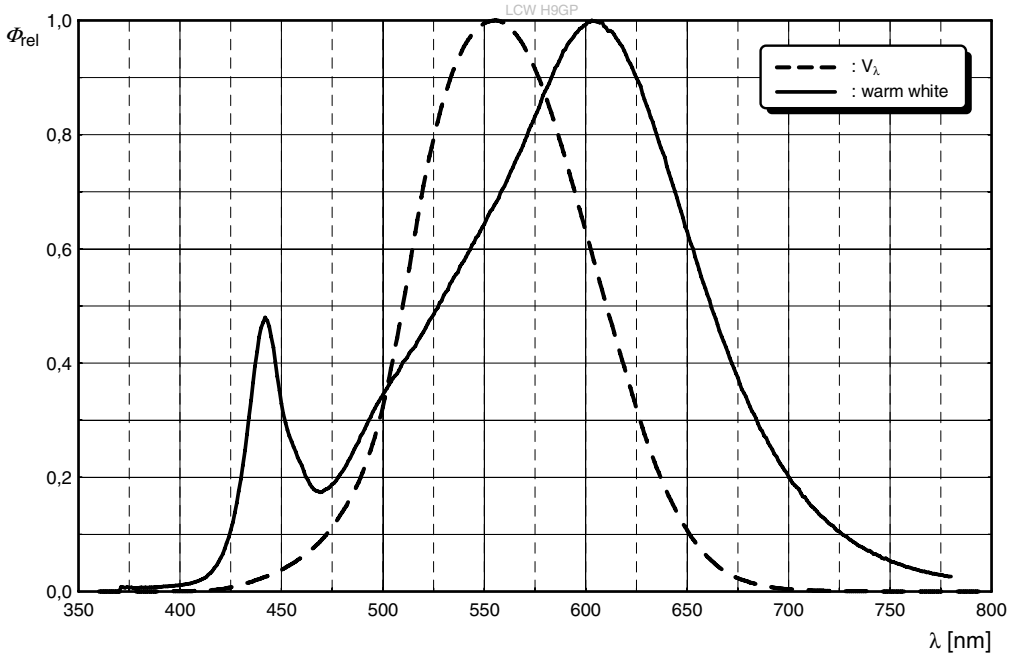
Group Name on Label

Example: JZ-4J-8E

Brightness	Color Chromaticity	Forward Voltage
JZ	4J	8E

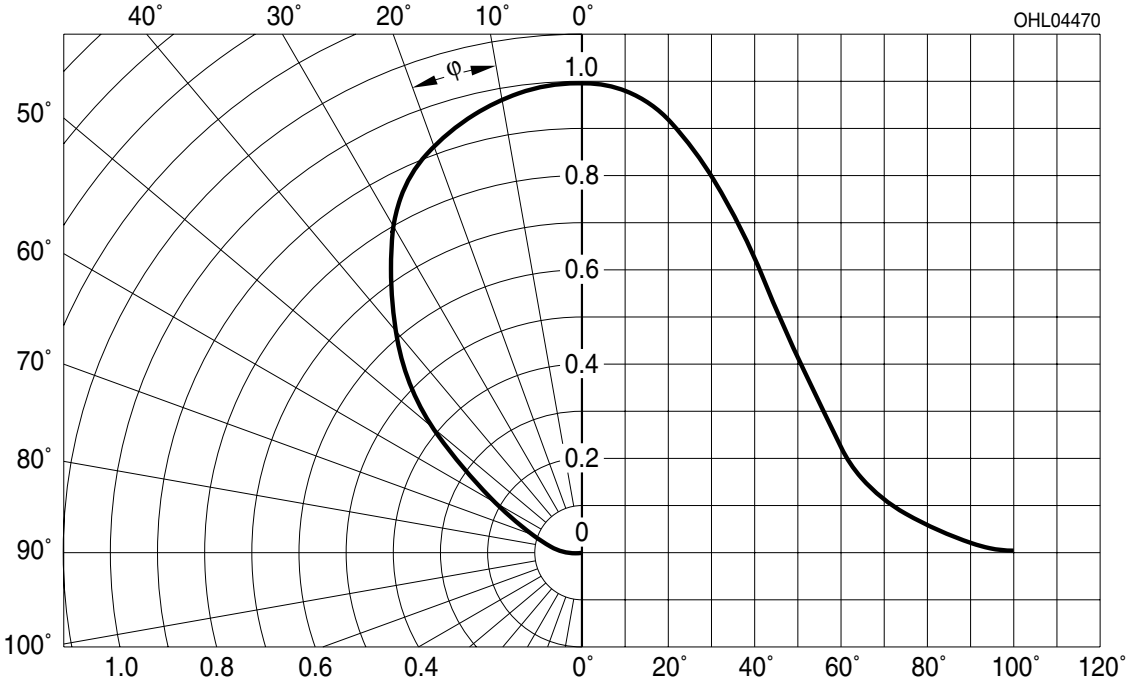
Relative Spectral Emission [6]

