

LCW W5SM

Golden DRAGON®



Applications

- Hospitality
- Mood Lighting
- Stage Lighting (LED & Laser)
- Table Lamp

Features:

- Package: white SMD package, colorless clear silicone resin, chip level conversion
- Chip technology: ThinGaN
- Typ. Radiation: 120° (Lambertian emitter)
- Color: Cx = 0.42, Cy = 0.4 acc. to CIE 1931 (• warm white)
- Optical efficacy: 87 lm/W
- Corrosion Robustness Class: 3B
- Color temperature: 2700K - 4500K
- CRI: 80
- ESD: 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)

Ordering Information

Type	Luminous Flux ¹⁾ $I_F = 350 \text{ mA}$ Φ_V	Color Temperature	Ordering Code
LCW W5SM-JXKX-4U9X	45 ... 82 lm	2700 K	Q65110A9692
LCW W5SM-JYKY-4R9T	52 ... 97 lm	3000 K	Q65110A9693
LCW W5SM-JXKY-4O9Q	45 ... 97 lm	3500 K	Q65110A9681
LCW W5SM-JYKY-4L8N	52 ... 97 lm	4000 K	Q65110A9694
LCW W5SM-JYKZ-4J8K	52 ... 112 lm	4500 K	Q65110A9698

Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min.	-40 °C
		max.	125 °C
Storage Temperature	T_{stg}	min.	-40 °C
		max.	125 °C
Junction Temperature	T_j	max.	135 °C
Junction Temperature for short time applications*	T_j	max.	175 °C
Forward Current	I_F	min.	100 mA
$T_s = 25\text{ °C}$		max.	1000 mA
Surge Current	I_{FS}	max.	2500 mA
$t \leq 10\text{ }\mu\text{s}$; $D = 0.005$; $T_s = 25\text{ °C}$			
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 $T_j = 175\text{ °C}$ is 100h.

Characteristics

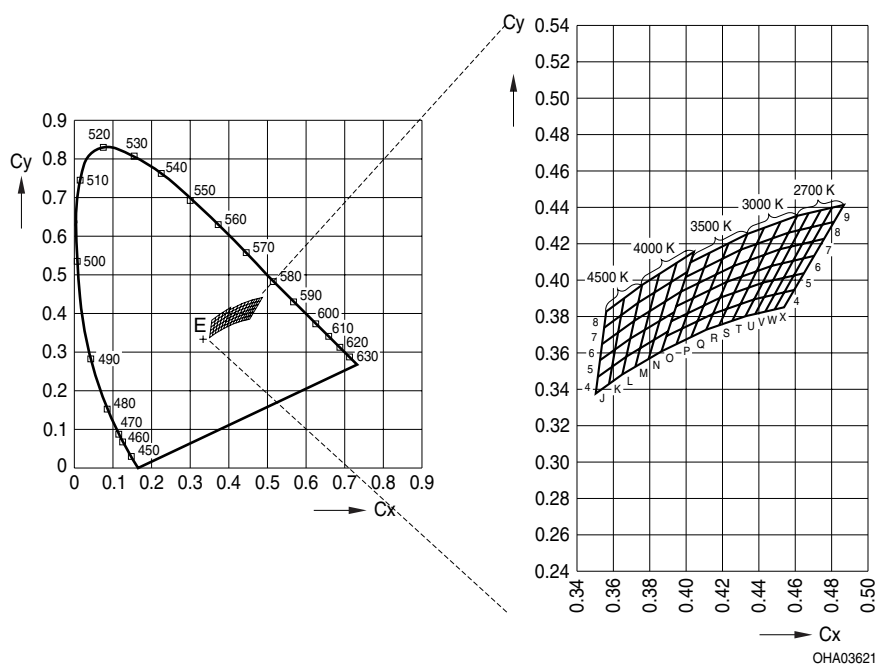
$I_F = 350 \text{ mA}$; $T_s = 25 \text{ °C}$

Parameter	Symbol		Values
Chromaticity Coordinate ³⁾	Cx	typ.	0.42
	Cy	typ.	0.4
Viewing angle at 50 % I_v	2ϕ	typ.	120 °
Forward Voltage ⁴⁾ $I_F = 350 \text{ mA}$	V_F	min.	2.70 V
		typ.	3.20 V
		max.	3.70 V
Reverse voltage (ESD device)	$V_{R \text{ ESD}}$	min.	45 V
Reverse voltage ²⁾ $I_R = 20 \text{ mA}$	V_R	max.	1.2 V
Color Rendering Index	CRI	typ.	80
Real thermal resistance junction/solderpoint ⁵⁾	$R_{thJS \text{ real}}$	typ.	5.0 K / W
		max.	6.4 K / W

Brightness Groups

Group	Luminous Flux ¹⁾ $I_F = 350 \text{ mA}$ min. Φ_v	Luminous Flux ¹⁾ $I_F = 350 \text{ mA}$ max. Φ_v	Luminous Intensity ⁶⁾ $I_F = 350 \text{ mA}$ typ. I_v
JX	45 lm	52 lm	16 cd
JY	52 lm	61 lm	19 cd
JZ	61 lm	71 lm	22 cd
KX	71 lm	82 lm	25 cd
KY	82 lm	97 lm	30 cd
KZ	97 lm	112 lm	35 cd

