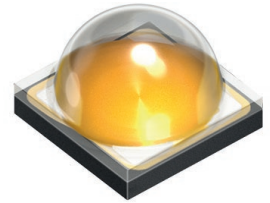


# GW CSSRM3.PM

## OSLON® Square

Fifth generation of OSLON Square with enhanced performance. Most compact high-power LED with well known superior robustness, high reliability, long lifetime and low thermal resistance.



## Applications

- Highbay Industrial
- Street, Tunnel and Outdoor

## Features:

- Package: SMT ceramic package with silicone lens
- Typ. Radiation: 120° (Lambertian emitter)
- Corrosion Robustness Class: 3B
- Color temperature: 2200K - 6500K
- CRI: 70 (min.), 72 (typ.)
- ESD: 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)
- Luminous Flux: typ. 335 lm @ 4000 K, 85 °C
- Luminous efficacy: typ. 171 lm/W @ 4000 K, 85 °C

## Ordering Information

Type	Luminous Flux <sup>1)</sup> $I_F = 700 \text{ mA}$ $\Phi_V$	Ordering Code
GW CSSRM3.PM-N5N9-A636-1	320 ... 370 lm	Q65113A2245
GW CSSRM3.PM-M8MF-A10310-1	250 ... 280 lm	Q65112A7537
GW CSSRM3.PM-M8MF-XX510-1	250 ... 280 lm	Q65112A7538
GW CSSRM3.PM-M8N3-A10310-1	250 ... 310 lm	Q65113A2240
GW CSSRM3.PM-M8N3-XX510-1	250 ... 310 lm	Q65113A2241
GW CSSRM3.PM-M9N1-A939-1	260 ... 290 lm	Q65112A7539
GW CSSRM3.PM-M9N1-XX59-1	260 ... 290 lm	Q65112A7540
GW CSSRM3.PM-M9N3-A939-1	260 ... 310 lm	Q65113A2250
GW CSSRM3.PM-M9N3-XX59-1	260 ... 310 lm	Q65113A2251
GW CSSRM3.PM-MFN2-A838-1	270 ... 300 lm	Q65112A7541
GW CSSRM3.PM-MFN2-XX58-1	270 ... 300 lm	Q65112A7542
GW CSSRM3.PM-N1N5-A838-1	280 ... 330 lm	Q65113A2249
GW CSSRM3.PM-N1N5-XX58-1	280 ... 330 lm	Q65113A2488
GW CSSRM3.PM-N3N5-A737-1	300 ... 330 lm	Q65112A6138
GW CSSRM3.PM-N3N5-XX57-1	300 ... 330 lm	Q65112A6250
GW CSSRM3.PM-N4N8-A737-1	310 ... 360 lm	Q65113A2248
GW CSSRM3.PM-N4N8-XX57-1	310 ... 360 lm	Q65113A2247
GW CSSRM3.PM-N5N7-A636-1	320 ... 350 lm	Q65112A6139
GW CSSRM3.PM-N5N7-XX56-1	320 ... 350 lm	Q65112A6249
GW CSSRM3.PM-N5N9-XX56-1	320 ... 370 lm	Q65113A2244
GW CSSRM3.PM-N6N8-A535-1	330 ... 360 lm	Q65112A6140
GW CSSRM3.PM-N6N8-XX55-1	330 ... 360 lm	Q65112A6248
GW CSSRM3.PM-N7P1-A535-1	340 ... 380 lm	Q65113A2243
GW CSSRM3.PM-N7P1-XX55-1	340 ... 380 lm	Q65113A2242
GW CSSRM3.PM-N6N8-A434-1	330 ... 360 lm	Q65112A6141
GW CSSRM3.PM-N6N8-XX54-1	330 ... 360 lm	Q65112A6251
GW CSSRM3.PM-N7P1-A434-1	340 ... 380 lm	Q65113A2299
GW CSSRM3.PM-N7P1-XX54-1	340 ... 380 lm	Q65113A2302
GW CSSRM3.PM-N6N8-A333-1	330 ... 360 lm	Q65112A6142
GW CSSRM3.PM-N6N8-XX53-1	330 ... 360 lm	Q65112A6254
GW CSSRM3.PM-N7P1-A333-1	340 ... 380 lm	Q65113A2298
GW CSSRM3.PM-N7P1-XX53-1	340 ... 380 lm	Q65113A2301

## Ordering Information

Type	Luminous Flux <sup>1)</sup> $I_F = 700 \text{ mA}$ $\Phi_V$	Ordering Code
GW CSSRM3.PM-N6N8-A232-1	330 ... 360 lm	Q65112A6143
GW CSSRM3.PM-N6N8-XX52-1	330 ... 360 lm	Q65112A6253
GW CSSRM3.PM-N7P1-A232-1	340 ... 380 lm	Q65113A2297
GW CSSRM3.PM-N7P1-XX52-1	340 ... 380 lm	Q65113A2300
GW CSSRM3.PM-N5N7-A131-1	320 ... 350 lm	Q65112A6144
GW CSSRM3.PM-N5N7-XX51-1	320 ... 350 lm	Q65112A6252
GW CSSRM3.PM-N6P1-A131-1	330 ... 380 lm	Q65113A2295
GW CSSRM3.PM-N6P1-XX51-1	330 ... 380 lm	Q65113A2296
GW CSSRM3.PM-N6P1-XX51-1	330 ... 380 lm	Q65113A2296

## 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 absolute **	$T_{j,abs}$	max.	150 °C
Junction Temperature	$T_j$	max.	135 °C
Forward Current $T_j = 85\text{ °C}$	$I_F$	min.	100 mA
		max.	1800 mA
Surge Current $t \leq 10\ \mu\text{s}; D = 0.005; T_j = 85\text{ °C}$	$I_{FS}$	max.	2000 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

$I_F = 700 \text{ mA}$ ;  $T_J = 85 \text{ °C}$

Parameter	Symbol		Values
Viewing angle at 50% $I_V$	$2\phi$	typ.	120 °
Forward Voltage <sup>3)</sup> $I_F = 700 \text{ mA}$	$V_F$	min. typ. max.	2.70 V 2.80 V 3.20 V
Reverse voltage (ESD device)	$V_{R\text{ESD}}$	min.	45 V
Reverse voltage <sup>2)</sup> $I_R = 20 \text{ mA}$	$V_R$	max.	1.2 V
Color Rendering Index <sup>4)</sup> (2200K - 6500K)	CRI	min. typ.	70 72
Electrical thermal resistance junction/solderpoint with efficiency $\eta_e = 41 \%$	$R_{\text{thJS elec.}}$	typ.	1.8 K / W

