

OSRAM LW M67D

Datasheet

Published by **ams-OSRAM AG**

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Mini TOPLED®

LW M67D

Small size high-flux LED for slim designs



Applications

- Ambient Lighting

Features

- Package: white SMT package, colored diffused resin
- Chip technology: ThinGaN
- Typ. Radiation: 120° (Lambertian emitter)
- Color: Cx = 0.29, Cy = 0.28 acc. to CIE 1931 (● white)
- Corrosion Robustness Class: 3B
- Qualifications: AEC-Q102 Qualified
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)

Ordering Information

Type	Luminous Intensity ¹⁾ $I_F = 1.5\text{ mA}$ I_v	Ordering Code
LW M67D-P2R2-FK0PN0-S6Z6-1.5	56 ... 180 mcd	Q65113A4946

Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min. max.	-40 °C 100 °C
Storage Temperature	T_{stg}	min. max.	-40 °C 100 °C
Junction Temperature	T_j	max.	110 °C
Forward current $T_s = 25\text{ °C}$	I_F	min. max.	0.25 mA 7 mA
Forward current pulsed $t \leq 0.1\text{ ms}$; $D = 0.03$; $T_s = 25\text{ °C}$	$I_{F\text{ pulse}}$	max.	40 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

Characteristics

$I_F = 1.5 \text{ mA}$; $T_S = 25 \text{ °C}$

Parameter	Symbol		Values
Chromaticity Coordinate ³⁾	Cx	typ.	0.29
	Cy	typ.	0.28
Viewing angle at 50% I_V	2ϕ	typ.	120 °
Forward Voltage ⁴⁾ $I_F = 1.5 \text{ mA}$	V_F	min.	2.40 V
		typ.	2.60 V
		max.	3.00 V
Reverse current ²⁾ $V_R = 5 \text{ V}$	I_R	typ.	0.01 μA
		max.	10 μA
Real thermal resistance junction/solderpoint ⁵⁾	$R_{\text{thJS real}}$	typ.	70 K / W
		max.	95 K / W

