

# GW DASPA2.EC

## OSCONIQ® P 2226

High-efficacy mid-power LED with long lifetimes also at high currents and high junction temperatures.



### Applications

- Architecture
- Architecture / Garden Lighting (LED & Laser)
- Medical Illumination
- Photo Therapy

### Features

- Package: SMT package
- Typ. Radiation: 120°
- Color temperature: 2700K - 6500K
- CRI: 80 (min.), 83 (typ.), R9: 0 (min.)
- Lumen maintenance: Test results according to IESNA LM-80 available
- ESD: 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)
- Luminous Flux: typ. 37 lm @ 3000 K
- Luminous efficacy: typ. 130 lm/W @ 3000 K

## Ordering Information

Type	Color temperature	Luminous Flux <sup>1)</sup> $I_F = 100 \text{ mA}$ $\Phi_V$	Ordering Code
GW DASPA2.EC-HRHT-5U8X-1	2700 K	33 ... 42 lm	Q65112A5408
GW DASPA2.EC-HSHU-5R8T-1	3000 K	36 ... 45 lm	Q65112A5409
GW DASPA2.EC-HSHU-5O8Q-1	3500 K	36 ... 45 lm	Q65112A5410
GW DASPA2.EC-HTJP-5L7N-1	4000 K	39 ... 48 lm	Q65112A5411
GW DASPA2.EC-HTJP-5J7K-1	4500 K	39 ... 48 lm	Q65112A5412
GW DASPA2.EC-HTJP-5H7I-1	5000 K	39 ... 48 lm	Q65112A5413
GW DASPA2.EC-HTJP-5F7G-1	5700 K	39 ... 48 lm	Q65112A5414
GW DASPA2.EC-HTJP-5C7E-1	6500 K	39 ... 48 lm	Q65112A5415

## Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	$T_{op}$	min.	-40 °C
		max.	120 °C
Storage Temperature	$T_{stg}$	min.	-40 °C
		max.	120 °C
Junction temperature absolute **	$T_{j,abs}$	max.	170 °C
Junction Temperature	$T_j$	max.	125 °C
Forward Current $T_j = 25\text{ °C}$	$I_F$	min.	30 mA
		max.	250 mA
Reverse current <sup>2)</sup>	$I_R$	max.	200 mA
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)	$V_{ESD}$		8 kV

\*\* This is verified by testing 30 pieces. Pass criteria: No catastrophic failures allowed, luminous flux must be better than L70B50 after 1000 h.

## Characteristics

$I_F = 100 \text{ mA}$ ;  $T_J = 25 \text{ °C}$

Parameter	Symbol		Values
Viewing angle at 50% $I_V$	$2\phi$	typ.	130 °
Forward Voltage <sup>3)</sup> $I_F = 100 \text{ mA}$	$V_F$	min. typ. max.	2.60 V 2.85 V 3.20 V
Reverse voltage <sup>2)</sup> $I_R = 5 \text{ mA}$	$V_R$	max.	1.2 V
Color Rendering Index <sup>4)</sup>	CRI	min. typ.	80 83
Color Rendering Index (R9) <sup>4)</sup>	CRI (R9)	min.	0
Electrical thermal resistance junction/solderpoint with efficiency $\eta_e = 36 \%$	$R_{thJS \text{ elec.}}$	typ.	14 K / W

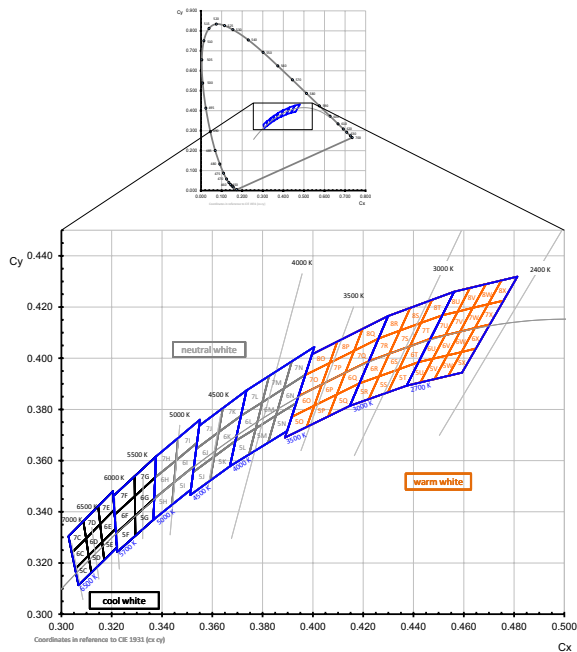
## Brightness Groups

Group	Luminous Flux <sup>1)</sup> $I_F = 100 \text{ mA}$ min. $\Phi_V$	Luminous Flux <sup>1)</sup> $I_F = 100 \text{ mA}$ max. $\Phi_V$
HR	33 lm	36 lm
HS	36 lm	39 lm
HT	39 lm	42 lm
HU	42 lm	45 lm
JP	45 lm	48 lm

## Forward Voltage Groups

Group	Forward Voltage <sup>3)</sup> $I_F = 100 \text{ mA}$ min. $V_F$	Forward Voltage <sup>3)</sup> $I_F = 100 \text{ mA}$ max. $V_F$
K	2.60 V	2.80 V
L	2.80 V	3.00 V
M	3.00 V	3.20 V