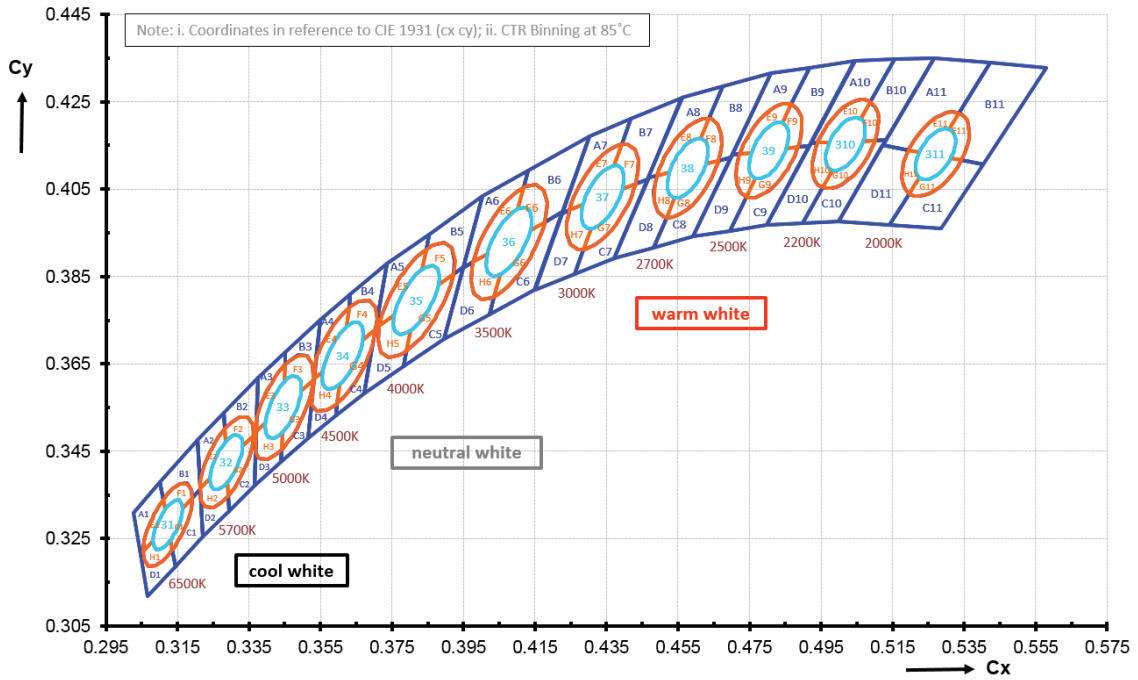
## Brightness Groups

Group	Luminous Flux <sup>1)</sup> $I_F = 700 \text{ mA}$ min. $\Phi_V$	Luminous Flux <sup>1)</sup> $I_F = 700 \text{ mA}$ max. $\Phi_V$
M8	250 lm	260 lm
M9	260 lm	270 lm
MF	270 lm	280 lm
N1	280 lm	290 lm
N2	290 lm	300 lm
N3	300 lm	310 lm
N4	310 lm	320 lm
N5	320 lm	330 lm
N6	330 lm	340 lm
N7	340 lm	350 lm
N8	350 lm	360 lm
N9	360 lm	370 lm
P1	370 lm	380 lm

## Forward Voltage Groups

Group	Forward Voltage <sup>3)</sup> $I_F = 700 \text{ mA}$ min. $V_F$	Forward Voltage <sup>3)</sup> $I_F = 700 \text{ mA}$ max. $V_F$
K2	2.70 V	2.80 V
L1	2.80 V	2.90 V
L2	2.90 V	3.00 V
M1	3.00 V	3.10 V
M2	3.10 V	3.20 V

### Chromaticity Coordinate Groups 5)



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**Chromaticity Coordinate Groups**

CCT	Center Cx	Center Cy	3step a	3step b	5step a	5step b	Ø
2200 K	0.5020	0.4156	0.0072	0.0040	0.0120	0.0067	39.9
2500 K	0.4804	0.4138	0.0076	0.0041	0.0126	0.0068	53.1
2700 K	0.4577	0.4098	0.0080	0.0041	0.0133	0.0068	54.1
3000 K	0.4339	0.4032	0.0086	0.0042	0.0142	0.0069	53.7
3500 K	0.4077	0.3929	0.0093	0.0042	0.0155	0.0069	53.9
4000 K	0.3818	0.3796	0.0094	0.0041	0.0157	0.0068	53.4
4500 K	0.3613	0.3669	0.0089	0.0038	0.0148	0.0063	57
5000 K	0.3446	0.3551	0.0081	0.0035	0.0135	0.0059	59.8
5700 K	0.3287	0.3425	0.0072	0.0032	0.0119	0.0052	58.8
6500 K	0.3123	0.3282	0.0066	0.0027	0.0110	0.0045	58.1