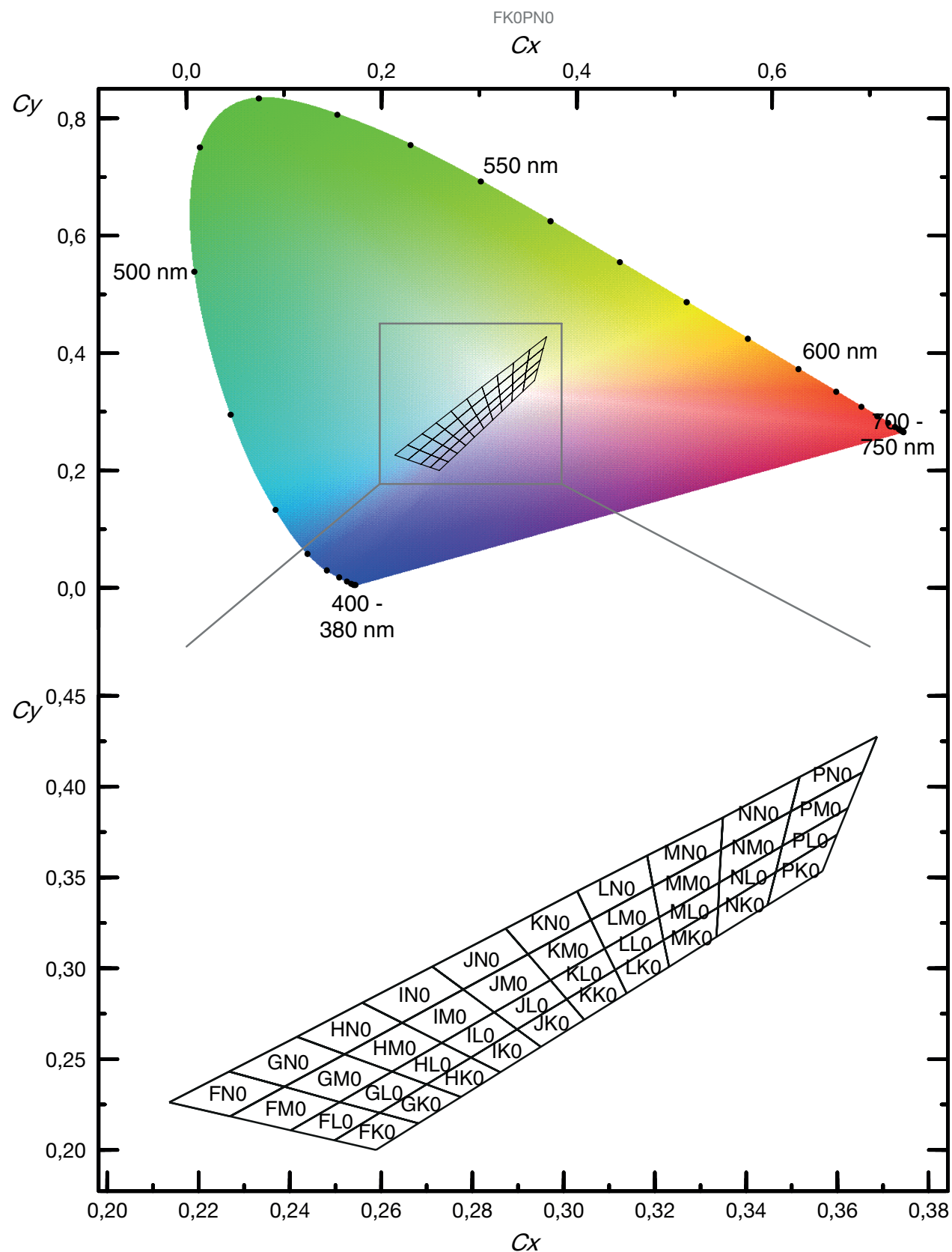
Brightness Groups

Group	Luminous Intensity ¹⁾ $I_F = 1.5 \text{ mA}$ min. I_v	Luminous Intensity ¹⁾ $I_F = 1.5 \text{ mA}$ max. I_v	Luminous Flux ⁶⁾ $I_F = 1.5 \text{ mA}$ typ. Φ_v
P2	56 mcd	71 mcd	190 mlm
Q1	71 mcd	90 mcd	240 mlm
Q2	90 mcd	112 mcd	300 mlm
R1	112 mcd	140 mcd	380 mlm
R2	140 mcd	180 mcd	480 mlm

Forward Voltage Groups

Group	Forward Voltage ⁴⁾ $I_F = 1.5 \text{ mA}$ min. V_F	Forward Voltage ⁴⁾ $I_F = 1.5 \text{ mA}$ max. V_F
S6	2.40 V	2.70 V
Z6	2.70 V	3.00 V

Chromaticity Coordinate Groups



Chromaticity Coordinate Groups ³⁾

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
FK0	0.2498	0.2053	HK0	0.2700	0.2361	JK0	0.2898	0.2664
	0.2597	0.2204		0.2797	0.2509		0.3007	0.2830
	0.2682	0.2146		0.2861	0.2427		0.3045	0.2717
	0.2589	0.2000		0.2775	0.2292		0.2950	0.2568
FL0	0.2402	0.2108	HL0	0.2624	0.2431	JL0	0.2848	0.2757
	0.2509	0.2264		0.2733	0.2590		0.2971	0.2935
	0.2597	0.2204		0.2797	0.2509		0.3007	0.2830
	0.2498	0.2053		0.2700	0.2361		0.2898	0.2664
FM0	0.2269	0.2185	HM0	0.2520	0.2527	JM0	0.2780	0.2883
	0.2388	0.2348		0.2646	0.2700		0.2922	0.3077
	0.2509	0.2264		0.2733	0.2590		0.2971	0.2935
	0.2402	0.2108		0.2624	0.2431		0.2848	0.2757
FN0	0.2136	0.2262	HN0	0.2416	0.2623	JN0	0.2712	0.3009
	0.2267	0.2432		0.2559	0.2810		0.2873	0.3219
	0.2388	0.2348		0.2646	0.2700		0.2922	0.3077
	0.2269	0.2185		0.2520	0.2527		0.2780	0.2883
GK0	0.2597	0.2204	IK0	0.2797	0.2509	KK0	0.3007	0.2830
	0.2700	0.2361		0.2898	0.2664		0.3113	0.2992
	0.2775	0.2292		0.2950	0.2568		0.3138	0.2862
	0.2682	0.2146		0.2861	0.2427		0.3045	0.2717
GL0	0.2509	0.2264	IL0	0.2733	0.2590	KL0	0.2971	0.2935
	0.2624	0.2431		0.2848	0.2757		0.3090	0.3108
	0.2700	0.2361		0.2898	0.2664		0.3113	0.2992
	0.2597	0.2204		0.2797	0.2509		0.3007	0.2830
GM0	0.2388	0.2348	IM0	0.2646	0.2700	KM0	0.2922	0.3077
	0.2520	0.2527		0.2780	0.2883		0.3060	0.3266
	0.2624	0.2431		0.2848	0.2757		0.3090	0.3108
	0.2509	0.2264		0.2733	0.2590		0.2971	0.2935
GN0	0.2267	0.2432	IN0	0.2559	0.2810	KN0	0.2873	0.3219
	0.2416	0.2623		0.2712	0.3009		0.3030	0.3424
	0.2520	0.2527		0.2780	0.2883		0.3060	0.3266
	0.2388	0.2348		0.2646	0.2700		0.2922	0.3077

