

PCN

AO-PCN-2022-035-A

Introduction of 6" InGaAlP Thinfilm Chip for Firefly

01.09.2022

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 **10.10.2022** *).

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 6" InGaAlP Thinfilm Chip for Firefly	
Affected products:	LR VH9F	
Reason for change:	<ul style="list-style-type: none"> • Introduction of latest 6" chip technology to secure continuous supply • Fulfill market demands for higher brightness • Update of datasheet to latest format and correction of input, where needed. 	
	<u>Current status</u>	<u>New status</u>
Description of change:	For details refer to document 2_cip_AO-PCN-2022-035-A	
Product identification:	Date code: 0923 (WWYY)	
Time schedule for PCN material: (after implementation of change):	Final qualification report:	01.09.2022
	Samples available:	01.09.2022
	Intended Start of delivery:	01.03.2022 ^{*)} <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):	01.09.2023 ^{**)} <small>**) Lead time and LTO quantity shall be mutually agreed between OSRAM OS and customer.</small>
	Last time delivery date (LTD):	31.05.2024 ^{***)} <small>***) planned last date for delivery of products of current status</small>
Assessment:	No change of product reliability	
Documentation:	Customer information package 2_cip_AO-PCN-2022-035-A; 3_cip_AO-PCN-2022-035-A_Rel	

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-2022-035-A

Introduction of 6" InGaAlP Thinfilm Chip for Firefly

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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Introduction of 6" InGaAlP Thinfilm Chip for Firefly

Customer information package

R&D-PD-LED-TLM and OS Q CQM ICI
2022-09-01

Agenda

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Introduction of 6” InGaAlP Thinfilm Chip for Firefly

Reason for change

Item	Description
1.	Introduction of latest 6” chip technology to secure continuous supply
2.	Fulfill market demands for higher brightness
3.	Update of datasheet to latest format and correction of input, where needed.

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Introduction of 6" InGaAlP Thinfilm Chip for Firefly

Description of change: new chip

Item	Current status	2 nd source chip A
Picture (exemplary)		
Wafer size [mm]	100 (4")	150 (6")
Chip carrier substrate	Ge	Si
Chip size [μm]	250 x 250	175 x 175
Height [μm]	150	120

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Introduction of 6" InGaAlP Thinfilm Chip for Firefly

Changes in the datasheets:

Page	Change Item	Reason for change	Old	New
1	Typ. Radiation	Correction of datasheet	140° (horizontal), 165° (vertical)	140° (horizontal), 150° (vertical)
1	Optical efficacy	Change of new chip	38 lm/W	50 lm/W
2	Datasheet Q#	Change of new chip	P2R1 (56...140mcd) - Q65110A8088	Q2S1 (90mcd...224mcd) – Q65113A5238
4	Peak Wavelength	Change of new chip	632	634
4	Spectral Bandwidth at 50% I _{relmax}	Change of new chip	25nm	16nm
4	Viewing angle at 50% I _v -90°	Correction of datasheet	165°	150°
4	Typ. V _F at I _F = 5mA	Change of new chip	2.00V	1.90V
5	Brightness Groups	Change of new chip	P2-R1	Q2-S1

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Changes in the datasheets: Ordering Information

Old			New		
Ordering Information			Ordering Information		
Type	Luminous Intensity ¹⁾ $I_F = 5 \text{ mA}$ I_v	Ordering Code	Type	Luminous Intensity ¹⁾ $I_F = 5 \text{ mA}$ I_v	Ordering Code
LR VH9F-P2R1-1	56 ... 140 mcd	Q65110A8088	LR VH9F-Q2S1-1-0-Z	90 ... 224 mcd	Q65113A5238

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Changes in the datasheets:

Old				New			
Characteristics				Characteristics			
$I_F = 5 \text{ mA}; T_S = 25 \text{ }^\circ\text{C}$				$I_F = 5 \text{ mA}; T_S = 25 \text{ }^\circ\text{C}$			
Parameter	Symbol		Values	Parameter	Symbol		Values
Peak Wavelength	λ_{peak}	typ.	632 nm	Peak Wavelength	λ_{peak}	typ.	634 nm
Dominant Wavelength ³⁾	λ_{dom}	min.	620 nm	Dominant Wavelength ³⁾	λ_{dom}	min.	620 nm
		typ.	625 nm			typ.	625 nm
		max.	633 nm			max.	633 nm
Spectral Bandwidth at 50% $I_{\text{rel,max}}$	$\Delta\lambda$	typ.	25 nm	Spectral Bandwidth at 50% $I_{\text{rel,max}}$	$\Delta\lambda$	typ.	16 nm
Viewing angle at 50% I_V values for 0°, 90°	2ϕ	typ.	140 °	Viewing angle at 50% I_V values for 0°, 90°	2ϕ	typ.	140 °
		typ.	165 °			typ.	150 °
Forward Voltage ⁴⁾ $I_F = 5 \text{ mA}$	V_F	min.	1.80 V	Forward Voltage ⁴⁾ $I_F = 5 \text{ mA}$	V_F	min.	1.80 V
		typ.	2.00 V			typ.	1.90 V
		max.	2.40 V			max.	2.40 V

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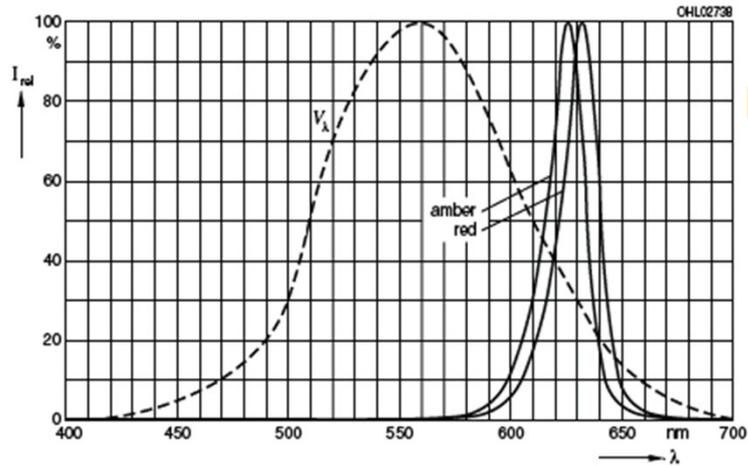
Introduction of 6" InGaAlP Thinfilm Chip for Firefly

Changes in the datasheets: Spectral Emission:

Old

Relative Spectral Emission ⁷⁾

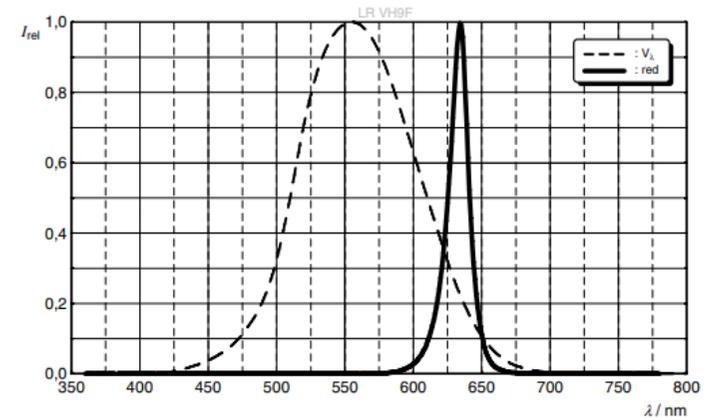
$$I_{rel} = f(\lambda); I_F = 5 \text{ mA}; T_A = 25 \text{ }^\circ\text{C}$$