CCT	Group	1		2		3		4		5	
		Cx	Cy	Cx	Cy	Cx	Cy	Cx	Cy	Cx	Cy
2200 K	A	0.5155	0.4347	0.5044	0.4344	0.4921	0.4156	0.4941	0.4156	0.5088	0.4249
	B	0.5155	0.4347	0.5265	0.4350	0.5132	0.4163	0.5101	0.4161	0.5088	0.4249
	C	0.5132	0.4163	0.4998	0.3975	0.4898	0.3971	0.4955	0.4054	0.5101	0.4161
	D	0.4955	0.4054	0.4941	0.4156	0.4921	0.4156	0.4798	0.3967	0.4898	0.3971
	E	0.5088	0.4249	0.4941	0.4156	0.4973	0.4157	0.5061	0.4210		
	F	0.5088	0.4249	0.5101	0.4161	0.5068	0.4160	0.5061	0.4210		
	G	0.5101	0.4161	0.4955	0.4054	0.4981	0.4093	0.5068	0.4158		
	H	0.4981	0.4093	0.4973	0.4157	0.4941	0.4156	0.4955	0.4054		
2500 K	A	0.4917	0.4328	0.4811	0.4315	0.4701	0.4128	0.4723	0.4130	0.4867	0.4245
	B	0.4917	0.4328	0.5044	0.4344	0.4917	0.4149	0.4885	0.4146	0.4867	0.4245
	C	0.4917	0.4149	0.4798	0.3967	0.4695	0.3954	0.4741	0.4031	0.4885	0.4146
	D	0.4741	0.4031	0.4723	0.4130	0.4701	0.4128	0.4591	0.3941	0.4695	0.3954
	E	0.4867	0.4245	0.4723	0.4130	0.4755	0.4133	0.4842	0.4202		
	F	0.4867	0.4245	0.4885	0.4146	0.4853	0.4143	0.4842	0.4202		
	G	0.4885	0.4146	0.4741	0.4031	0.4766	0.4074	0.4853	0.4143		
	H	0.4766	0.4074	0.4755	0.4133	0.4723	0.4130	0.4741	0.4031		
2700 K	A	0.4675	0.4285	0.4561	0.4259	0.4467	0.4076	0.4491	0.4081	0.4637	0.4212
	B	0.4675	0.4285	0.4811	0.4315	0.4698	0.4123	0.4663	0.4115	0.4637	0.4212
	C	0.4698	0.4123	0.4591	0.3941	0.4482	0.3917	0.4517	0.3984	0.4663	0.4115
	D	0.4517	0.3984	0.4491	0.4081	0.4467	0.4076	0.4372	0.3892	0.4482	0.3917
	E	0.4637	0.4212	0.4491	0.4081	0.4526	0.4088	0.4613	0.4166		
	F	0.4637	0.4212	0.4663	0.4115	0.4628	0.4108	0.4613	0.4166		
	G	0.4663	0.4115	0.4517	0.3984	0.4541	0.4030	0.4628	0.4108		
	H	0.4541	0.4030	0.4526	0.4088	0.4491	0.4081	0.4517	0.3984		
3000 K	A	0.4418	0.4211	0.4302	0.4171	0.4226	0.3995	0.4246	0.4002	0.4393	0.4153
	B	0.4418	0.4211	0.4561	0.4259	0.4465	0.4073	0.4432	0.4062	0.4393	0.4153
	C	0.4465	0.4073	0.4372	0.3892	0.4261	0.3856	0.4285	0.3911	0.4432	0.4062
	D	0.4285	0.3911	0.4246	0.4002	0.4226	0.3995	0.4149	0.3819	0.4261	0.3856
	E	0.4393	0.4153	0.4246	0.4002	0.4283	0.4014	0.4371	0.4105		
	F	0.4393	0.4153	0.4432	0.4062	0.4395	0.4050	0.4371	0.4105		
	G	0.4432	0.4062	0.4285	0.3911	0.4307	0.3960	0.4395	0.4050		
	H	0.4307	0.3960	0.4283	0.4014	0.4246	0.4002	0.4285	0.3911		

3500 K	A	0.4131	0.4093	0.4003	0.4034	0.3949	0.3871	0.3977	0.3883	0.4118	0.4054
	B	0.4131	0.4093	0.4302	0.4171	0.4227	0.3997	0.4177	0.3975	0.4118	0.4054
	C	0.4227	0.3997	0.4149	0.3819	0.4022	0.3763	0.4036	0.3804	0.4177	0.3975
	D	0.4036	0.3804	0.3977	0.3883	0.3949	0.3871	0.3895	0.3707	0.4022	0.3763
	E	0.4118	0.4054	0.3977	0.3883	0.4017	0.3902	0.4102	0.4004		
	F	0.4118	0.4054	0.4177	0.3975	0.4137	0.3957	0.4102	0.4004		
	G	0.4177	0.3975	0.4036	0.3804	0.4052	0.3854	0.4137	0.3957		
	H	0.4052	0.3854	0.4017	0.3902	0.3977	0.3883	0.4036	0.3804		
4000 K	A	0.3853	0.3947	0.3737	0.3879	0.3704	0.3731	0.3714	0.3737	0.3845	0.3913
	B	0.3853	0.3947	0.4003	0.4034	0.3949	0.3871	0.3922	0.3855	0.3845	0.3913
	C	0.3949	0.3871	0.3895	0.3707	0.3783	0.3645	0.3791	0.3679	0.3922	0.3855
	D	0.3791	0.3679	0.3714	0.3737	0.3704	0.3731	0.3671	0.3583	0.3783	0.3645
	E	0.3845	0.3913	0.3714	0.3737	0.3756	0.3760	0.3834	0.3866		
	F	0.3845	0.3913	0.3922	0.3855	0.3880	0.3832	0.3834	0.3866		
	G	0.3922	0.3855	0.3791	0.3679	0.3802	0.3726	0.3880	0.3832		
	H	0.3802	0.3726	0.3756	0.3760	0.3714	0.3737	0.3791	0.3679		
4500 K	A	0.3634	0.3809	0.3550	0.3752	0.3538	0.3664	0.3629	0.3779		
	B	0.3634	0.3809	0.3737	0.3879	0.3709	0.3753	0.3629	0.3779		
	C	0.3695	0.3690	0.3671	0.3583	0.3593	0.3532	0.3597	0.3559		
	D	0.3597	0.3559	0.3524	0.3555	0.3514	0.3480	0.3593	0.3532		
	E	0.3629	0.3779	0.3538	0.3664	0.3532	0.3616	0.3557	0.3632	0.3623	0.3735
	F	0.3629	0.3779	0.3709	0.3753	0.3703	0.3728	0.3669	0.3706	0.3623	0.3735
	G	0.3703	0.3728	0.3695	0.3690	0.3597	0.3559	0.3603	0.3603	0.3669	0.3706
	H	0.3603	0.3603	0.3557	0.3632	0.3532	0.3616	0.3524	0.3555	0.3597	0.3559
5000 K	A	0.3452	0.3678	0.3375	0.3619	0.3372	0.3528	0.3451	0.3648		
	B	0.3452	0.3678	0.3550	0.3752	0.3532	0.3614	0.3530	0.3612	0.3451	0.3648
	C	0.3532	0.3614	0.3514	0.3480	0.3440	0.3426	0.3441	0.3454	0.3530	0.3612
	D	0.3441	0.3454	0.3369	0.3445	0.3366	0.3372	0.3440	0.3426		
	E	0.3451	0.3648	0.3372	0.3528	0.3371	0.3496	0.3396	0.3514	0.3449	0.3609
	F	0.3451	0.3648	0.3530	0.3612	0.3496	0.3588	0.3449	0.3609		
	G	0.3530	0.3612	0.3441	0.3454	0.3443	0.3493	0.3496	0.3588		
	H	0.3443	0.3493	0.3396	0.3514	0.3371	0.3496	0.3369	0.3445	0.3441	0.3454

