OSRAM LZ7-04M2PD

Datasheet

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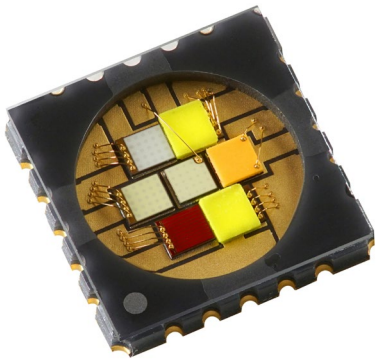
Tobelbader Strasse 30, 8141 Premstaetten, Austria
Phone +43 3136 500-0
ams-osram.com

OSRAM

LED ENGIN LuxiGen®

LZ7-04M2PD

Industry’s most robust high power ceramic package with flat glass window for high performance over life.



Applications

- Entertainment
- Indoor Lighting

Features

- Package: Ceramic package with integrated glass window
- Chip technology: Thinfilm / UX:3
- Typ. Radiation: 120°
- Color: λ_{dom} = 623 nm (● red); λ_{dom} = 520 nm (● true green); λ_{dom} = 451 nm (● blue); Cx = 0.565, Cy = 0.420 acc. to CIE 1931 (● converted yellow); λ_{dom} = 500 nm (● verde); Cx = 0.41, Cy = 0.54 acc. to CIE 1931 (● lime green)

Ordering Information

Type	Brightness [1)]	Ordering Code
LZ7-04M2PD-0000_G2		Q65113A6852
● red	● Φ_V = 85 ... 130 lm (I_F = 1000 mA)	
● true green	● Φ_V = 160 ... 280 lm (I_F = 1000 mA)	
● blue	● Φ_E = 1.0 ... 1.5 W (I_F = 1000 mA)	
● converted yellow	● Φ_V = 90 ... 175 lm (I_F = 1000 mA)	
● verde	● Φ_V = 85 ... 156 lm (I_F = 1000 mA)	
● lime green	● Φ_V = 495 ... 1000 lm (I_F = 1000 mA)	

Maximum Ratings

Parameter	Symbol		Values ● red	Values ● true green	Values ● blue
Operating Temperature	T_{op}	min. max.	-40 °C 125 °C	-40 °C 125 °C	-40 °C 125 °C
Storage Temperature	T_{stg}	min. max.	-40 °C 125 °C	-40 °C 125 °C	-40 °C 125 °C
Junction Temperature [2]	T_j	max.	125 °C	125 °C	125 °C
Forward Current [2]	I_F	min. max.	40 mA 2500 mA	40 mA 3000 mA	40 mA 3000 mA
Forward Current pulsed t ≤ 10 ms; D ≤ 0.1 ; T_C = 25 °C	$I_{F\ pulse}$	max.	2500 mA	3000 mA	3000 mA
ESD withstand voltage acc. ANSI/ESDA/JEDEC JS-001 (HBM, Class 0)	V_{ESD}		ESD sensitive device	ESD sensitive device	ESD sensitive device
Reverse voltage [3]	V_R		Not designed for reverse operation	Not designed for reverse operation	Not designed for reverse operation

Maximum Ratings

Parameter	Symbol		Values ● converted yellow	Values ● verde	Values ● lime green
Operating Temperature	T_{op}	min. max.	-40 °C 125 °C	-40 °C 125 °C	-40 °C 125 °C
Storage Temperature	T_{stg}	min. max.	-40 °C 125 °C	-40 °C 125 °C	-40 °C 125 °C
Junction Temperature [2]	T_j	max.	125 °C	125 °C	125 °C
Forward Current [2]	I_F	min. max.	10 mA 1500 mA	30 mA 1000 mA	40 mA 2500 mA
Forward Current pulsed t ≤ 10 ms; D ≤ 0.1 ; T_C = 25 °C	$I_{F\ pulse}$	max.	2000 mA	1000 mA	3000 mA
ESD withstand voltage acc. ANSI/ESDA/JEDEC JS-001 (HBM, Class 0)	V_{ESD}		ESD sensitive device	ESD sensitive device	ESD sensitive device
Reverse voltage [3]	V_R		Not designed for reverse operation	Not designed for reverse operation	Not designed for reverse operation

Characteristics

I_F = 1000 mA; T_C = 25 °C

Parameter	Symbol		Values ● red	Values ● true green	Values ● blue
Chromaticity Coordinate [4]	Cx Cy	typ. typ.			
Total radiant flux [5]	Φ_E	typ.			1.2 W
Luminous Flux [5]	Φ_V	typ.	95 lm	210 lm	
Dominant Wavelength [6] I_F = 1000 mA	λ_{dom}	min. typ. max.	620 nm 623 nm 628 nm	519 nm 520 nm 525 nm	449 nm 451 nm 453 nm
Viewing angle at 50% I_V	2φ	typ.	114 °	114 °	114 °
Forward Voltage [7][5] I_F = 1000 mA	V_F	min. typ. max.	1.8 V 2.3 V 2.8 V	2.6 V 2.9 V 3.6 V	2.7 V 3.0 V 3.4 V
Reverse current [3]	I_R		Not designed for reverse operation	Not designed for reverse operation	Not designed for reverse operation
Electrical thermal resistance junction/ case For value(s) see first column, all chips operated simultaneously	$R_{thJC\ elec.}$	typ.	0.80 K / W		

Characteristics

I_F = 1000 mA; T_C = 25 °C

Parameter	Symbol		Values converted yellow	Values verde	Values lime green
Chromaticity Coordinate [4]	Cx Cy	typ. typ.	0.565 0.420		0.41 0.54
Total radiant flux [5]	Φ_E	typ.			
Luminous Flux [5]	Φ_V	typ.	140 lm	135 lm	620 lm
Dominant Wavelength [6] I_F = 1000 mA	λ_{dom}	min. typ. max.		495 nm 500 nm 502 nm	
Viewing angle at 50% I_V	2φ	typ.	114 °	114 °	114 °
Forward Voltage [7][5] I_F = 1000 mA	V_F	min. typ. max.	2.8 V 3.0 V 3.8 V	2.9 V 3.5 V 4.0 V	5.4 V 6.0 V 6.8 V
Reverse current [3]	I_R		Not designed for reverse operation	Not designed for reverse operation	Not designed for reverse operation
Electrical thermal resistance junction/ case For value(s) see first column, all chips operated simultaneously	$R_{thJC\ elec.}$	typ.			

Brightness Groups

● red

Group	Luminous Flux [1] I_F = 1000 mA min. Φ_V	Luminous Flux [1] I_F = 1000 mA max. Φ_V
27R	85 lm	130 lm

Brightness Groups

● true green

Group	Luminous Flux [1] I_F = 1000 mA min. Φ_V	Luminous Flux [1] I_F = 1000 mA max. Φ_V
31G	160 lm	210 lm
32G	210 lm	280 lm

Brightness Groups

● blue

Group	Total radiant flux [1] I_F = 1000 mA min. Φ_E	Total radiant flux [1] I_F = 1000 mA max. Φ_E
9B	1.0 W	1.5 W

Brightness Groups

● converted yellow

Group	Luminous Flux [1] I_F = 1000 mA min. Φ_V	Luminous Flux [1] I_F = 1000 mA max. Φ_V
17A	90 lm	175 lm

Brightness Groups

- verde

Group	Luminous Flux [1] I_F = 1000 mA min. Φ_V	Luminous Flux [1] I_F = 1000 mA max. Φ_V
3C	85 lm	156 lm

Brightness Groups

all chips operated in series

- lime green

Group	Luminous Flux [1] I_F = 1000 mA min. Φ_V	Luminous Flux [1] I_F = 1000 mA max. Φ_V
2L	495 lm	700 lm
3L	700 lm	1000 lm

Wavelength Groups

- red

Group	Dominant Wavelength [6] I_F = 1000 mA min. λ_{dom}	Dominant Wavelength [6] I_F = 1000 mA max. λ_{dom}
A	620 nm	624 nm
B	624 nm	628 nm

Wavelength Groups

- true green

Group	Dominant Wavelength [6] I_F = 1000 mA min. λ_{dom}	Dominant Wavelength [6] I_F = 1000 mA max. λ_{dom}
A	519 nm	522 nm
B	522 nm	525 nm

