

PCN

AO-PCN-2023-033-A

Introduction of new Green LED chip for LED ENGINE emitters

01.05.2023

Dear Customer,

please review this **PCN** and provide your feedback in the **Customer approval form** (at the end of this PCN document) to your ams OSRAM sales partner before **05.06.2023** *).

Your prompt reply will help ams OSRAM to assure a smooth and well executed transition. If ams OSRAM does not hear from your side by the due date, we will assume your (if you are a Distributor: and your customer's) full acceptance to this proposed change and its implementation.

ams OSRAM understands the time requirements your organization needs to approve this PCN. However, if you can provide ams OSRAM an estimated date your organization will have finalized this PCN review, ams OSRAM can use this date to plan continued production to secure your order needs during the transition time.

Your attention and response to this matter is highly appreciated.

Please direct your inquiries to your local Sales office.

- *) ams OSRAM aligns with the widely recognized JEDEC/ECIA/IPC Joint Standard No. 46, which stipulates:
- Customers should acknowledge receipt of the PCN within 30 days of delivery of the PCN.
 - Lack of acknowledgement of the PCN within 30 days constitutes acceptance of the change.
 - After acknowledgement, lack of additional response within the 90 day period constitutes acceptance of the change. If the customer requires additional time to perform sample testing, beyond the 90 day review period, an extension must be negotiated with the supplier.

Subject of change: Introduction of new Green LED chip for LED ENGIN emitters

Affected products: Refer to document 2_cip_AO-PCN-2023-033-A

Reason for change:

- Performance improvement
- Secure continuous supply

	<u>Current status</u>	<u>New status</u>
Description of change:	<ul style="list-style-type: none"> • Current green LED Chip • Current Datasheet Versions 	<ul style="list-style-type: none"> • New green LED Chip • New Datasheet Versions
For details refer to document 2_cip_AO-PCN-2023-033-A		

Product identification: Updated Prod No on Reel Label

Time schedule for PCN material: (after implementation of change):	Final qualification report:	01.05.2023
	Samples available:	On Request
	Intended Start of delivery:	01.08.2023 ^{*)} <small>*) or earlier if released by customer and upon mutual agreement</small>
Time schedule for Pre-PCN material: (prior to implementation of change):	Last time order date (LTO):	01.08.2023 ^{**)} <small>**) Lead time and LTO quantity shall be mutually agreed between OSRAM OS and customer.</small>
	Last time delivery date (LTD):	01.11.2023 ^{***)} <small>***) planned last date for delivery of products of current status</small>

Assessment: No change of fit, form and reliability. Function will be changed according to the new datasheet version.

Documentation: Customer information package 2_cip_AO-PCN-2023-033-A
Qualification Report 3_qual_AO-PCN-2023-033-A

Note:

Pre-PCN material: Products of current status, means before implementation of the changes as described in the PCN.

PCN material: Products with implementation of the changes as described in the PCN.

Customer approval form AO-PCN-2023-033-A

Introduction of new Green LED chip for LED ENGINE emitters

Please list product(s) affected in your application(s):

Please check the appropriate box below:

- | | |
|--|---|
| <input type="radio"/> Approval:
We agree with the proposed change and accept start of the shipment upon availability of PCN material | <input type="radio"/> Not relevant:
Change is not relevant for products in use. |
|--|---|

☐ **Change cannot be accepted:**

- ☐ **We have objections:**
- ☐ **We request following Information:**
- ☐ **We request following Samples:**
- ☐ **Expected approval date:**
- ☐ **Volume requirements for Pre-PCN material:**

☐ **Remarks:**

Sender:

Company:

Address / Location:

Signature:

Date:

Please return this approval form to your Sales partner.

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PCN

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Introduction of new Green LED chip for LED ENGINE emitters

Customer information package

OS Q CQM ICI
2023-05-01

Agenda

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Reason for change

Item	Description
1.	Performance improvement
2.	Secure continuous supply

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Introduction of new Green LED chip for LED ENGINE emitters

Description of change

Item	Current status	New status
1.	Current green LED Chip	New green LED Chip

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Introduction of new Green LED chip for LED ENGIN emitters

Changes in the datasheets: The displayed changes below are for LZ1-00G102 as example.
Regarding details for the other affected devices please refer to the updated datasheets.

Item	Current status	New status
Format	OSRAM Opto Semiconductors format	Updated ams OSRAM Format

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Changes in the datasheets: The displayed changes below are for LZ1-00G102 as example. Regarding details for the other affected devices please refer to the updated datasheets.

