

OSRAM KW DSLP31.CC

Datasheet

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Tobelbader Strasse 30, 8141 Premstaetten, Austria

Phone +43 3136 500-0

ams-osram.com

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OSTUNE™ E3030

KW DSLP31.CC specified at 140 mA

The OSTUNE™ E3030 KW DSLP31.CC is specifically designed for automotive interior high quality white applications, offering a color temperature range from 2700 K (warm white) to 6500 K (cold white) at a superior CRI level.



Applications

- Ambient Lighting
- Automotive Aftermarket

Features

- Package: white SMT package, colored diffused silicone resin
- Chip technology: Volume emitter on Sapphire (AlInGaN)
- Typ. Radiation: 120° (Lambertian emitter)
- Color: $C_x = 0.4$, $C_y = 0.38$ acc. to CIE 1931 (● white)
- Corrosion Robustness Class: 3B
- Qualifications: AEC-Q102 Qualified
- Color temperature: 2700K - 6500K
- CRI: 90 (min.)
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)

Ordering Information

Type	Color temperature	Luminous Flux ¹⁾ $I_F = 140 \text{ mA}$ Φ_V	Ordering Code
KW DSLP31.CC-JXJZ-4U9X-46A6	2700 K	45 ... 71 lm	Q65112A9969
KW DSLP31.CC-JXJZ-4R9T-46A6	3000 K	45 ... 71 lm	Q65112A9970
KW DSLP31.CC-JXJZ-4O9Q-46A6	3500 K	45 ... 71 lm	Q65112A9971
KW DSLP31.CC-JXJZ-4L8N-46A6	4000 K	45 ... 71 lm	Q65113A1207
KW DSLP31.CC-JXJZ-4J8K-46A6	4500 K	45 ... 71 lm	Q65113A1209
KW DSLP31.CC-JYKX-4H8I-46A6	5000 K	52 ... 82 lm	Q65115A0870
KW DSLP31.CC-JYKX-4F8G-46A6	5700 K	52 ... 82 lm	Q65115A0871
KW DSLP31.CC-JYKX-4C8E-46A6	6500 K	52 ... 82 lm	Q65115A0872

Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min.	-40 °C
		max.	110 °C
Storage Temperature	T_{stg}	min.	-40 °C
		max.	110 °C
Junction Temperature	T_j	max.	125 °C
Junction Temperature for short time applications*	T_j	max.	135 °C
Forward current	I_F	min.	3 mA
$T_s = 25\text{ °C}$		max.	200 mA
Forward current pulsed $t \leq 5\text{ ms}$; $D = 10\%$; $T_s = 25\text{ °C}$	$I_{F\text{ pulse}}$	max.	400 mA
Reverse voltage ²⁾ $T_s = 25\text{ °C}$	V_R	max.	5 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}		2 kV

* The median lifetime (L70/B50) for $T_j = 135\text{ °C}$ is 100h.

Characteristics

$I_F = 140 \text{ mA}$; $T_s = 25 \text{ °C}$

Parameter	Symbol		Values
Chromaticity Coordinate ³⁾	Cx	typ.	0.4
	Cy	typ.	0.38
Viewing angle at 50% I_V	2ϕ	typ.	120 °
Forward Voltage ⁴⁾ $I_F = 140 \text{ mA}$	V_F	min.	2.90 V
		typ.	3.20 V
		max.	3.50 V
Reverse current ²⁾ $V_R = 5 \text{ V}$	I_R	typ.	0.01 μA
		max.	10 μA
Color Rendering Index	CRI	min.	90
Real thermal resistance junction/solderpoint ⁵⁾	$R_{\text{thJS real}}$	typ.	26 K / W
		max.	36 K / W

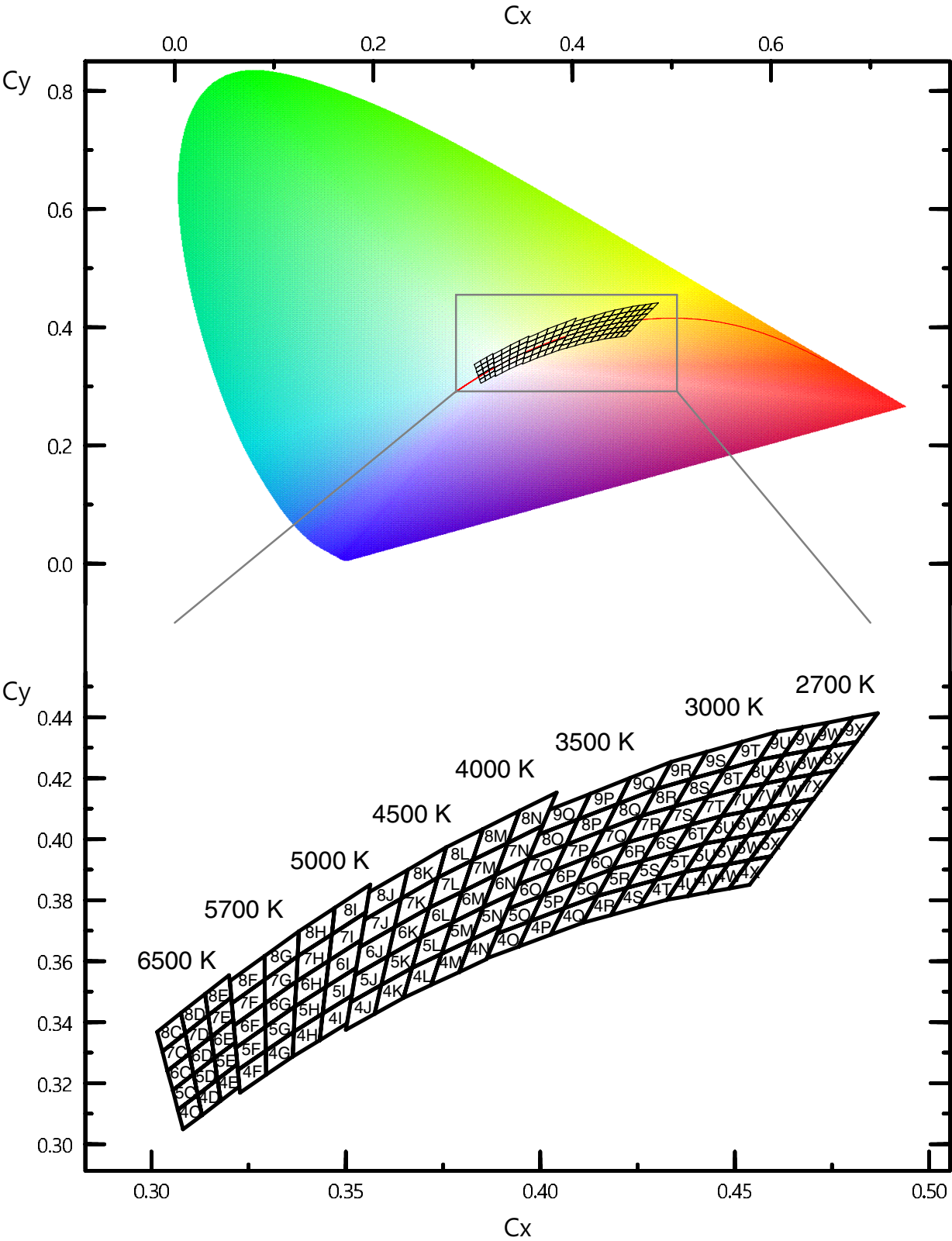
Brightness Groups

Group	Luminous Flux ¹⁾ $I_F = 140 \text{ mA}$ min. Φ_V	Luminous Flux ¹⁾ $I_F = 140 \text{ mA}$ max. Φ_V
JX	45 lm	52 lm
JY	52 lm	61 lm
JZ	61 lm	71 lm
KX	71 lm	82 lm