5700 K	A	0.3280	0.3539	0.3205	0.3475	0.3212	0.3373	0.3283	0.3502		
	B	0.3280	0.3539	0.3375	0.3619	0.3370	0.3493	0.3363	0.3486	0.3283	0.3502
	C	0.3370	0.3493	0.3366	0.3372	0.3294	0.3314	0.3291	0.3348	0.3363	0.3486
	D	0.3291	0.3348	0.3215	0.3337	0.3221	0.3255	0.3294	0.3314		
	E	0.3283	0.3502	0.3212	0.3373	0.3213	0.3365	0.3242	0.3388	0.3284	0.3471
	F	0.3283	0.3502	0.3363	0.3486	0.3332	0.3462	0.3284	0.3471		
	G	0.3363	0.3486	0.3291	0.3348	0.3290	0.3379	0.3332	0.3462		
	H	0.3291	0.3348	0.3215	0.3337	0.3213	0.3365	0.3242	0.3388	0.3290	0.3379
6500 K	A	0.3102	0.3379	0.3027	0.3310	0.3047	0.3214	0.3054	0.3220	0.3110	0.3340
	B	0.3102	0.3379	0.3205	0.3475	0.3213	0.3363	0.3192	0.3344	0.3110	0.3340
	C	0.3213	0.3363	0.3221	0.3255	0.3144	0.3187	0.3136	0.3224	0.3192	0.3344
	D	0.3136	0.3224	0.3054	0.3220	0.3047	0.3214	0.3067	0.3118	0.3144	0.3187
	E	0.3110	0.3340	0.3054	0.3220	0.3082	0.3245	0.3115	0.3317		
	F	0.3110	0.3340	0.3192	0.3344	0.3165	0.3319	0.3115	0.3317		
	G	0.3192	0.3344	0.3136	0.3224	0.3131	0.3247	0.3165	0.3319		
	H	0.3136	0.3224	0.3054	0.3220	0.3082	0.3245	0.3131	0.3247		

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## Group Name on Label

**Example: M8-K2**

Brightness

Forward Voltage

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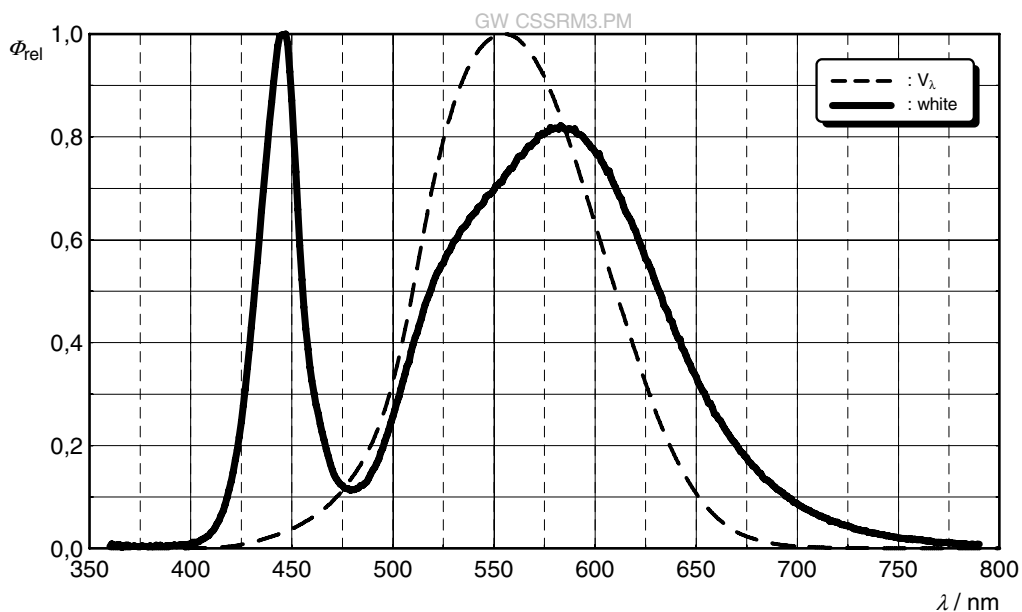
M8

K2

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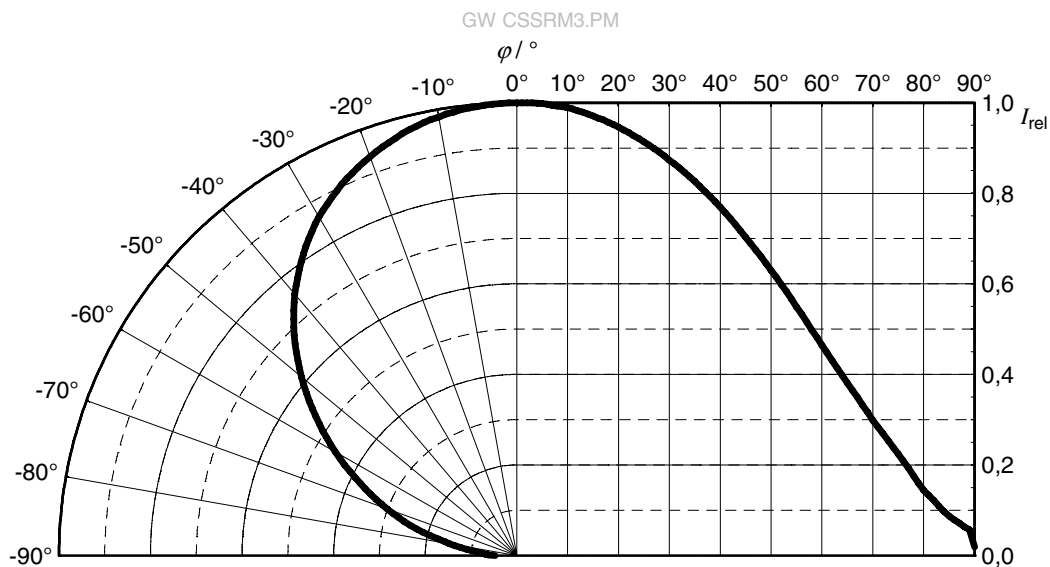
### Relative Spectral Emission <sup>6)</sup>