Chromaticity Coordinate Groups ³⁾



Color Chromaticity Groups

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
4J	0.3500	0.3375	4N	0.3791	0.3564	4R	0.4109	0.3726
	0.3512	0.3465		0.3822	0.3670		0.4147	0.3814
	0.3591	0.3522		0.3898	0.3716		0.4222	0.3840
	0.3574	0.3427		0.3862	0.3607		0.4181	0.3751
4K	0.3574	0.3427	4O	0.3863	0.3609	4S	0.4181	0.3751
	0.3591	0.3522		0.3890	0.3690		0.4222	0.3840
	0.3670	0.3578		0.3975	0.3731		0.4298	0.3867
	0.3648	0.3479		0.3945	0.3648		0.4254	0.3776
4L	0.3648	0.3479	4P	0.3945	0.3648	4T	0.4254	0.3776
	0.3670	0.3578		0.3975	0.3731		0.4298	0.3867
	0.3746	0.3624		0.4061	0.3773		0.4373	0.3893
	0.3719	0.3522		0.4027	0.3687		0.4326	0.3801
4M	0.3719	0.3522	4Q	0.4027	0.3687	4U	0.4326	0.3801
	0.3746	0.3624		0.4061	0.3773		0.4373	0.3893
	0.3822	0.3670		0.4147	0.3814		0.4428	0.3906
	0.3791	0.3564		0.4109	0.3726		0.4379	0.3814

Not for new design

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

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
6P	0.4006	0.3815	6X	0.4591	0.4025	7Q	0.4130	0.3944
	0.4036	0.3898		0.4644	0.4118		0.4164	0.4029
	0.4130	0.3944		0.4703	0.4132		0.4261	0.4077
	0.4095	0.3858		0.4648	0.4038		0.4223	0.3990
6Q	0.4095	0.3858	7J	0.3536	0.3646	7R	0.4223	0.3990
	0.4130	0.3944		0.3548	0.3736		0.4261	0.4077
	0.4223	0.3990		0.3642	0.3805		0.4346	0.4108
	0.4185	0.3902		0.3625	0.3711		0.4305	0.4019
6R	0.4185	0.3902	7K	0.3625	0.3711	7S	0.4305	0.4019
	0.4223	0.3990		0.3642	0.3805		0.4346	0.4108
	0.4305	0.4019		0.3736	0.3874		0.4430	0.4138
	0.4263	0.3929		0.3714	0.3775		0.4386	0.4048
6S	0.4263	0.3929	7L	0.3714	0.3775	7T	0.4386	0.4048
	0.4305	0.4019		0.3736	0.3874		0.4430	0.4138
	0.4386	0.4048		0.3826	0.3931		0.4515	0.4168
	0.4342	0.3957		0.3799	0.3828		0.4468	0.4077
6T	0.4342	0.3957	7M	0.3799	0.3828	7U	0.4468	0.4077
	0.4386	0.4048		0.3826	0.3931		0.4515	0.4168
	0.4468	0.4077		0.3916	0.3987		0.4576	0.4183
	0.4420	0.3985		0.3885	0.3882		0.4526	0.4090
6U	0.4420	0.3985	7N	0.3885	0.3882	7V	0.4526	0.4090
	0.4468	0.4077		0.3916	0.3987		0.4576	0.4183
	0.4526	0.4090		0.4006	0.4044		0.4636	0.4197
	0.4477	0.3998		0.3970	0.3935		0.4585	0.4104
6V	0.4477	0.3998	7O	0.3943	0.3853	7W	0.4585	0.4104
	0.4526	0.4090		0.3970	0.3934		0.4636	0.4197
	0.4585	0.4104		0.4067	0.3982		0.4697	0.4211
	0.4534	0.4011		0.4036	0.3898		0.4644	0.4118
6W	0.4534	0.4011	7P	0.4036	0.3898	7X	0.4644	0.4118
	0.4585	0.4104		0.4067	0.3982		0.4697	0.4211
	0.4644	0.4118		0.4164	0.4029		0.4758	0.4225
	0.4591	0.4025		0.4130	0.3944		0.4703	0.4132