New

Relative Spectral Emission ⁶⁾

$$I_{rel} = f(\lambda); I_F = 5 \text{ mA}; T_A = 25 \text{ }^\circ\text{C}$$



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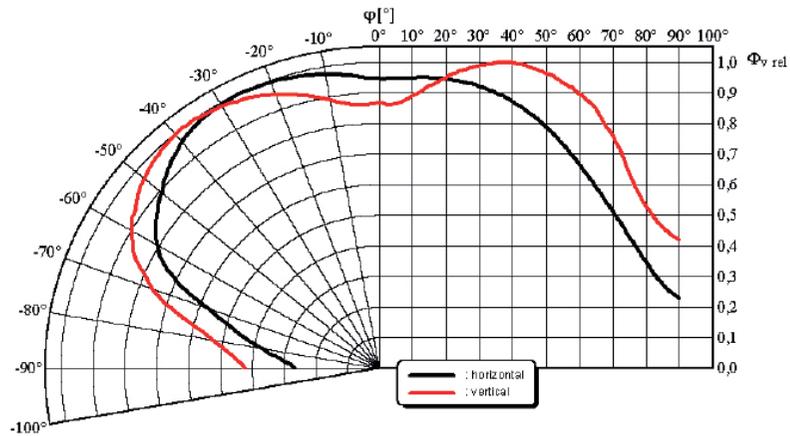
Changes in the datasheets: Radiation Characteristics:

Old

New

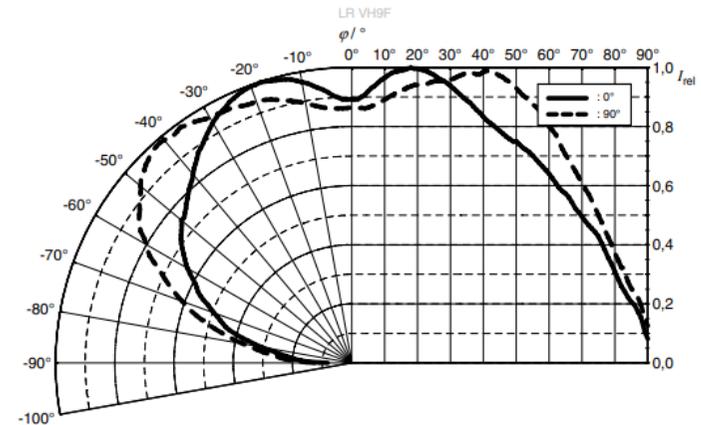
Radiation Characteristics ⁷⁾

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



Radiation Characteristics ⁶⁾

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



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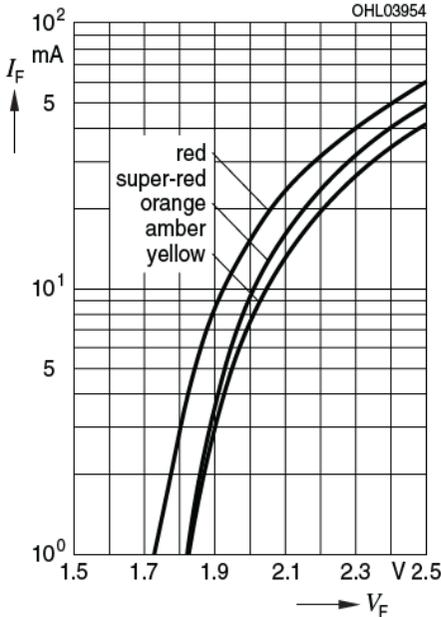
Introduction of 6" InGaAlP Thinfilm Chip for Firefly

Changes in the datasheets: Forward Current:

Old	New
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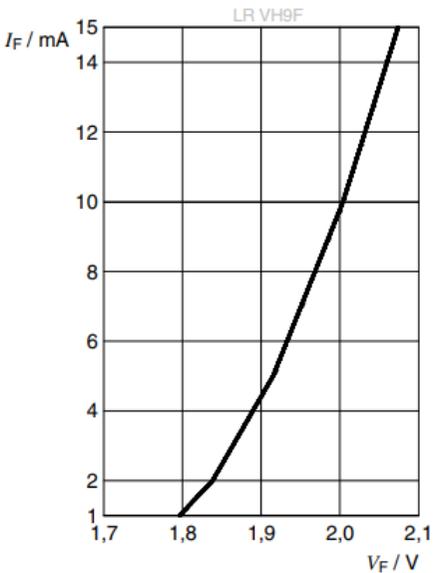
Forward current 7), 8)