Wavelength Groups

- blue

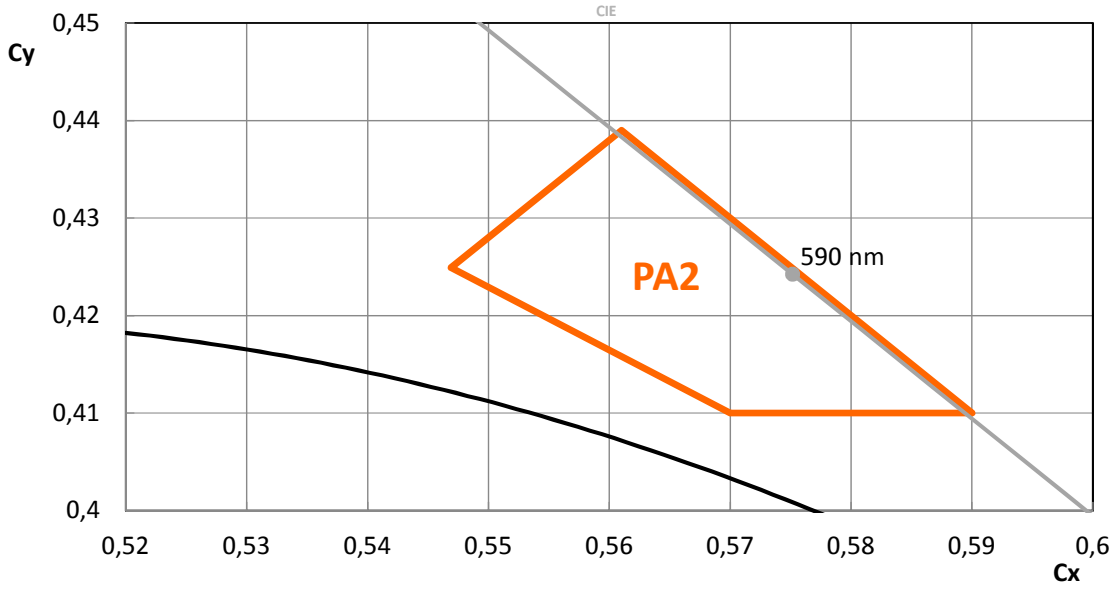
Group	Dominant Wavelength [6] I_F = 1000 mA min. λ_{dom}	Dominant Wavelength [6] I_F = 1000 mA max. λ_{dom}
A	449 nm	453 nm

Wavelength Groups

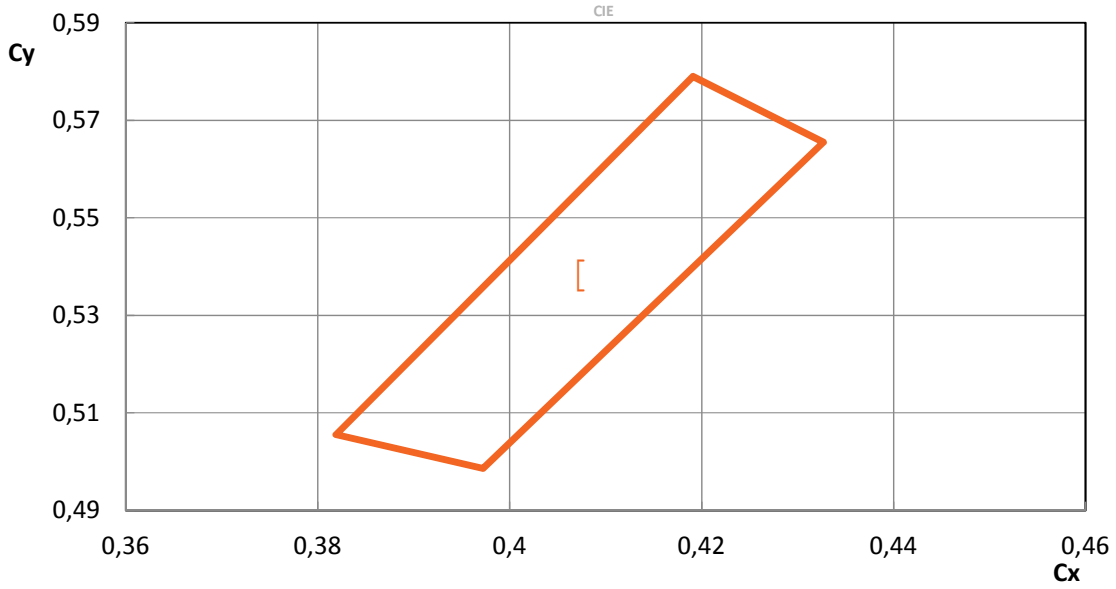
- verde

Group	Dominant Wavelength [6] I_F = 1000 mA min. λ_{dom}	Dominant Wavelength [6] I_F = 1000 mA max. λ_{dom}
A	495 nm	502 nm

Chromaticity Coordinate Groups



Chromaticity Coordinate Groups



Chromaticity Coordinate Groups

- converted yellow

Group	Cx	Cy
PA2	0.5469	0.4249
	0.5610	0.4390
	0.5900	0.4100
	0.5700	0.4100

Chromaticity Coordinate Groups

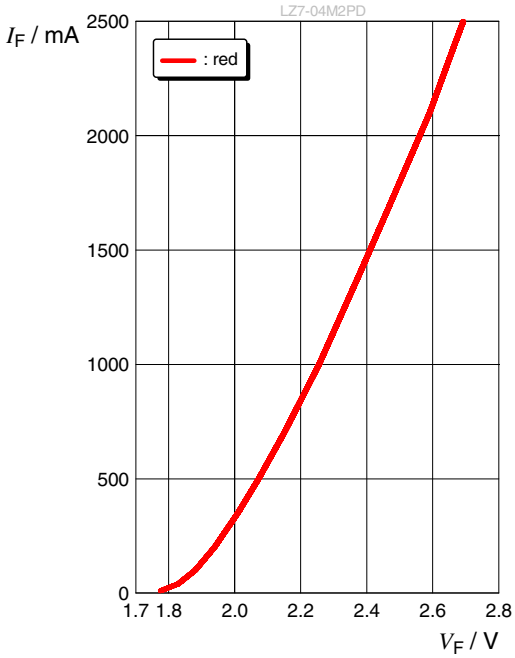
all chips operated in series

- lime green

Group	Cx	Cy
L	0.3819	0.5055
	0.4191	0.5790
	0.4327	0.5655
	0.3972	0.4986

Forward current [5]

$I_F = f(V_F)$; T_C = 25 °C



Forward current [5]

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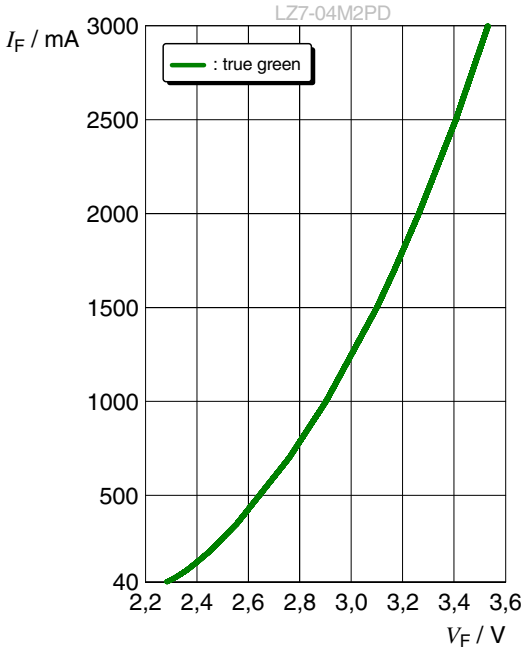
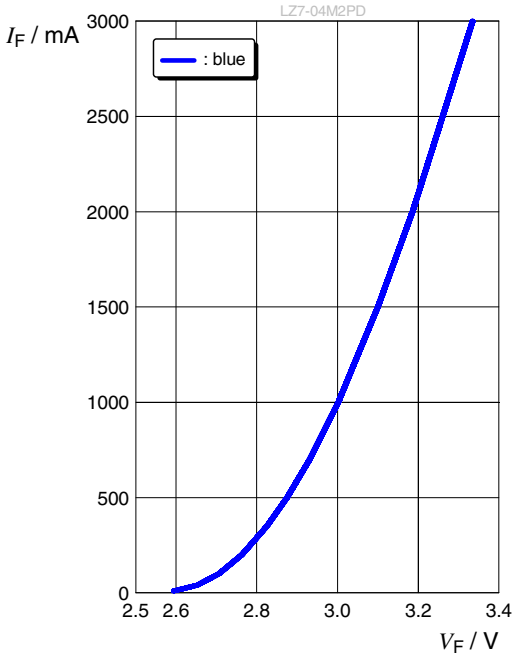


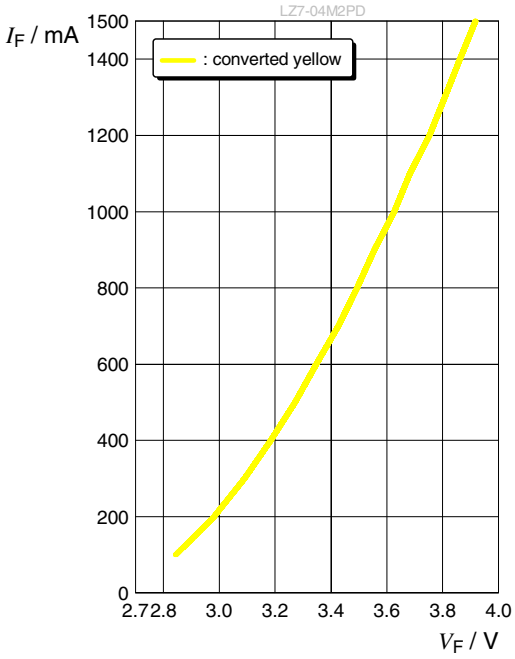
Forward current [5]