Forward Voltage Groups

Group	Forward Voltage ⁴⁾ $I_F = 140 \text{ mA}$ min. V_F	Forward Voltage ⁴⁾ $I_F = 140 \text{ mA}$ max. V_F
46	2.90 V	3.20 V
A6	3.20 V	3.50 V

Chromaticity Coordinate Groups



Chromaticity Coordinate Groups ³⁾

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
4C	0.3081	0.3049	5D	0.3119	0.3162	6E	0.3162	0.3282
	0.3068	0.3113		0.3108	0.3229		0.3154	0.3352
	0.3119	0.3162		0.3162	0.3282		0.3210	0.3408
	0.3130	0.3095		0.3170	0.3212		0.3216	0.3334
4D	0.3130	0.3095	5E	0.3170	0.3212	6F	0.3217	0.3316
	0.3119	0.3162		0.3162	0.3282		0.3212	0.3389
	0.3170	0.3212		0.3216	0.3334		0.3292	0.3461
	0.3178	0.3142		0.3221	0.3262		0.3293	0.3384
4E	0.3178	0.3142	5F	0.3222	0.3243	6G	0.3293	0.3384
	0.3170	0.3212		0.3217	0.3316		0.3292	0.3461
	0.3221	0.3262		0.3293	0.3384		0.3373	0.3534
	0.3226	0.3189		0.3294	0.3306		0.3369	0.3451
4F	0.3228	0.3170	5G	0.3294	0.3306	6H	0.3369	0.3451
	0.3222	0.3243		0.3293	0.3384		0.3373	0.3534
	0.3294	0.3306		0.3369	0.3451		0.3456	0.3601
	0.3295	0.3228		0.3366	0.3369		0.3448	0.3515
4G	0.3295	0.3228	5H	0.3366	0.3369	6I	0.3448	0.3515
	0.3294	0.3306		0.3369	0.3451		0.3456	0.3601
	0.3366	0.3369		0.3448	0.3515		0.3539	0.3669
	0.3363	0.3287		0.3441	0.3428		0.3527	0.3578
4H	0.3363	0.3287	5I	0.3441	0.3428	7C	0.3041	0.3240
	0.3366	0.3369		0.3448	0.3515		0.3028	0.3304
	0.3441	0.3428		0.3527	0.3578		0.3087	0.3363
	0.3433	0.3341		0.3515	0.3487		0.3098	0.3296
4I	0.3433	0.3341	6C	0.3055	0.3177	7D	0.3098	0.3296
	0.3441	0.3428		0.3041	0.3240		0.3087	0.3363
	0.3515	0.3487		0.3098	0.3296		0.3146	0.3422
	0.3503	0.3396		0.3108	0.3229		0.3154	0.3352
5C	0.3068	0.3113	6D	0.3108	0.3229	7E	0.3154	0.3352
	0.3055	0.3177		0.3098	0.3296		0.3146	0.3422
	0.3108	0.3229		0.3154	0.3352		0.3205	0.3481
	0.3119	0.3162		0.3162	0.3282		0.3210	0.3408

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
7F	0.3212	0.3389	8G	0.3292	0.3539	5V	0.4428	0.3906
	0.3206	0.3462		0.3291	0.3617		0.4477	0.3998
	0.3292	0.3539		0.3379	0.3698		0.4534	0.4011
	0.3292	0.3461		0.3376	0.3616		0.4483	0.3919
7G	0.3292	0.3461	8H	0.3376	0.3616	5W	0.4483	0.3919
	0.3292	0.3539		0.3379	0.3698		0.4534	0.4011
	0.3376	0.3616		0.3471	0.3775		0.4591	0.4025
	0.3373	0.3534		0.3464	0.3688		0.4538	0.3931
7H	0.3373	0.3534	8I	0.3464	0.3688	5X	0.4538	0.3931
	0.3376	0.3616		0.3471	0.3775		0.4591	0.4025
	0.3464	0.3688		0.3563	0.3851		0.4648	0.4038
	0.3456	0.3601		0.3551	0.3760		0.4593	0.3944
7I	0.3456	0.3601	4U	0.4326	0.3801	6U	0.4420	0.3985
	0.3464	0.3688		0.4373	0.3893		0.4468	0.4077
	0.3551	0.3760		0.4428	0.3906		0.4526	0.4090
	0.3539	0.3669		0.4379	0.3814		0.4477	0.3998
8C	0.3028	0.3304	4V	0.4379	0.3814	6V	0.4477	0.3998
	0.3015	0.3368		0.4428	0.3906		0.4526	0.4090
	0.3076	0.3430		0.4483	0.3919		0.4585	0.4104
	0.3087	0.3363		0.4432	0.3826		0.4534	0.4011
8D	0.3087	0.3363	4W	0.4432	0.3826	6W	0.4534	0.4011
	0.3076	0.3430		0.4483	0.3919		0.4585	0.4104
	0.3138	0.3492		0.4538	0.3931		0.4644	0.4118
	0.3146	0.3422		0.4485	0.3838		0.4591	0.4025
8E	0.3146	0.3422	4X	0.4485	0.3838	6X	0.4591	0.4025
	0.3138	0.3492		0.4538	0.3931		0.4644	0.4118
	0.3200	0.3554		0.4593	0.3944		0.4703	0.4132
	0.3205	0.3481		0.4538	0.3850		0.4648	0.4038
8F	0.3206	0.3462	5U	0.4373	0.3893	7U	0.4468	0.4077
	0.3201	0.3534		0.4420	0.3985		0.4515	0.4168
	0.3291	0.3617		0.4477	0.3998		0.4576	0.4183
	0.3292	0.3539		0.4428	0.3906		0.4526	0.4090