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
LK0	0.3113	0.2992	MM0	0.3196	0.3451	PK0	0.3465	0.3530
	0.3219	0.3154		0.3345	0.3654		0.3599	0.3735
	0.3231	0.3008		0.3341	0.3472		0.3567	0.3535
	0.3138	0.2862		0.3209	0.3281		0.3447	0.3347
LL0	0.3090	0.3108	MN0	0.3183	0.3621	PL0	0.3479	0.3673
	0.3209	0.3281		0.3349	0.3830		0.3623	0.3882
	0.3219	0.3154		0.3345	0.3654		0.3599	0.3735
	0.3113	0.2992		0.3196	0.3451		0.3465	0.3530
LM0	0.3060	0.3266	NK0	0.3339	0.3336	PM0	0.3498	0.3863
	0.3196	0.3451		0.3465	0.3530		0.3655	0.4079
	0.3209	0.3281		0.3447	0.3347		0.3623	0.3882
	0.3090	0.3108		0.3335	0.3172		0.3479	0.3673
LN0	0.3030	0.3424	NL0	0.3341	0.3472	PN0	0.3517	0.4053
	0.3183	0.3621		0.3479	0.3673		0.3687	0.4276
	0.3196	0.3451		0.3465	0.3530		0.3655	0.4079
	0.3060	0.3266		0.3339	0.3336		0.3498	0.3863
MK0	0.3219	0.3154	NM0	0.3345	0.3654			
	0.3339	0.3336		0.3498	0.3863			
	0.3335	0.3172		0.3479	0.3673			
	0.3231	0.3008		0.3341	0.3472			
ML0	0.3209	0.3281	NN0	0.3349	0.3830			
	0.3341	0.3472		0.3517	0.4053			
	0.3339	0.3336		0.3498	0.3863			
	0.3219	0.3154		0.3345	0.3654			