## Chromaticity Coordinate Groups 5)



### Chromaticity Coordinate Groups

Group	Cx	Cy	CCT	Group	Cx	Cy	CCT	Group	Cx	Cy	CCT
5U	0.4420	0.3985	2700	7U	0.4515	0.4168	2700	5R	0.4185	0.3902	3000
	0.4477	0.3998	2700		0.4576	0.4183	2700		0.4263	0.3929	3000
	0.4428	0.3906	2700		0.4526	0.4090	2700		0.4222	0.3840	3000
	0.4373	0.3893	2700		0.4468	0.4077	2700		0.4147	0.3814	3000
5V	0.4477	0.3998	2700	7V	0.4576	0.4183	2700	5S	0.4263	0.3929	3000
	0.4534	0.4011	2700		0.4636	0.4197	2700		0.4342	0.3957	3000
	0.4483	0.3919	2700		0.4585	0.4104	2700		0.4298	0.3867	3000
	0.4428	0.3906	2700		0.4526	0.4090	2700		0.4222	0.3840	3000
5W	0.4534	0.4011	2700	7W	0.4636	0.4197	2700	5T	0.4342	0.3957	3000
	0.4591	0.4025	2700		0.4697	0.4211	2700		0.4420	0.3985	3000
	0.4538	0.3931	2700		0.4644	0.4118	2700		0.4373	0.3893	3000
	0.4483	0.3919	2700		0.4585	0.4104	2700		0.4298	0.3867	3000
5X	0.4591	0.4025	2700	7X	0.4697	0.4211	2700	6R	0.4223	0.3990	3000
	0.4648	0.4038	2700		0.4758	0.4225	2700		0.4305	0.4019	3000
	0.4593	0.3944	2700		0.4703	0.4132	2700		0.4263	0.3929	3000
	0.4538	0.3931	2700		0.4644	0.4118	2700		0.4185	0.3902	3000
6U	0.4468	0.4077	2700	8U	0.4562	0.4260	2700	6S	0.4305	0.4019	3000
	0.4526	0.4090	2700		0.4625	0.4275	2700		0.4386	0.4048	3000
	0.4477	0.3998	2700		0.4576	0.4183	2700		0.4342	0.3957	3000
	0.4420	0.3985	2700		0.4515	0.4168	2700		0.4263	0.3929	3000
6V	0.4526	0.4090	2700	8V	0.4625	0.4275	2700	6T	0.4386	0.4048	3000
	0.4585	0.4104	2700		0.4688	0.4290	2700		0.4468	0.4077	3000
	0.4534	0.4011	2700		0.4636	0.4197	2700		0.4420	0.3985	3000
	0.4477	0.3998	2700		0.4576	0.4183	2700		0.4342	0.3957	3000
6W	0.4585	0.4104	2700	8W	0.4688	0.4290	2700	7R	0.4261	0.4077	3000
	0.4644	0.4118	2700		0.4750	0.4304	2700		0.4346	0.4108	3000
	0.4591	0.4025	2700		0.4697	0.4211	2700		0.4305	0.4019	3000
	0.4534	0.4011	2700		0.4636	0.4197	2700		0.4223	0.3990	3000
6X	0.4644	0.4118	2700	8X	0.4750	0.4304	2700	7S	0.4346	0.4108	3000
	0.4703	0.4132	2700		0.4813	0.4319	2700		0.4430	0.4138	3000
	0.4648	0.4038	2700		0.4758	0.4225	2700		0.4386	0.4048	3000
	0.4591	0.4025	2700		0.4697	0.4211	2700		0.4305	0.4019	3000

Group	Cx	Cy	CCT	Group	Cx	Cy	CCT	Group	Cx	Cy	CCT
7T	0.4430	0.4138	3000	6P	0.4036	0.3898	3500	5L	0.3692	0.3677	4000
	0.4515	0.4168	3000		0.4130	0.3944	3500		0.3773	0.3726	4000
	0.4468	0.4077	3000		0.4095	0.3858	3500		0.3746	0.3624	4000
	0.4386	0.4048	3000		0.4006	0.3815	3500		0.3670	0.3578	4000
8R	0.4299	0.4165	3000	6Q	0.4130	0.3944	3500	5M	0.3773	0.3726	4000
	0.4387	0.4197	3000		0.4223	0.3990	3500		0.3853	0.3776	4000
	0.4346	0.4108	3000		0.4185	0.3902	3500		0.3822	0.3670	4000
	0.4261	0.4077	3000		0.4095	0.3858	3500		0.3746	0.3624	4000
8S	0.4387	0.4197	3000	7O	0.3970	0.3934	3500	5N	0.3853	0.3776	4000
	0.4474	0.4228	3000		0.4067	0.3982	3500		0.3934	0.3825	4000
	0.4430	0.4138	3000		0.4036	0.3898	3500		0.3898	0.3716	4000
	0.4346	0.4108	3000		0.3943	0.3853	3500		0.3822	0.3670	4000
8T	0.4474	0.4228	3000	7P	0.4067	0.3982	3500	6L	0.3714	0.3775	4000
	0.4562	0.4260	3000		0.4164	0.4029	3500		0.3799	0.3828	4000
	0.4515	0.4168	3000		0.4130	0.3944	3500		0.3773	0.3726	4000
	0.4430	0.4138	3000		0.4036	0.3898	3500		0.3692	0.3677	4000
5O	0.3916	0.3772	3500	7Q	0.4164	0.4029	3500	6M	0.3799	0.3828	4000
	0.4006	0.3815	3500		0.4261	0.4077	3500		0.3885	0.3882	4000
	0.3975	0.3731	3500		0.4223	0.3990	3500		0.3853	0.3776	4000
	0.3890	0.3690	3500		0.4130	0.3944	3500		0.3773	0.3726	4000
5P	0.4006	0.3815	3500	8O	0.3997	0.4015	3500	6N	0.3885	0.3882	4000
	0.4095	0.3858	3500		0.4097	0.4065	3500		0.3970	0.3935	4000
	0.4061	0.3773	3500		0.4067	0.3982	3500		0.3934	0.3825	4000
	0.3975	0.3731	3500		0.3970	0.3934	3500		0.3853	0.3776	4000
5Q	0.4095	0.3858	3500	8P	0.4097	0.4065	3500	7L	0.3736	0.3874	4000
	0.4185	0.3902	3500		0.4198	0.4115	3500		0.3826	0.3931	4000
	0.4147	0.3814	3500		0.4164	0.4029	3500		0.3799	0.3828	4000
	0.4061	0.3773	3500		0.4067	0.3982	3500		0.3714	0.3775	4000
6O	0.3943	0.3853	3500	8Q	0.4198	0.4115	3500	7M	0.3826	0.3931	4000
	0.4036	0.3898	3500		0.4299	0.4165	3500		0.3916	0.3987	4000
	0.4006	0.3815	3500		0.4261	0.4077	3500		0.3885	0.3882	4000
	0.3916	0.3772	3500		0.4164	0.4029	3500		0.3799	0.3828	4000