$\Phi_{rel} = f(\lambda); I_F = 700 \text{ mA}; T_J = 85 \text{ }^\circ\text{C}$



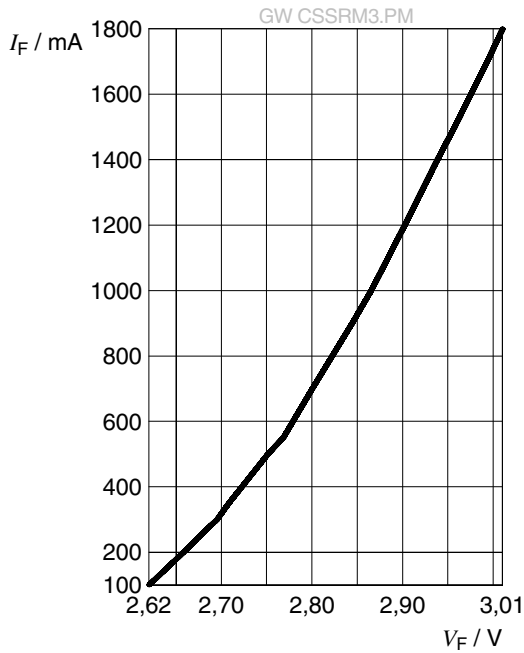
### Radiation Characteristics <sup>6)</sup>

$I_{rel} = f(\phi); T_J = 85 \text{ }^\circ\text{C}$



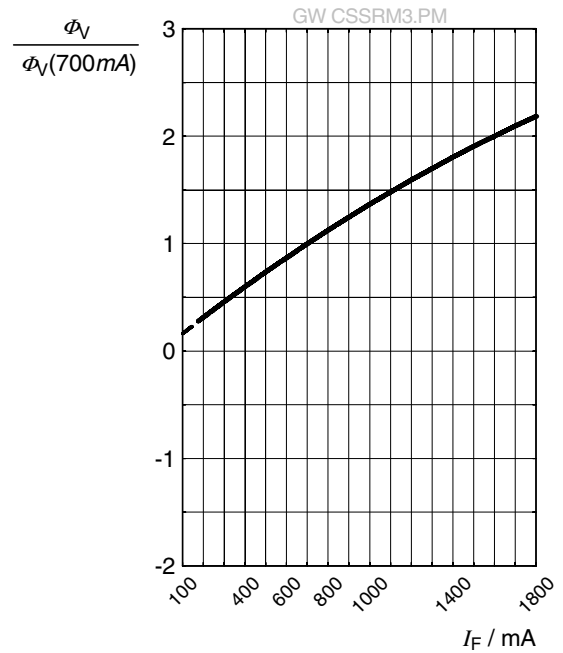
**Forward current** <sup>6), 7)</sup>

$I_F = f(V_F); T_J = 85 \text{ }^\circ\text{C}$



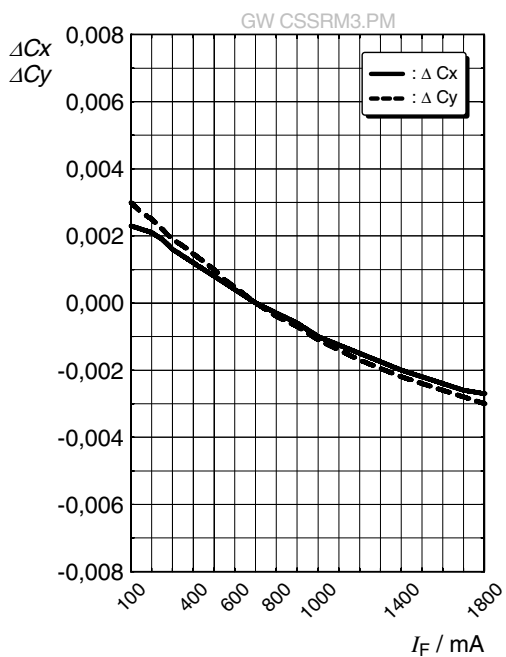
**Relative Luminous Flux** <sup>6), 7)</sup>

$\Phi_V / \Phi_V(700 \text{ mA}) = f(I_F); T_J = 85 \text{ }^\circ\text{C}$



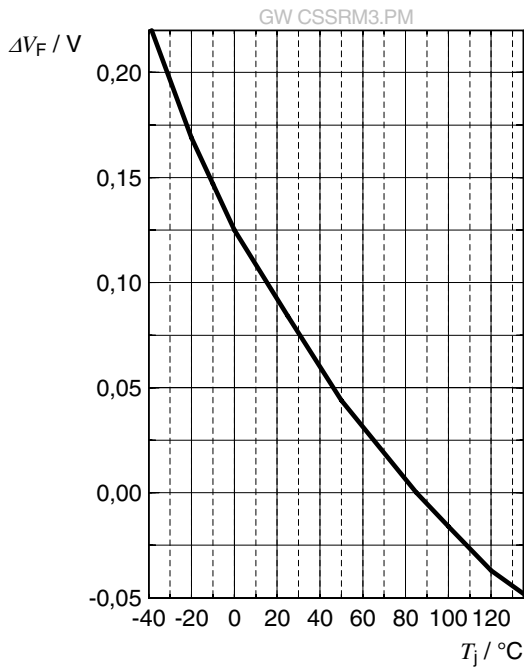
**Chromaticity Coordinate Shift** <sup>6)</sup>