Not for new design

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

Not for new design

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

Group Name on Label

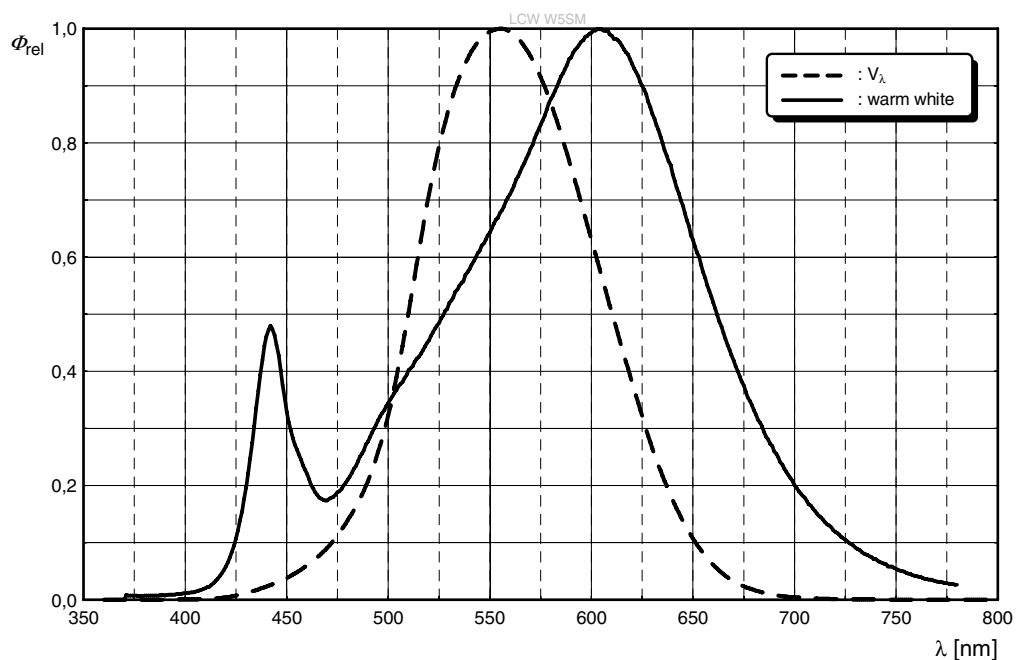
Example: JX-4J

Brightness	Color chromaticity
JX	4J

Not for new design

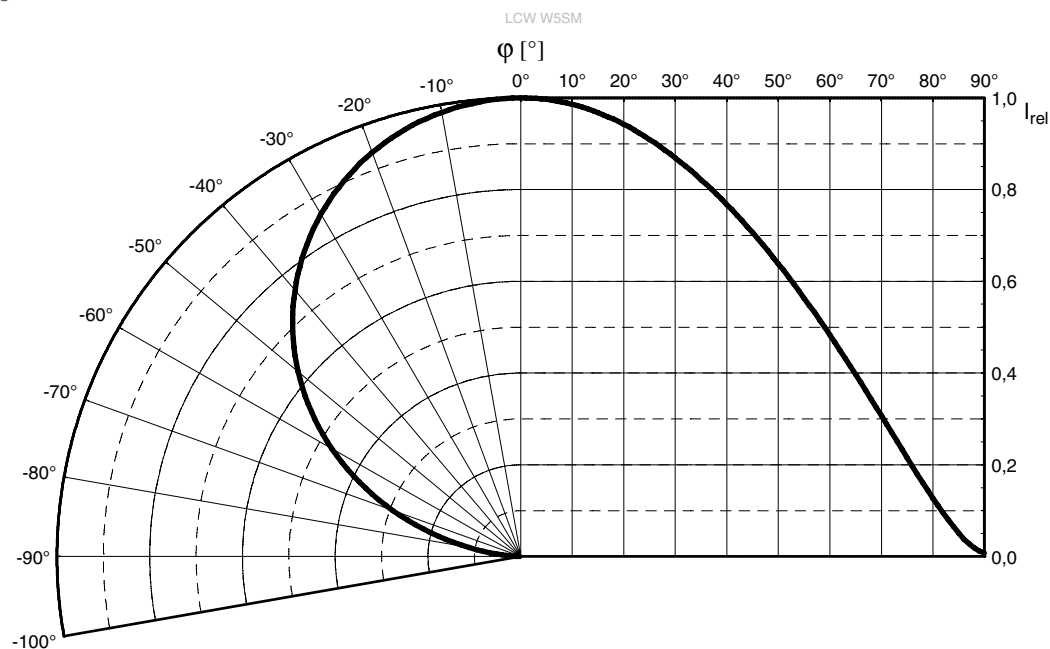
Relative Spectral Emission ⁶⁾

$$I_{\text{rel}} = f(\lambda); I_F = 350 \text{ mA}; T_S = 25 \text{ }^\circ\text{C}$$



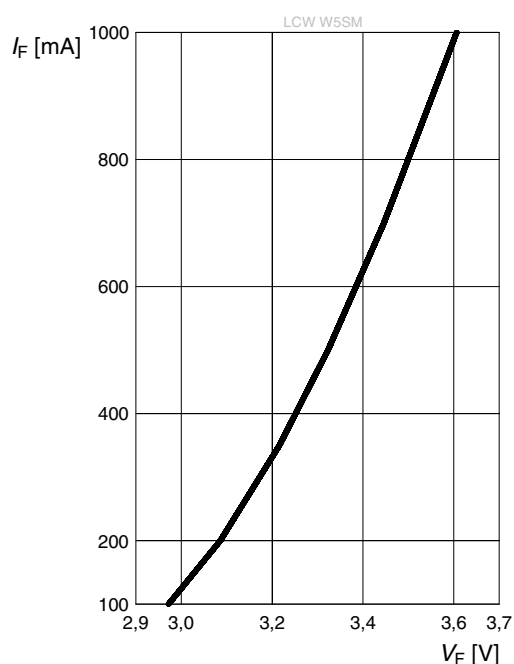
Radiation Characteristics ⁶⁾

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

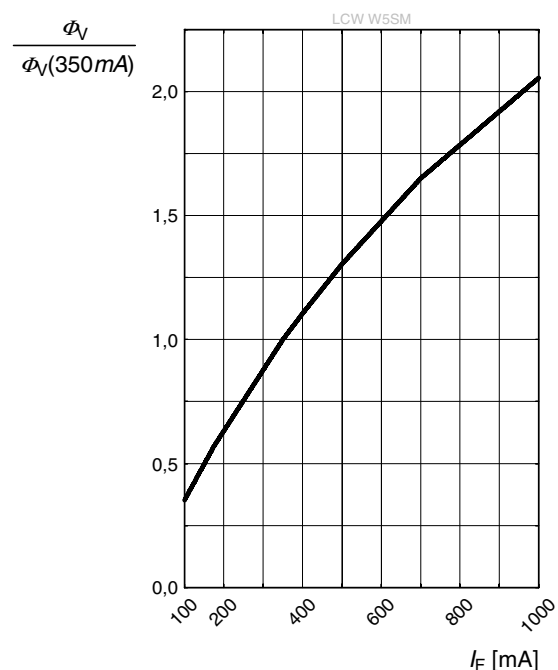


Forward current ^{6), 7)}

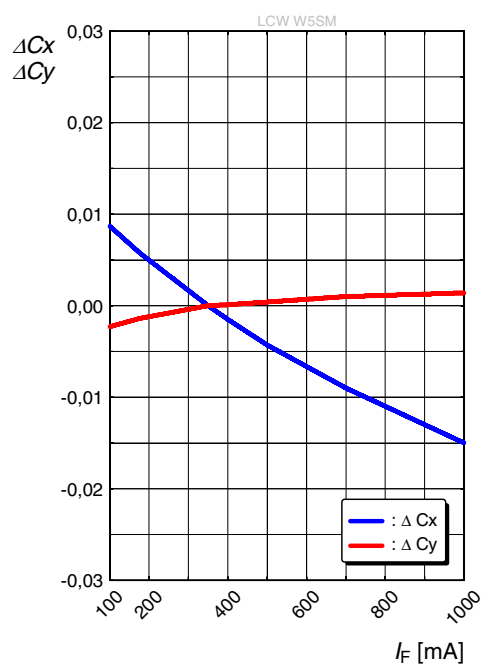
$$I_F = f(V_F); T_S = 25^\circ\text{C}$$