Group	Cx	Cy	CCT	Group	Cx	Cy	CCT	Group	Cx	Cy	CCT
7N	0.3916	0.3987	4000	5I	0.3448	0.3515	5000	6G	0.3292	0.3461	5700
	0.4006	0.4044	4000		0.3527	0.3578	5000		0.3373	0.3534	5700
	0.3970	0.3935	4000		0.3515	0.3487	5000		0.3369	0.3451	5700
	0.3885	0.3882	4000		0.3441	0.3428	5000		0.3293	0.3384	5700
5J	0.3524	0.3555	4500	6H	0.3373	0.3534	5000	7F	0.3206	0.3462	5700
	0.3608	0.3616	4500		0.3456	0.3601	5000		0.3292	0.3539	5700
	0.3591	0.3522	4500		0.3448	0.3515	5000		0.3292	0.3461	5700
	0.3512	0.3465	4500		0.3369	0.3451	5000		0.3212	0.3389	5700
5K	0.3608	0.3616	4500	6I	0.3456	0.3601	5000	7G	0.3292	0.3539	5700
	0.3692	0.3677	4500		0.3539	0.3669	5000		0.3376	0.3616	5700
	0.3670	0.3578	4500		0.3527	0.3578	5000		0.3373	0.3534	5700
	0.3591	0.3522	4500		0.3448	0.3515	5000		0.3292	0.3461	5700
6J	0.3536	0.3646	4500	7H	0.3376	0.3616	5000	5C	0.3055	0.3177	6500
	0.3625	0.3711	4500		0.3464	0.3688	5000		0.3108	0.3229	6500
	0.3608	0.3616	4500		0.3456	0.3601	5000		0.3119	0.3162	6500
	0.3524	0.3555	4500		0.3373	0.3534	5000		0.3068	0.3113	6500
6K	0.3625	0.3711	4500	7I	0.3464	0.3688	5000	5D	0.3108	0.3229	6500
	0.3714	0.3775	4500		0.3551	0.3760	5000		0.3162	0.3282	6500
	0.3692	0.3677	4500		0.3539	0.3669	5000		0.3170	0.3212	6500
	0.3608	0.3616	4500		0.3456	0.3601	5000		0.3119	0.3162	6500
7J	0.3548	0.3736	4500	5F	0.3217	0.3316	5700	5E	0.3162	0.3282	6500
	0.3642	0.3805	4500		0.3293	0.3384	5700		0.3216	0.3334	6500
	0.3625	0.3711	4500		0.3294	0.3306	5700		0.3221	0.3262	6500
	0.3536	0.3646	4500		0.3222	0.3243	5700		0.3170	0.3212	6500
7K	0.3642	0.3805	4500	5G	0.3293	0.3384	5700	6C	0.3041	0.3240	6500
	0.3736	0.3874	4500		0.3369	0.3451	5700		0.3098	0.3296	6500
	0.3714	0.3775	4500		0.3366	0.3369	5700		0.3108	0.3229	6500
	0.3625	0.3711	4500		0.3294	0.3306	5700		0.3055	0.3177	6500
5H	0.3369	0.3451	5000	6F	0.3212	0.3389	5700	6D	0.3098	0.3296	6500
	0.3448	0.3515	5000		0.3292	0.3461	5700		0.3154	0.3352	6500
	0.3441	0.3428	5000		0.3293	0.3384	5700		0.3162	0.3282	6500
	0.3366	0.3369	5000		0.3217	0.3316	5700		0.3108	0.3229	6500

Group	Cx	Cy	CCT	Group	Cx	Cy	CCT
6E	0.3154	0.3352	6500	7D	0.3087	0.3363	6500
	0.3210	0.3408	6500		0.3146	0.3422	6500
	0.3216	0.3334	6500		0.3154	0.3352	6500
	0.3162	0.3282	6500		0.3098	0.3296	6500
7C	0.3028	0.3304	6500	7E	0.3146	0.3422	6500
	0.3087	0.3363	6500		0.3205	0.3481	6500
	0.3098	0.3296	6500		0.3210	0.3408	6500
	0.3041	0.3240	6500		0.3154	0.3352	6500