$\Phi_{rel} = f(\lambda)$; I_F = 350 mA; T_S = 25 °C



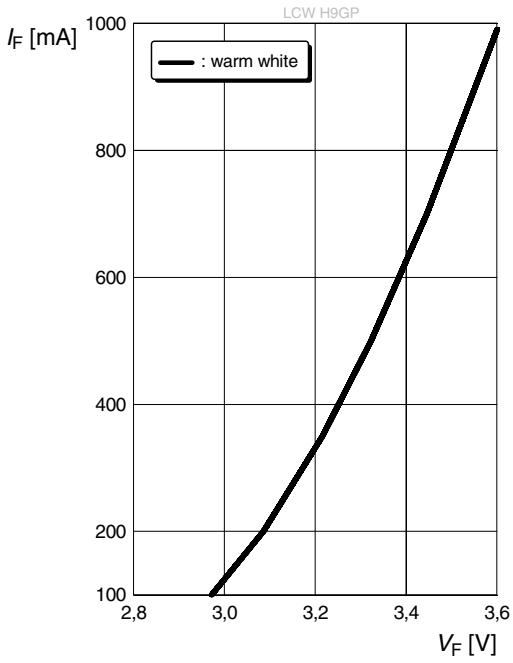
Radiation Characteristics [6]

$I_{rel} = f(\phi)$; T_S = 25 °C



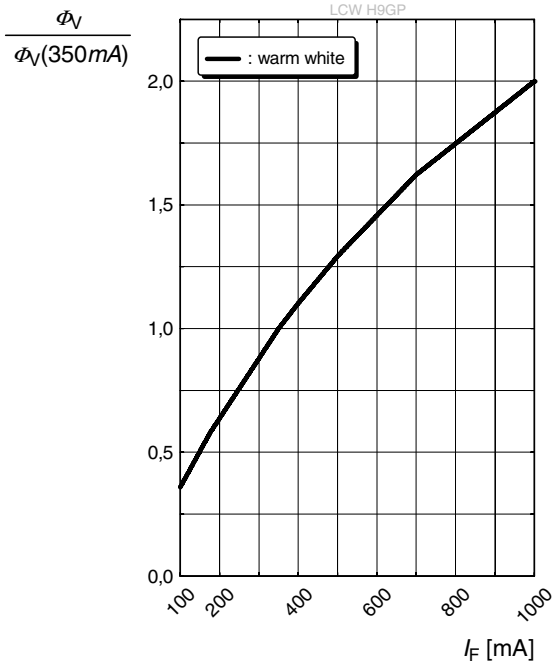
Forward current [6), 7)]

$I_F = f(V_F)$; T_S = 25 °C



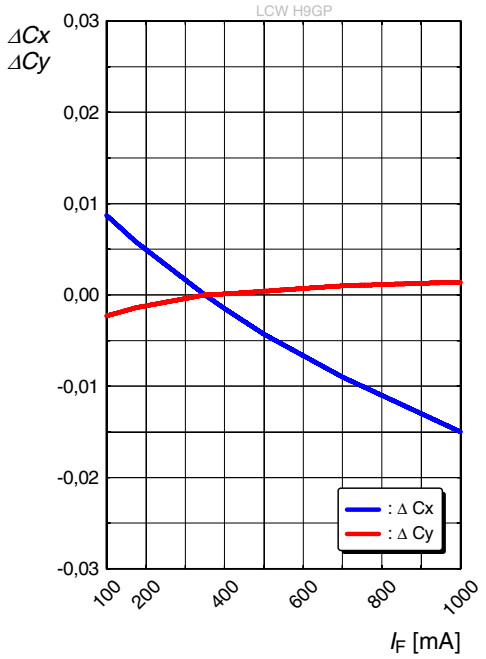
Relative Luminous Flux [6), 7)]

$\Phi_v/\Phi_v(350\ mA) = f(I_F)$; T_S = 25 °C



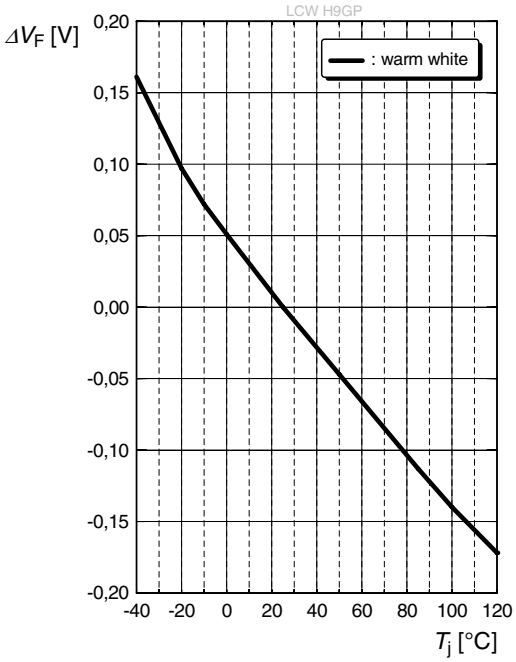
Chromaticity Coordinate Shift [6)]