$I_F = f(V_F); T_A = 25\text{ }^\circ\text{C}$



Forward current 6)

$I_F = f(V_F); T_A = 25\text{ }^\circ\text{C}$

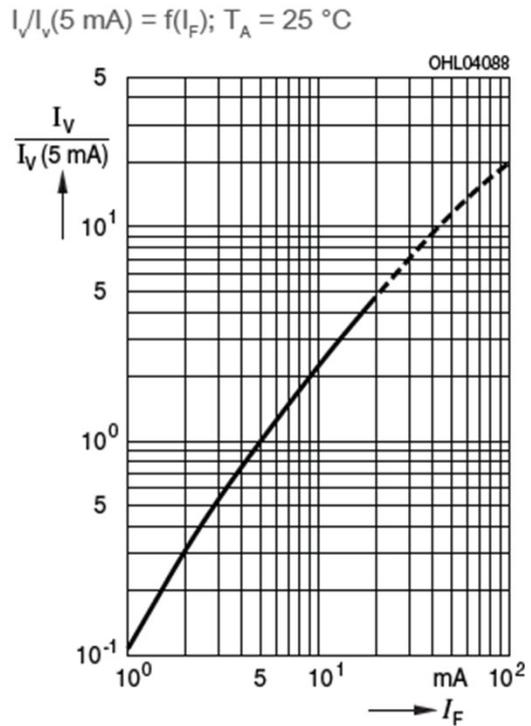


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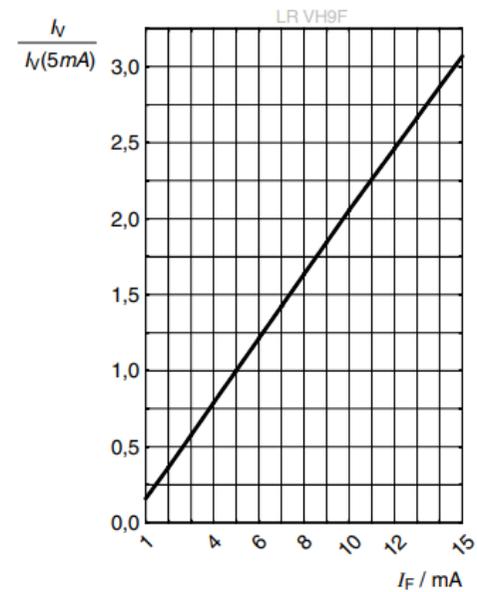
Changes in the datasheets: Relative Luminous Intensity (I_f):