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## Group Name on Label

**Example: HR-5C-K**

Brightness

Color Chromaticity

Forward Voltage

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HR

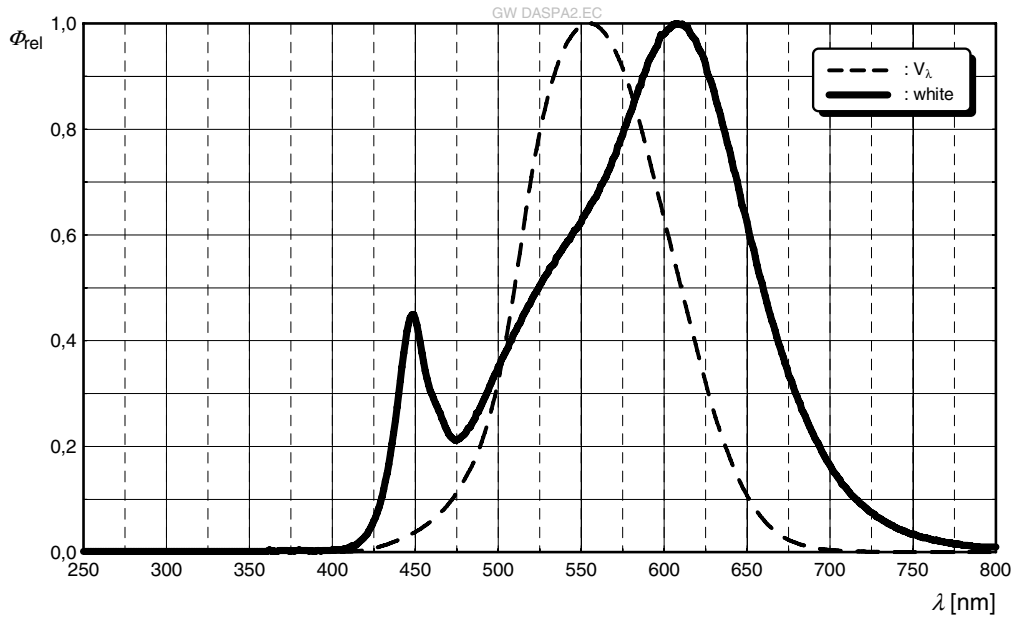
5C

K

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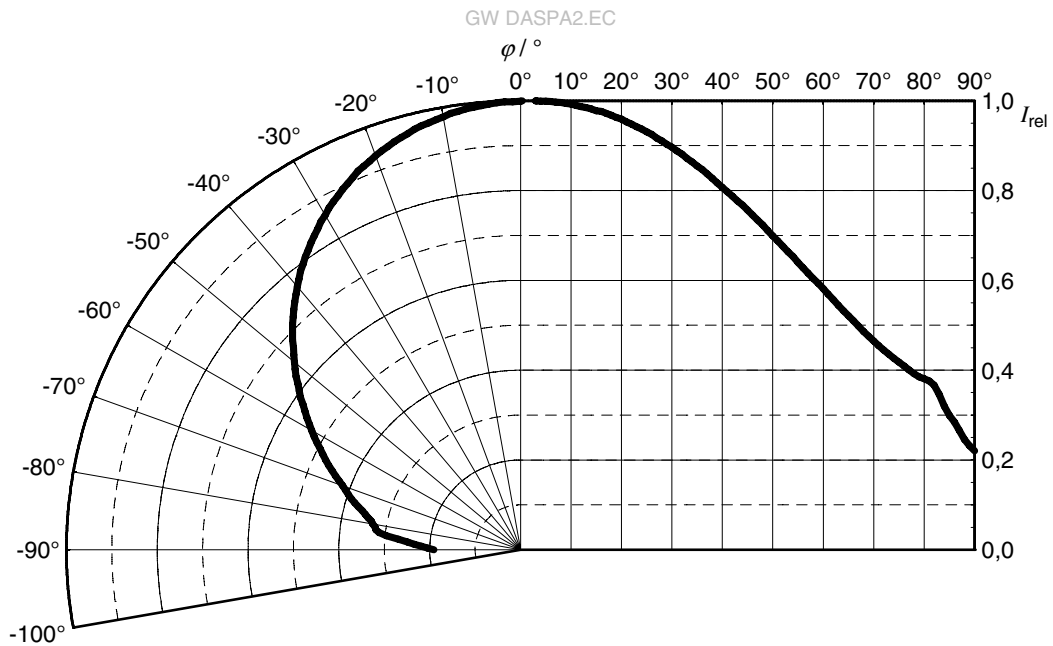
### Relative Spectral Emission <sup>6)</sup>

$\Phi_{rel} = f(\lambda); I_F = 100 \text{ mA}; T_J = 25 \text{ }^\circ\text{C}$



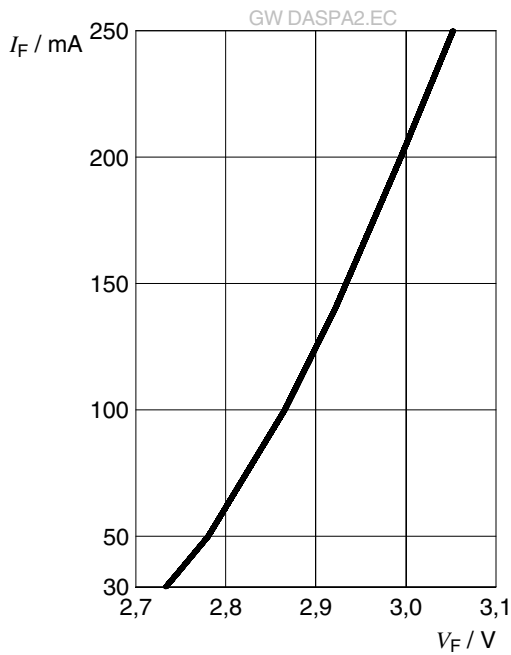
### Radiation Characteristics <sup>6)</sup>

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



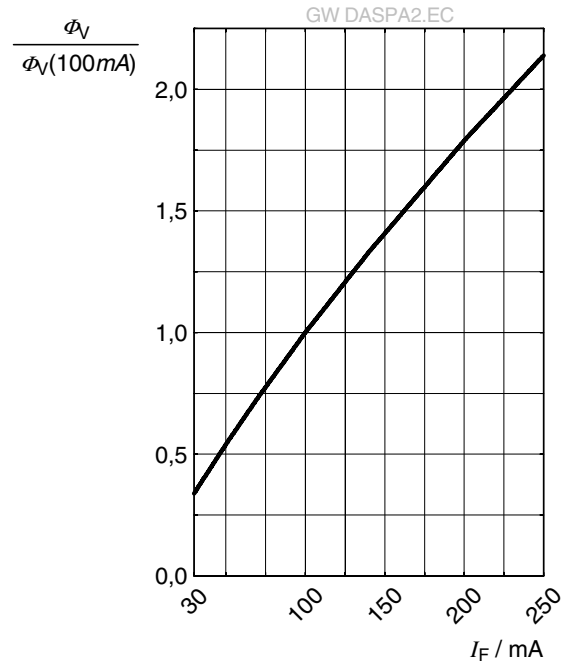
**Forward current** 6), 7)

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



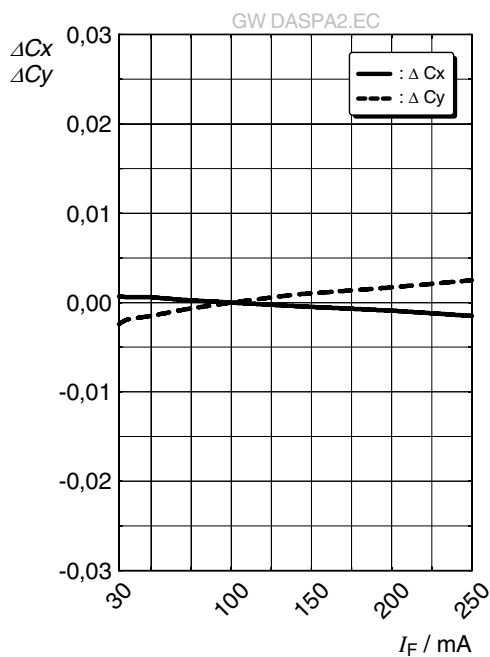
**Relative Luminous Flux** 6), 7)

$\Phi_V / \Phi_V(100\text{ mA}) = f(I_F); T_J = 25\text{ }^\circ\text{C}$



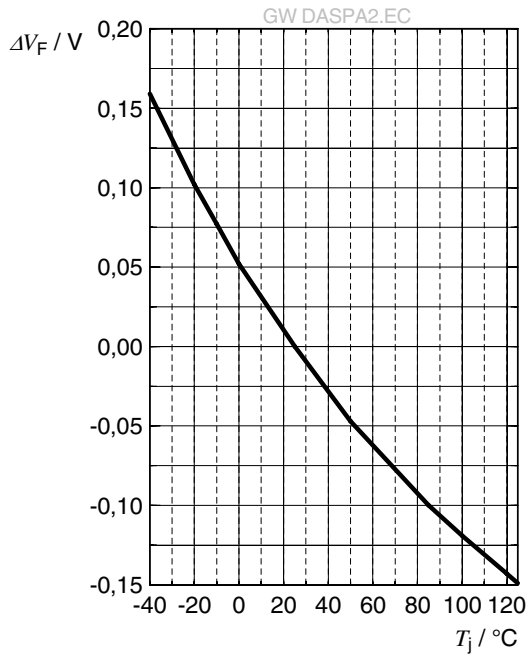
**Chromaticity Coordinate Shift** 6)