Cx,Cy = $f(I_F)$; T_S = 25°C



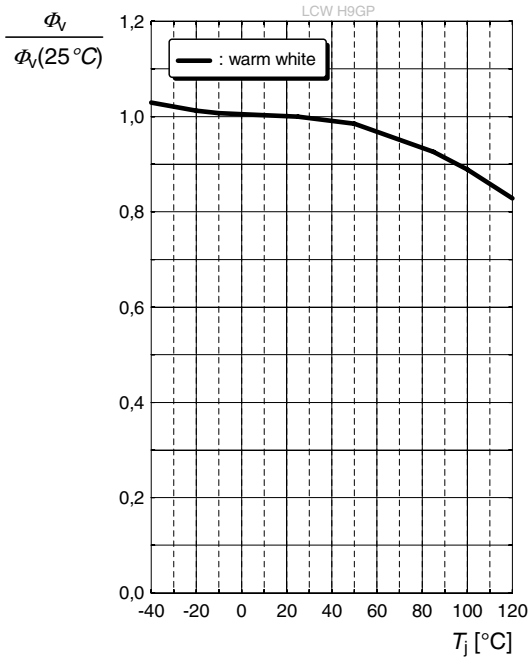
Forward Voltage [6]

$\Delta V_F = V_F - V_F(25\ °C) = f(T_j);\ I_F = 350\ mA$



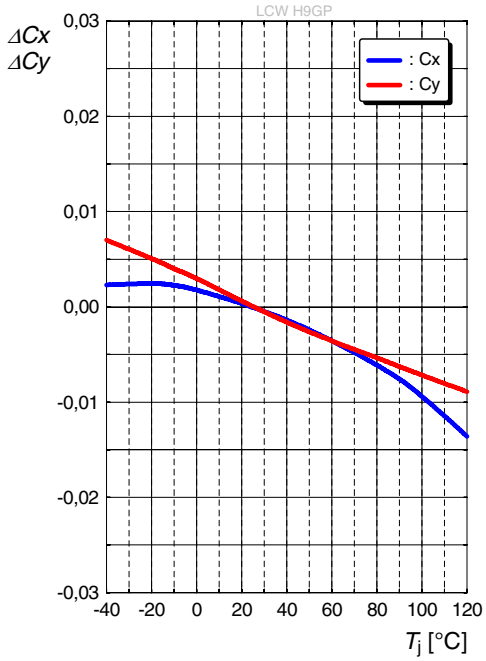
Relative Luminous Flux [6]

$\Phi_v/\Phi_v(25\ °C) = f(T_j);\ I_F = 350\ mA$



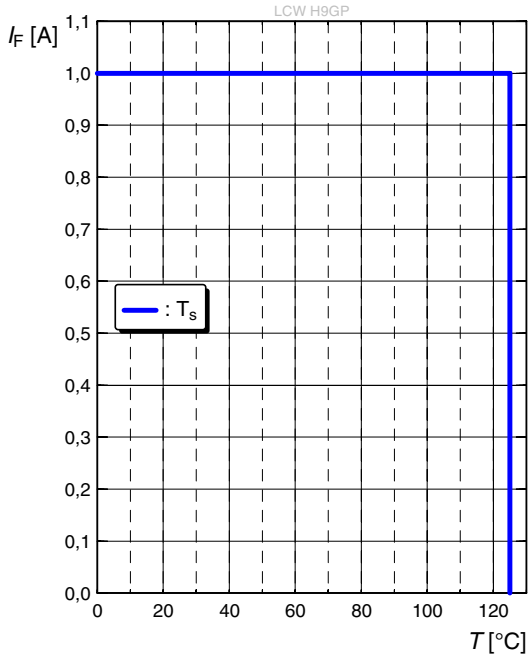
Chromaticity Coordinate Shift [6]