$I_F = f(V_F)$; T_C = 25 °C



Forward current [5]

$I_F = f(V_F)$; T_C = 25 °C



Forward current [5]

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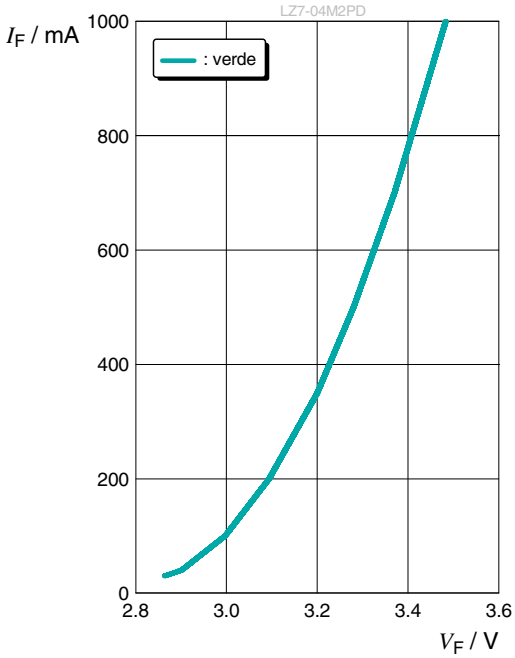
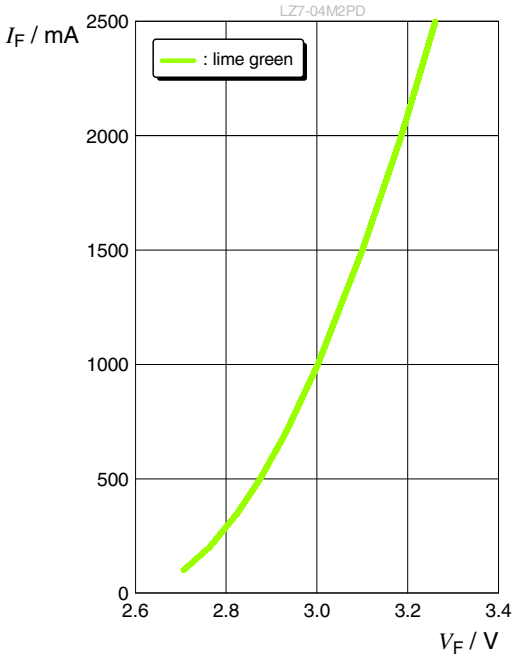


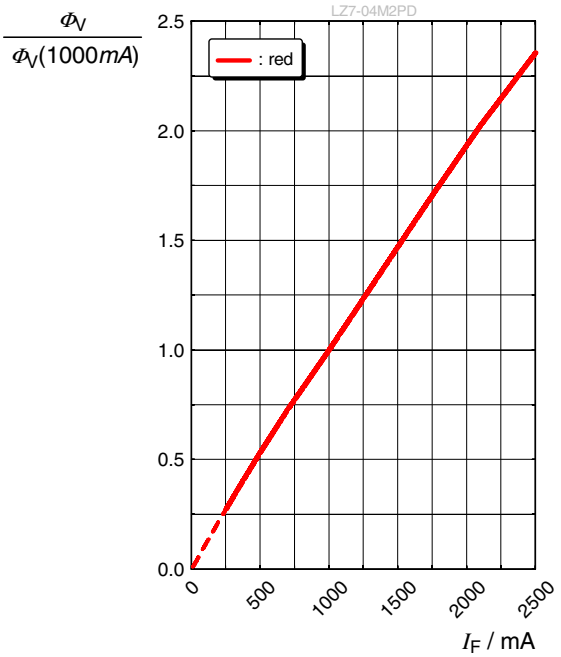
Forward current [5]

$I_F = f(V_F)$; T_C = 25 °C



Relative Luminous Flux [5], [8]

$\Phi_v/\Phi_v(1000\ mA) = f(I_F)$; T_C = 25 °C



Relative Luminous Flux [5], [8]

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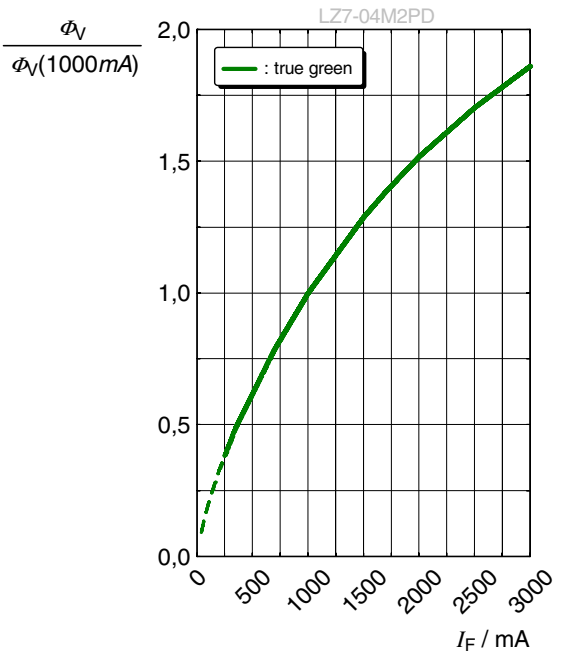
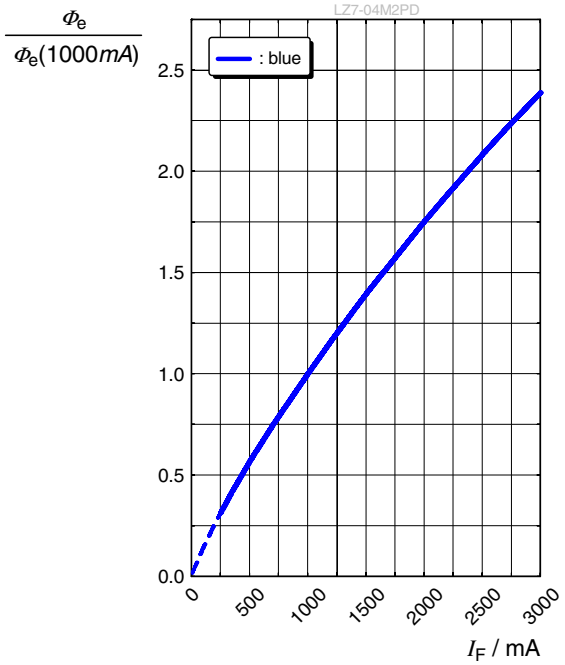


Relative Radiant Power 5), 8)

$\Phi_E/\Phi_E(1000\ mA) = f(I_F);\ T_C = 25\ °C$



Relative Luminous Flux 5), 8)

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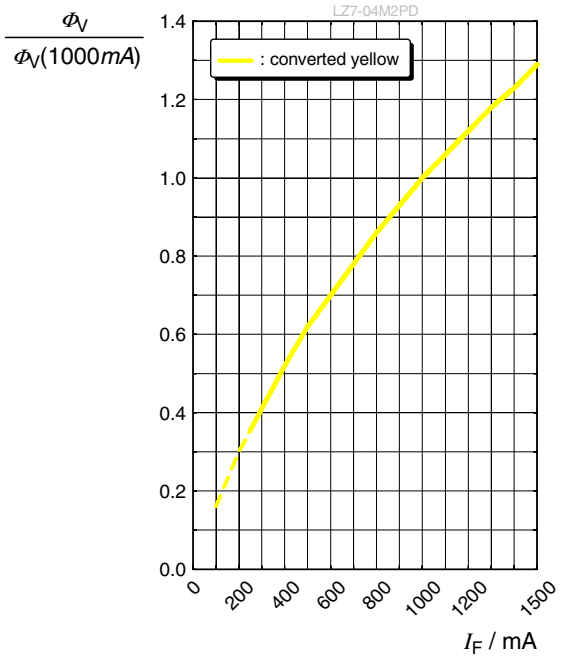