Item	Current status	New status																																																																																
Characteristics	<div><p>Characteristics</p><p>I_F = 1000 mA; T_C = 25 °C</p><table><tr><th>Parameter</th><th>Symbol</th><th></th><th>Values</th></tr><tr><td>Total radiant flux ⁴⁾</td><td>Φ_E</td><td>typ.</td><td>450 mW</td></tr><tr><td>Luminous Flux ⁴⁾</td><td>Φ_V</td><td>typ.</td><td>215 lm</td></tr><tr><td>Photosynthetic Photon Flux (PPF) ⁴⁾ λ = 400 - 700 nm</td><td>Φ_P</td><td>typ.</td><td>2.0 μmol/s</td></tr><tr><td>Peak Wavelength</td><td>λ_{peak}</td><td>typ.</td><td>517 nm</td></tr><tr><td>Dominant Wavelength ⁵⁾ I_F = 1000 mA</td><td>λ_{dom}</td><td>min. typ. max.</td><td>520 nm 523 nm 530 nm</td></tr><tr><td>Viewing angle at 50% I_V</td><td>2φ</td><td>typ.</td><td>100 °</td></tr><tr><td>Forward Voltage ⁶⁾⁴⁾ I_F = 1000 mA</td><td>V_F</td><td>min. typ. max.</td><td>3.20 V 3.60 V 4.20 V</td></tr><tr><td>Reverse current ³⁾</td><td>I_R</td><td></td><td>Not designed for reverse operation</td></tr><tr><td>Electrical thermal resistance junction/case</td><td>R_{thJC elec.}</td><td>typ.</td><td>6.0 K / W</td></tr></table></div>	Parameter	Symbol		Values	Total radiant flux ⁴⁾	Φ _E	typ.	450 mW	Luminous Flux ⁴⁾	Φ _V	typ.	215 lm	Photosynthetic Photon Flux (PPF) ⁴⁾ λ = 400 - 700 nm	Φ _P	typ.	2.0 μmol/s	Peak Wavelength	λ _{peak}	typ.	517 nm	Dominant Wavelength ⁵⁾ I _F = 1000 mA	λ _{dom}	min. typ. max.	520 nm 523 nm 530 nm	Viewing angle at 50% I _V	2φ	typ.	100 °	Forward Voltage ⁶⁾⁴⁾ I _F = 1000 mA	V _F	min. typ. max.	3.20 V 3.60 V 4.20 V	Reverse current ³⁾	I _R		Not designed for reverse operation	Electrical thermal resistance junction/case	R _{thJC elec.}	typ.	6.0 K / W	<div><p>Characteristics</p><p>I_F = 1000 mA; T_C = 25 °C</p><table><tr><th>Parameter</th><th>Symbol</th><th></th><th>Values</th></tr><tr><td>Total radiant flux ⁴⁾</td><td>Φ_E</td><td>typ.</td><td>575 mW</td></tr><tr><td>Luminous Flux ⁴⁾</td><td>Φ_V</td><td>typ.</td><td>275 lm</td></tr><tr><td>Photosynthetic Photon Flux (PPF) ⁴⁾ λ = 400 - 700 nm</td><td>Φ_P</td><td>typ.</td><td>2.6 μmol/s</td></tr><tr><td>Peak Wavelength</td><td>λ_{peak}</td><td>typ.</td><td>517 nm</td></tr><tr><td>Dominant Wavelength ⁵⁾ I_F = 1000 mA</td><td>λ_{dom}</td><td>min. typ. max.</td><td>520 nm 523 nm 530 nm</td></tr><tr><td>Viewing angle at 50% I_V</td><td>2φ</td><td>typ.</td><td>100 °</td></tr><tr><td>Forward Voltage ⁶⁾⁴⁾ I_F = 1000 mA</td><td>V_F</td><td>min. typ. max.</td><td>2.50 V 2.90 V 3.50 V</td></tr><tr><td>Reverse current ³⁾</td><td>I_R</td><td></td><td>Not designed for reverse operation</td></tr><tr><td>Electrical thermal resistance junction/case</td><td>R_{thJC elec.}</td><td>typ.</td><td>6.0 K / W</td></tr></table></div>	Parameter	Symbol		Values	Total radiant flux ⁴⁾	Φ _E	typ.	575 mW	Luminous Flux ⁴⁾	Φ _V	typ.	275 lm	Photosynthetic Photon Flux (PPF) ⁴⁾ λ = 400 - 700 nm	Φ _P	typ.	2.6 μmol/s	Peak Wavelength	λ _{peak}	typ.	517 nm	Dominant Wavelength ⁵⁾ I _F = 1000 mA	λ _{dom}	min. typ. max.	520 nm 523 nm 530 nm	Viewing angle at 50% I _V	2φ	typ.	100 °	Forward Voltage ⁶⁾⁴⁾ I _F = 1000 mA	V _F	min. typ. max.	2.50 V 2.90 V 3.50 V	Reverse current ³⁾	I _R		Not designed for reverse operation	Electrical thermal resistance junction/case	R _{thJC elec.}	typ.	6.0 K / W
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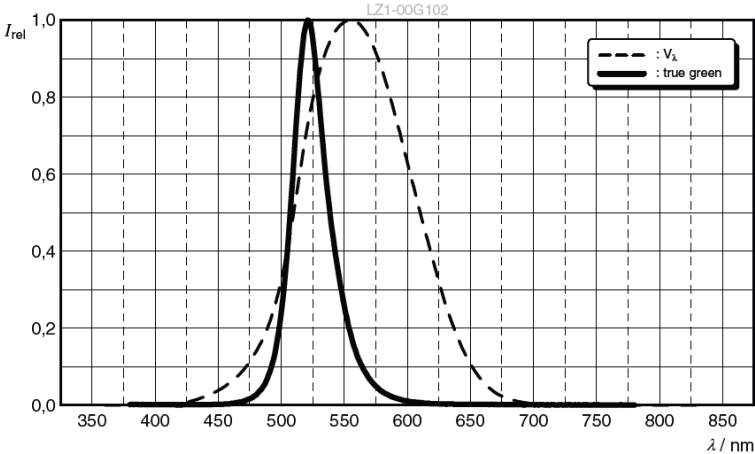
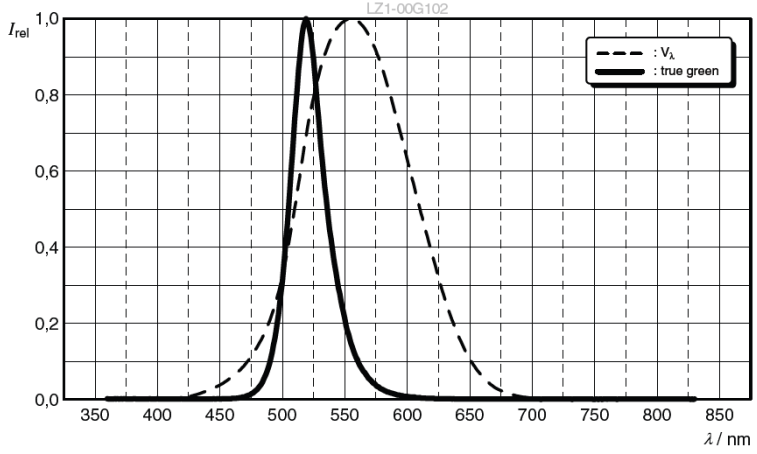
Changes in the datasheets: The displayed changes below are for LZ1-00G102 as example.
Regarding details for the other affected devices please refer to the updated datasheets.