**Relative Luminous Flux** ^{6), 7)}

$$\Phi_V / \Phi_V(350\text{ mA}) = f(I_F); T_S = 25^\circ\text{C}$$

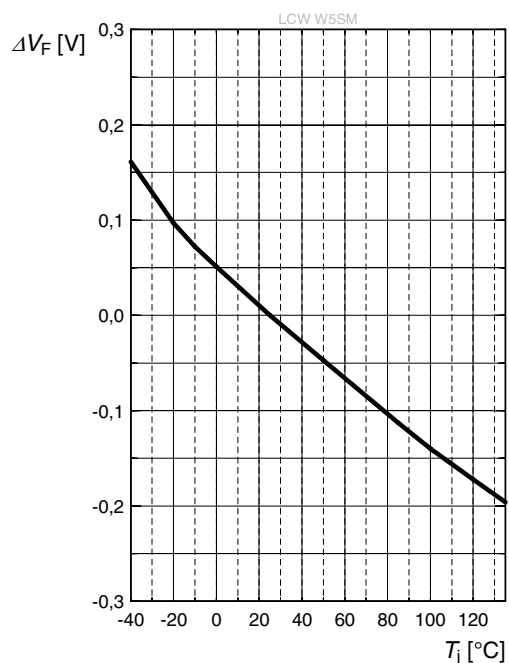
**Chromaticity Coordinate Shift** ⁶⁾

$$\Delta C_x, \Delta C_y = f(I_F); T_S = 25^\circ\text{C}$$

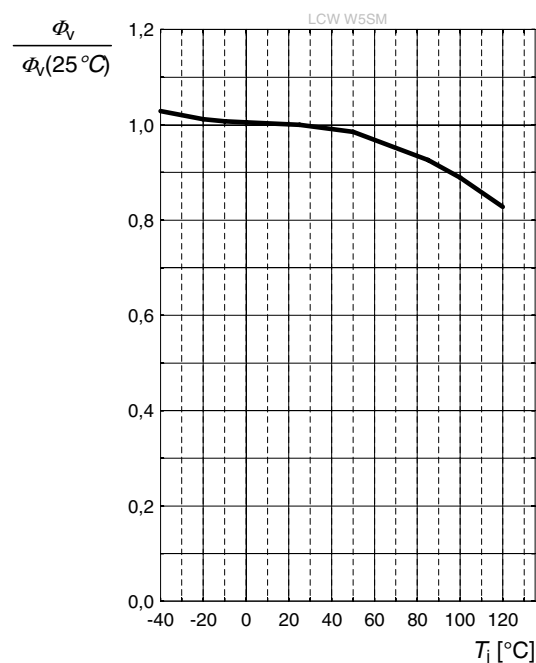


Forward Voltage ⁶⁾

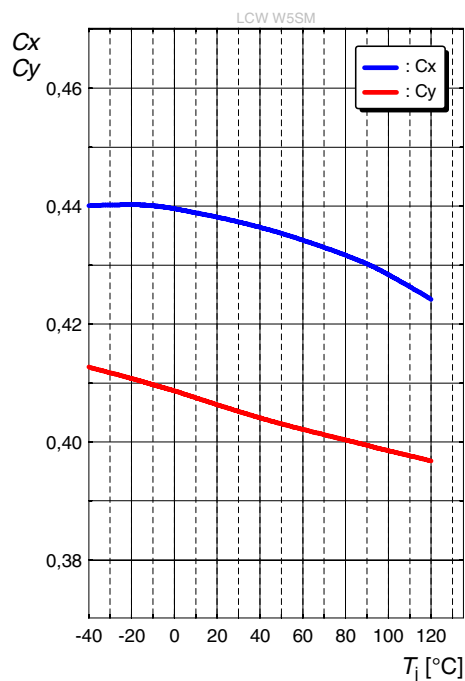
$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 350\text{ mA}$$