$\Delta C_x, \Delta C_y = f(I_F); T_J = 85 \text{ }^\circ\text{C}$



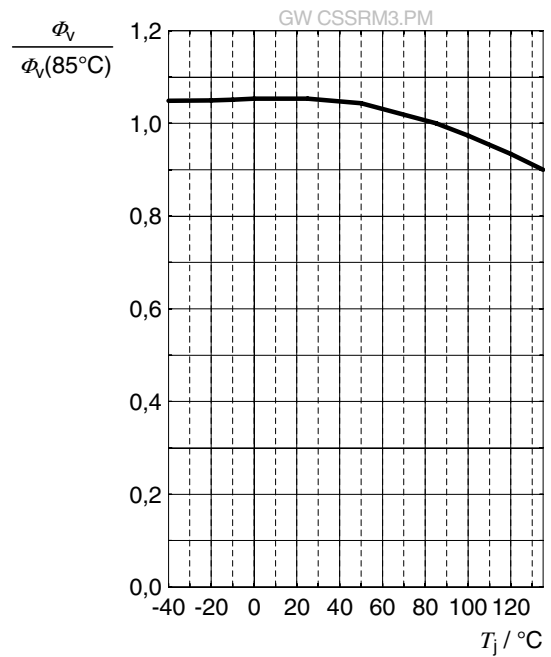
**Forward Voltage** <sup>6)</sup>

$$\Delta V_F = V_F - V_F(85^\circ\text{C}) = f(T_j); I_F = 700\text{ mA}$$



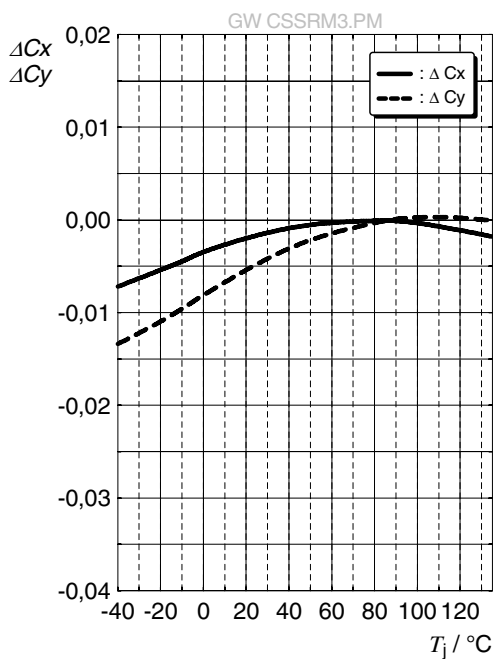
**Relative Luminous Flux** <sup>6)</sup>

$$\Phi_V / \Phi_V(85^\circ\text{C}) = f(T_j); I_F = 700\text{ mA}$$



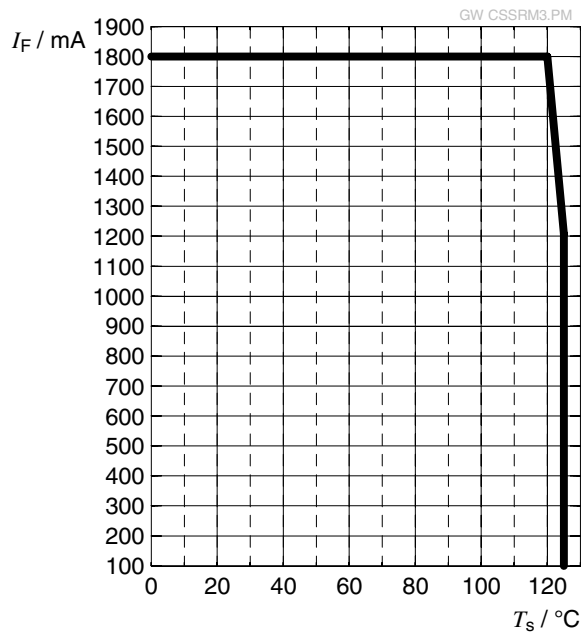
**Chromaticity Coordinate Shift** <sup>6)</sup>

$$\Delta C_x, \Delta C_y = f(T_j); I_F = 700\text{ mA}$$



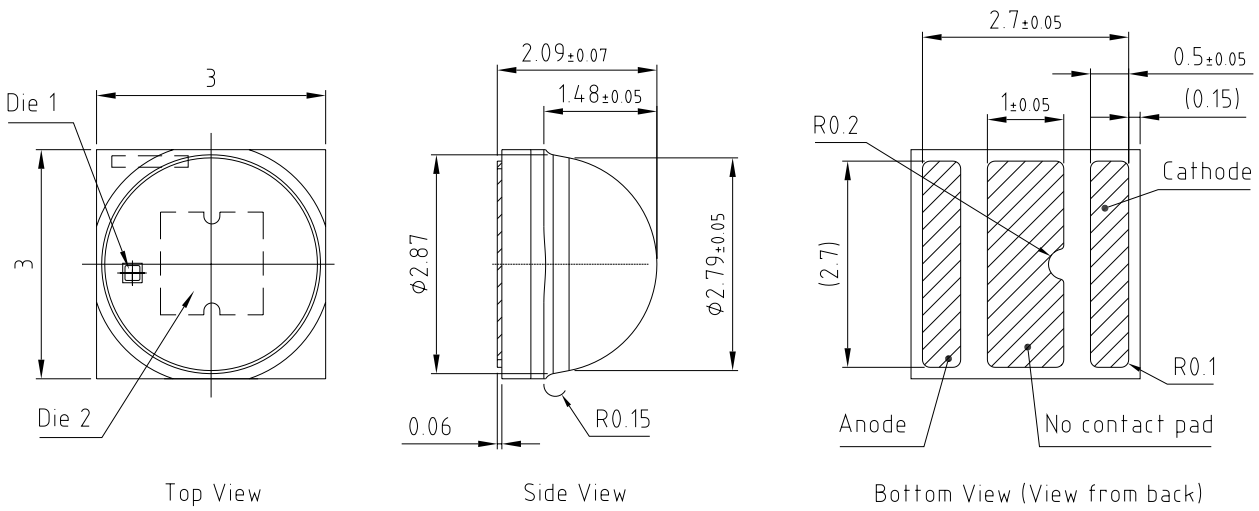
## Max. Permissible Forward Current

$$I_F = f(T)$$





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



C67062-A0160-A1-04

**Further Information:**

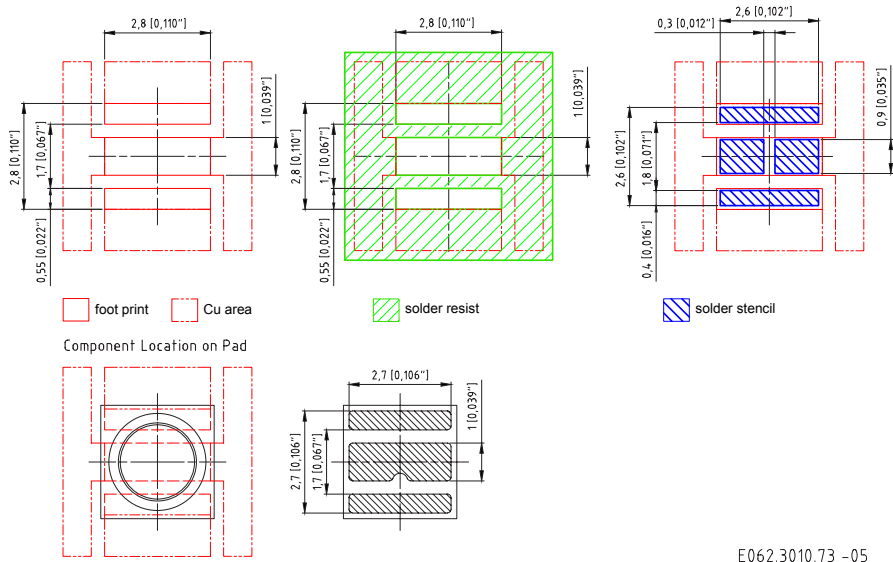
**Approximate Weight:** 29.0 mg

**Package marking:** Cathode

**Corrosion test:** Class: 3B  
 Test condition: 40°C / 90 % RH / 15 ppm H<sub>2</sub>S / 14 days (stricter than 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)