Cx,Cy = $f(T_j)$; I_F = 350 mA



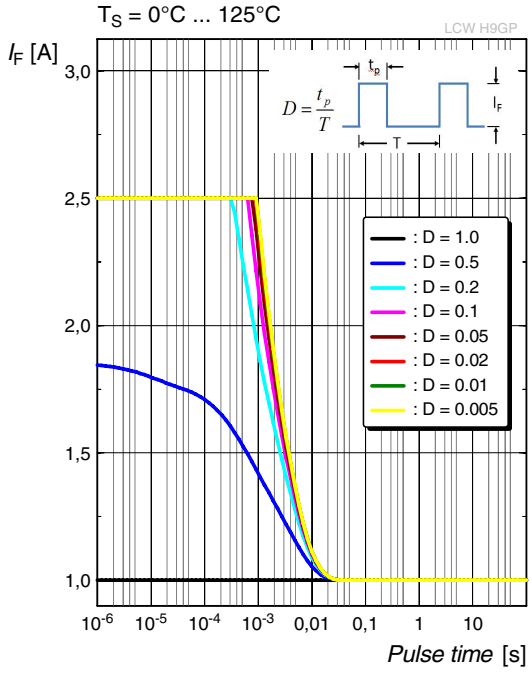
Max. Permissible Forward Current

$I_F = f(T)$

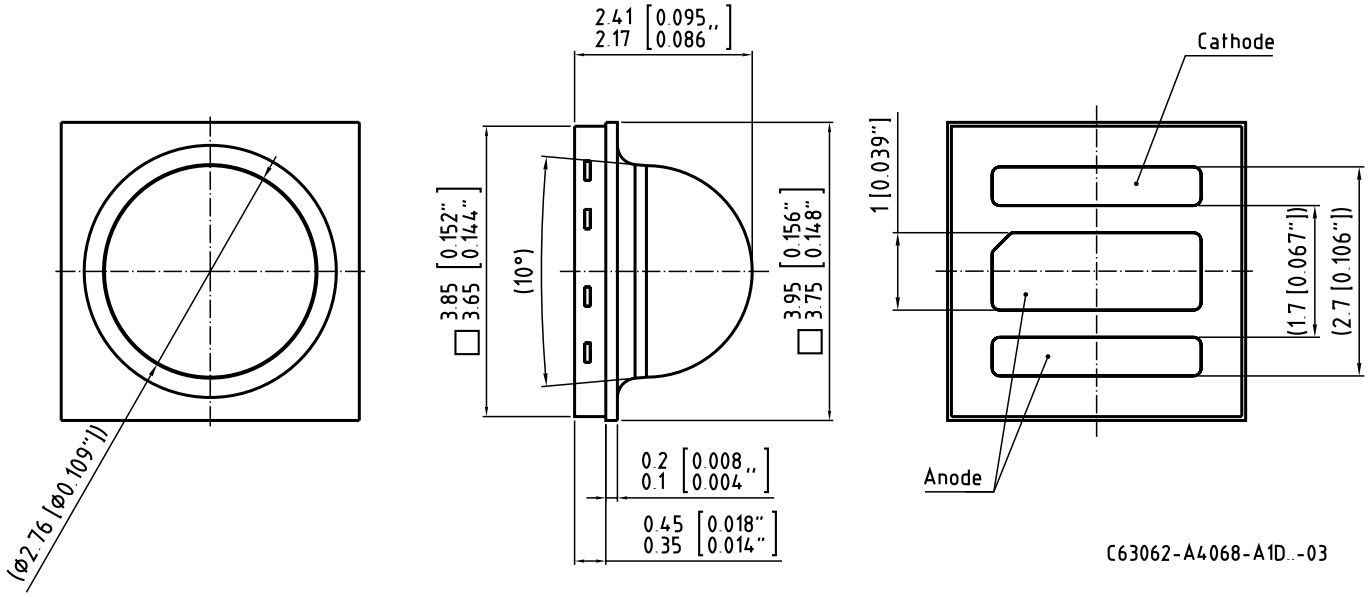


Permissible Pulse Handling Capability

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

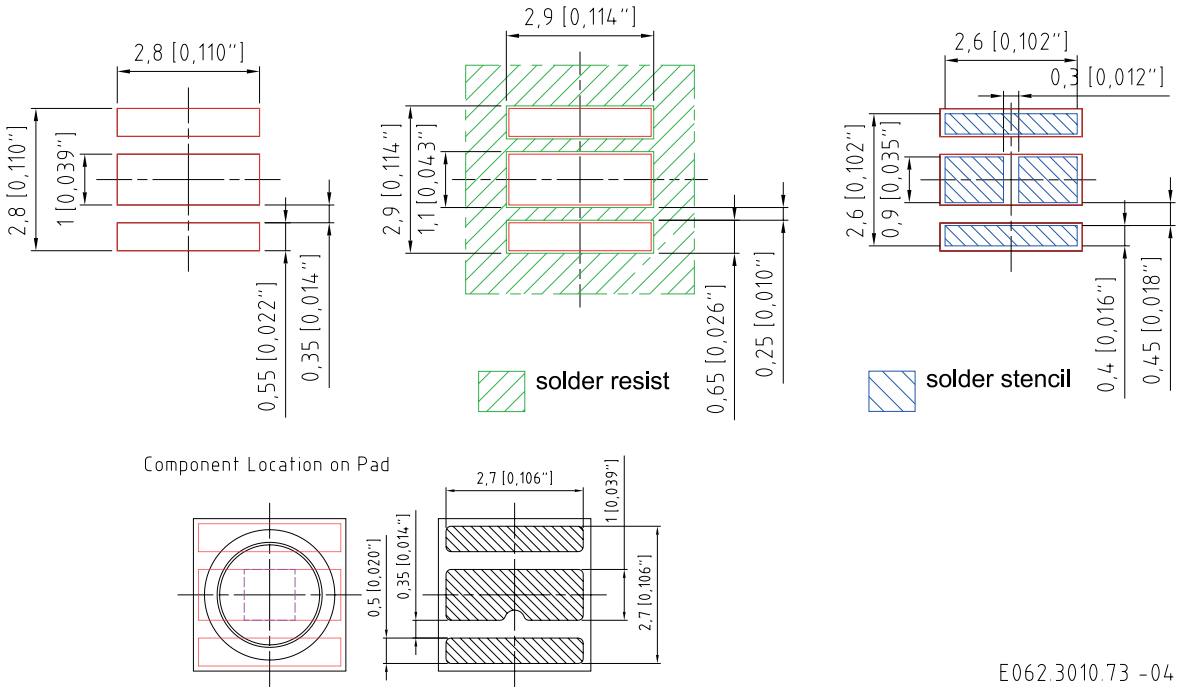


Dimensional Drawing [8)]



Approximate Weight:	32.0 mg
Package marking:	Cathode
Corrosion test:	Class: 3B Test condition: 40°C / 90 % RH / 15 ppm H_2S / 14 days (stricter then IEC 60068-2-43)
ESD advice:	The device is protected by ESD device which is connected in parallel to the Chip.