Old	New
-----	-----



Relative Luminous Intensity ^{6), 7)}

$I_V/I_V(5 \text{ mA}) = f(I_F); T_A = 25 \text{ }^\circ\text{C}$

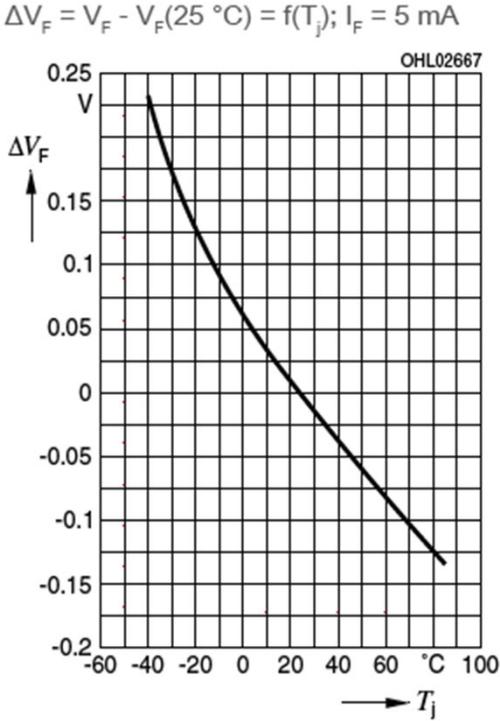


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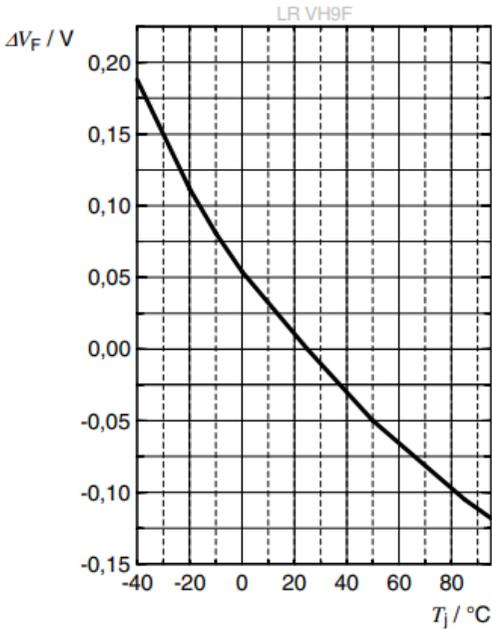
Changes in the datasheets: Forward Voltage:

Old	New
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Forward Voltage ⁶⁾

$\Delta V_F = V_F - V_F(25\text{ }^\circ\text{C}) = f(T_j); I_F = 5\text{ mA}$



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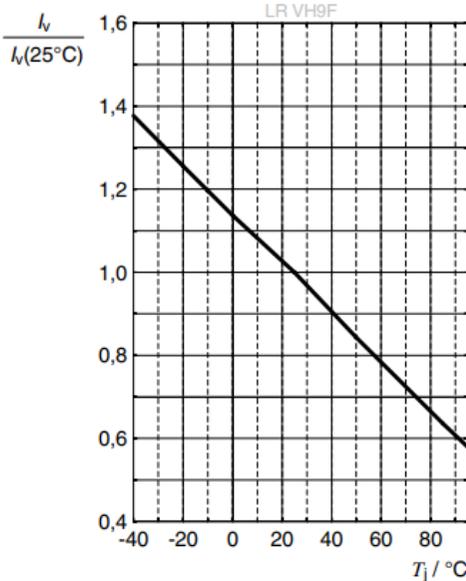
Changes in the datasheets: Relative Luminous Intensity (Tj):

Old	New
-----	-----

N/A in old Datasheet

Relative Luminous Intensity ⁶⁾

$$I_v/I_v(25\text{ }^\circ\text{C}) = f(T_j); I_F = 5\text{ mA}$$



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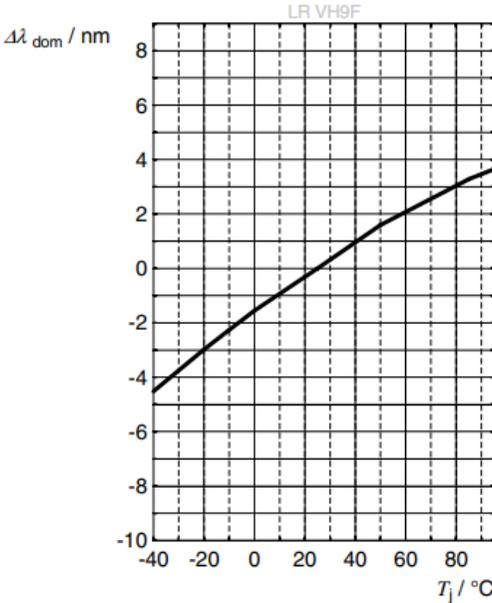
Changes in the datasheets: Dominant Wavelength:

Old	New
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N/A in old Datasheet