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
7V	0.4526	0.4090	9V	0.4625	0.4275	5T	0.4298	0.3867
	0.4576	0.4183		0.4674	0.4367		0.4342	0.3957
	0.4636	0.4197		0.4739	0.4382		0.4420	0.3985
	0.4585	0.4104		0.4688	0.4290		0.4373	0.3893
7W	0.4585	0.4104	9W	0.4688	0.4290	6R	0.4185	0.3902
	0.4636	0.4197		0.4739	0.4382		0.4223	0.3990
	0.4697	0.4211		0.4803	0.4398		0.4305	0.4019
	0.4644	0.4118		0.4750	0.4304		0.4263	0.3929
7X	0.4644	0.4118	9X	0.4750	0.4304	6S	0.4263	0.3929
	0.4697	0.4211		0.4803	0.4398		0.4305	0.4019
	0.4758	0.4225		0.4868	0.4413		0.4386	0.4048
	0.4703	0.4132		0.4813	0.4319		0.4342	0.3957
8U	0.4515	0.4168	4R	0.4109	0.3726	6T	0.4342	0.3957
	0.4562	0.4260		0.4147	0.3814		0.4386	0.4048
	0.4625	0.4275		0.4222	0.3840		0.4468	0.4077
	0.4576	0.4183		0.4181	0.3751		0.4420	0.3985
8V	0.4576	0.4183	4S	0.4181	0.3751	7R	0.4223	0.3990
	0.4625	0.4275		0.4222	0.3840		0.4261	0.4077
	0.4688	0.4290		0.4298	0.3867		0.4346	0.4108
	0.4636	0.4197		0.4254	0.3776		0.4305	0.4019
8W	0.4636	0.4197	4T	0.4254	0.3776	7S	0.4305	0.4019
	0.4688	0.4290		0.4298	0.3867		0.4346	0.4108
	0.4750	0.4304		0.4373	0.3893		0.4430	0.4138
	0.4697	0.4211		0.4326	0.3801		0.4386	0.4048
8X	0.4697	0.4211	5R	0.4147	0.3814	7T	0.4386	0.4048
	0.4750	0.4304		0.4185	0.3902		0.4430	0.4138
	0.4813	0.4319		0.4263	0.3929		0.4515	0.4168
	0.4758	0.4225		0.4222	0.3840		0.4468	0.4077
9U	0.4562	0.4260	5S	0.4222	0.3840	8R	0.4261	0.4077
	0.4609	0.4352		0.4263	0.3929		0.4299	0.4165
	0.4674	0.4367		0.4342	0.3957		0.4387	0.4197
	0.4625	0.4275		0.4298	0.3867		0.4346	0.4108

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
8S	0.4346	0.4108	5O	0.3890	0.3690	7Q	0.4130	0.3944
	0.4387	0.4197		0.3916	0.3772		0.4164	0.4029
	0.4474	0.4228		0.4006	0.3815		0.4261	0.4077
	0.4430	0.4138		0.3975	0.3731		0.4223	0.3990
8T	0.4430	0.4138	5P	0.3975	0.3731	8O	0.3970	0.3934
	0.4474	0.4228		0.4006	0.3815		0.3997	0.4015
	0.4562	0.4260		0.4095	0.3858		0.4097	0.4065
	0.4515	0.4168		0.4061	0.3773		0.4067	0.3982
9R	0.4299	0.4165	5Q	0.4061	0.3773	8P	0.4067	0.3982
	0.4337	0.4253		0.4095	0.3858		0.4097	0.4065
	0.4428	0.4286		0.4185	0.3902		0.4198	0.4115
	0.4387	0.4197		0.4147	0.3814		0.4164	0.4029
9S	0.4387	0.4197	6O	0.3916	0.3772	8Q	0.4164	0.4029
	0.4428	0.4286		0.3943	0.3853		0.4198	0.4115
	0.4519	0.4319		0.4036	0.3898		0.4299	0.4165
	0.4474	0.4228		0.4006	0.3815		0.4261	0.4077
9T	0.4474	0.4228	6P	0.4006	0.3815	9O	0.3997	0.4015
	0.4519	0.4319		0.4036	0.3898		0.4023	0.4097
	0.4609	0.4352		0.4130	0.3944		0.4128	0.4148
	0.4562	0.4260		0.4095	0.3858		0.4097	0.4065
4O	0.3863	0.3609	6Q	0.4095	0.3858	9P	0.4097	0.4065
	0.3890	0.3690		0.4130	0.3944		0.4128	0.4148
	0.3975	0.3731		0.4223	0.3990		0.4232	0.4201
	0.3945	0.3648		0.4185	0.3902		0.4198	0.4115
4P	0.3945	0.3648	7O	0.3943	0.3853	9Q	0.4198	0.4115
	0.3975	0.3731		0.3970	0.3934		0.4232	0.4201
	0.4061	0.3773		0.4067	0.3982		0.4337	0.4253
	0.4027	0.3687		0.4036	0.3898		0.4299	0.4165
4Q	0.4027	0.3687	7P	0.4036	0.3898	4L	0.3648	0.3479
	0.4061	0.3773		0.4067	0.3982		0.3670	0.3578
	0.4147	0.3814		0.4164	0.4029		0.3746	0.3624
	0.4109	0.3726		0.4130	0.3944		0.3719	0.3522

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
4M	0.3719	0.3522	7L	0.3714	0.3775	5J	0.3512	0.3465
	0.3746	0.3624		0.3736	0.3874		0.3524	0.3555
	0.3822	0.3670		0.3826	0.3931		0.3608	0.3616
	0.3791	0.3564		0.3799	0.3828		0.3591	0.3522
4N	0.3791	0.3564	7M	0.3799	0.3828	5K	0.3591	0.3522
	0.3822	0.3670		0.3826	0.3931		0.3608	0.3616
	0.3898	0.3716		0.3916	0.3987		0.3692	0.3677
	0.3862	0.3607		0.3885	0.3882		0.3670	0.3578
5L	0.3670	0.3578	7N	0.3885	0.3882	6J	0.3524	0.3555
	0.3692	0.3677		0.3916	0.3987		0.3536	0.3646
	0.3773	0.3726		0.4006	0.4044		0.3625	0.3711
	0.3746	0.3624		0.3970	0.3935		0.3608	0.3616
5M	0.3746	0.3624	8L	0.3736	0.3874	6K	0.3608	0.3616
	0.3773	0.3726		0.3758	0.3973		0.3625	0.3711
	0.3853	0.3776		0.3853	0.4033		0.3714	0.3775
	0.3822	0.3670		0.3826	0.3931		0.3692	0.3677
5N	0.3822	0.3670	8M	0.3826	0.3931	7J	0.3536	0.3646
	0.3853	0.3776		0.3853	0.4033		0.3548	0.3736
	0.3934	0.3825		0.3947	0.4093		0.3642	0.3805
	0.3898	0.3716		0.3916	0.3987		0.3625	0.3711
6L	0.3692	0.3677	8N	0.3916	0.3987	7K	0.3625	0.3711
	0.3714	0.3775		0.3947	0.4093		0.3642	0.3805
	0.3799	0.3828		0.4042	0.4153		0.3736	0.3874
	0.3773	0.3726		0.4006	0.4044		0.3714	0.3775
6M	0.3773	0.3726	4J	0.3500	0.3375	8J	0.3548	0.3736
	0.3799	0.3828		0.3512	0.3465		0.3560	0.3826
	0.3885	0.3882		0.3591	0.3522		0.3659	0.3900
	0.3853	0.3776		0.3574	0.3427		0.3642	0.3805
6N	0.3853	0.3776	4K	0.3574	0.3427	8K	0.3642	0.3805
	0.3885	0.3882		0.3591	0.3522		0.3659	0.3900
	0.3970	0.3935		0.3670	0.3578		0.3758	0.3973
	0.3934	0.3825		0.3648	0.3479		0.3736	0.3874