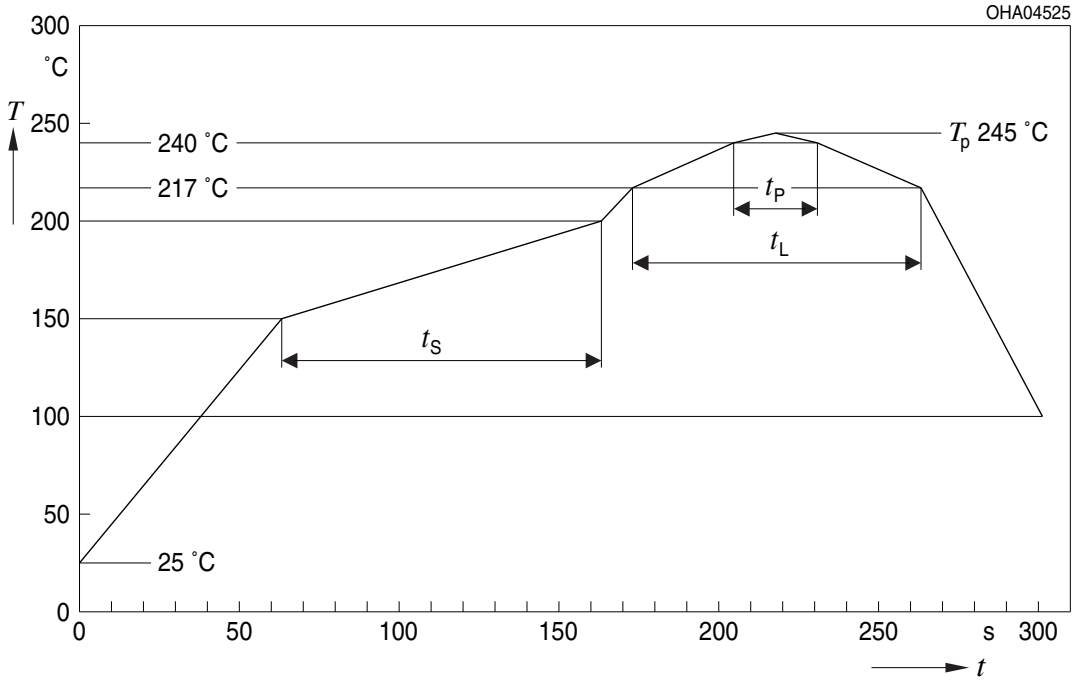
Recommended Solder Pad [8)]



For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. In case the PCB layout of the application is intended to be used with other OSLON derivates or in future developed OSLON derivates, the heat sink must not be electrically connected to anode or cathode solder pad because of possible chip inverted polarity. Package not suitable for ultra sonic cleaning.

Reflow Soldering Profile

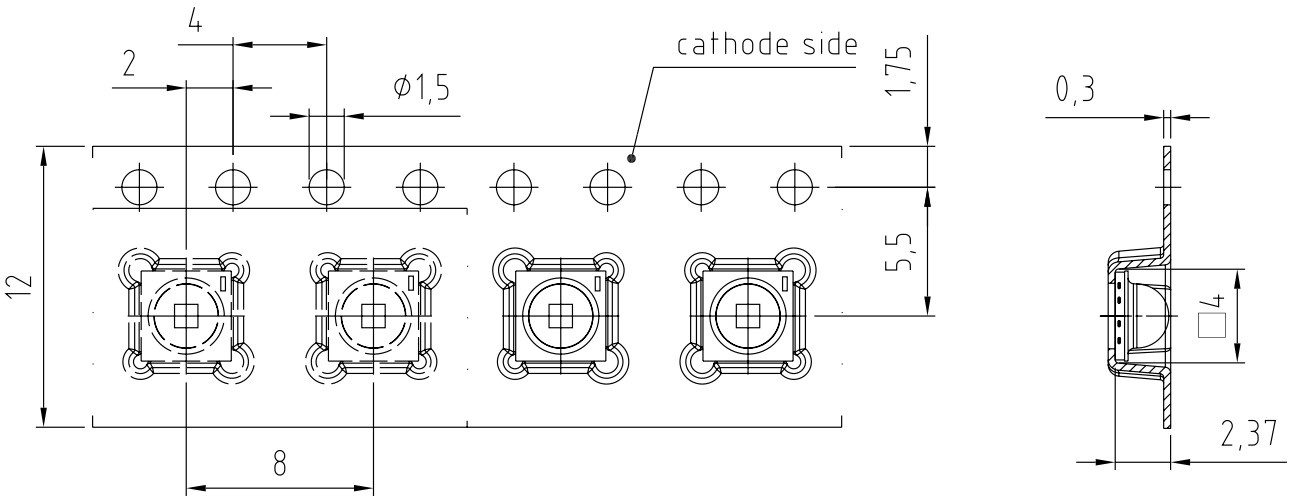
Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