Item	Current status	New status																											
Brightness Groups	<div><p>Brightness Groups</p><table><tr><th>Group</th><th>Luminous Flux ¹⁾ I_F = 1000 mA min. Φ_V</th><th>Luminous Flux ¹⁾ I_F = 1000 mA max. Φ_V</th></tr><tr><td>N</td><td>146 lm</td><td>182 lm</td></tr><tr><td>P</td><td>182 lm</td><td>228 lm</td></tr><tr><td>Q</td><td>228 lm</td><td>285 lm</td></tr></table></div>	Group	Luminous Flux ¹⁾ I _F = 1000 mA min. Φ _V	Luminous Flux ¹⁾ I _F = 1000 mA max. Φ _V	N	146 lm	182 lm	P	182 lm	228 lm	Q	228 lm	285 lm	<div><p>Brightness Groups</p><table><tr><th>Group</th><th>Luminous Flux ¹⁾ I_F = 1000 mA min. Φ_V</th><th>Luminous Flux ¹⁾ I_F = 1000 mA max. Φ_V</th></tr><tr><td>P</td><td>182 lm</td><td>228 lm</td></tr><tr><td>Q</td><td>228 lm</td><td>285 lm</td></tr><tr><td>R</td><td>285 lm</td><td>356 lm</td></tr><tr><td>S</td><td>356 lm</td><td>445 lm</td></tr></table></div>	Group	Luminous Flux ¹⁾ I _F = 1000 mA min. Φ _V	Luminous Flux ¹⁾ I _F = 1000 mA max. Φ _V	P	182 lm	228 lm	Q	228 lm	285 lm	R	285 lm	356 lm	S	356 lm	445 lm
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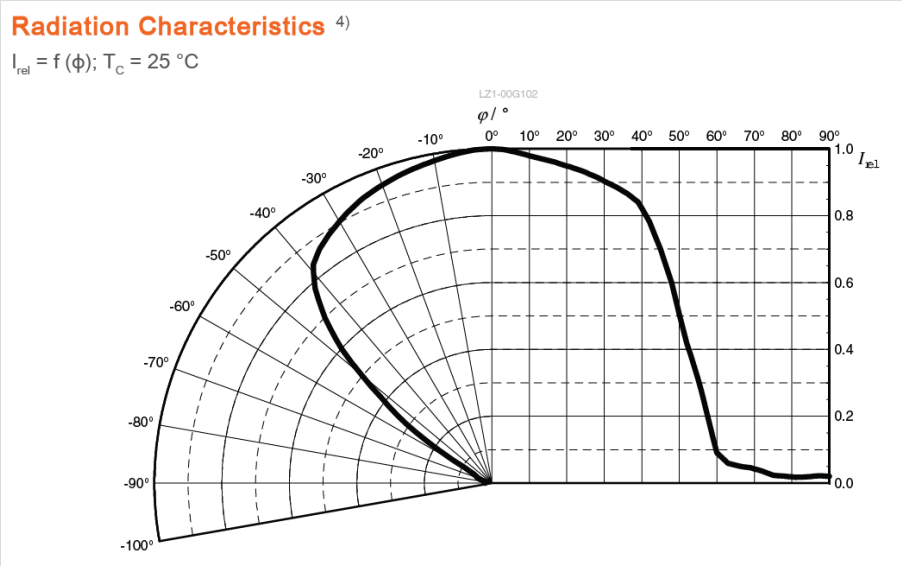
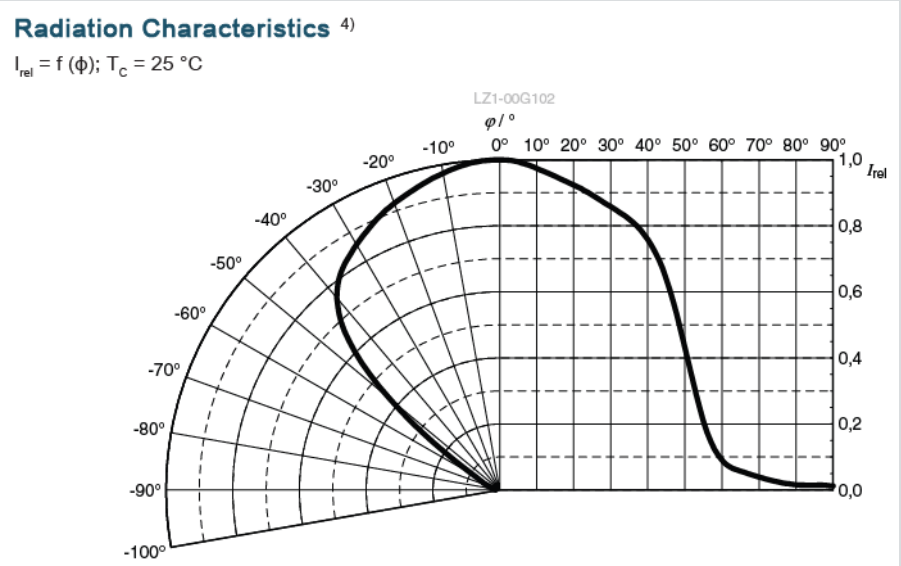
Changes in the datasheets: The displayed changes below are for LZ1-00G102 as example.
Regarding details for the other affected devices please refer to the updated datasheets.