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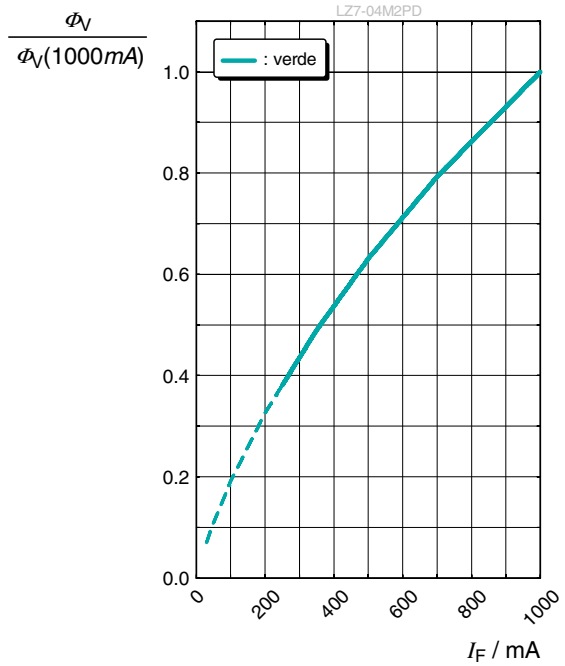

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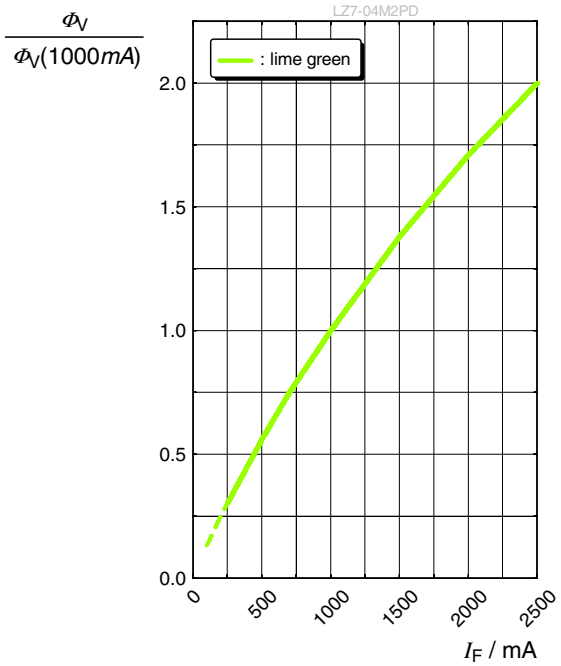
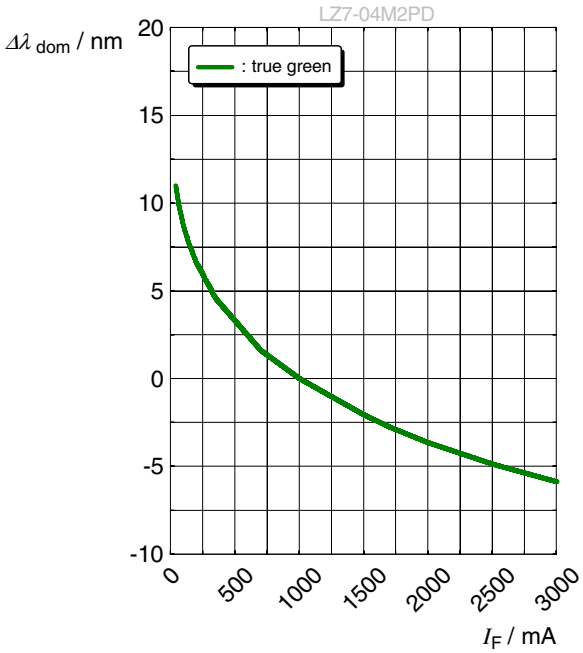


Dominant Wavelength [5)]

$\Delta\lambda_{dom} = f(I_F)$; T_C = 25 °C



Dominant Wavelength [5)]

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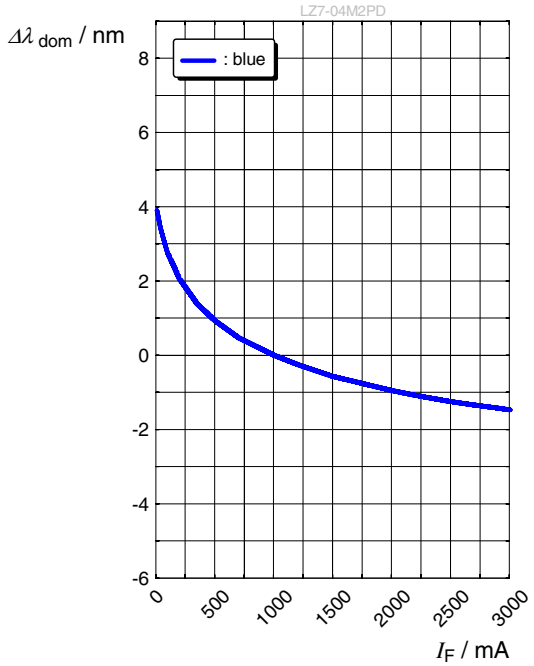
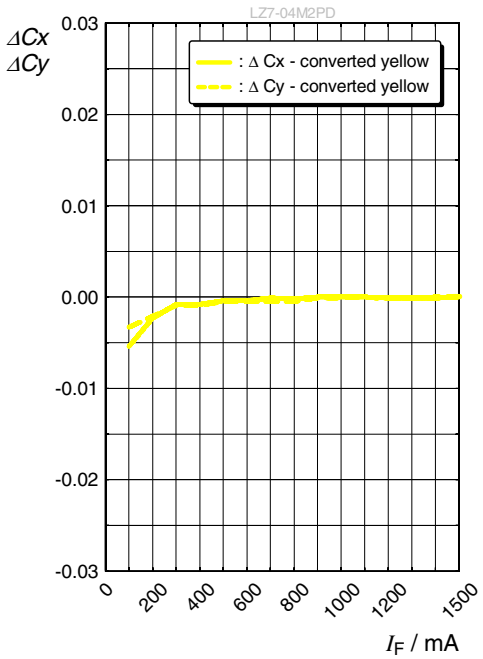


Chromaticity Coordinate Shift [5)]

$\Delta Cx, \Delta Cy = f(I_F)$; T_C = 25 °C



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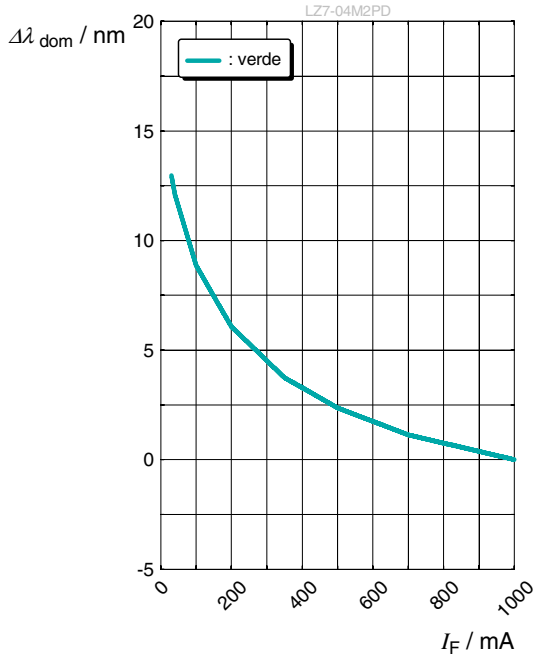

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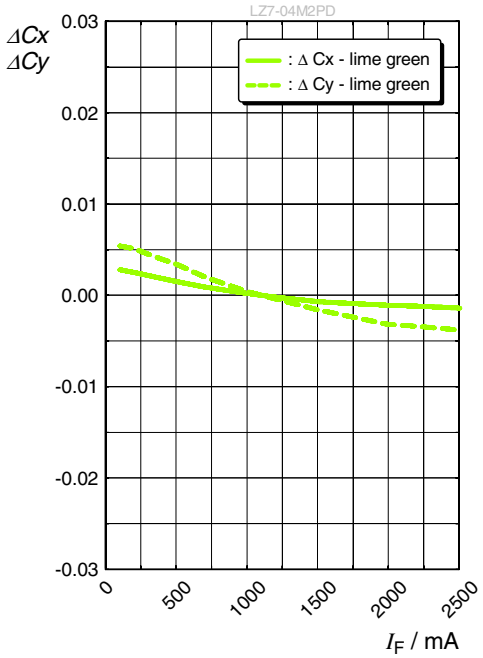
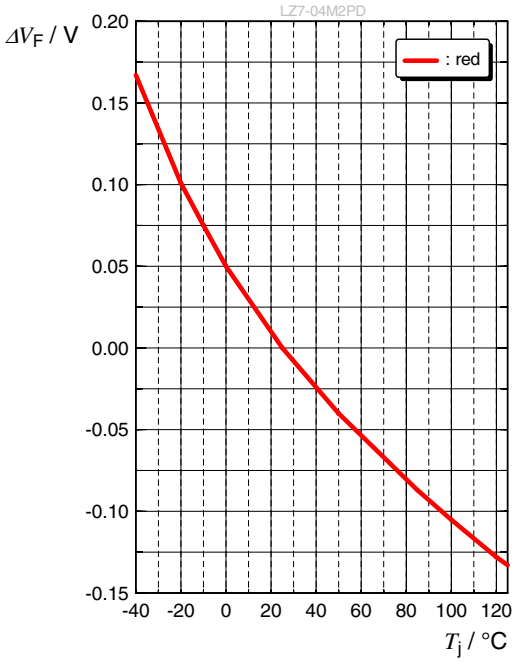