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 [8)]



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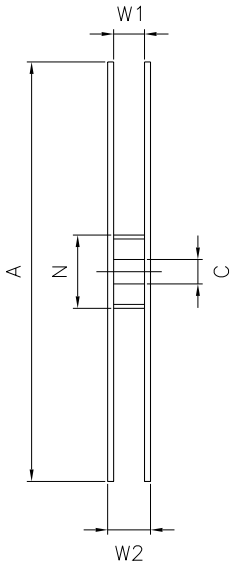
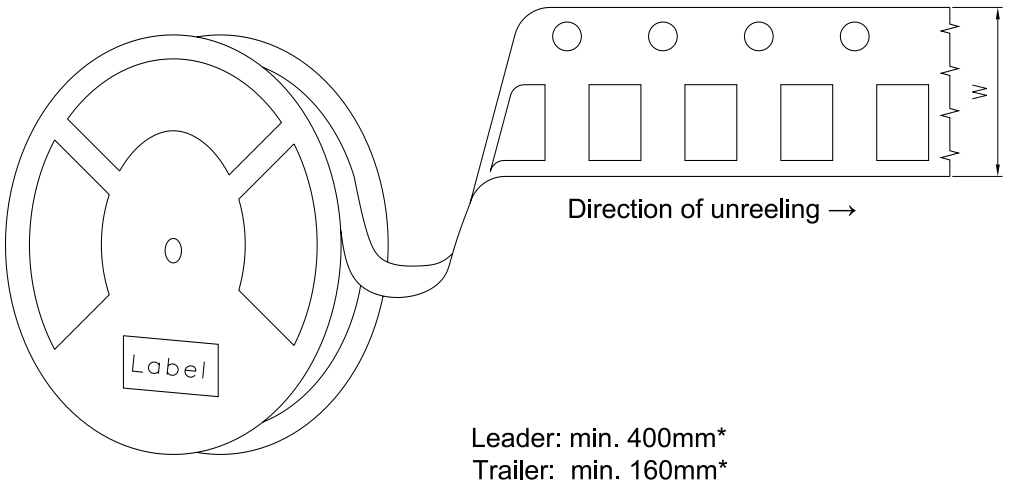
Tape and Reel [9)]



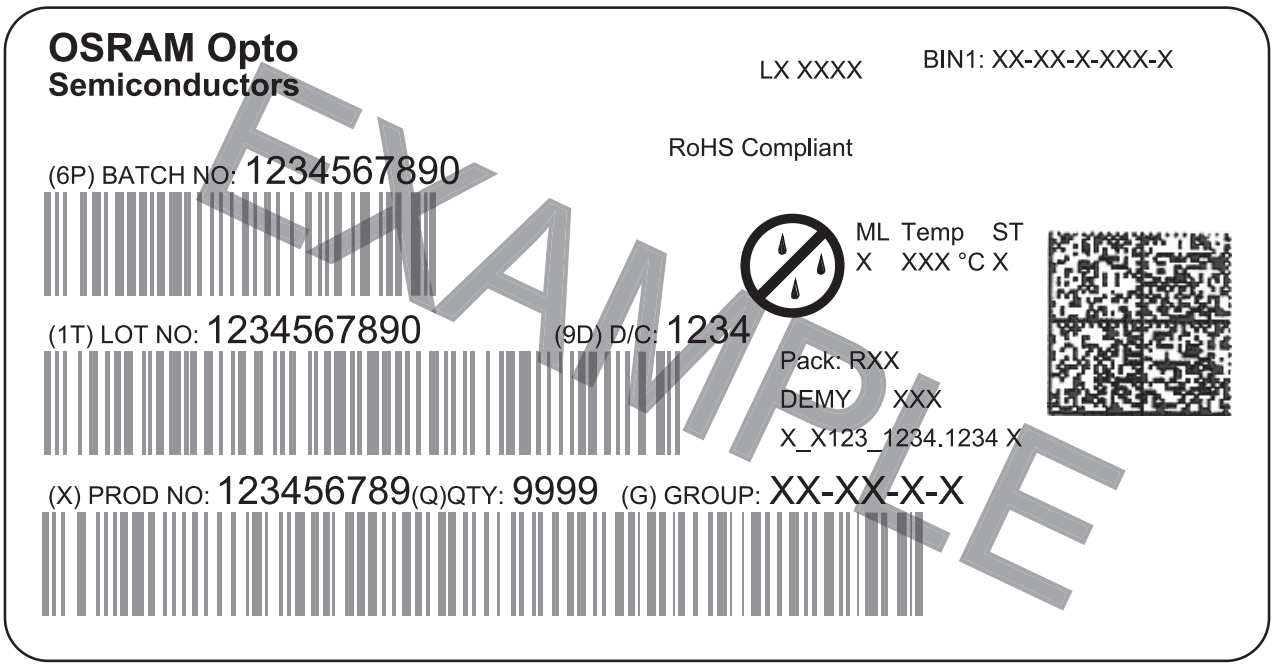


Leader: min. 400mm*
Trailer: min. 160mm*
*)Dimensions acc. to IEC 60286-3; EIA 481-E