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



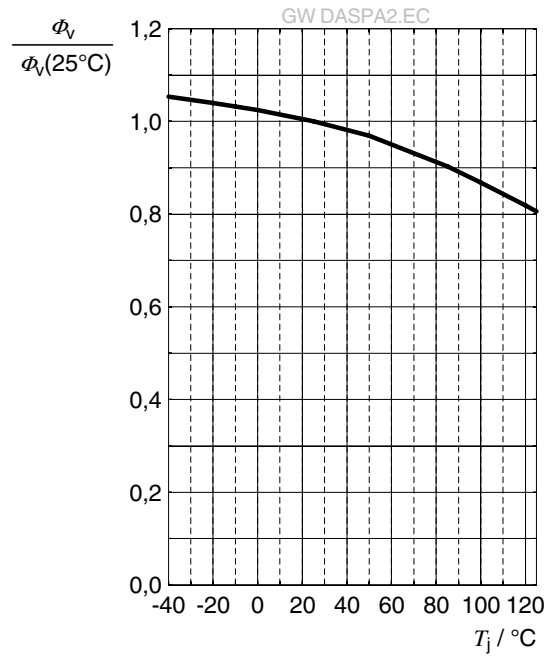
### Forward Voltage <sup>6)</sup>

$$\Delta V_F = V_F - V_F(25\text{ }^\circ\text{C}) = f(T_j); I_F = 100\text{ mA}$$



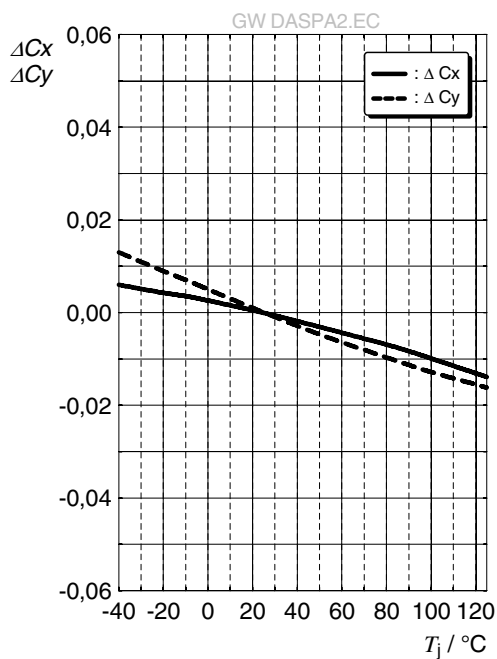
### Relative Luminous Flux <sup>6)</sup>

$$\Phi_V / \Phi_V(25\text{ }^\circ\text{C}) = f(T_j); I_F = 100\text{ mA}$$



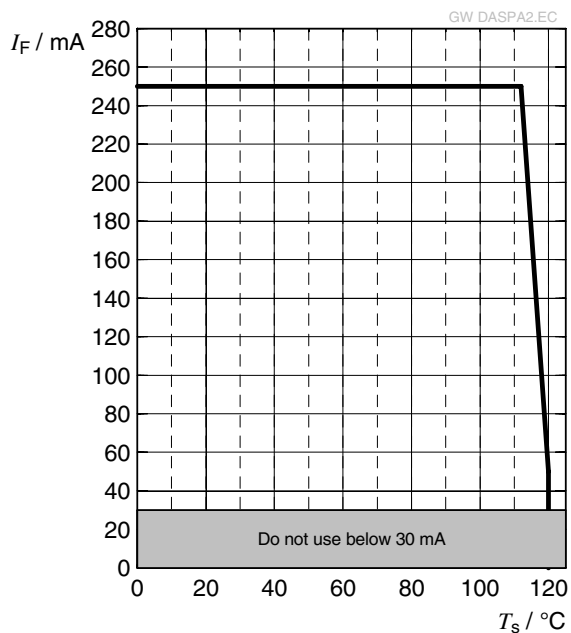
### Chromaticity Coordinate Shift <sup>6)</sup>