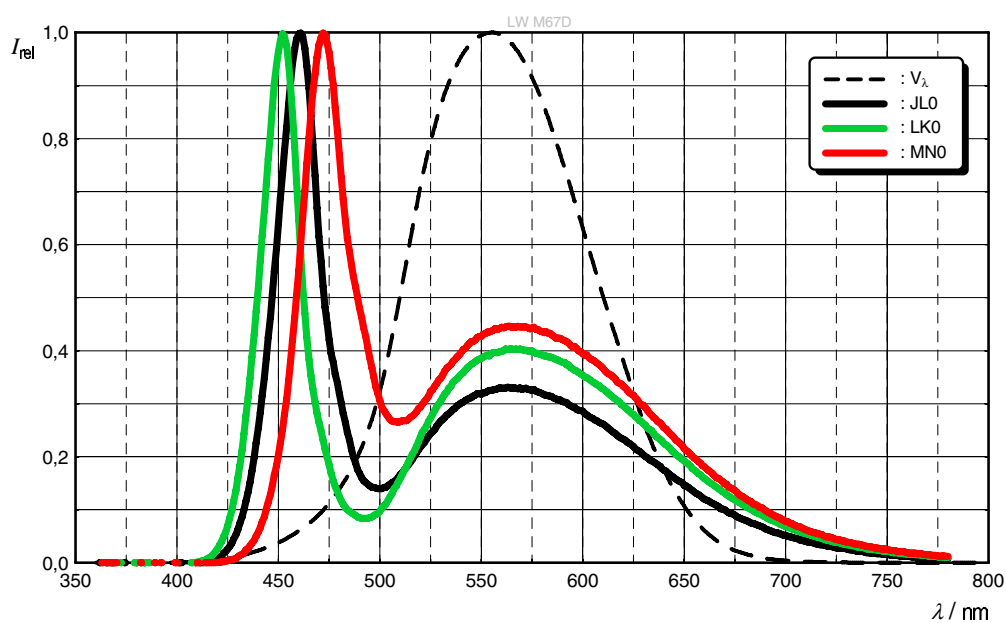
Group Name on Label

Example: P2-FK0-S6

Brightness	Color Chromaticity	Forward Voltage
P2	FK0	S6

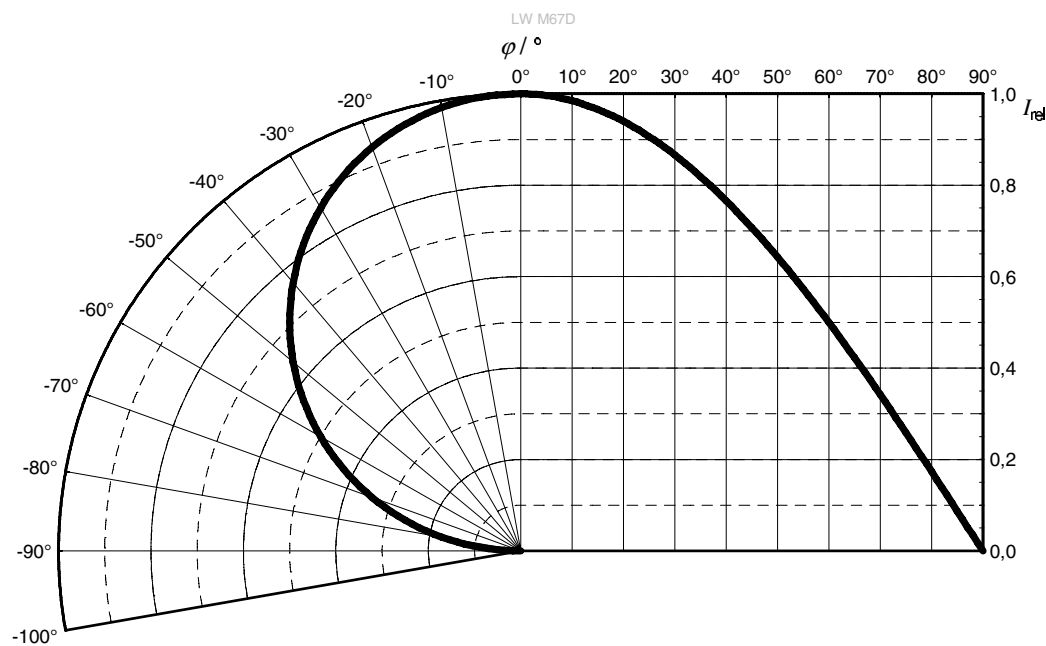
Relative Spectral Emission ⁶⁾

$I_{\text{rel}} = f(\lambda)$; $I_F = 1.5 \text{ mA}$; $T_S = 25 \text{ °C}$



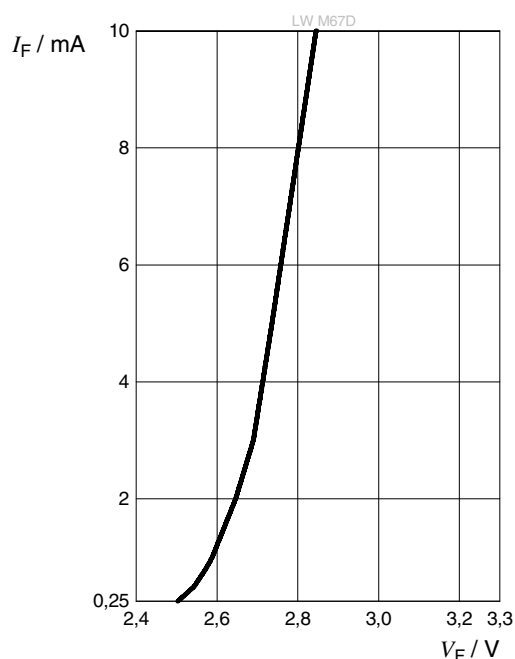
Radiation Characteristics ⁶⁾

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



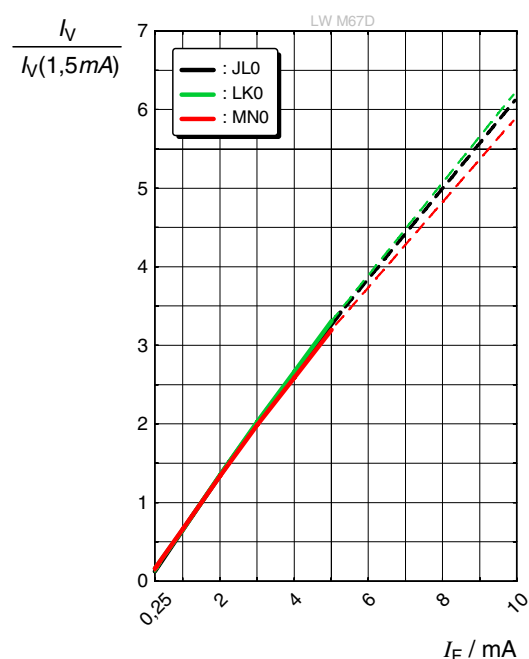
Forward current ⁶⁾