Item	Current status	New status
Relative Spectral Emission	<p>Relative Spectral Emission ⁴⁾</p> <p>$I_{rel} = f(\lambda); I_F = 1000 \text{ mA}; T_C = 25 \text{ }^{\circ}\text{C}$</p> 	<p>Relative Spectral Emission ⁴⁾</p> <p>$I_{rel} = f(\lambda); I_F = 1000 \text{ mA}; T_C = 25 \text{ }^{\circ}\text{C}$</p> 

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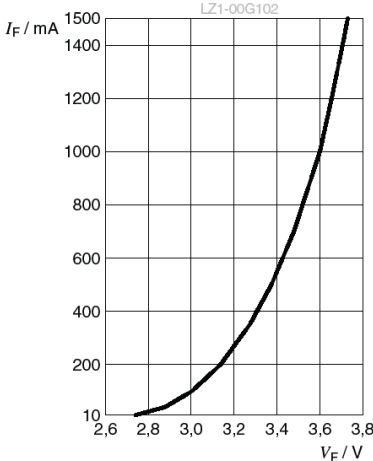
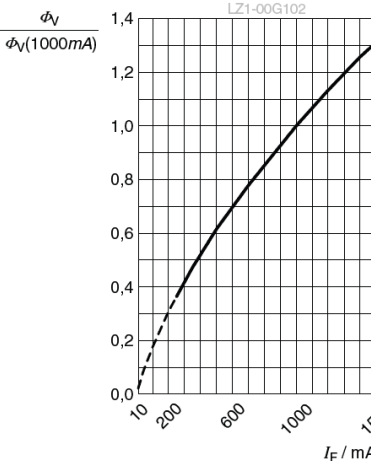
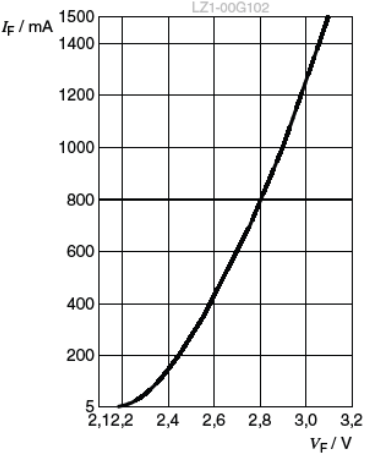
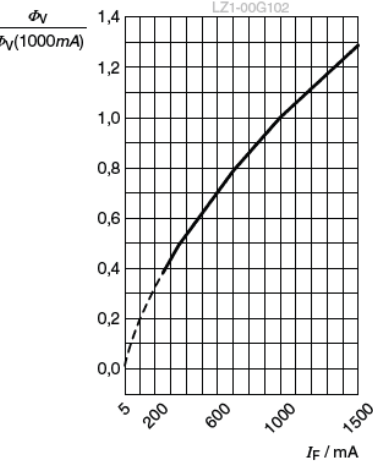
Changes in the datasheets: The displayed changes below are for LZ1-00G102 as example.
Regarding details for the other affected devices please refer to the updated datasheets.

Item	Current status	New status
Radiation Characteristics	<p>Radiation Characteristics ⁴⁾</p> <p>$I_{rel} = f(\phi); T_C = 25\text{ °C}$</p> 	<p>Radiation Characteristics ⁴⁾</p> <p>$I_{rel} = f(\phi); T_C = 25\text{ °C}$</p> 