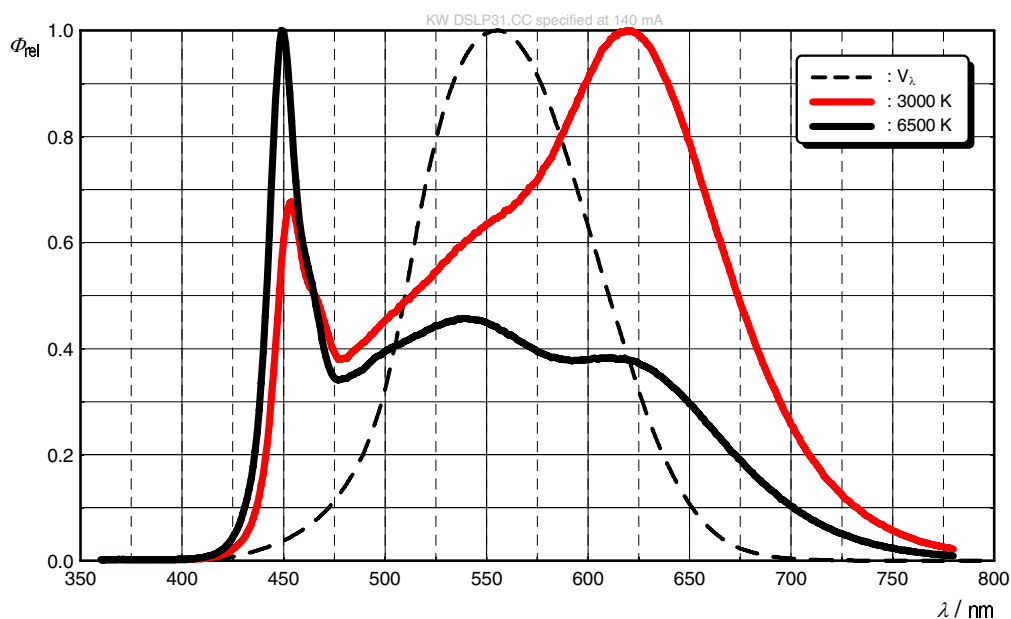
Group Name on Label

Example: JX-4C-46

Brightness	Color Chromaticity	Forward Voltage
JX	4C	46

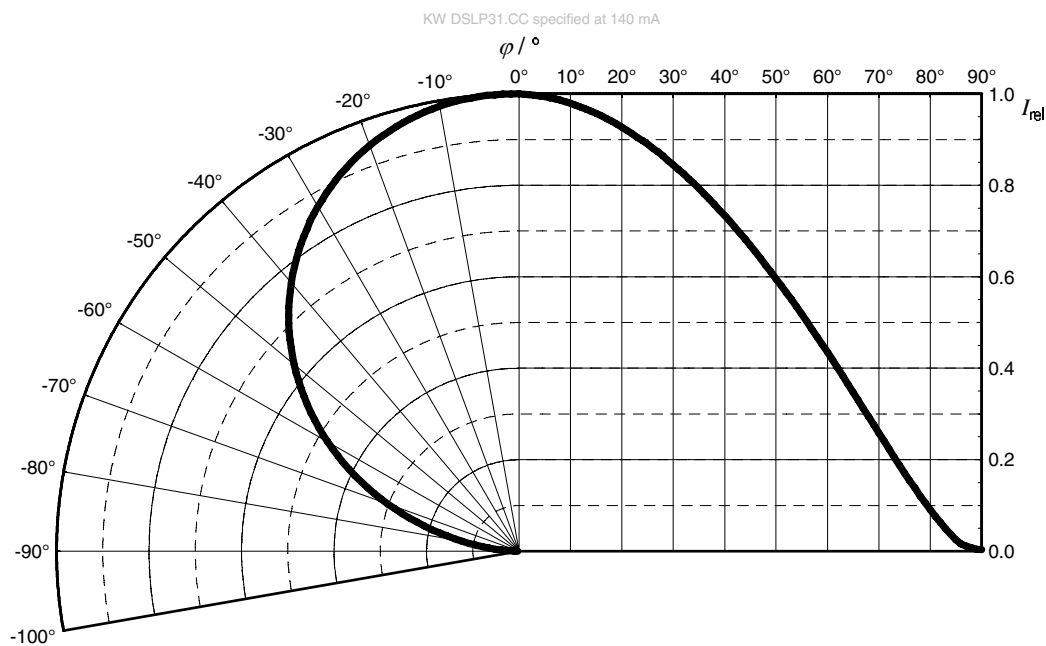
Relative Spectral Emission ⁶⁾

$\Phi_{\text{rel}} = f(\lambda)$; $I_F = 140 \text{ mA}$; $T_S = 25^\circ\text{C}$