$$I_F = f(V_F); T_S = 25\text{ °C}$$



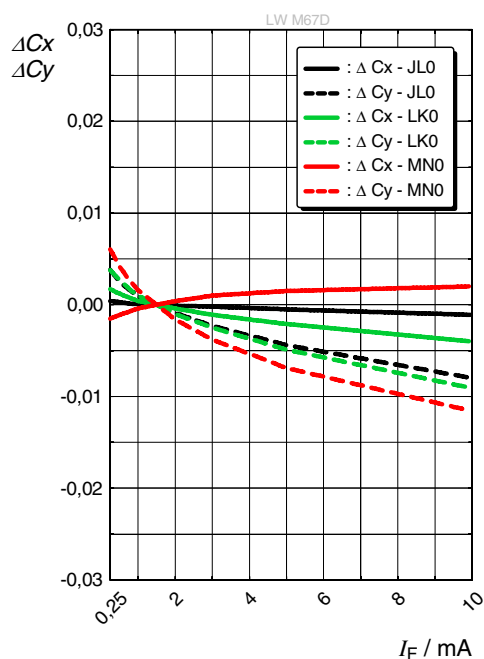
Relative Luminous Intensity ^{6), 7)}

$$I_V/I_V(1.5\text{ mA}) = f(I_F); T_S = 25\text{ °C}$$



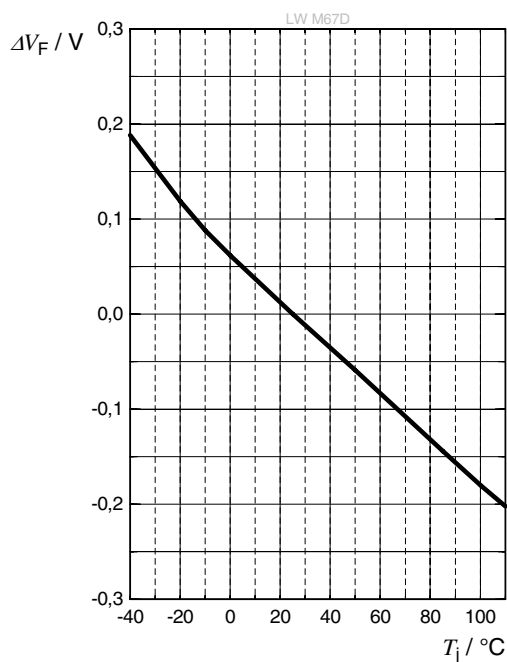
Chromaticity Coordinate Shift ⁶⁾

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

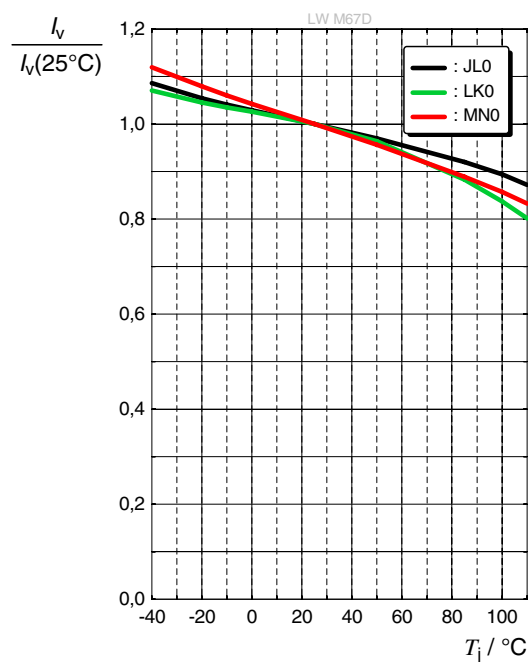


Forward Voltage ⁶⁾

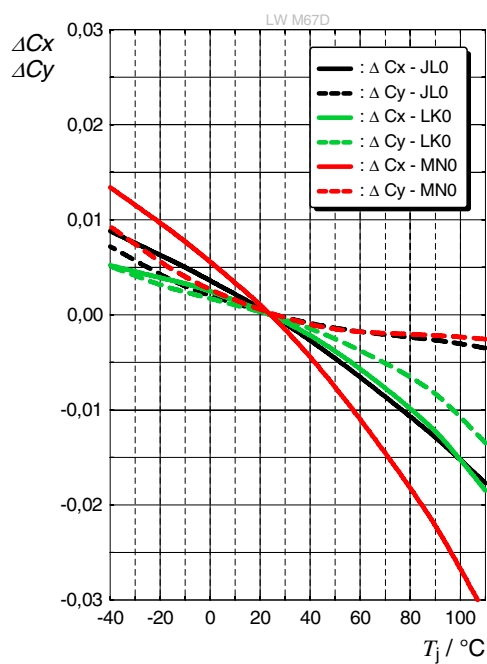
$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 1.5\text{ mA}$$