$$C_x, C_y = f(T_j); I_F = 100\text{ mA}$$

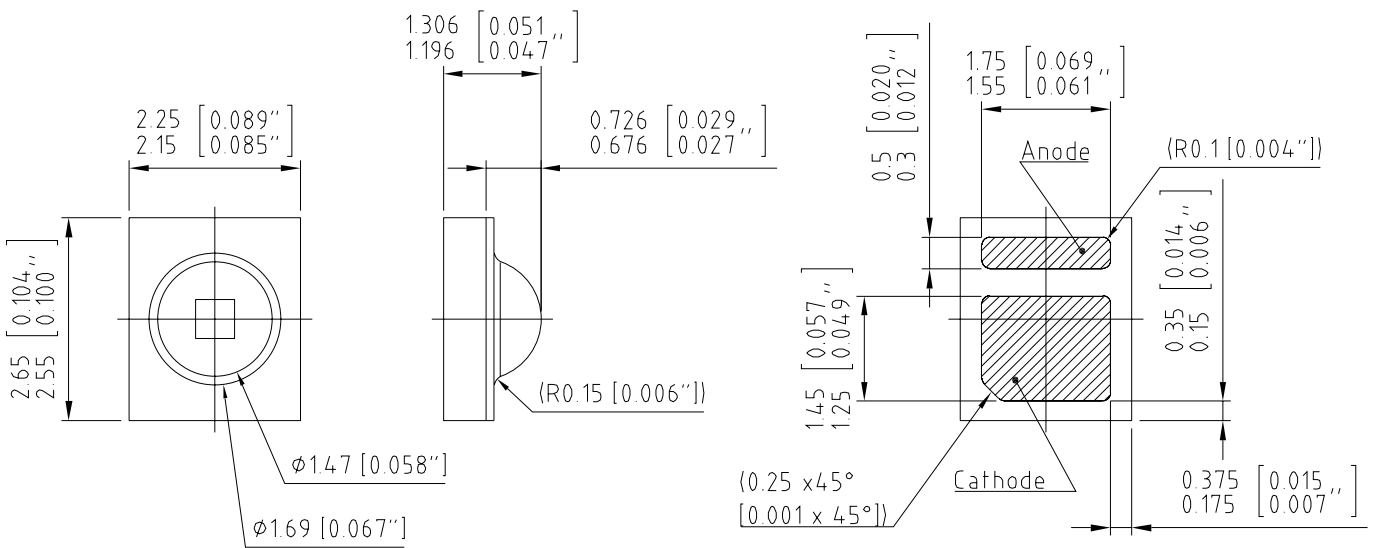


## Max. Permissible Forward Current

$$I_F = f(T)$$



**Dimensional Drawing** <sup>8)</sup>



C67062-A0022-A1.-06

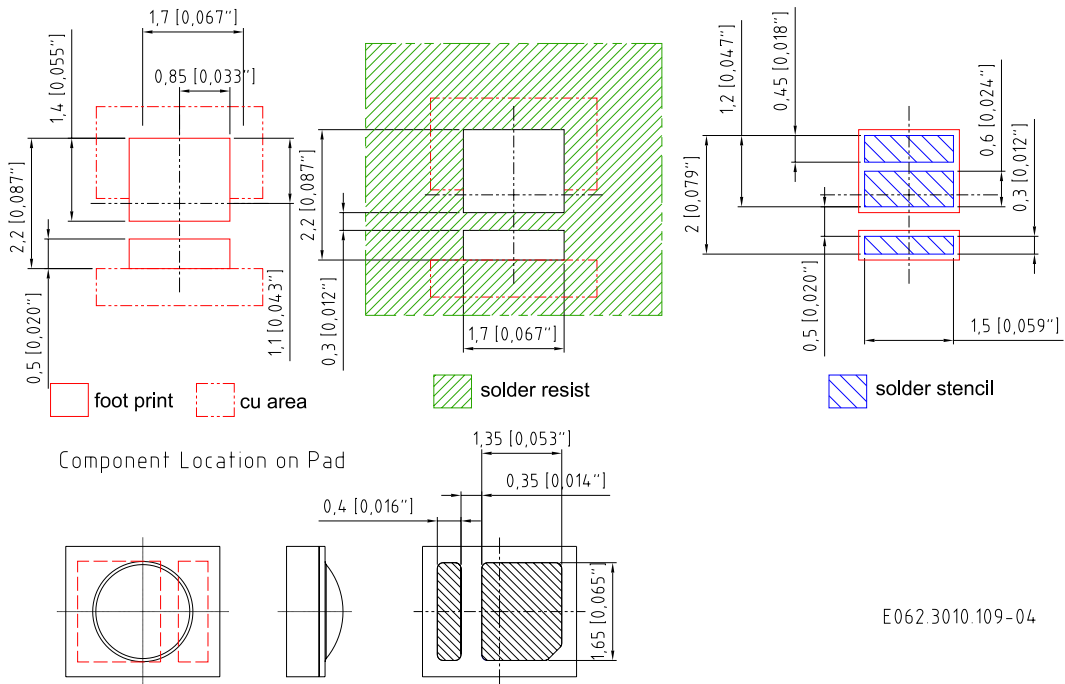
**Further Information:**

**Approximate Weight:** 13.0 mg

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



**Recommended Solder Pad** 8)

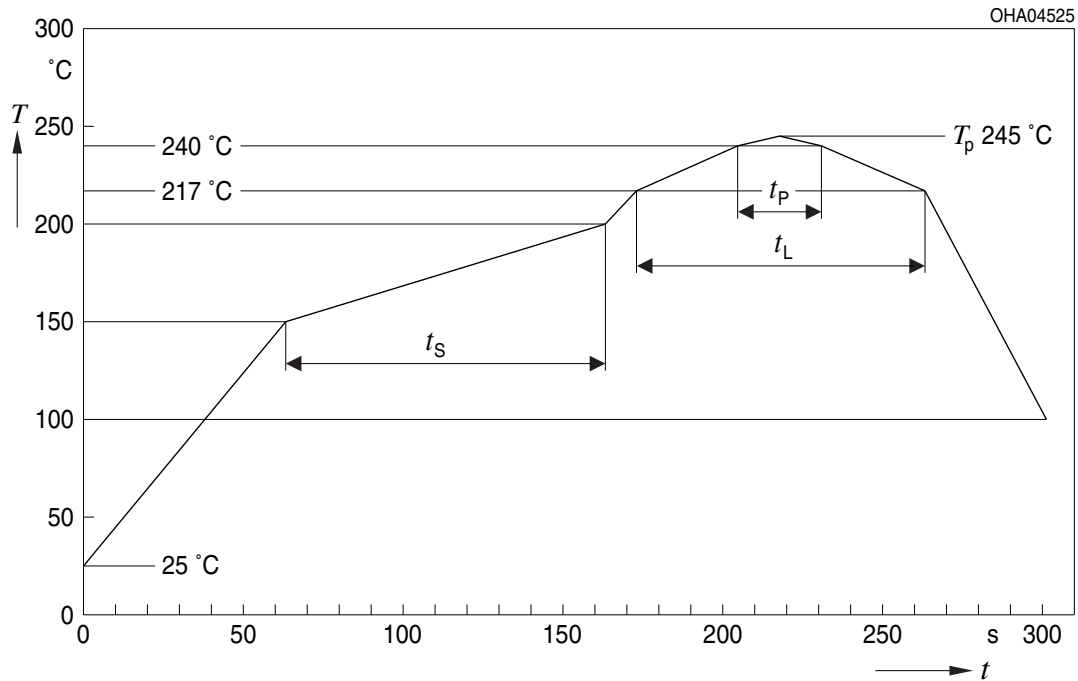


E062.3010.109-04

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

## Reflow Soldering Profile

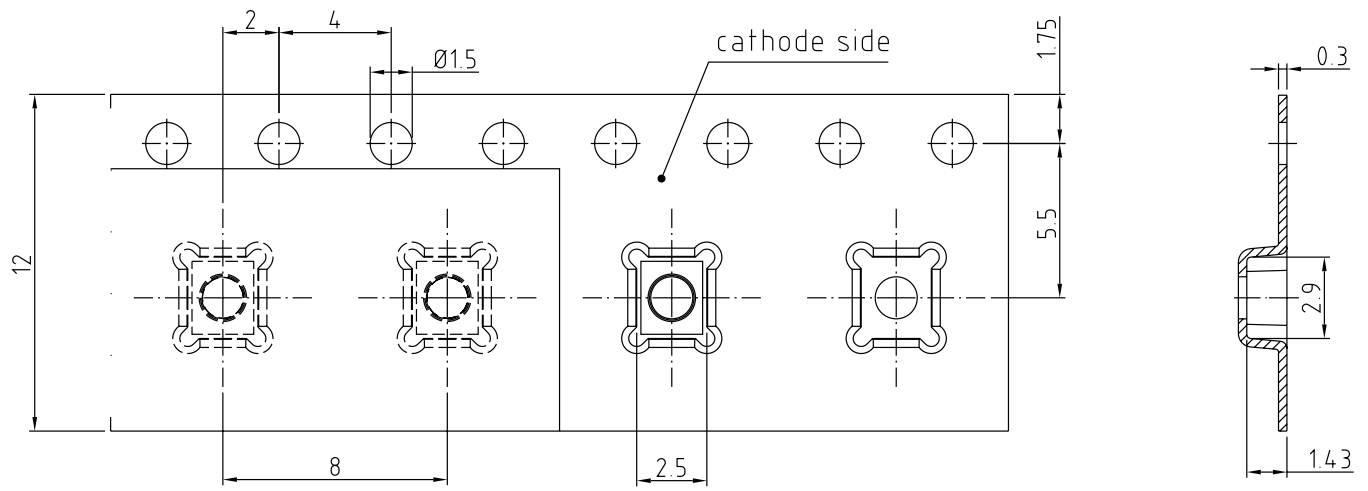
Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat <sup>*)</sup> 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 <sup>*)</sup> $T_{Smax}$ 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

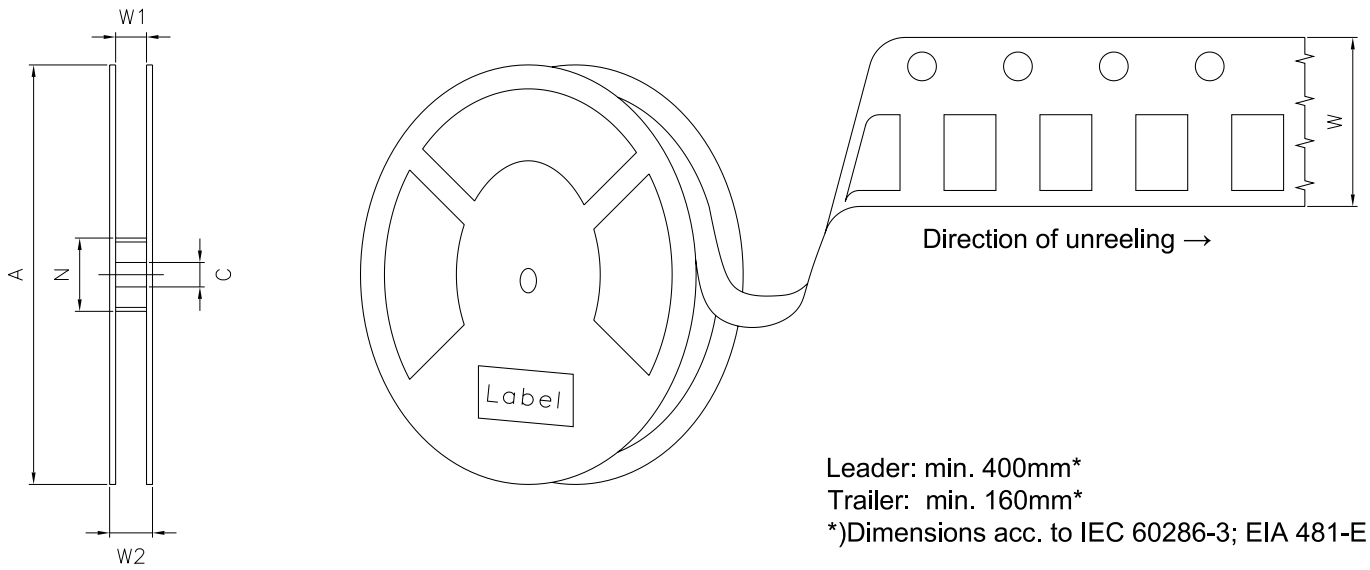
All temperatures refer to the center of the package, measured on the top of the component  
 \*) slope calculation  $DT/Dt$ :  $Dt$  max. 5 s; fulfillment for the whole T-range

**Taping** <sup>8)</sup>



C67062-A0022-B1-10

**Tape and Reel** <sup>9)</sup>



**Reel Dimensions**

A	W	N <sub>min</sub>	W <sub>1</sub>	W <sub>2max</sub>	Pieces per PU
180 mm	12 + 0.3 / - 0.1 mm	60 mm	12.4 + 2 mm	18.4 mm	1200