**Relative Luminous Flux** ⁶⁾

$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j); I_F = 350\text{ mA}$$

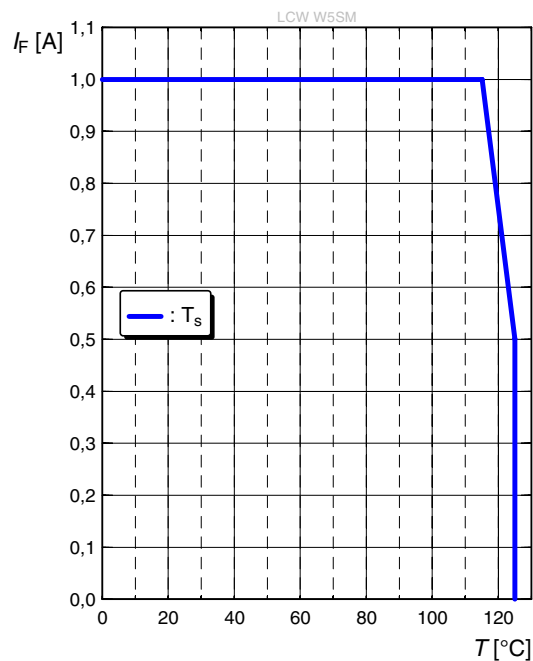
**Chromaticity Coordinate Shift** ⁶⁾

$$C_x, C_y = f(T_j); I_F = 350\text{ mA}$$



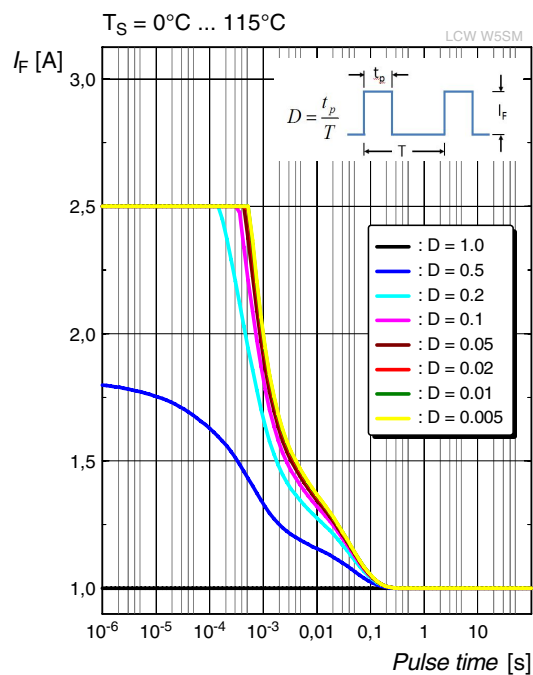
Max. Permissible Forward Current

$$I_F = f(T)$$



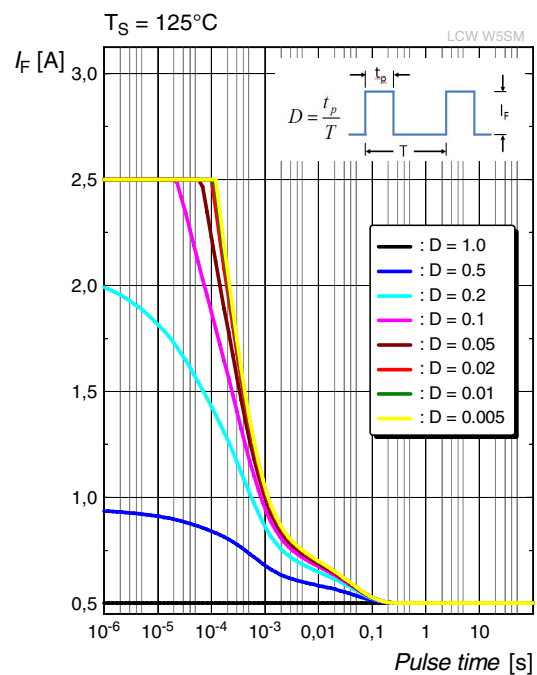
Permissible Pulse Handling Capability

$$I_F = f(t_p); D: \text{Duty cycle}$$

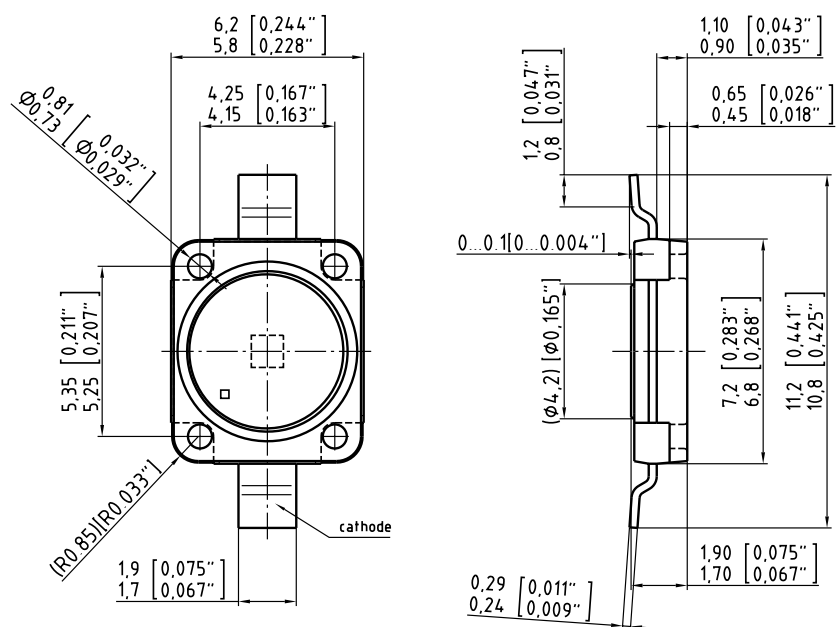


Permissible Pulse Handling Capability

$$I_F = f(t_p); D: \text{Duty cycle}$$



Dimensional Drawing ⁸⁾



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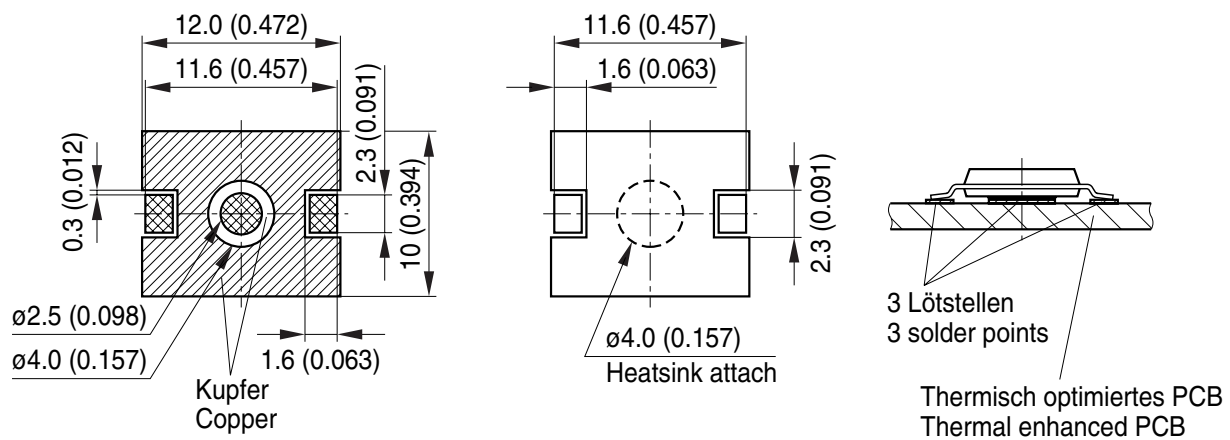
Approximate Weight: 218.0 mg

Package marking: Cathode

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

ESD advice: LED is protected by ESD device which is connected in parallel to LED-Chip.