**Relative Luminous Intensity** ⁶⁾

$$I_V / I_V(25^\circ\text{C}) = f(T_j); I_F = 1.5\text{ mA}$$

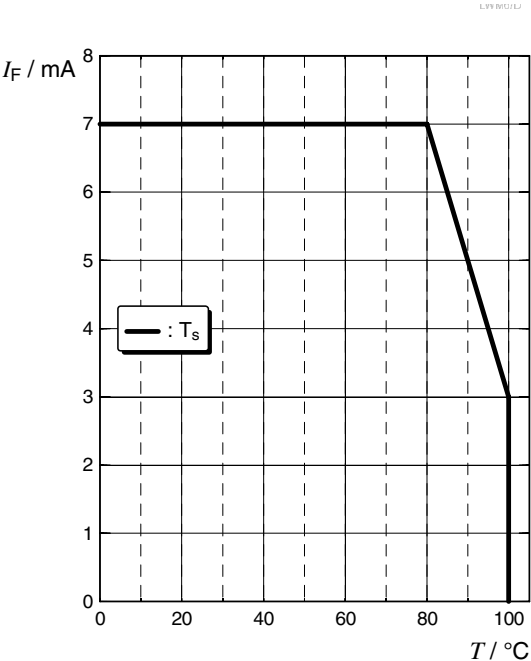
**Chromaticity Coordinate Shift** ⁶⁾

$$\Delta C_x, \Delta C_y = f(T_j); I_F = 1.5\text{ mA}$$



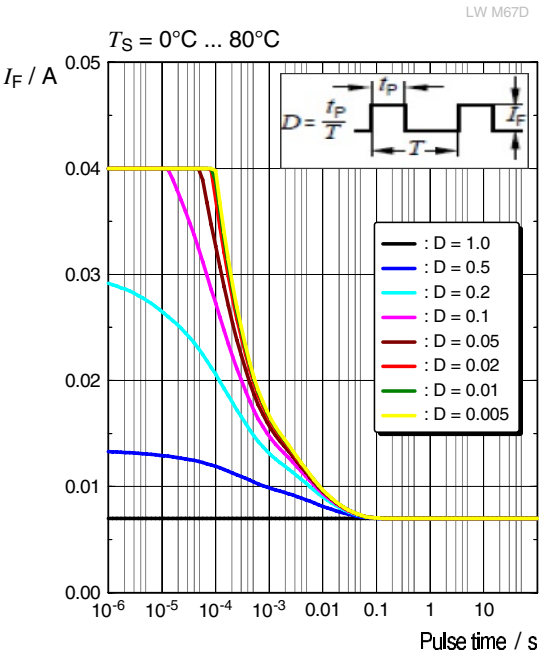
Max. Permissible Forward Current

$I_F = f(T)$



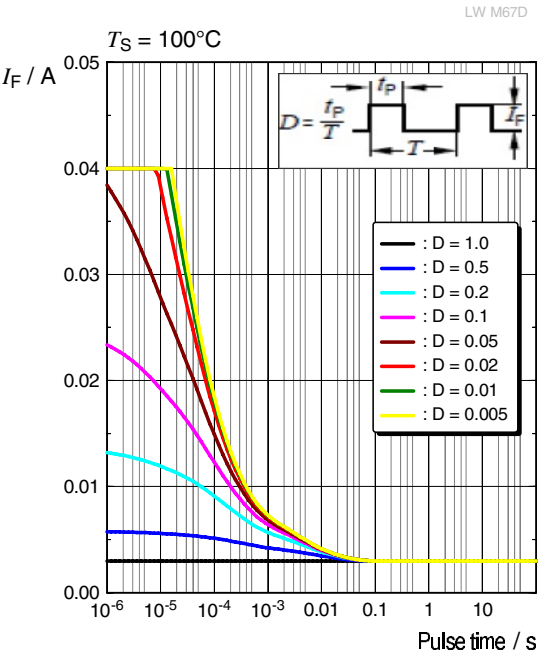
Permissible Pulse Handling Capability

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

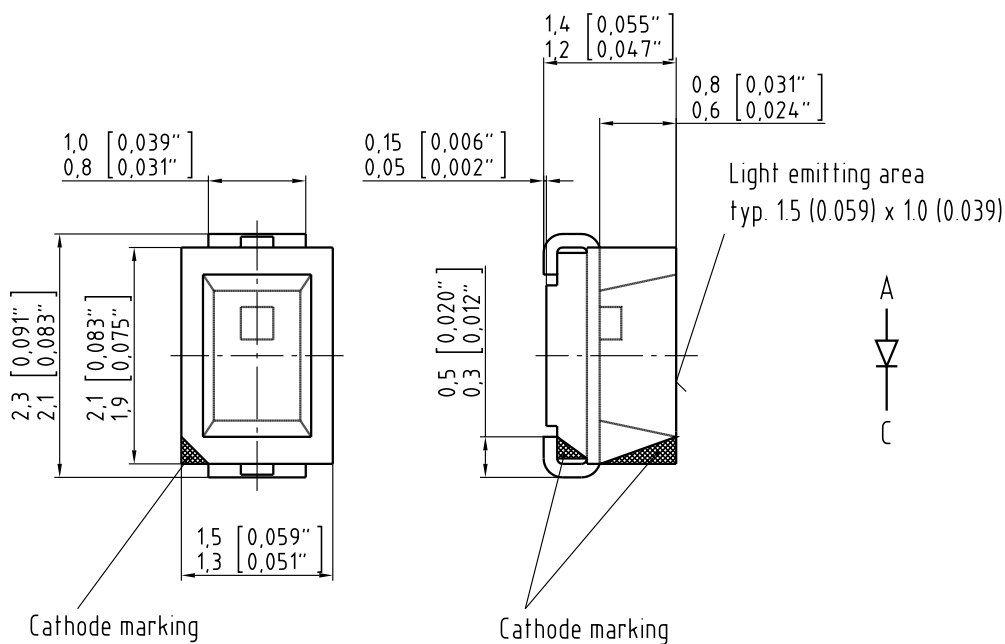


Permissible Pulse Handling Capability

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



Dimensional Drawing ⁸⁾



C63062-A3740-A1.. -05

Further Information:

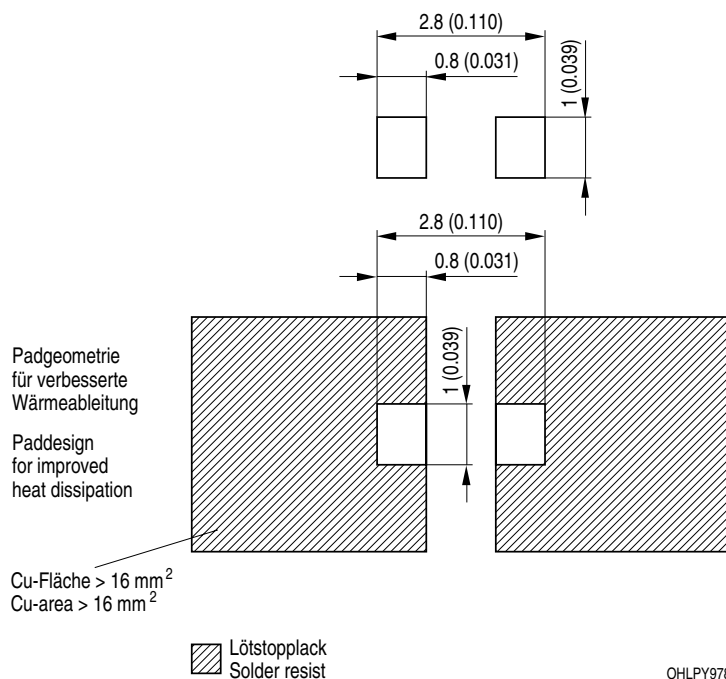
Approximate Weight: 7.0 mg

Package marking: Cathode

Corrosion test: Class: 3B

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

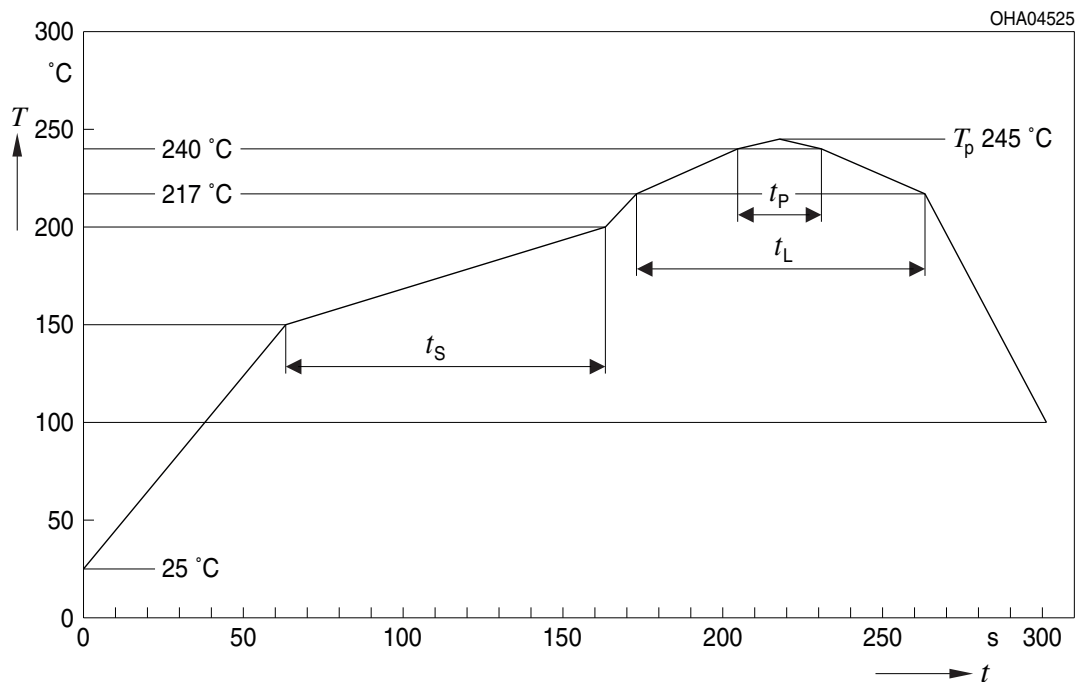
Recommended Solder Pad ⁸⁾



All products are packed in a dry pack bag (Moisture Barrier Bag, MBB) according MIL-PRF-81705, after opening the MBB the products should go to reflow soldering process. Unused remaining LEDs should be protected from environment due to silver plated soldering terminal. In order to maintain solderability it is recommended to protect the silver plated solder terminals from corrosive environment before soldering. 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

Technical drawing showing the cathode side of a component. The drawing includes a top view and a side view.

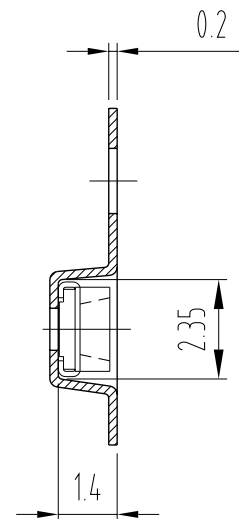
Top View Dimensions:

- Overall width: 8
- Overall height: 1.75
- Distance from left edge to first hole center: 2
- Distance between hole centers: 4
- Hole diameter: $\phi 1.55$
- Distance from right edge to last hole center: 1.55

Side View Dimensions:

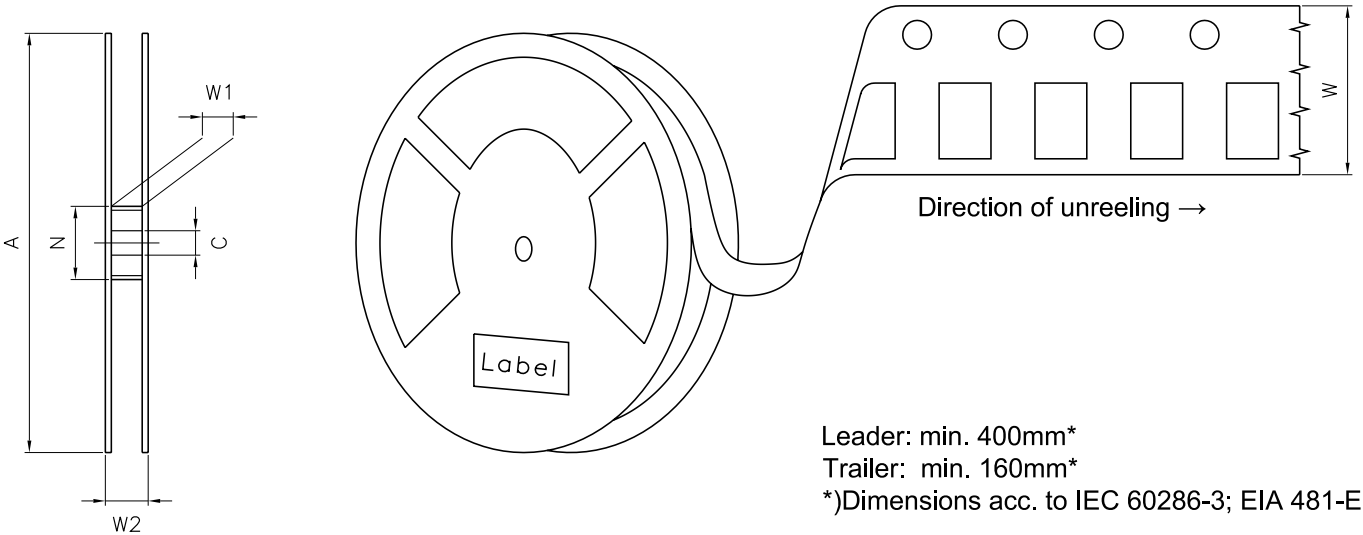
- Overall height: 3.5
- Distance from bottom edge to hole center line: 1.75

The drawing also shows a label "cathode side" pointing to the top view.



C63062-A3151-B5-04

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	3000

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

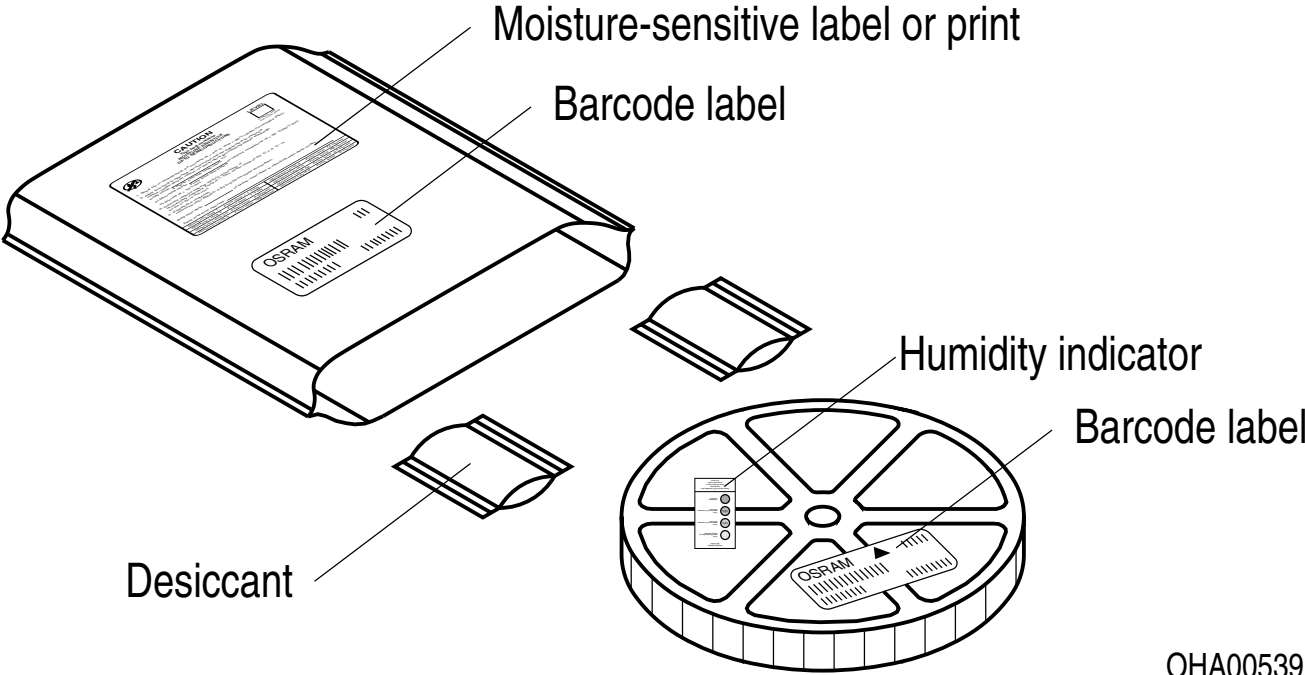
(X) PROD NO: 123456789(Q)QTY: 9999 (G) GROUP: XX-XX-X-X

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 **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.

For further application related information please visit 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 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 $\pm 0.05\text{ V}$ 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 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	2023-02-16	Ordering Information Brightness Groups Electro - Optical Characteristics (Diagrams) Features
1.1	2023-03-23	Description



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。

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