Dominant Wavelength ⁶⁾

$$\lambda_{\text{dom}} = f(T_j); I_F = 5 \text{ mA}$$

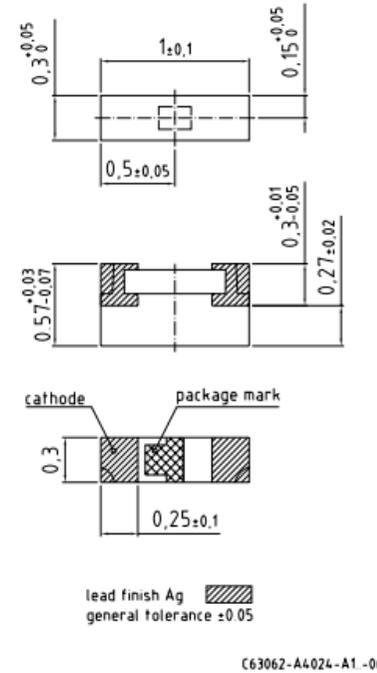
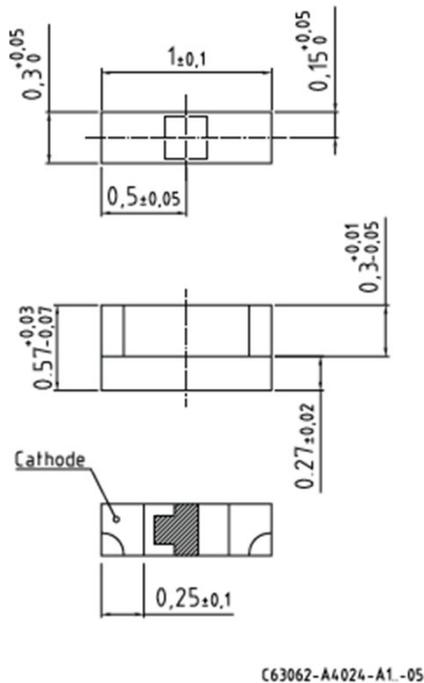


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Changes in the datasheets: Dimensional Drawing

Old	New
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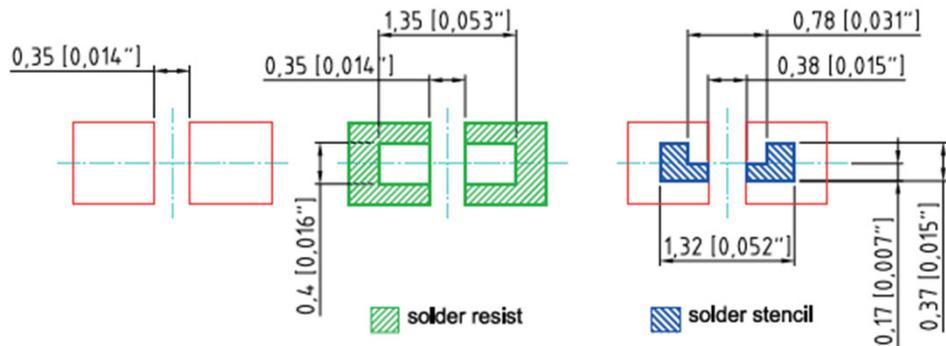
Comment: Correction of datasheet only

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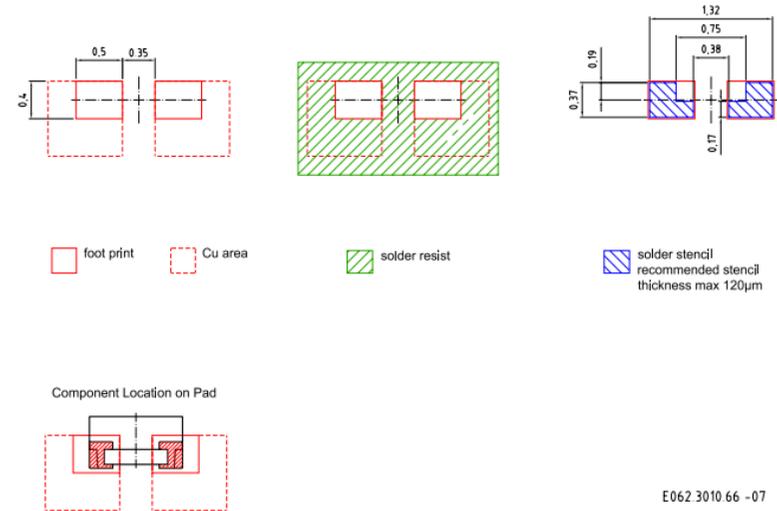
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Changes in the datasheets: Recommended Solder Pad