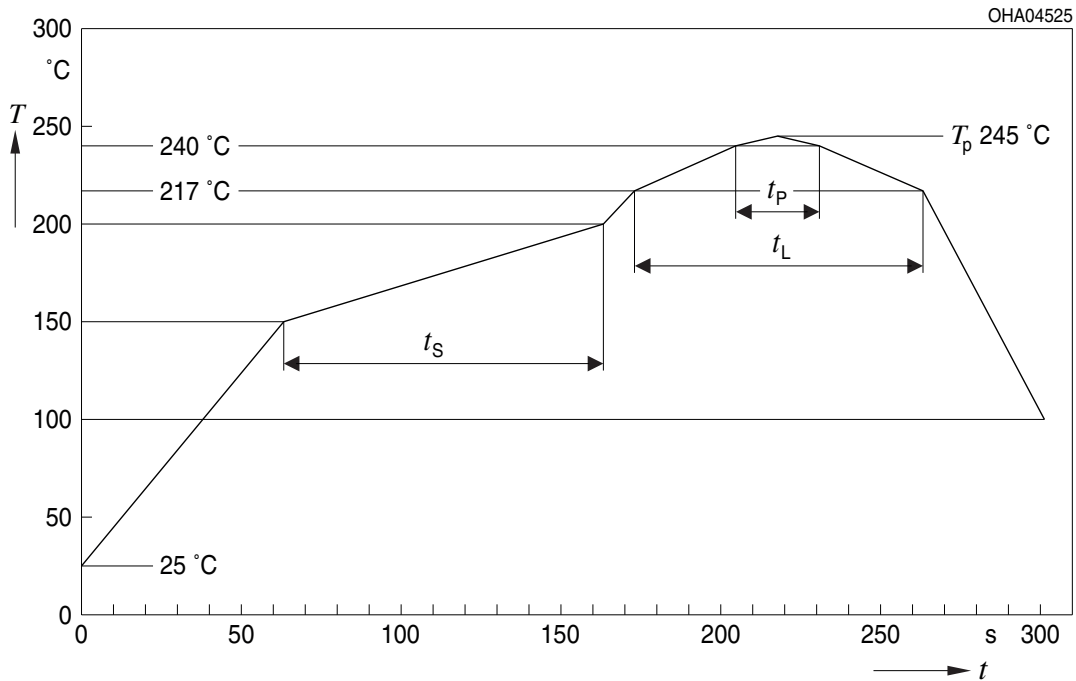


E062.3010.73 -05

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Further information can be found in our Application Note: "Handling and Processing Details for Ceramic LEDs".

## Reflow Soldering Profile

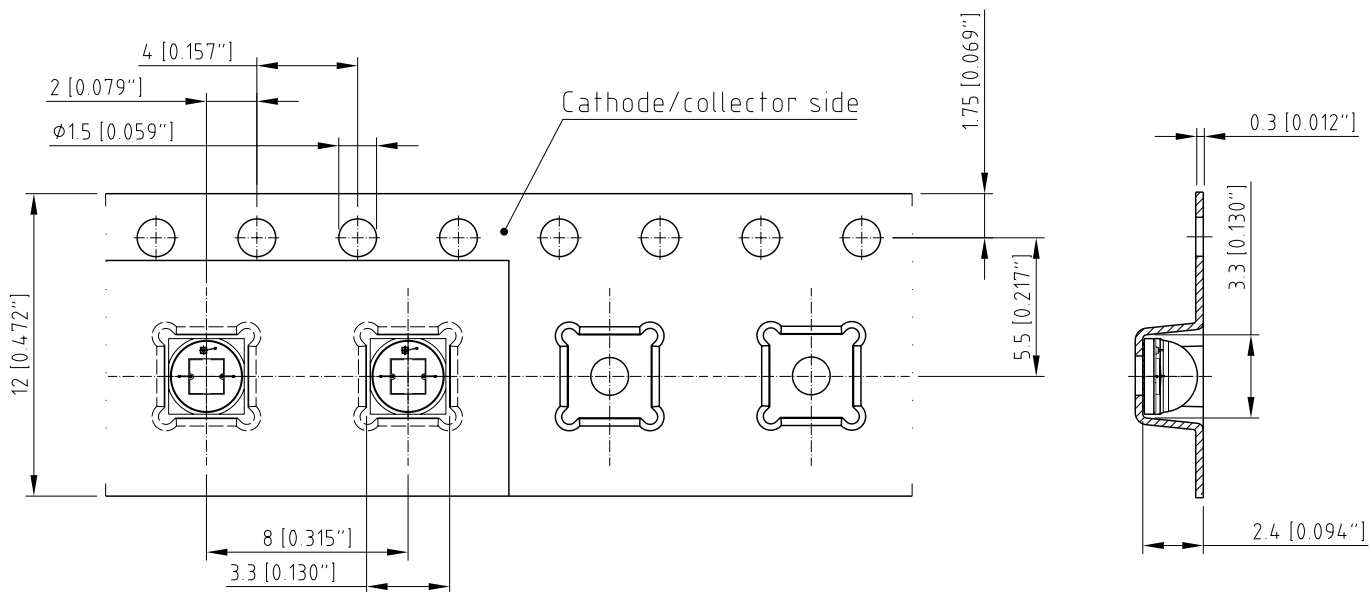
Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