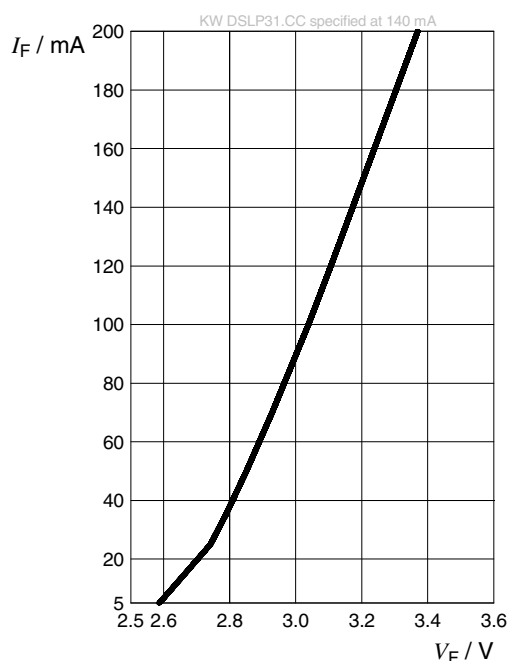
Radiation Characteristics ⁶⁾

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



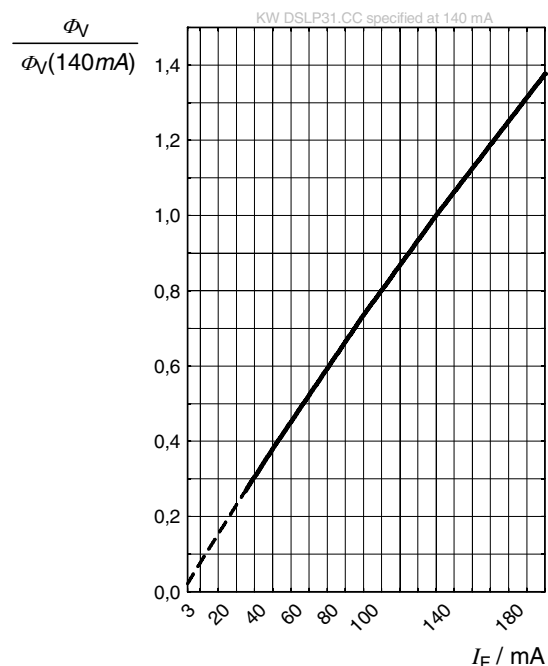
Forward current ⁶⁾

$$I_F = f(V_F); T_S = 25\text{ °C}$$



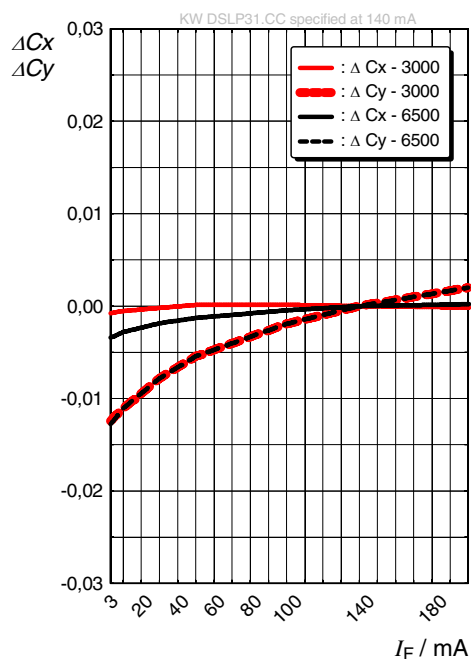
Relative Luminous Flux ^{6), 7)}

$$\Phi_V / \Phi_V(140\text{ mA}) = f(I_F); T_S = 25\text{ °C}$$



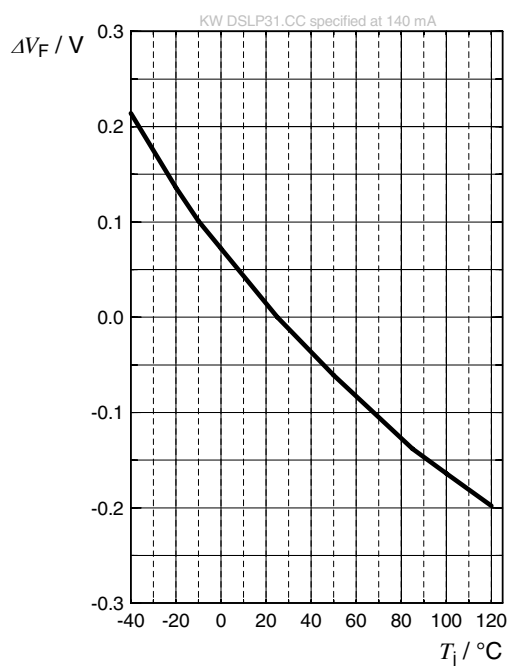
Chromaticity Coordinate Shift ⁶⁾

$$\Delta Cx, \Delta Cy = f(I_F); T_S = 25\text{ °C}$$



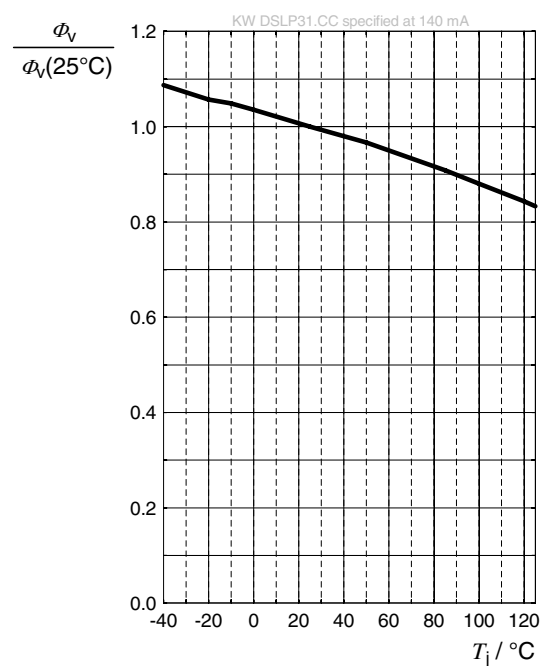
Forward Voltage ⁶⁾

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 140\text{ mA}$$