Forward Voltage [5)]

$\Delta V_F = V_F - V_F(25\ °C) = f(T_j);\ I_F = 1000\ mA$



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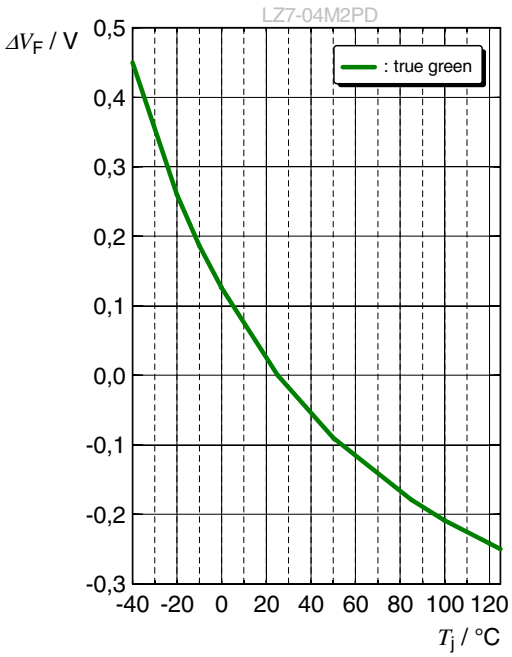

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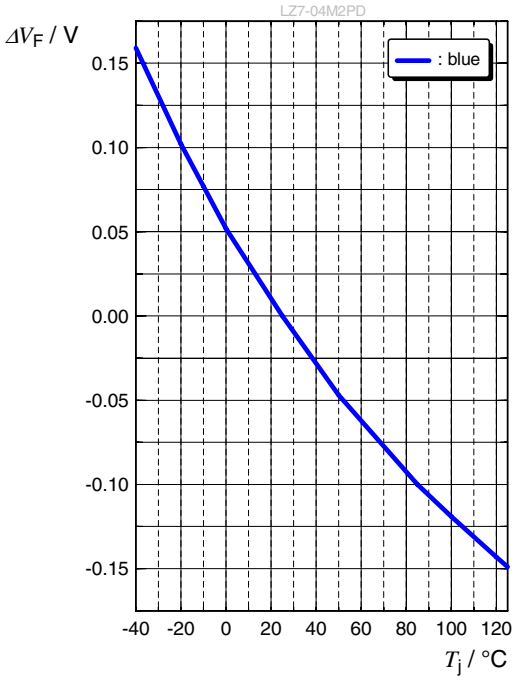

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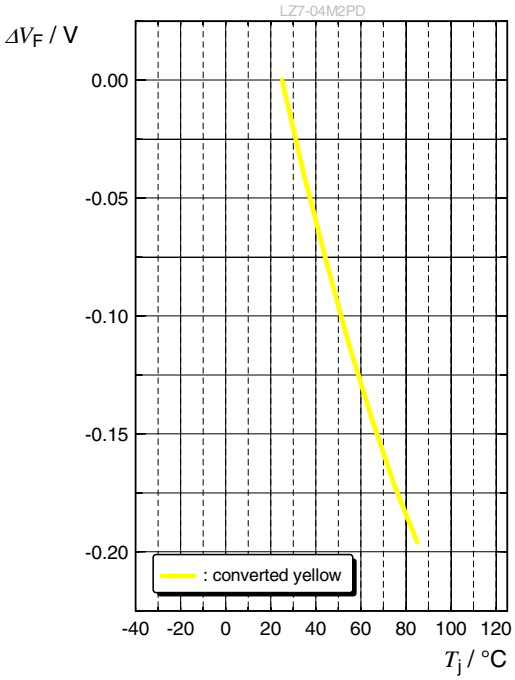

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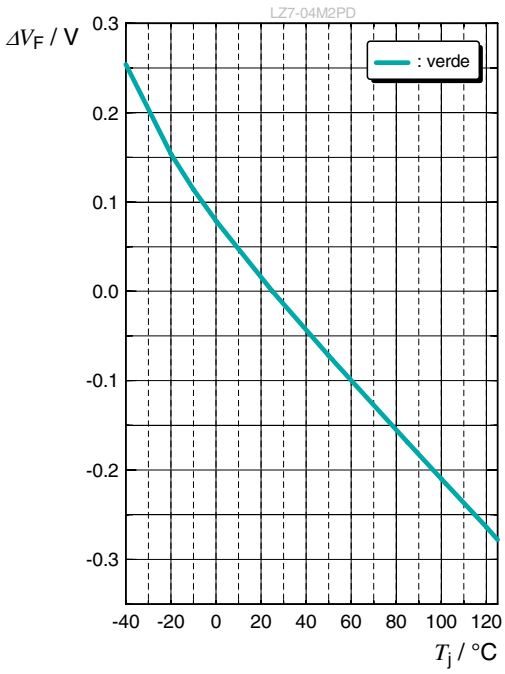

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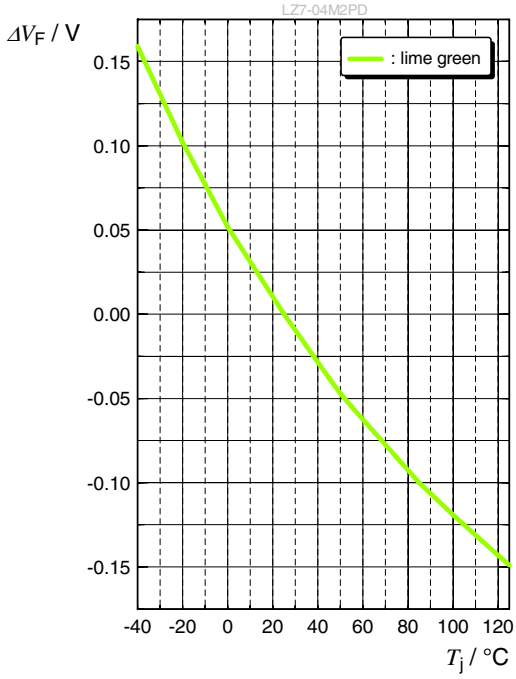
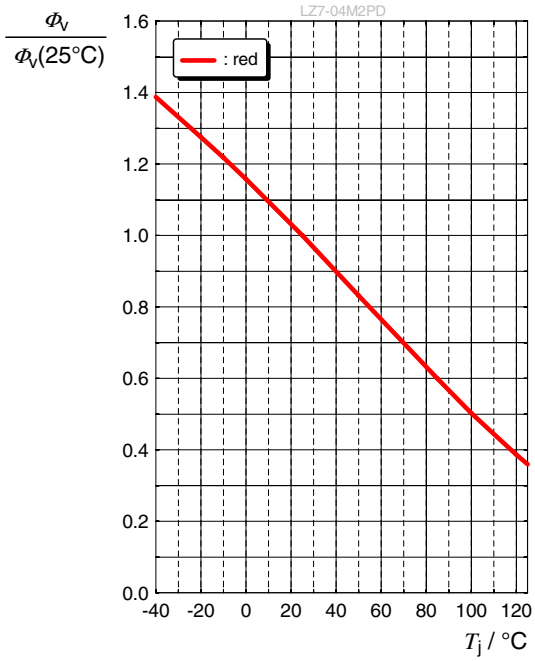


Relative Luminous Flux [5]