Recommended Solder Pad ⁸⁾

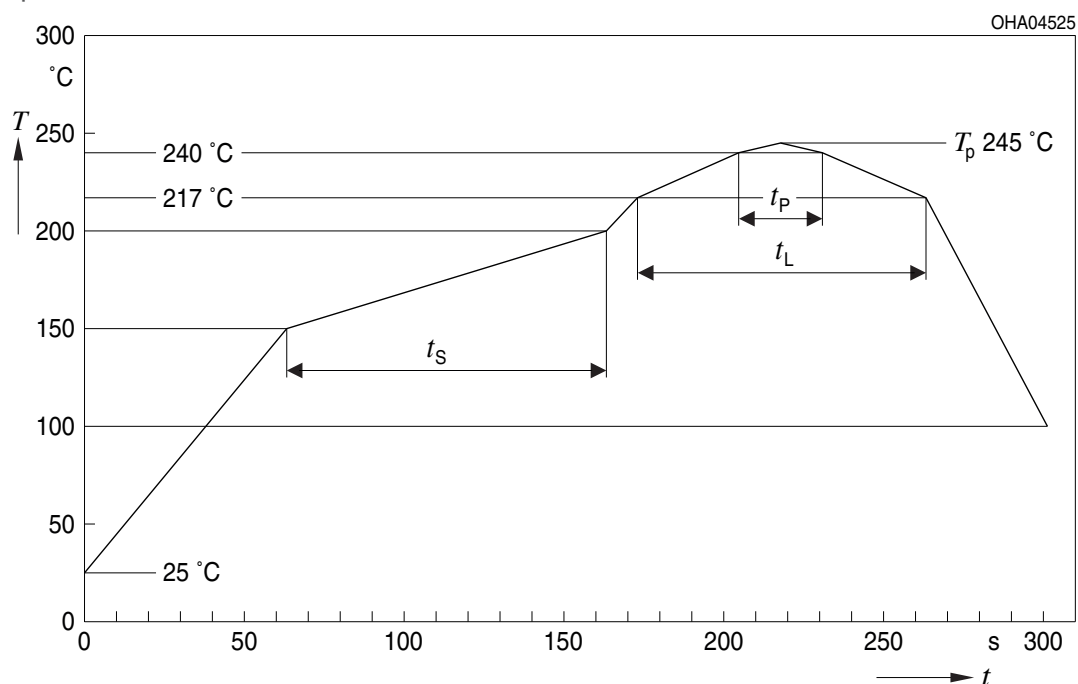


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For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for ultra sonic cleaning.

Reflow Soldering Profile

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



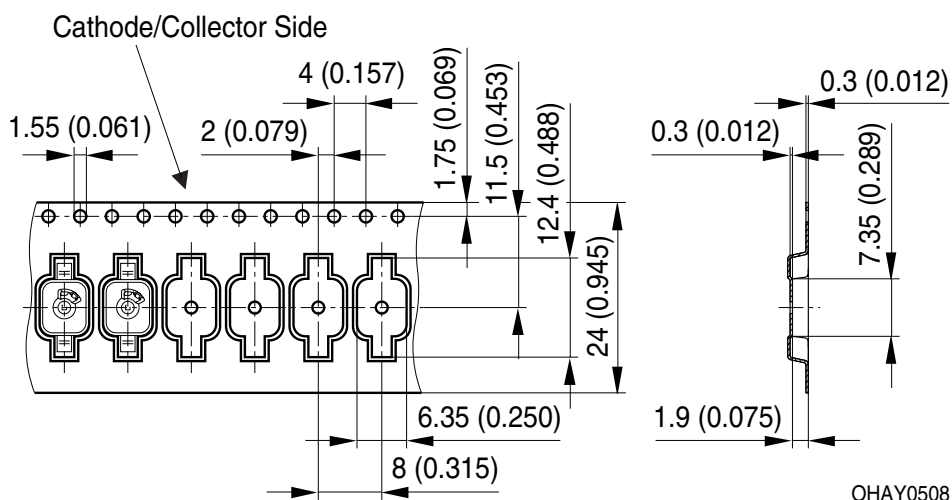
Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 $^{\circ}\text{C}$ to 150 $^{\circ}\text{C}$			2	3	K/s
Time t_s T_{Smin} to T_{Smax}	t_s	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_p			2	3	K/s
Liquidus temperature	T_L		217		$^{\circ}\text{C}$
Time above liquidus temperature	t_L		80	100	s
Peak temperature	T_p		245	260	$^{\circ}\text{C}$
Time within 5 $^{\circ}\text{C}$ of the specified peak temperature $T_p - 5 \text{ K}$	t_p	10	20	30	s
Ramp-down rate* T_p to 100 $^{\circ}\text{C}$			3	6	K/s
Time 25 $^{\circ}\text{C}$ to T_p				480	s

All temperatures refer to the center of the package, measured on the top of the component