### Barcode-Product-Label (BPL)

**OSRAM Opto Semiconductors** LX XXXX BIN1: XX-XX-X-XXX-X

RoHS Compliant

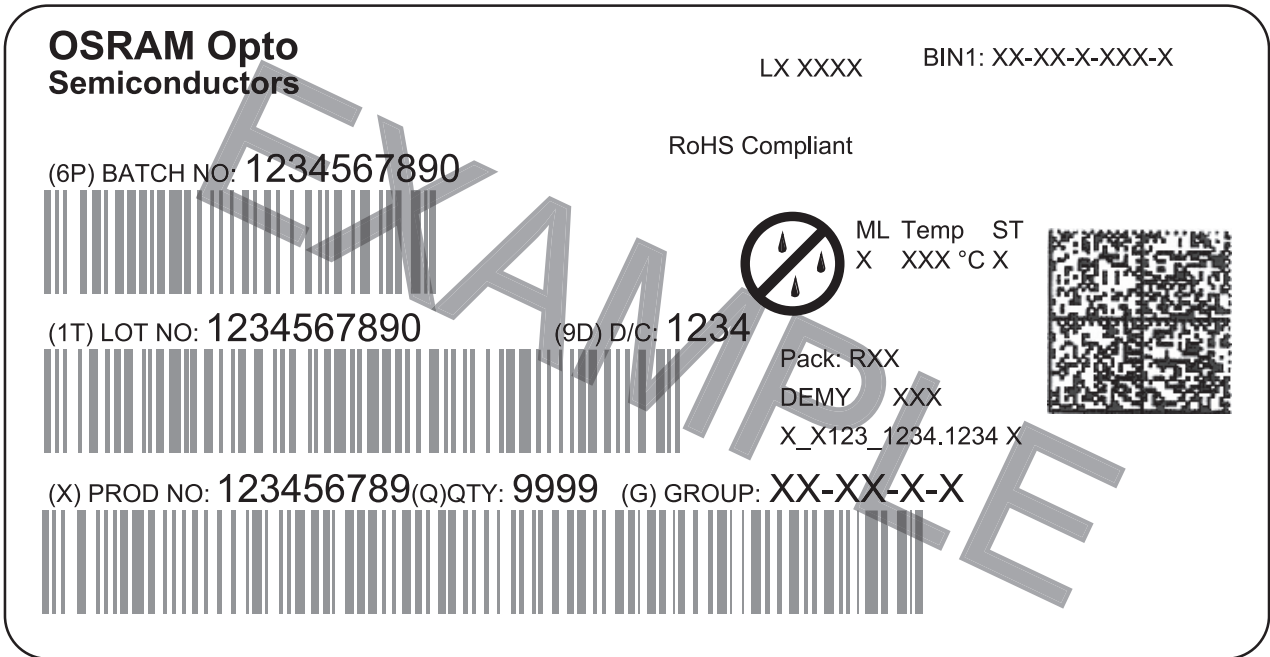
(6P) BATCH NO: 1234567890

(1T) LOT NO: 1234567890 (9D) D/C: 1234

(X) PROD NO: 123456789 (Q) QTY: 9999 (G) GROUP: XX-XX-X-X

ML Temp ST  
X XXX °C X

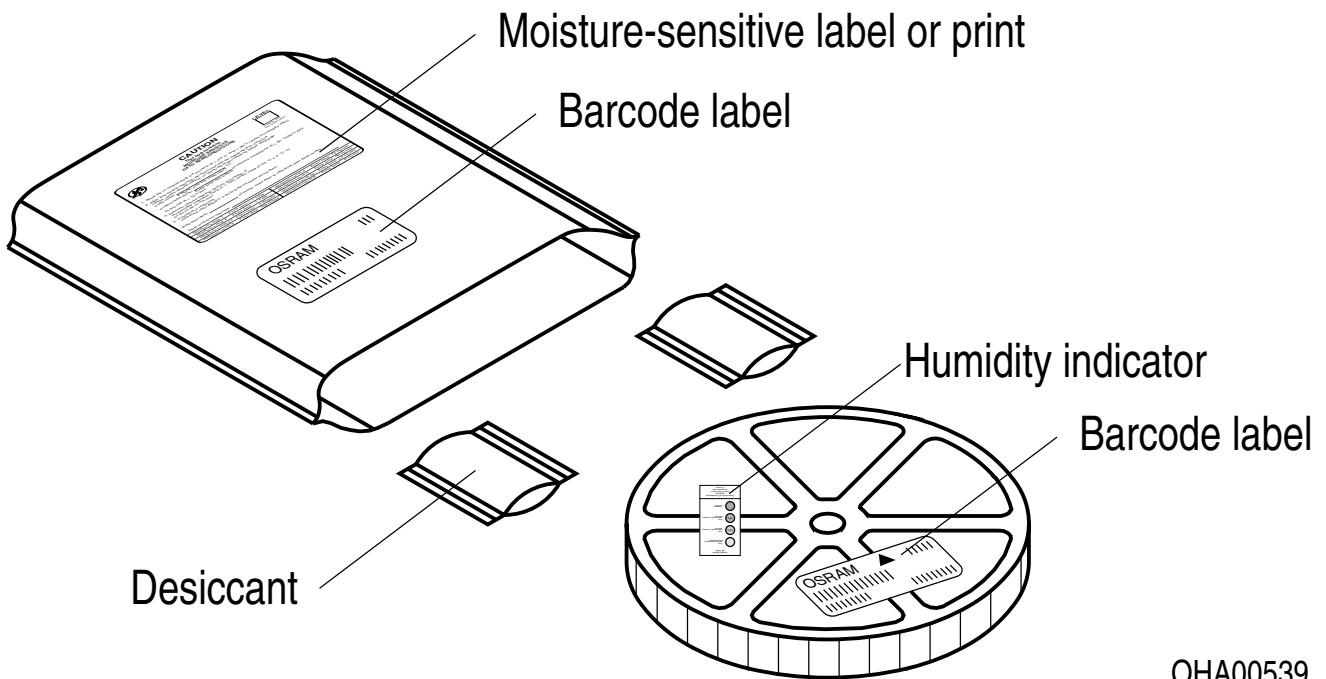
Pack: RXX  
DEMY XXX  
X\_X123\_1234.1234 X



The diagram shows a rectangular label with rounded corners. It contains the OSRAM logo and product name at the top left. To the right are fields for 'LX XXXX' and 'BIN1: XX-XX-X-XXX-X'. Below the logo is a 'RoHS Compliant' statement. The label features three horizontal barcode sections. The first is labeled '(6P) BATCH NO: 1234567890'. The second is labeled '(1T) LOT NO: 1234567890' and '(9D) D/C: 1234'. The third is labeled '(X) PROD NO: 123456789 (Q) QTY: 9999 (G) GROUP: XX-XX-X-X'. To the right of the second barcode is a 'no liquid' symbol (a circle with a diagonal line and three drops) and the text 'ML Temp ST X XXX °C X'. Below this is a QR code. Further down are the fields 'Pack: RXX', 'DEMY XXX', and 'X\_X123\_1234.1234 X'. A large 'EXAMPLE' watermark is overlaid diagonally across the center of the label.

OHA04563

### Dry Packing Process and Materials <sup>8)</sup>



OHA00539

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

## 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 **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.

This device is designed for specific/recommended applications only. Please consult OSRAM Opto Semiconductors Sales Staff in advance for detailed information on other non-recommended applications (e.g. automotive).

Change management for this component is aligned with the requirements of the lighting market.

For further application related information please visit [www.osram-os.com/appnotes](http://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 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 10 ms, with a tolerance of +/- 7%.
- 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) **Forward Voltage:** The Forward voltage is measured during a current pulse duration of typically 1 ms with a tolerance of  $\pm 0.05V$ .
- 4) **Color reproduction index:** Color reproduction index values (CRI-RA) are measured during a current pulse of typically 10 ms and with a tolerance of  $\pm 2$ .
- 5) **Chromaticity coordinate groups:** Chromaticity coordinates are measured during a current pulse of typically 25 ms, with an internal reproducibility of  $\pm 0.005$  and an expanded uncertainty of  $\pm 0.01$  (acc. to GUM with a coverage factor of  $k = 3$ ).
- 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  $\pm 0.1$  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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## Revision History

Version	Date	Change
1.2	2019-11-28	New Layout Taping Schematic Transportation Box Dimensions of Transportation Box
1.3	2020-11-23	Applications
1.4	2021-06-21	Features Electro - Optical Characteristics (Diagrams)
1.5	2022-01-24	Tape and Reel Glossary
1.6	2022-02-08	Features

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