$\Phi_v/\Phi_v(25\ °C) = f(T_j);\ I_F = 1000\ mA$



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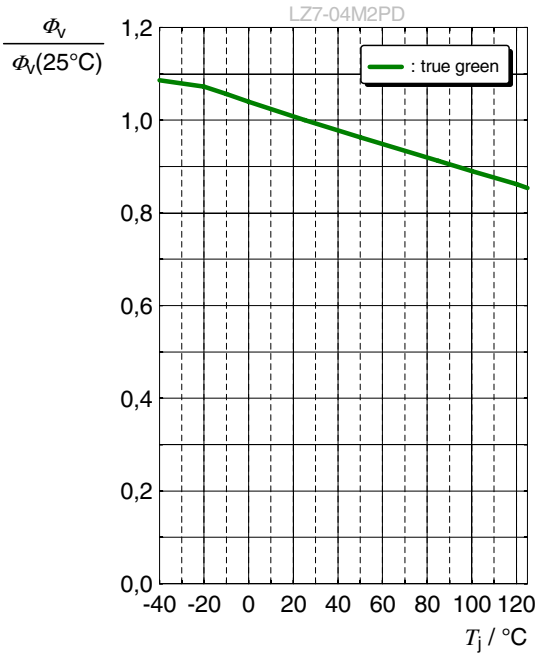
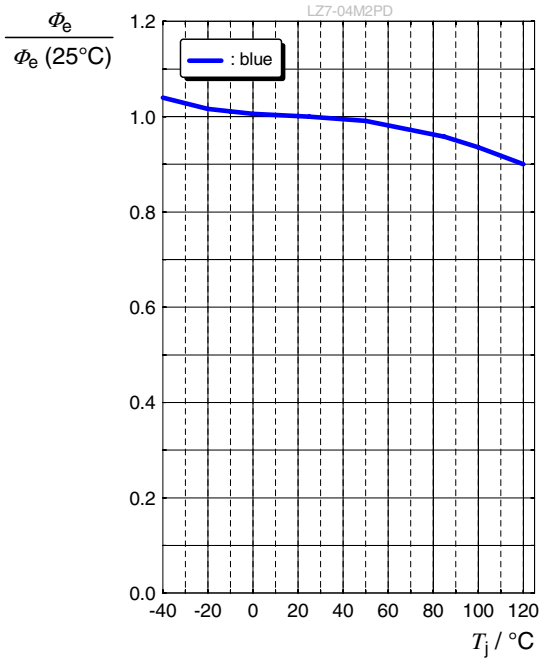


Relative Radiant Power [5]

$\Phi_E/\Phi_E(25\ °C) = f(T_j);\ I_F = 1000\ mA$



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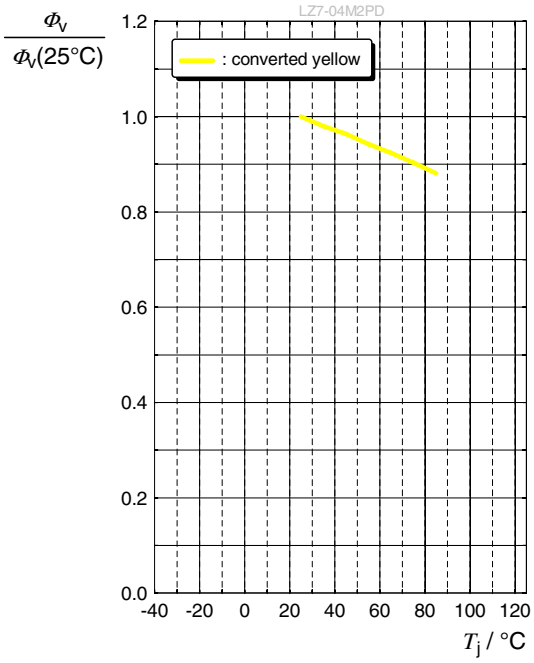

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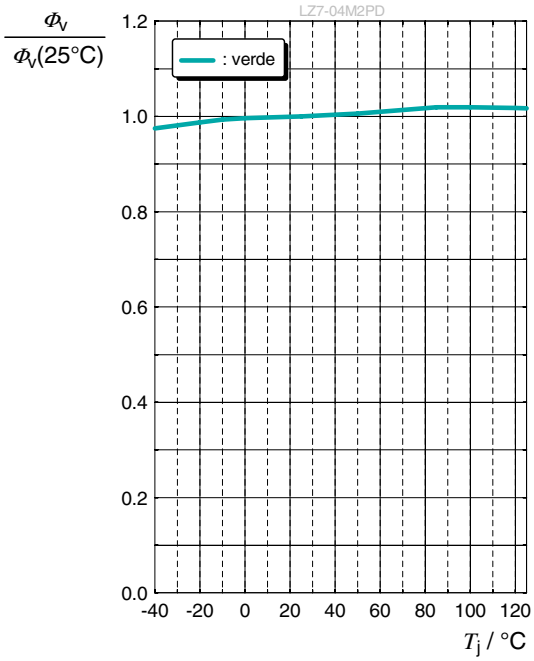

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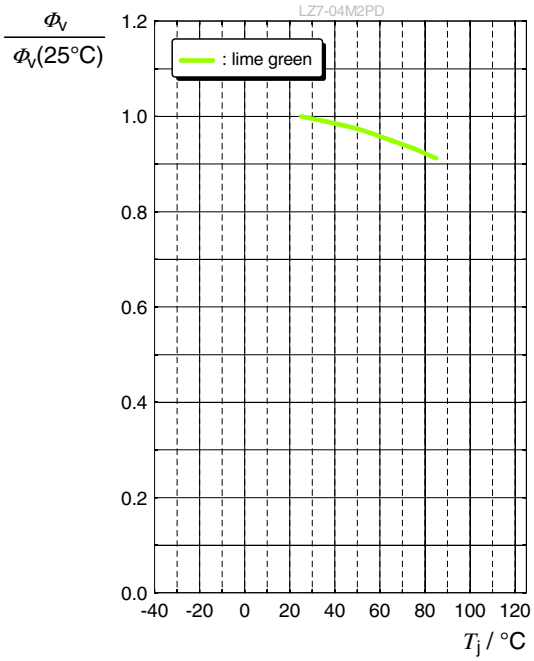
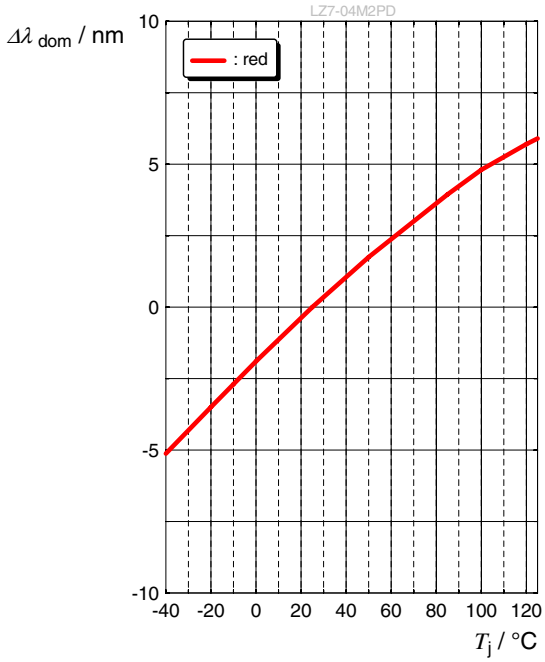


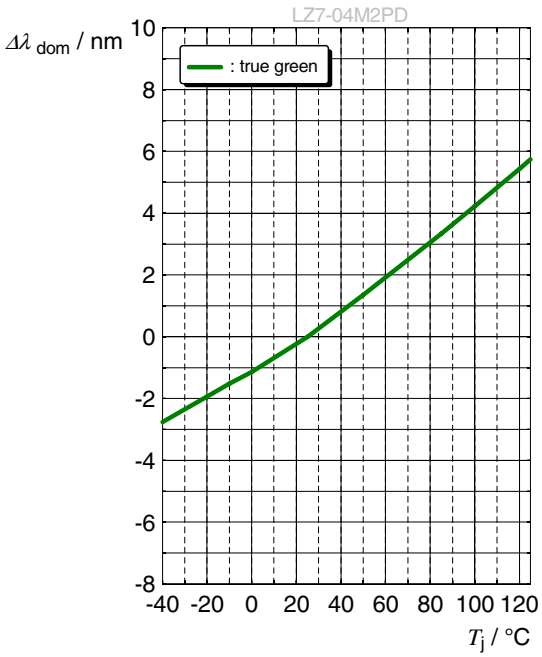
Dominant Wavelength 5)

$\Delta\lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25\ °C) = f(T_j);\ I_F = 1000\ mA$



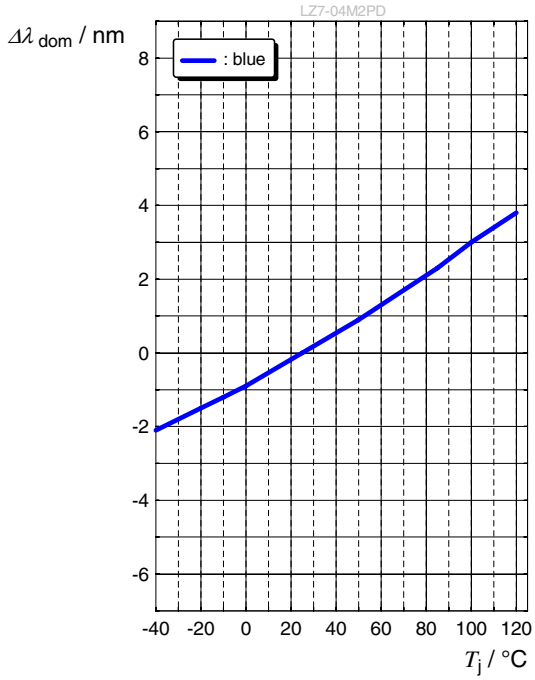
Dominant Wavelength 5)