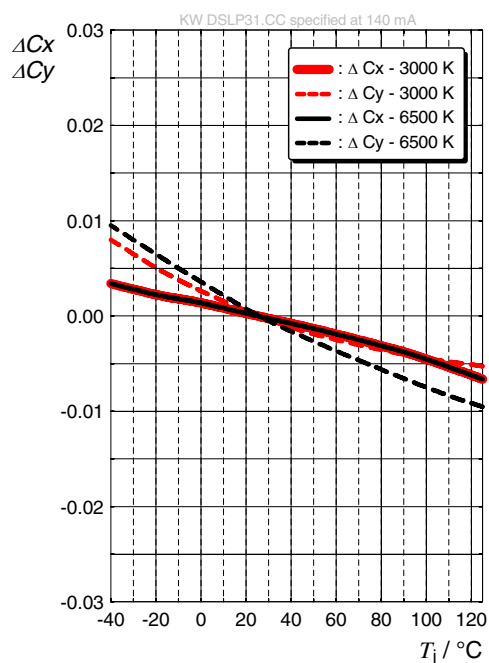
Relative Luminous Flux ⁶⁾

$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j); I_F = 140\text{ mA}$$



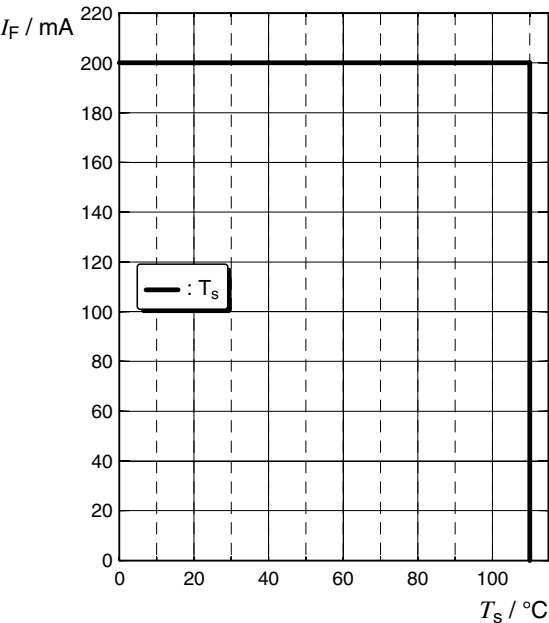
Chromaticity Coordinate Shift ⁶⁾

$$\Delta Cx, \Delta Cy = f(T_j); I_F = 140\text{ mA}$$



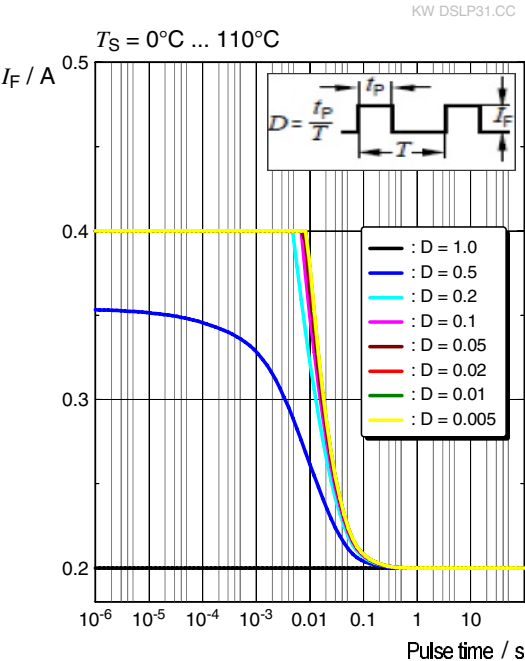
Max. Permissible Forward Current ⁵⁾

$I_F = f(T)$

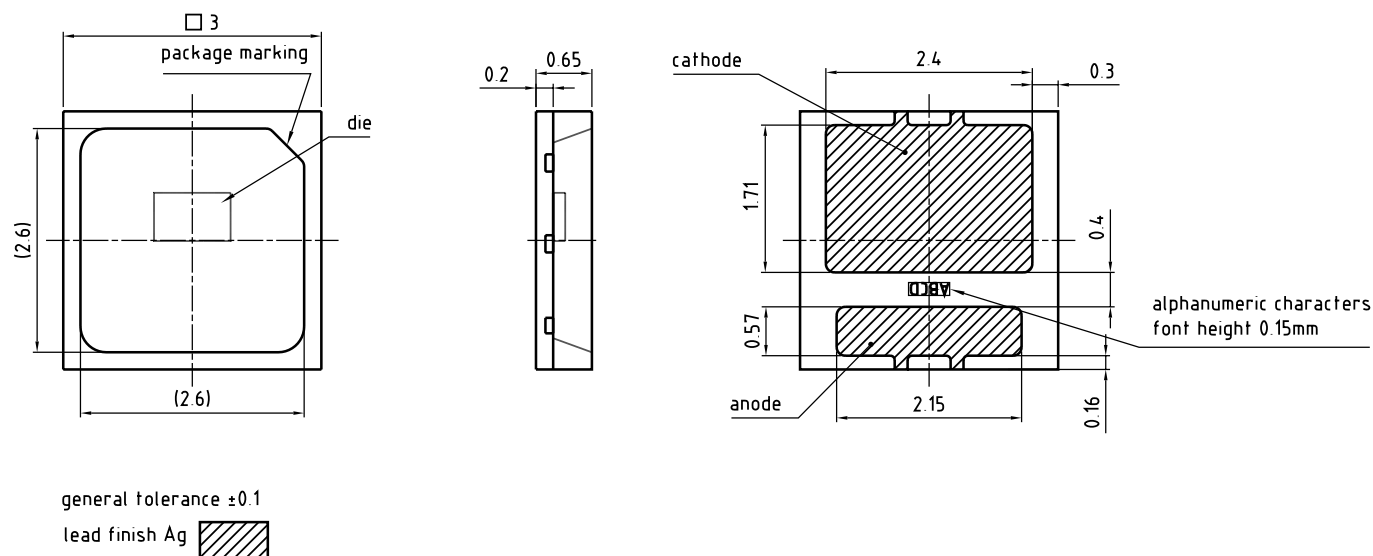


Permissible Pulse Handling Capability

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



Dimensional Drawing ⁸⁾



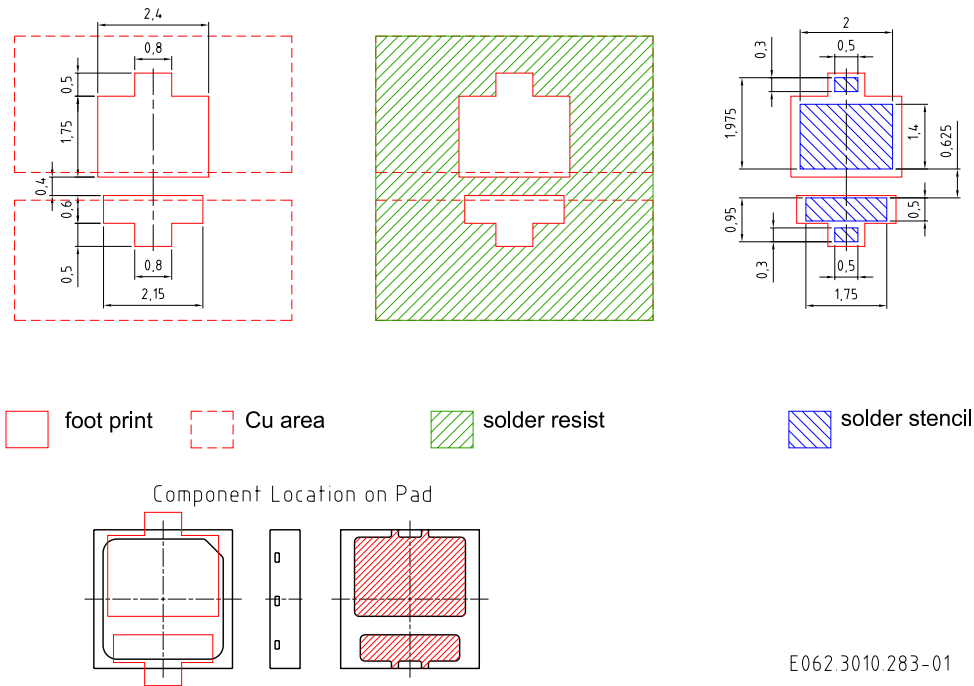
C63062-A4415-A1.-03

Further Information:

Approximate Weight: 16.0 mg

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

Recommended Solder Pad ⁸⁾

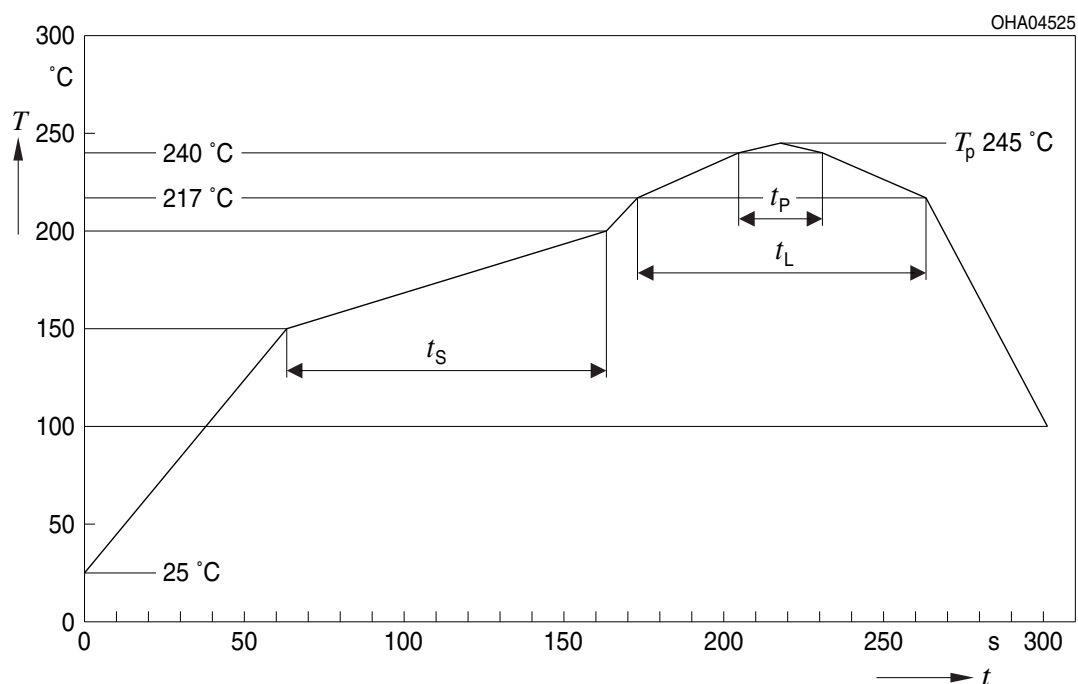


E062.3010.283-01

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere.

Reflow Soldering Profile

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

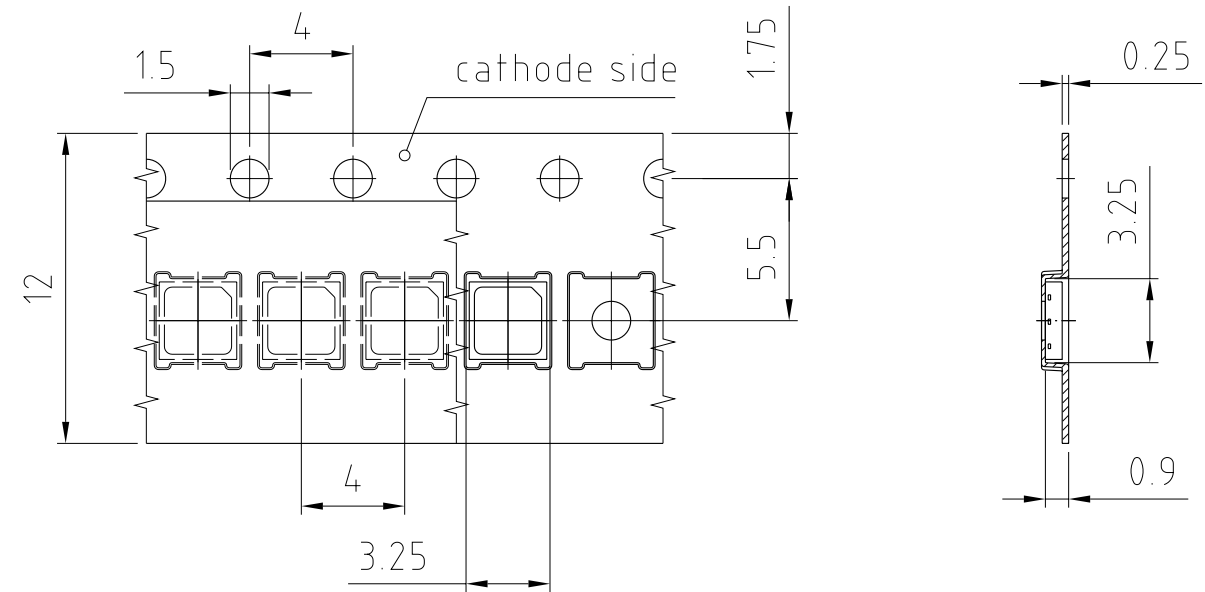


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat ^{*)} 25 °C to 150 °C			2	3	K/s
Time t_s T_{Smin} to T_{Smax}	t_s	60	100	120	s
Ramp-up rate to peak ^{*)} T_{Smax} to T_p			2	3	K/s
Liquidus temperature	T_L		217		$^{\circ}\text{C}$
Time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

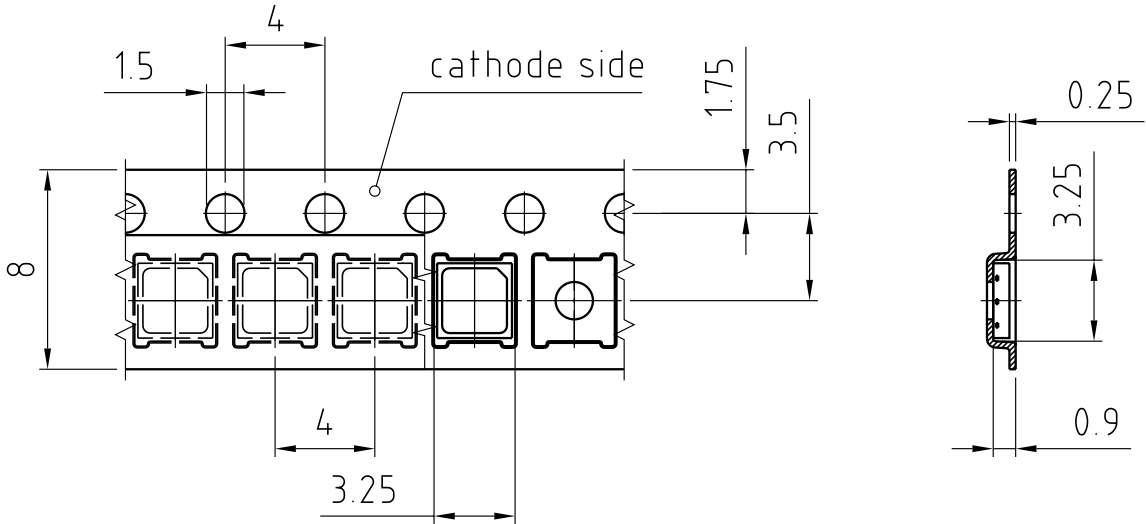
* slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T-range