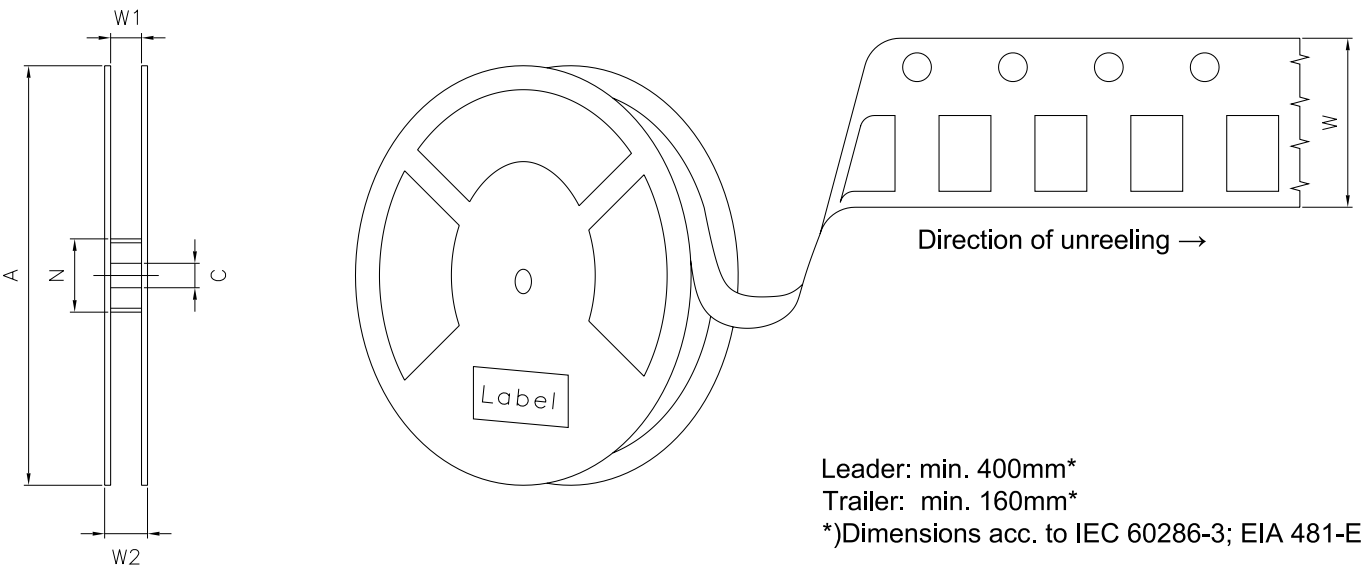
* slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T -range

Not for new design

Taping ⁸⁾



Tape and Reel ⁹⁾

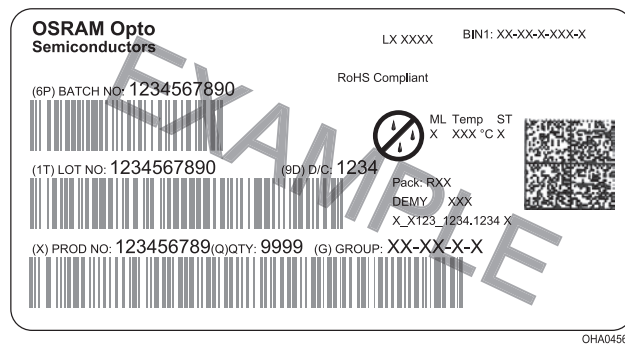


Reel dimensions [mm]

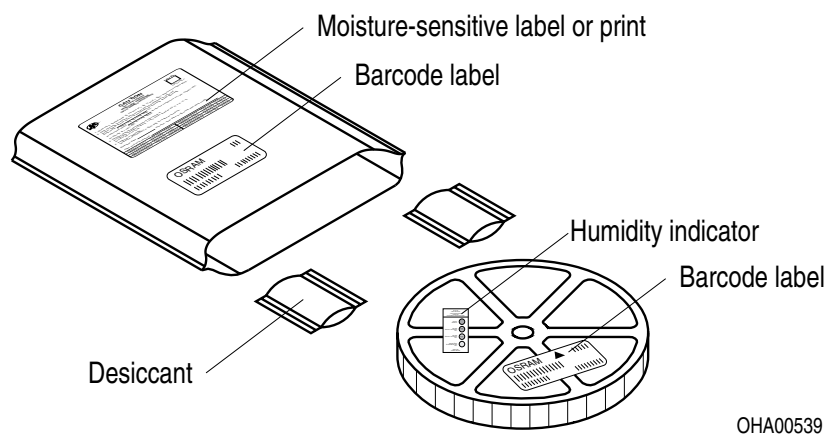
A	W	N _{min}	W ₁	W _{2 max}	Pieces per PU
180 mm	24 + 0.3 / - 0.1	60/100	24.4 + 2	30.4	800

Not for new design

Barcode-Product-Label (BPL)