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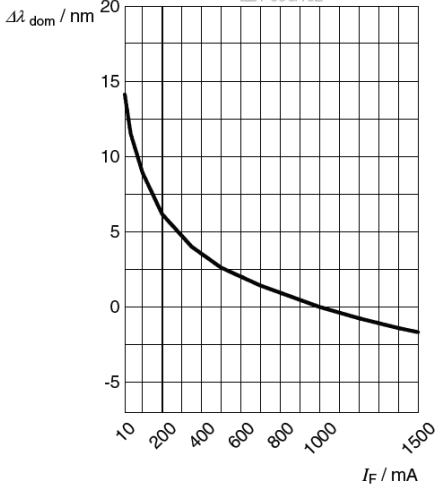
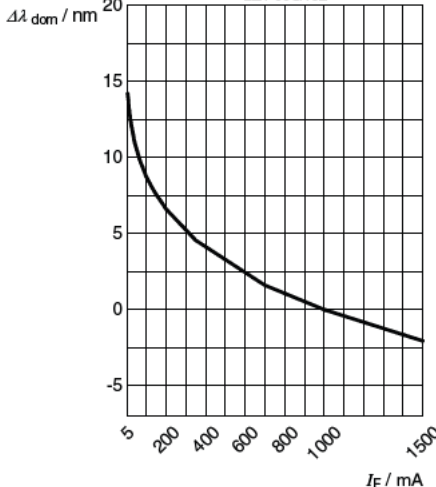
Changes in the datasheets: The displayed changes below are for LZ1-00G102 as example.
Regarding details for the other affected devices please refer to the updated datasheets.

Item	Current status	New status
Forward current & Relative Luminous Flux	<p>Forward current ⁴⁾</p> <p>$I_F = f(V_F); T_C = 25\text{ °C}$</p>  <p>Relative Luminous Flux ^{4), 7)}</p> <p>$\Phi_V / \Phi_V(1000\text{ mA}) = f(I_F); T_C = 25\text{ °C}$</p> 	<p>Forward current ⁴⁾</p> <p>$I_F = f(V_F); T_C = 25\text{ °C}$</p>  <p>Relative Luminous Flux ^{4), 7)}</p> <p>$\Phi_V / \Phi_V(1000\text{ mA}) = f(I_F); T_C = 25\text{ °C}$</p> 

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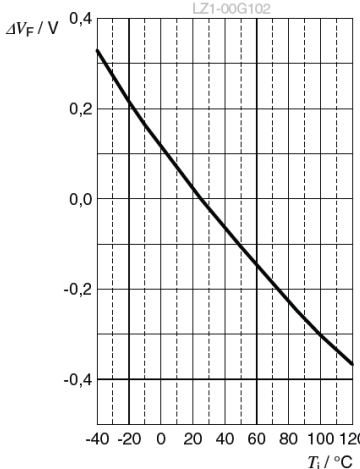
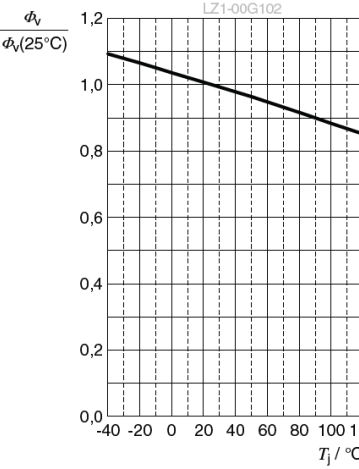
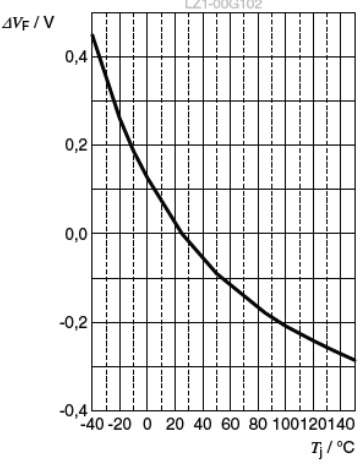
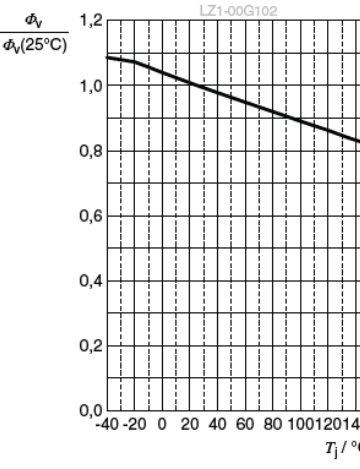
Changes in the datasheets: The displayed changes below are for LZ1-00G102 as example.
Regarding details for the other affected devices please refer to the updated datasheets.

Item	Current status	New status
Dominant Wavelength	<div><p>Dominant Wavelength ⁴⁾</p><p>$\Delta\lambda_{\text{dom}} = f(I_F); T_C = 25\text{ °C}$</p><p>LZ1-00G102</p></div>	<div><p>Dominant Wavelength ⁴⁾</p><p>$\Delta\lambda_{\text{dom}} = f(I_F); T_C = 25\text{ °C}$</p><p>LZ1-00G102</p></div>