Reel dimensions [mm]

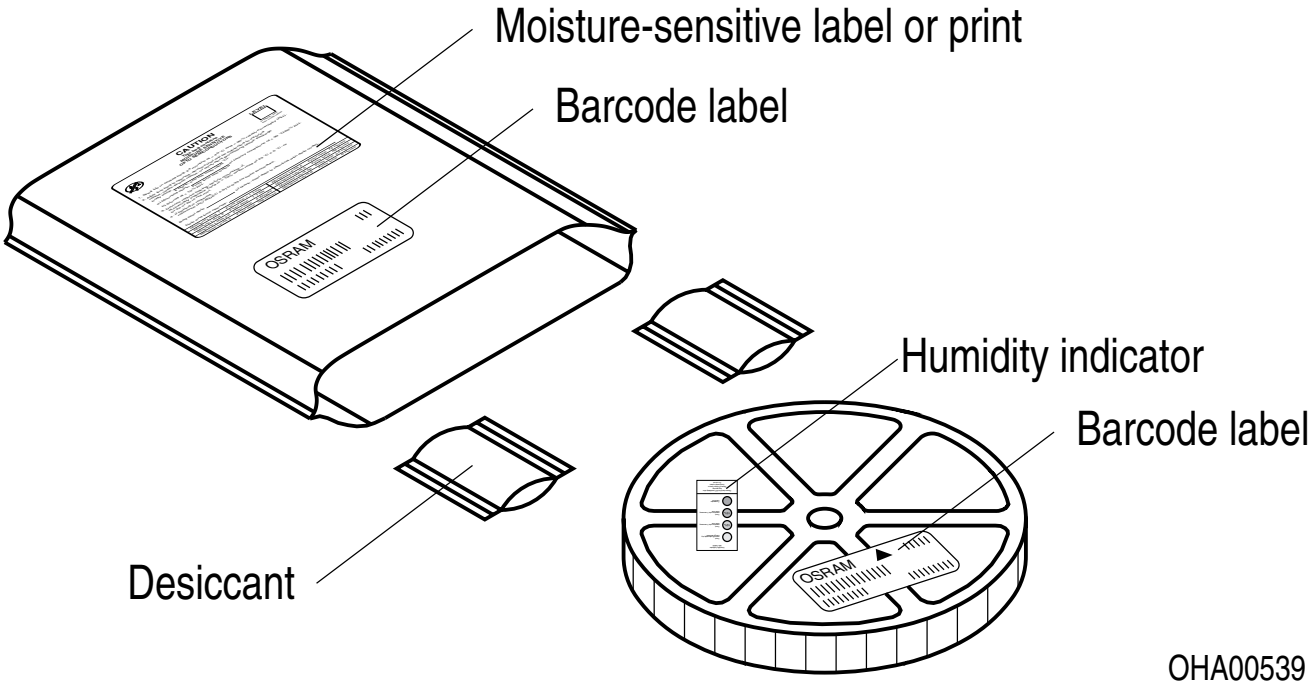
A	W	N_{min}	W_1	$W_{2\,max}$	Pieces per PU
180 mm	12 + 0.3 / - 0.1	60	12.4 + 2	18.4	600
330 mm	12 + 0.3 / - 0.1	60	12.4 + 2	18.4	3000

Barcode-Product-Label (BPL)



OHA04563

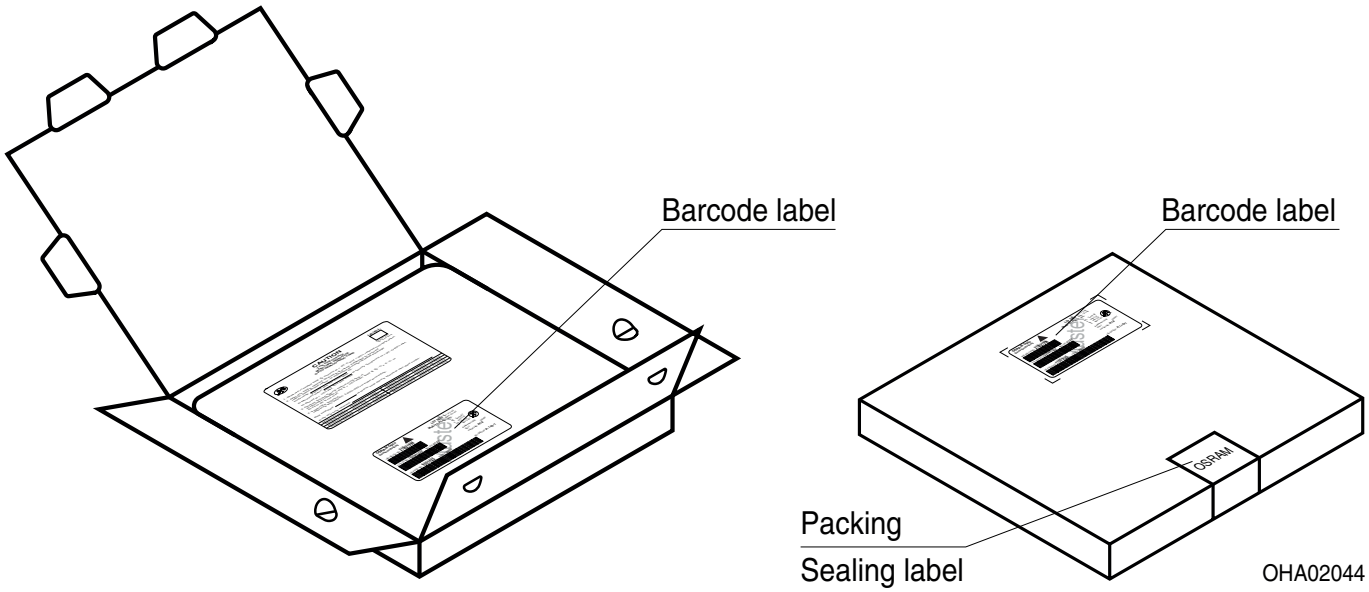
Dry Packing Process and Materials [8)]