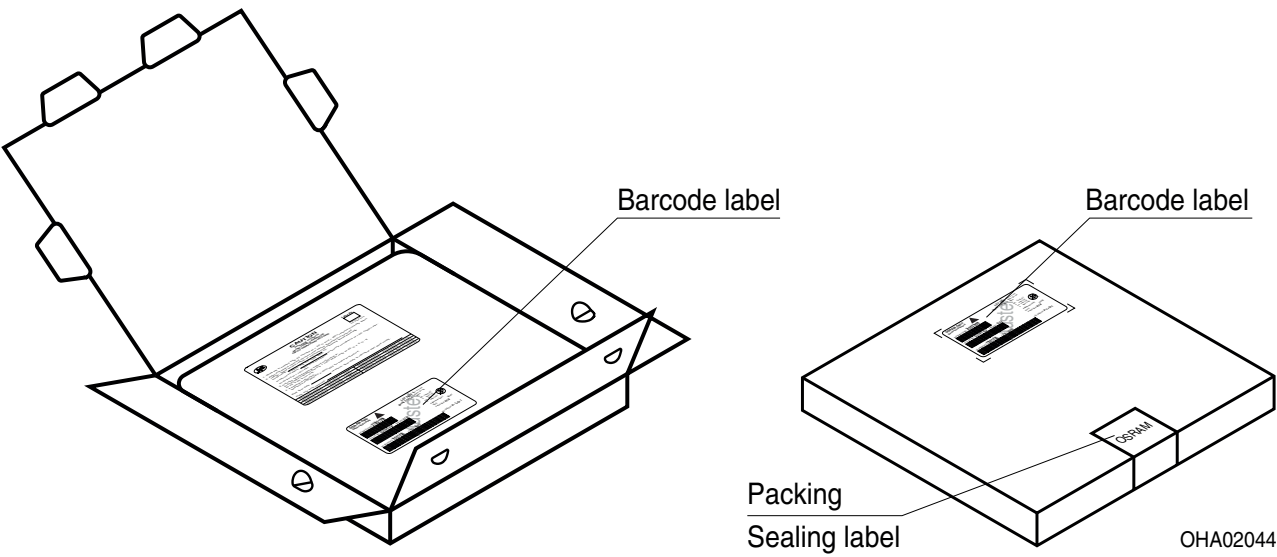


Dry Packing Process and Materials ⁸⁾



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

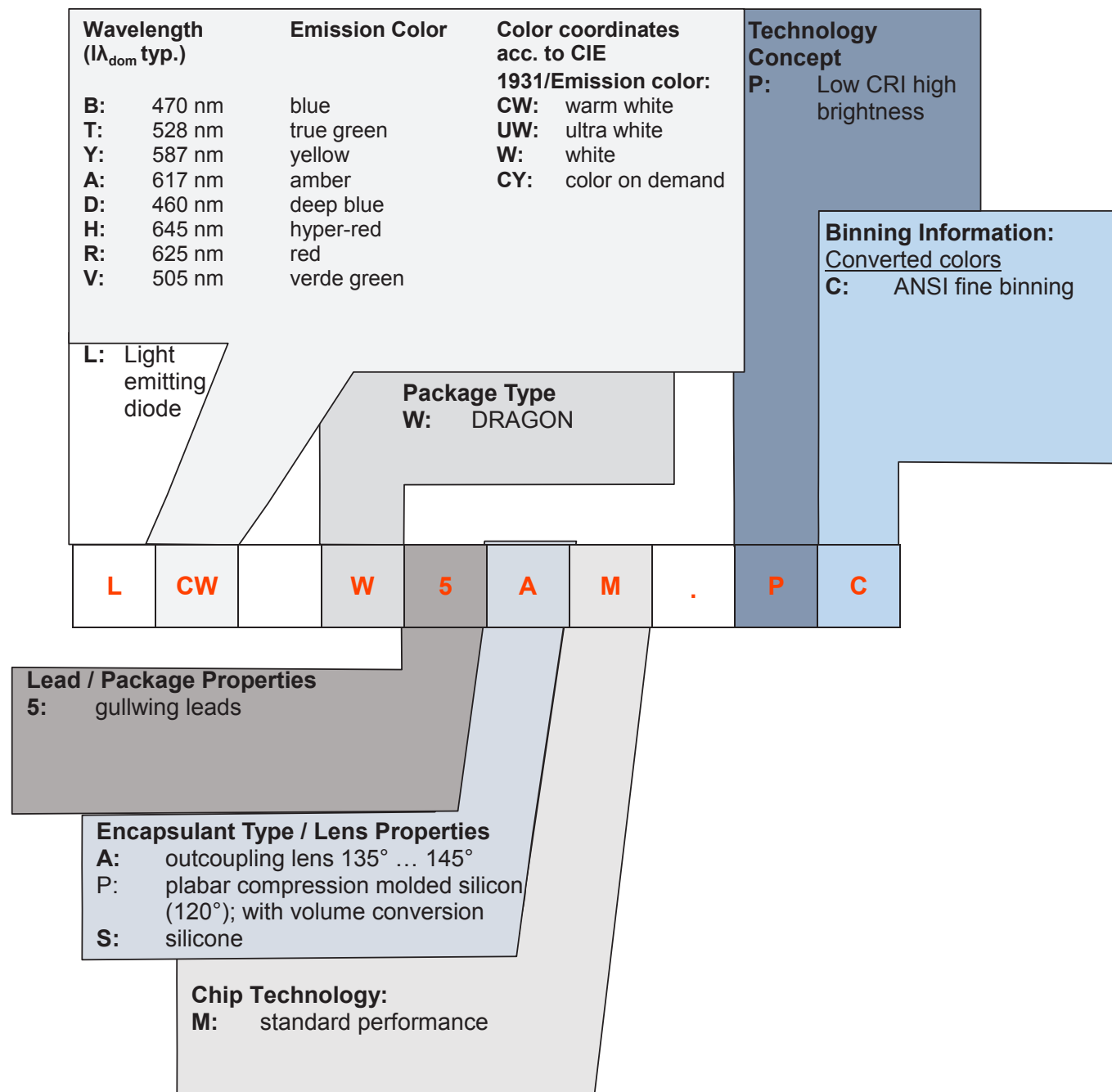
Transportation Packing and Materials ⁸⁾



Dimensions of transportation box in mm

Width	Length	Height
195 ± 5 mm	195 ± 5 mm	42 ± 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 LED specified in this data sheet fall into the class **exempt group (exposure time 10000 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

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 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:** 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 $\pm 0.05\text{ V}$ and an expanded uncertainty of $\pm 0.1\text{ V}$ (acc. to GUM with a coverage factor of $k = 3$).
- 5) **Thermal Resistance:** $R_{th\text{ max}}$ 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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