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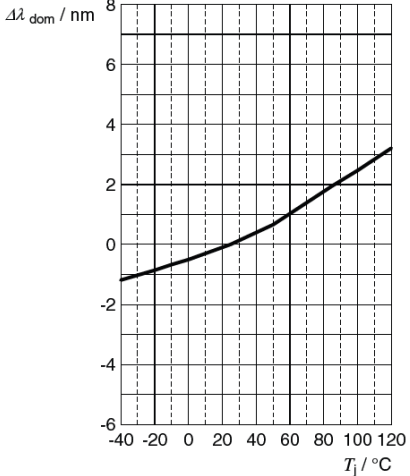
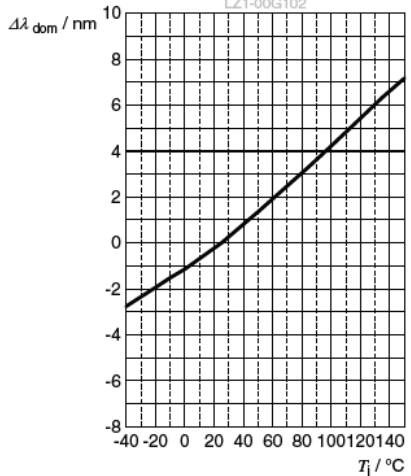
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Item	Current status	New status
Forward Voltage & Relative Luminous Flux	<div><div>Forward Voltage ⁴⁾ $\Delta V_F = V_F - V_F(25\text{ }^{\circ}\text{C}) = f(T_j); I_F = 1000\text{ mA}$</div><div></div></div> <div><div>Relative Luminous Flux ⁴⁾ $\Phi_V / \Phi_V(25\text{ }^{\circ}\text{C}) = f(T_j); I_F = 1000\text{ mA}$</div><div></div></div>	<div><div>Forward Voltage ⁴⁾ $\Delta V_F = V_F - V_F(25\text{ }^{\circ}\text{C}) = f(T_j); I_F = 1000\text{ mA}$</div><div></div></div> <div><div>Relative Luminous Flux ⁴⁾ $\Phi_V / \Phi_V(25\text{ }^{\circ}\text{C}) = f(T_j); I_F = 1000\text{ mA}$</div><div></div></div>

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Item	Current status	New status
Dominant Wavelength	<div><p>Dominant Wavelength ⁴⁾</p><p>$\Delta\lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25\text{ °C}) = f(T_j); I_F = 1000\text{ mA}$</p><p>LZ1-00G102</p></div>	<div><p>Dominant Wavelength ⁴⁾</p><p>$\Delta\lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25\text{ °C}) = f(T_j); I_F = 1000\text{ mA}$</p><p>LZ1-00G102</p></div>

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Changes in the datasheets: Updated Datasheet Version

Product type	Data sheet version <u>before PCN</u>	Data sheet version <u>after PCN</u>
LZ1-00G102	1.7	1.8
LZ4-00G108	1.8	1.9
LZ4-00MA08	1.1	1.2
LZ4-00MC08	1.2	1.3
LZ4-00MD09	1.3	1.4
LZ4-01MNCA	1.1	1.2
LZ4-01MWCA	1.2	1.3
LZ7-04M2PD	1.1	1.2
LZP-00MD00	1.10	1.11
LZP-00MN00	1.1	1.2

Note: After PCN approval and shipment of new material, the new data sheet versions will be valid.
Latest version of data sheet is accessible on the ams OSRAM homepage.

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Changes in the datasheets: Updated Datasheet Version

Product type	Data sheet version <u>before PCN</u>	Data sheet version <u>after PCN</u>
LQ4-04MZPB-0790	1.3	1.4
LQ4-01MZCA-0808	1.2	1.3
LQ4-04MDPB-0708	1.4	1.5
LQ4-04MZC8-0761	1.2	1.3
LQ4-04MZPB-0755	0.2	1.0
LQ7-04MZPD-0791	1.0	1.1

Note: After PCN approval and shipment of new material, the new data sheet versions will be valid.
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List of affected products



LED ENGIN LuxiGen Level 1	LED ENGIN LuxiGen Level 2
LZ1-00G102	LZ1-10G102
LZ4-00G108	LZ4-40G108
LZ4-00MA08	LZ4-20MA08
LZ4-00MC08	LZ4-20MC08
LZ4-00MD09	LZ4-60MD09
LZ4-01MNCA	LZ7-A4M2PD
LZ4-01MWCA	LZP-W0MN00
LZ7-04M2PD	LZP-W0MD00
LZP-00MN00	LZP-L0MD00
LZP-00MD00	LQ4-V4MDPB-0708
LQ4-01MZCA-0808	
LQ4-04MDPB-0708	
LQ4-04MZC8-0761	
LQ4-04MZPB-0755	
LQ4-04MZPB-0790	
LQ7-04MZPD-0791	

AO-PCN-2023-033-A

Introduction of new Green LED chip for LED ENGINE emitters

PCN Samples

LED ENGINE LuxiGen Level 1	LED ENGINE LuxiGen Level 2
LZ1-00G102	LZ1-10G102
LZ4-00G108	LZ4-40G108
LZ4-00MA08	LZ4-20MA08
LZ4-00MC08	LZ4-20MC08
LZ4-00MD09	LZ4-60MD09
LZ4-01MNCA	LZ7-A4M2PD
LZ4-01MWCA	LZP-W0MN00
LZ7-04M2PD	LZP-W0MD00
LZP-00MN00	LZP-L0MD00
LZP-00MD00	LQ4-V4MDPB-0708
LQ4-01MZCA-0808	
LQ4-04MDPB-0708	
LQ4-04MZC8-0761	
LQ4-04MZPB-0755	
LQ4-04MZPB-0790	
LQ7-04MZPD-0791	

Color code:  available  on request

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Introduction of new Green LED chip for LED ENGIN emitters

Time schedule

for PCN material (<u>after</u> implementation of change):		
Final qualification report	01.05.2023	
Samples available	On Request	
Intended Start of delivery	01.08.2023 *)	*) or earlier if released by customer and upon mutual agreement

for Pre-PCN material (<u>prior to</u> implementation of change):		
Last time order date (LTO)	01.08.2023 **)	**) Lead time and LTO quantity shall be mutually agreed between OSRAM OS and customer.
Last time delivery date (LTD)	01.11.2023 ***)	***) planned last date for delivery of products of current status

Note:

Pre-PCN material: Products of current status, means before implementation of the changes as described in the PCN.