OHA00539

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

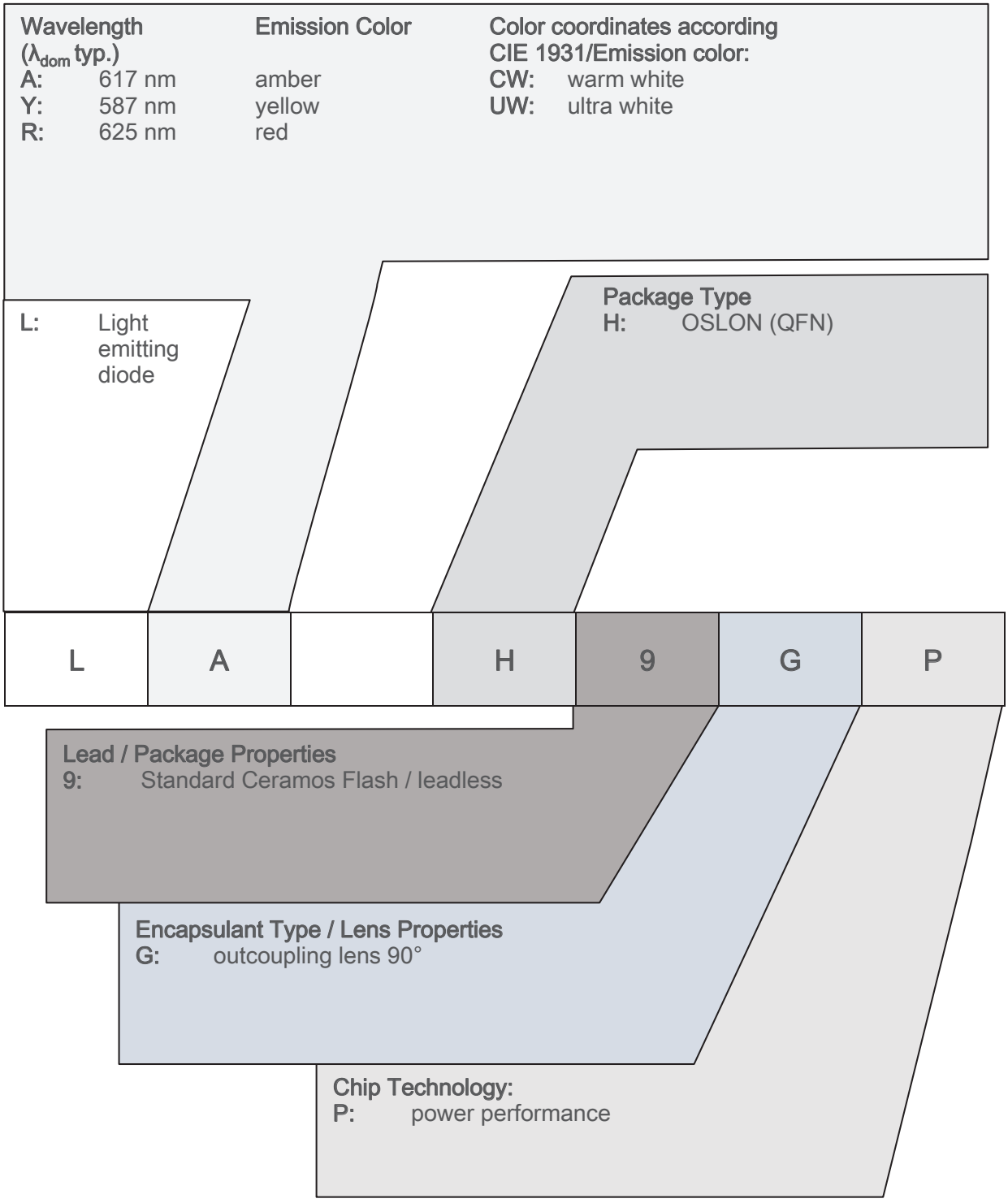
Transportation Packing and Materials [8)]



Dimensions of transportation box in mm

Width	Length	Height
195 ± 5 mm	195 ± 5 mm	30 ± 5 mm
349 ± 5 mm	349 ± 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 **low risk (exposure time 100 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.
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Packing
Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office.
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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.

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EU RoHS and China RoHS compliant product

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