$\Delta\lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25\ °C) = f(T_j);\ I_F = 1000\ mA$



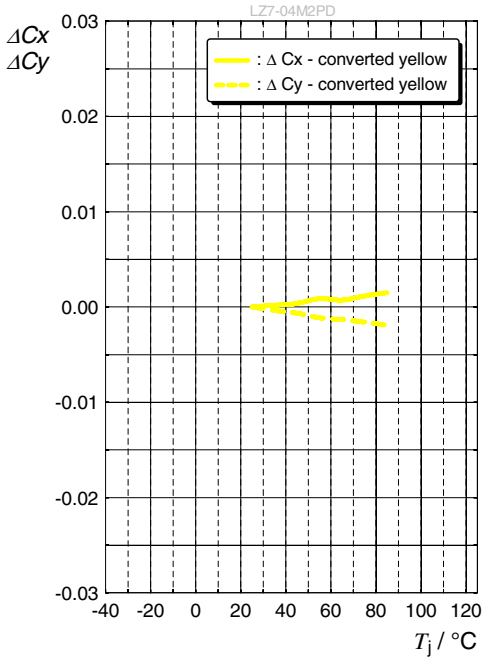
Dominant Wavelength 5)

$\Delta\lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25\ °C) = f(T_j);\ I_F = 1000\ mA$



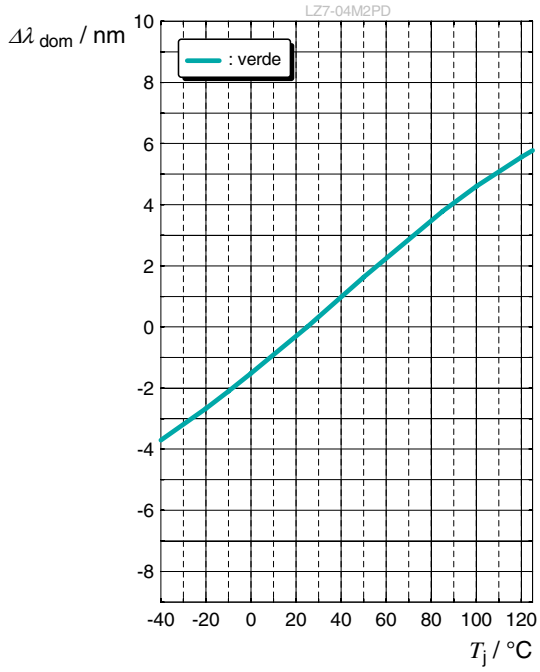
Chromaticity Coordinate Shift 5)

$\Delta Cx,\ \Delta Cy = f(T_j);\ I_F = 1000\ mA$



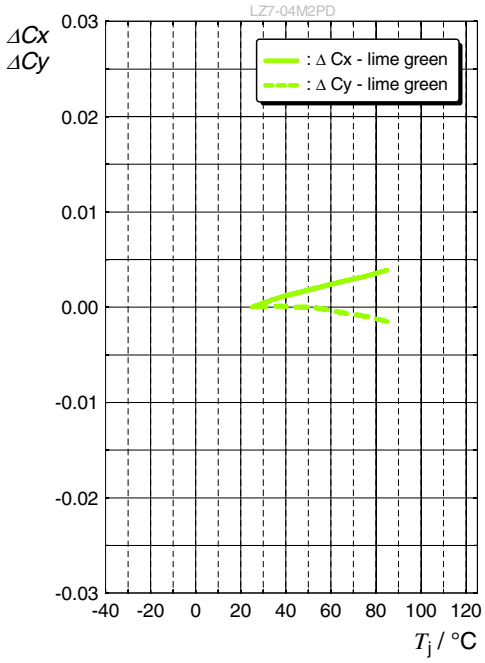
Dominant Wavelength [5)]

$\Delta\lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25\ °C) = f(T_j);\ I_F = 1000\ mA$

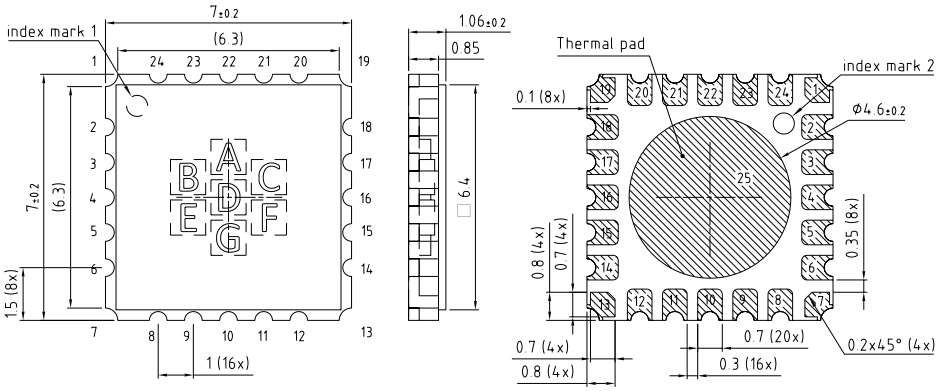


Chromaticity Coordinate Shift [5)]

$\Delta Cx,\ \Delta Cy = f(T_j);\ I_F = 1000\ mA$



Dimensional Drawing [9)]



Further Information:

Approximate Weight: 163.0 mg

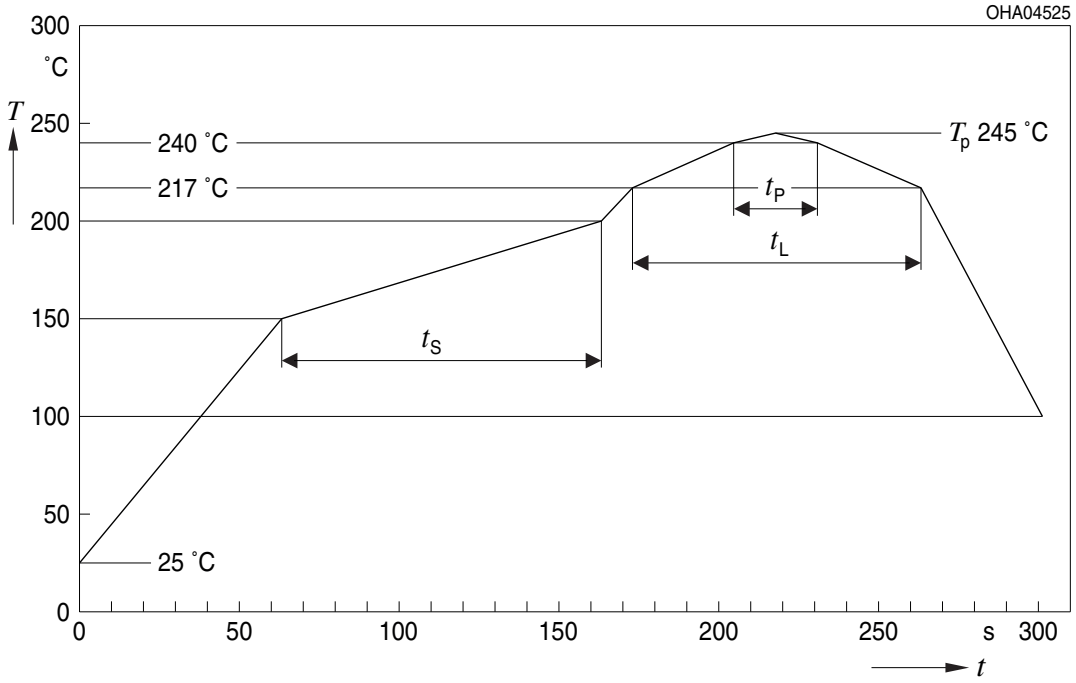
Electrical Internal Circuit

Pin Out		
Pad	Die	Function
2	B	Anode
3	A	Anode
5	C	Anode
6	F	Anode
8	E	Anode
9	G	Anode
11	D	Cathode
14	D	Anode
15	G	Cathode
17	E	Cathode
20	F	Cathode
21	C	Cathode
23	A	Cathode
24	B	Cathode
NC pins: 1. 4. 7. 10. 12. 13. 16. 18. 19. 22.		
DNC pins : none		

Pin	Description
2, 24	Die B - red
3, 23	Die A - blue
5, 21	Die C - true green
6, 8, 17, 20	Die E, F - lime green
9, 15	Die G - converted yellow
11, 14	Die D - verde