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

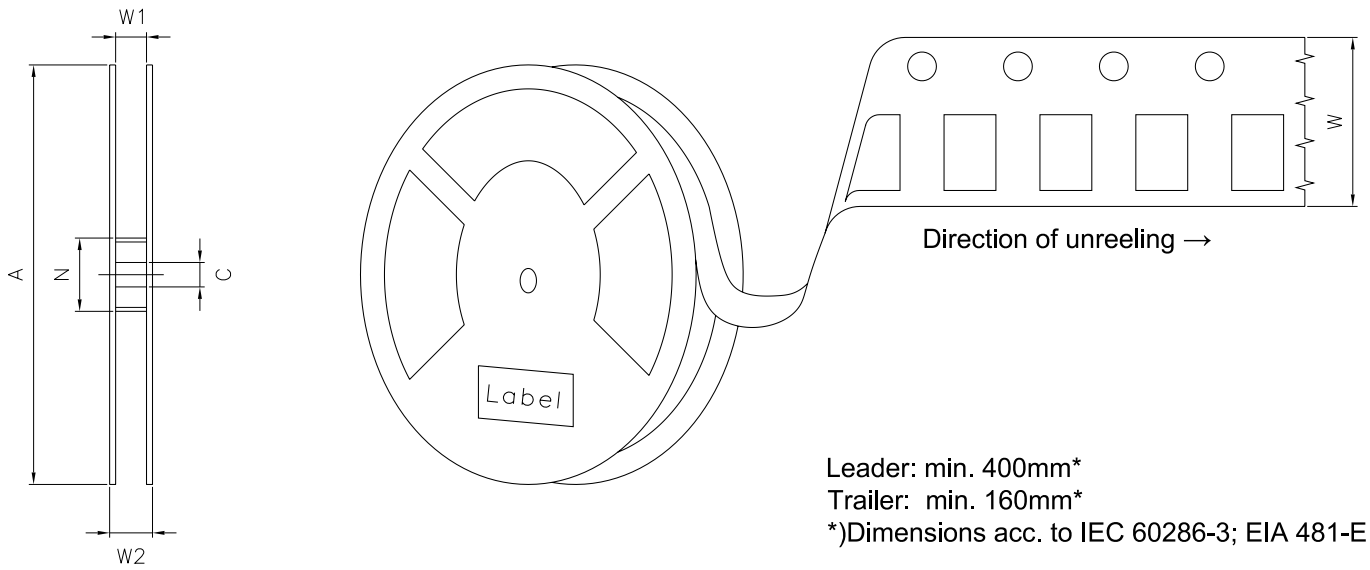
All temperatures refer to the center of the package, measured on the top of the component  
 \*) slope calculation  $DT/Dt$ :  $Dt$  max. 5 s; fulfillment for the whole T-range

### Taping <sup>8)</sup>



C67062-A0160-B4-02

**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	600
330 mm	12 + 0.3 / - 0.1 mm	60 mm	12.4 + 2 mm	18.4 mm	3000

**Barcode-Product-Label (BPL)**

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


RoHS Compliant

(6P) BATCH NO: 1234567890 ML Temp    ST  
X    XXX °C X

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

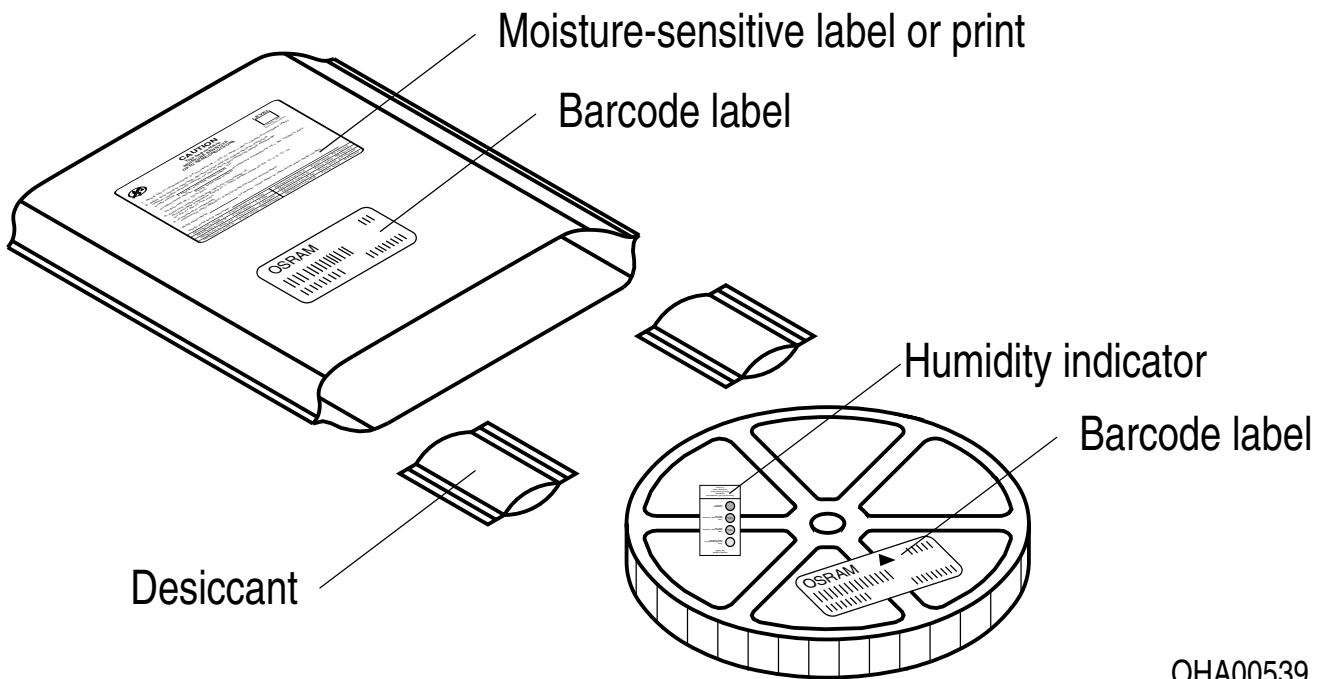
(X) PROD NO: 123456789(Q)QTY: 9999 (G) GROUP: XX-XX-X-X

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



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 falls into the class **moderate risk (exposure time 0.25 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 coordinate groups are measured during a current pulse duration of typically 10ms with a tolerance of  $\pm 0.005$ .
- 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
1.1	2019-01-08	Characteristics Electro - Optical Characteristics (Diagrams) Derating (Diagrams)
1.2	2019-02-12	Ordering Information
1.3	2019-04-22	Disclaimer
1.3	2020-10-06	Schematic Transportation Box Dimensions of Transportation Box
1.4	2020-12-21	Ordering Information Tape and Reel

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