PCN material: Products with implementation of the changes as described in the PCN.

Sensing is life



Qualification Report

230089C1

Subject	Qualification report of LED ENGIN Green Product Family
Date	20.03.2023
Tested devices	LQ4-04MZPB-0790 (LZ4 RGB – Lime) LZ7-04M2PD (LZ7 RGB – PC Amber – Verde – Lime)
Brand (including sub brands)	LED ENGIN
Applies to	LZ1-00G102 LZ4-00G108 Green Channel of the following devices: LQ4-04MZPB-0790 LZ7-04M2PD LZ4-00MA08 LZ4-00MC08 LZ4-00MD09

LZ4-01MNCA
LZ4-01MWCA
LZC-03MD07
LZP-00MD00
LZP-00MN00
LQ4-01MZCA-0808
LQ4-04MDPB-0708
LQ4-04MZC8-0761
LQ4-04MZPB-0755
LQ7-04MZPD-0791

Pre-conditioning according to Jedec Level 1

Test Performed	Condition	Duration	Sample Size	Failures		
				El.	Opt.	Vis
Temperature Cycling TC <i>JESD22-A104</i>	$T_A = -40^{\circ}\text{C}/+110^{\circ}\text{C}$ 15min each extreme	1000C	24	0	0	0
High Temperature Operating Life HTOL <i>JESD22-A108</i>	$T_A = 55^{\circ}\text{C}$; $T_j = 150^{\circ}\text{C}$ $I_F = 3000\text{ mA}$ LQ4-04MZPB-0790-Green only	1000h	24	0	0	0
High Temperature Operating Life RTOL <i>JESD22-A108</i>	$T_A = 25^{\circ}\text{C}$; $T_s = 75^{\circ}\text{C}$; $T_j = 127^{\circ}\text{C}$ $I_F = 3000\text{ mA}$ LZ7-04M2PD – all channels on	1000h	11	0	0	0

Note:

Failure criteria:

Electrical failures:	V_f ($I_f = 1000\text{mA}$)	$> \pm 10\%$ from initial value
Optical failures:	I_e ($I_f = 1000\text{mA}$)	$< 70\%$ from initial value
Visual failures:	acc JEDEC JESD22-B101	

Conclusion: The tested devices fulfill the reliability requirements. The tested devices representing the product family as stated in the applies to section fulfill the reliability requirements.

Disclaimer

PLEASE CAREFULLY READ THE BELOW TERMS AND CONDITIONS BEFORE USING THE INFORMATION.
IF YOU DO NOT AGREE WITH ANY OF THESE TERMS AND CONDITIONS, DO NOT USE THE INFORMATION.

The Information contained in this Document does not constitute an independent warranty. The committed behavior is described in the Product data sheet and/or further, mutually agreed specifications.

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Further explanations:

Data: The Data used in this Document consider the reliability test results under the mentioned driving conditions only. For Product information on the maximum operating conditions and the OSRAM standard qualification profile please refer to the Product data sheet or contact your local sales partner.

Conditions: The conditions for the generation of the Data are as follows:

1. The Data and curves shown in this Document are based on experiments carried out under laboratory conditions on a random sample size of LED/IRED/Laser/Detector with readouts at discrete readout times (where applicable). Thus, the Data above represent a limited number of production lots only and may differ between different assembly lots over time (including chip or package changes). Thus, the behavior of the LED/IRED/Laser/Detector in the final application may differ from the Data. The behavior of the LED/IRED/Laser/Detector at conditions or readout times deviating from those stated above may not be deduced from the Data.

2. If applicable:

a) Extended driving conditions:

The tested driving conditions exceed the maximum limits stated in the Product data sheet. Therefore, a reduced lifetime or an accelerated degradation is expected. Failure limits noted in the Document refer to the testing condition according to the OSRAM standard Product qualification profile and not to the actual testing condition.

b) Extended testing duration:

The testing duration exceed the OSRAM standard qualification profile of the mentioned Product. Failure limits noted in the Document refer to the testing duration according to the OSRAM standard Product qualification profile and not to the actual testing duration.

c) Exceeding standard qualification conditions – (Product data sheet limits not affected):

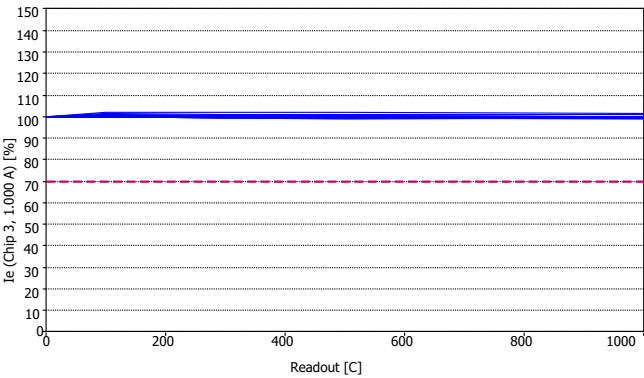
The tested driving conditions exceed the OSRAM standard qualification profile of the mentioned Product. Therefore a reduced lifetime or an accelerated degradation is expected. Failure limits noted in the Document refer to the testing condition according to the OSRAM standard Product qualification profile and not to the actual testing condition.