Reflow Soldering Profile

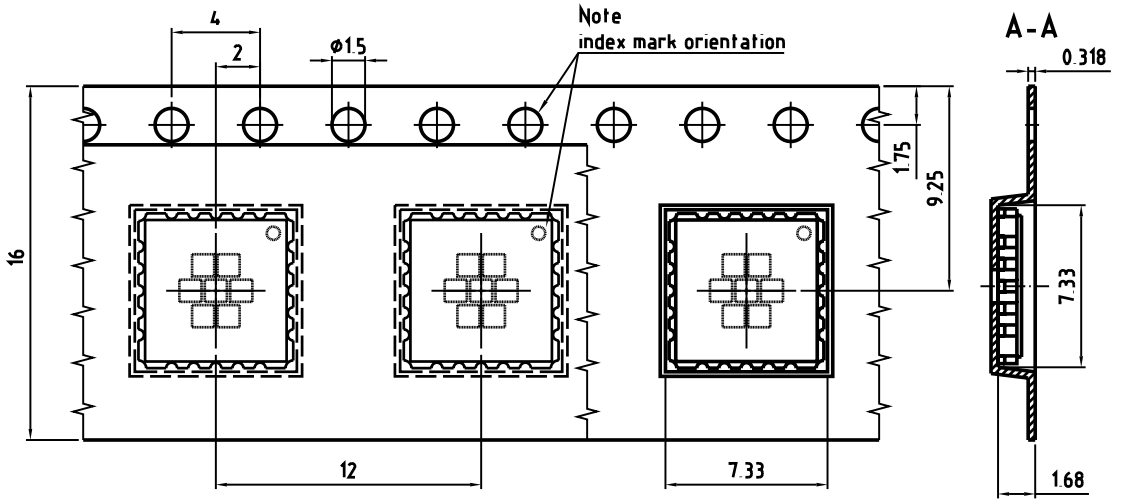
Product complies to MSL Level 1 acc. to JEDEC J-STD-020E



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		°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 [9)]



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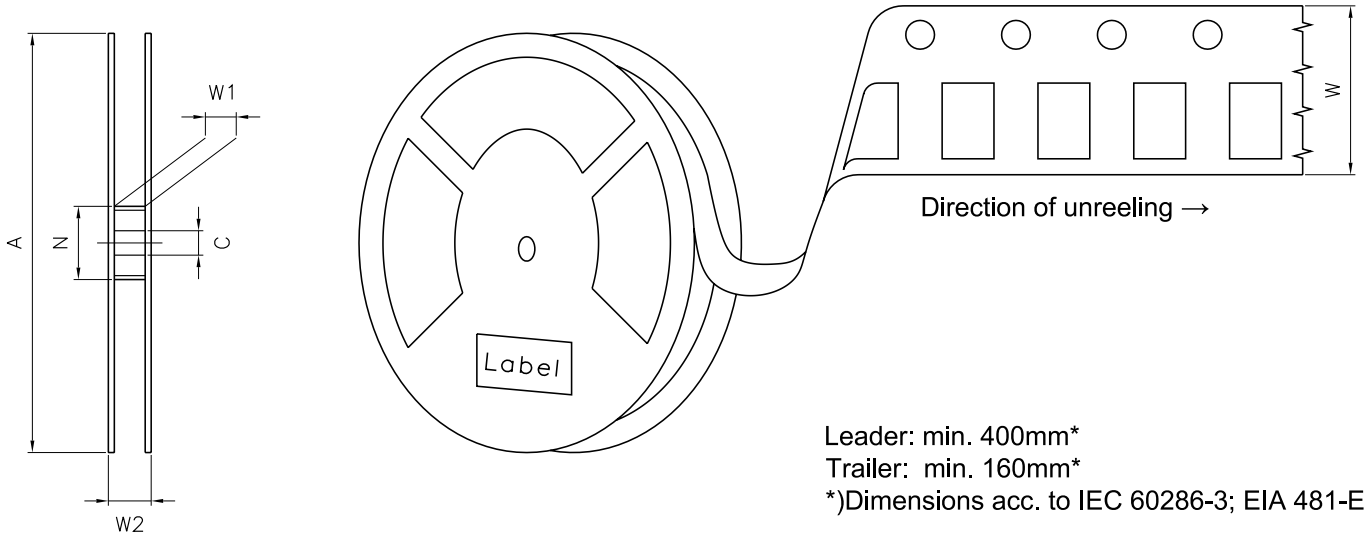
Tape and Reel [10)]

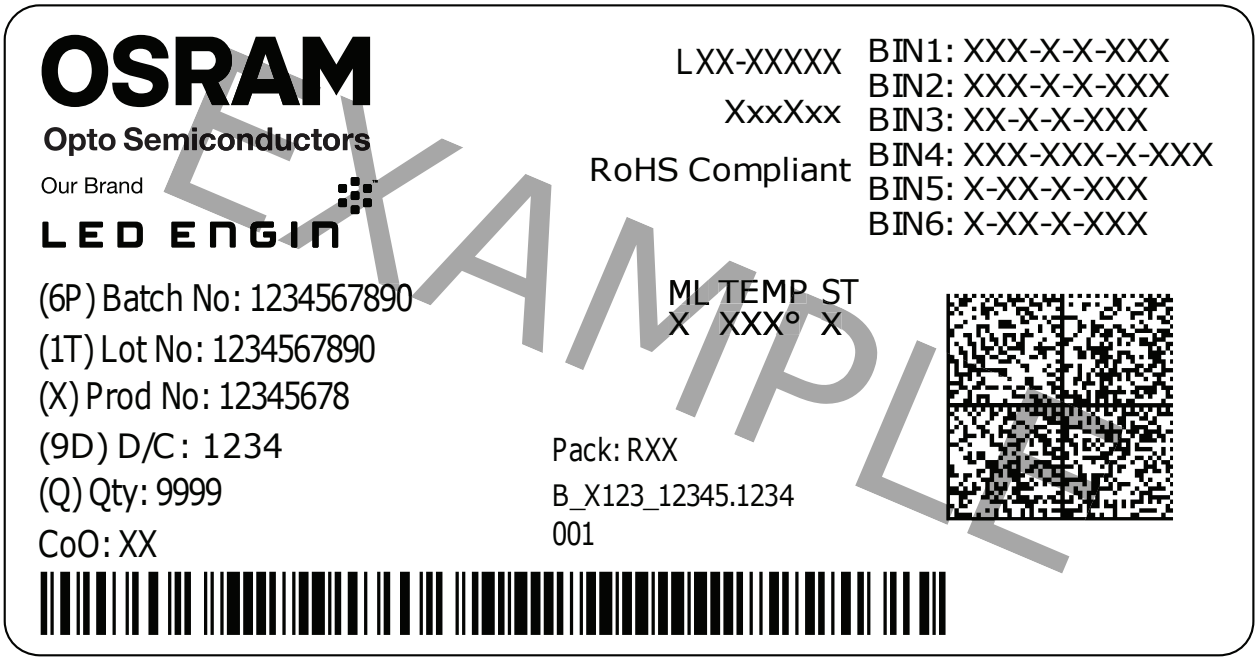


Leader: min. 400mm*
Trailer: min. 160mm*
*)Dimensions acc. to IEC 60286-3; EIA 481-E

Reel Dimensions

A	W	N_{min}	W_1	$W_{2\,max}$	Pieces per PU
180 mm	16 + 0.3 / - 0.1 mm	60/100 mm	16.4 + 2 mm	22.4 mm	500

Barcode-Product-Label (BPL)



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 **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.

Tapes and reels are shipped in airtight bags in order to reduce the onset of silver tarnish. We recommend bags only be opened when ready to use emitters. Partially used reels or trays should be stored in airtight bags or in storage purged with nitrogen.

Based on very short life cycle times in chip technology this component is subject to frequent adaption to the latest chip technology.

Changes to the content of this datasheet may occur without further notification. JEDEC 46C constitutes the guideline of the change management for the device specified in this document.

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 groups are tested at a current pulse duration of 10 ms and a tolerance of ±10 %.

2) **Operating Conditions:** Operating conditions according DC-derating (Max. Permissible Forward Current)

3) **Reverse Operation:** Not designed for reverse operation. Continuous reverse operation can cause migration and damage of the device.

4) **Chromaticity coordinate groups:** Chromaticity coordinate groups are tested at a current pulse duration of 10 ms and a tolerance of ±0.01.

5) **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.

6) **Wavelength:** Wavelengths are tested at a current pulse duration of 10 ms and a tolerance of ±1 nm.

7) **Forward Voltage:** Forward voltages are tested at a current pulse duration of 10 ms and a tolerance of ±0.1 V.

8) **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.

9) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ±0.1 and dimensions are specified in mm.

10) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

Revision History

Version	Date	Change
1.0	2020-04-03	Initial Version
1.1	2020-09-03	Dimensional Drawing
1.2	2023-08-04	New Layout Applications Ordering Information Characteristics Electro - Optical Characteristics (Diagrams)
1.3	2023-12-21	Characteristics Brightness Groups
1.4	2023-12-21	Dimensional Drawing

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Published by ams-OSRAM AG
Tobelbader Strasse 30, 8141 Premstaetten, Austria
Phone +43 3136 500-0
ams-osram.com

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