Taping ⁸⁾



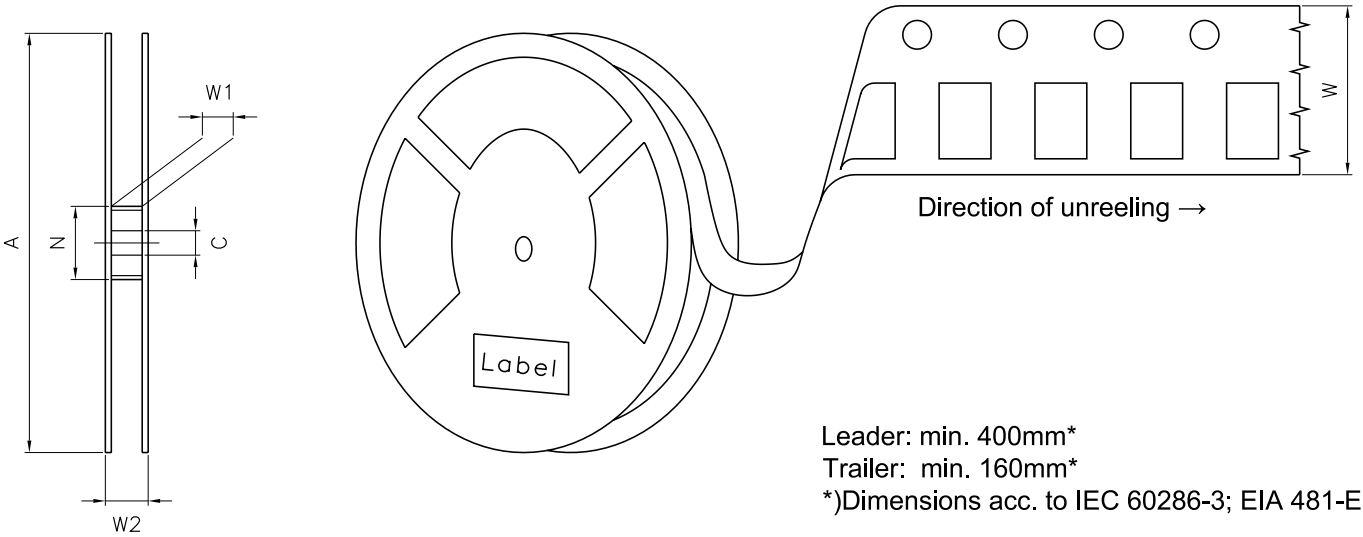
C63062-A4415-B4-02

Taping ⁸⁾



C63062-A4415-B4-03

Tape and Reel ⁹⁾



Reel Dimensions

A	W	N _{min}	W ₁	W _{2 max}	Pieces per PU
180 mm	8 + 0.3 / - 0.1 mm	60 mm	8.4 + 2 mm	14.4 mm	4500

Barcode-Product-Label (BPL)

OSRAM

LX XXXX

BIN1: XX-XX-X-XXX-X

RoHS Compliant

(6P) BATCH NO: 1234567890

(1T) LOT NO: 1234567890

(9D) D/C: 1234

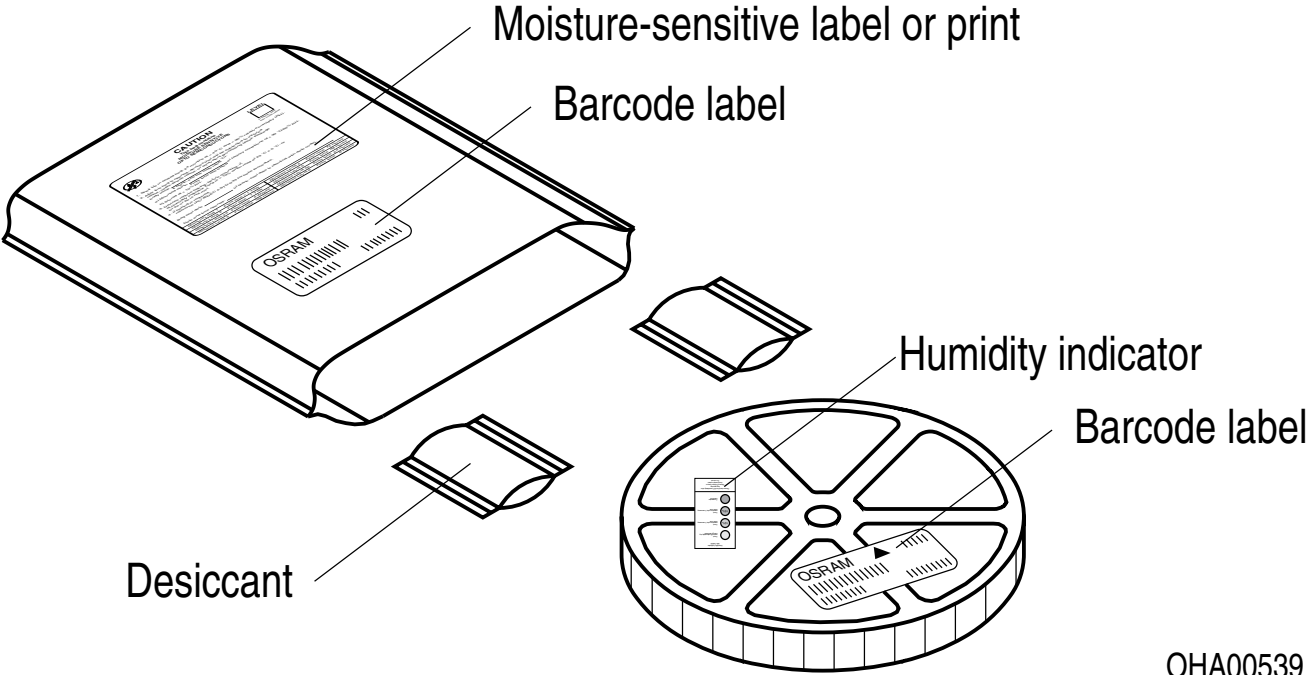
(X) PROD NO: 123456789(Q)QTY: 9999 (G) GROUP: XX-XX-X-X

ML Temp ST
X XXX °C X

Pack: RXX
DEMY XXX
X_X123_1234.1234 X

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.

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 **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 information please visit <https://ams-osram.com/support/application-notes>

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 our 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

Our components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.

Our products are not qualified at module and system level for such application.

In case buyer – or customer supplied by buyer – considers using our components in product safety devices/ applications or medical devices/applications, buyer and/or customer has to inform our local sales partner immediately and we and buyer and /or customer will analyze and coordinate the customer-specific request between us 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:** 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) **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:** $R_{th\ max}$ is based on statistic values (6σ) used for Derating.
- 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.

Revision History

Version	Date	Change
1.0	2020-11-18	Initial Version
1.1	2021-04-15	Characteristics
1.2	2021-11-02	Reel Dimensions
1.3	2023-03-09	Characteristics New Layout Applications
1.4	2023-10-09	Characteristics Features Reel Dimensions
1.5	2024-01-24	Certificate Logo
1.6	2024-11-12	Features Electro - Optical Characteristics (Diagrams)
1.7	2025-04-03	Ordering Information Brightness Groups



EU RoHS and China RoHS compliant product
此产品符合欧盟 RoHS 指令的要求；
按照中国的相关法规和标准，
不含有毒有害物质或元素。

Published by ams-OSRAM AG

Tobelbader Strasse 30, 8141 Premstaetten, Austria

Phone +43 3136 500-0

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