3. For long term operation additional failure modes of the chip or package can occur which are not shown in this Document.

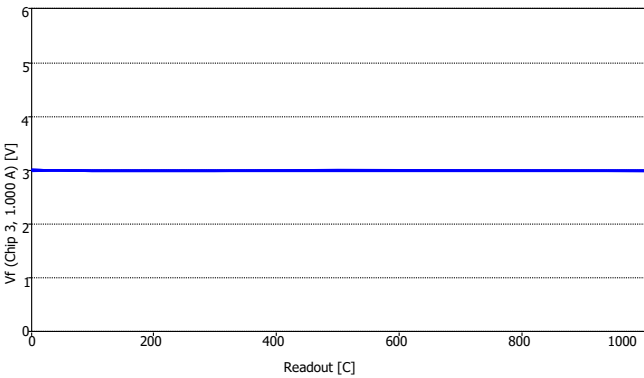
4. Possible differences in the thermal management of OSRAM and customer's setup may lead to a different aging behavior.

TC -40°C/125°C

4ZPB-0790□□TC 2 -40°C / 125°C R22_02058Q_4B 24 pcs

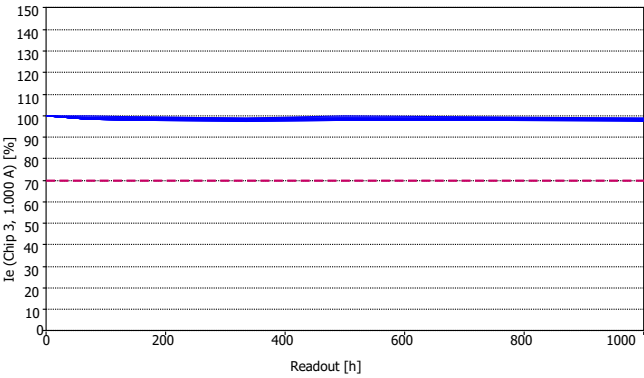


4ZPB-0790□□TC 2 -40°C / 125°C R22_02058Q_4B 24 pcs

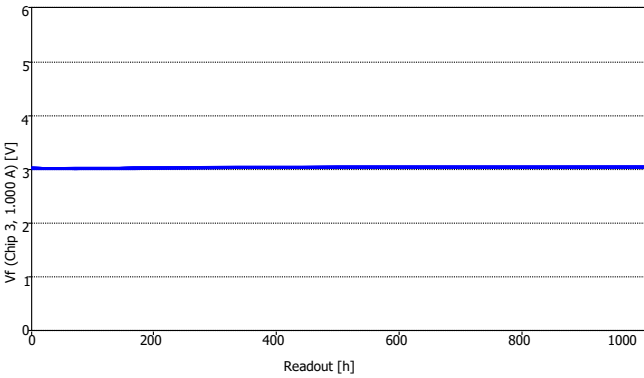


HTOL Ta=55°C (Tj=150°C); 3A

4ZPB-0790□□SSLT 55°C / 3000mA R22_02058Q_5B 24 pcs

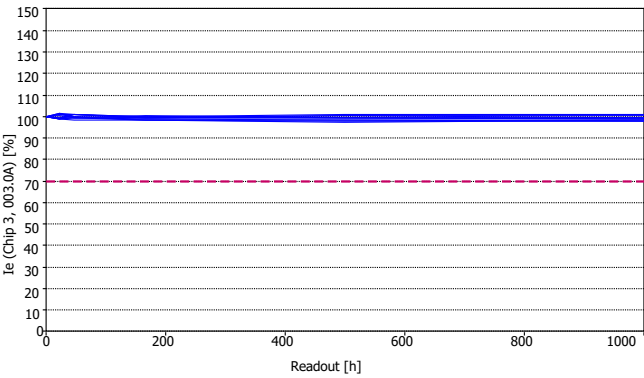


4ZPB-0790□□SSLT 55°C / 3000mA R22_02058Q_5B 24 pcs

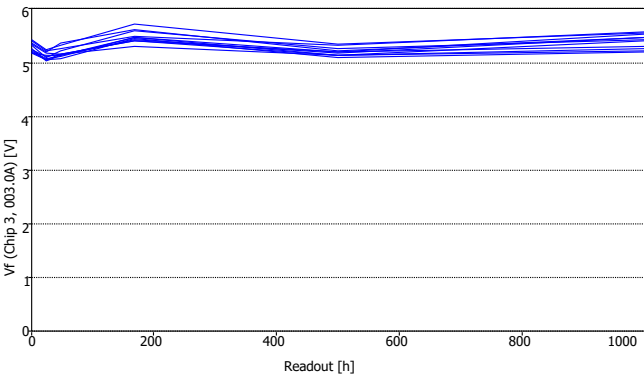


RTOL Ta=25°C (Ts=75°C, Tj=127°C); 3A

-04M2PD□□SSLT 75°C / 3000mA R23_00433Q_2A 11 pcs



-04M2PD□□SSLT 75°C / 3000mA R23_00433Q_2A 11 pcs



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