Old	New
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Recommended Solder Pad ⁸⁾



E062 3010 66 -07

Comment: Correction of datasheet only

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Introduction of 6” InGaAlP Thinfilm Chip for Firefly

List of affected products

Brand	
Firefly	LR VH9F

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Introduction of 6" InGaAlP Thinfilm Chip for Firefly

PCN Samples

Brand	
Firefly	LR VH9F

Color code: available on request

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Introduction of 6” InGaAlP Thinfilm Chip for Firefly

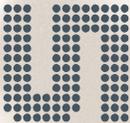
Time schedule

for PCN material (<u>after</u> implementation of change):		
Final qualification report	01.09.2022	
Samples available	01.09.2022	
Intended Start of delivery	01.03.2023*)	*) 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)	01.09.2023 **)	**) Lead time and LTO quantity shall be mutually agreed between OSRAM OS and customer.
Last time delivery date (LTD)	31.05.2024***)	***) 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.

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Reliability Report

220037C1

Subject	Reliability Report of next generation red chip according to AO-PCN-2022-035-A
Date	01.09.2022
Tested device	LR VH9F
Brand (including sub brands)	FIREFLY 0402
Applies to	LR VH9F

Pre-conditioning according to Jedec Level II

Test Performed	Condition	Duration	Sample Size	Failures		
				El.	Opt.	Vis
Resistance to Solder Heat RSH <i>JESD22-A113</i>	Reflow soldering 260°C	3x	3x30	0	0	0
Wet High Temperature Operating Life WHTOL <i>JESD22-A101</i>	T _A = 40°C; r.H.= 93% I _F = 5mA	1000h	4x30	0	0	0
Temperature Cycling TC <i>JESD22-A104</i>	T _A = -40°C/+85°C 15min each extreme	500c	4x30	0	0	0
High Temperature Operating Life HTOL <i>JESD22-A108</i>	T _A = 25°C I _F = 15mA	1000h	4x30	0	0	0
High Temperature Operating Life HTOL <i>JESD22-A108</i>	T _A = 85°C I _F = 5mA	1000h	4x30	0	0	0
Pulsed Operating Life PLT <i>JESD22-A108</i>	T _A = 25°C I _F = 100mA; t _p = 0,01ms; D = 3%	1000h	4x30	0	0	0

Remark: Lot A = Control lot; Lot B/C/D = Evaluation lot

Failure criteria:

Electrical failures: VF (I_f = 5mA) > 2,40V; ± 10% from initial value

Optical failures: IV (I_f = 5mA) absolute limit: ± 50% max. and $|\Delta\% \text{ max} - \Delta\% \text{ min}| > 50\%$

Visual failures: broken or damaged package or leads

Conclusion: 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.

Distribution of part or all of the contents of this Document to any 3rd party in any form without the prior permission of ams-OSRAM International GmbH is prohibited except in accordance with applicable mandatory law.

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.

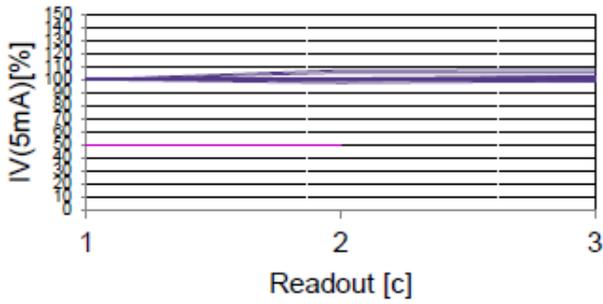
3. For long term operation additional failure modes of the chip or package can occur which are not shown in this Document.

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

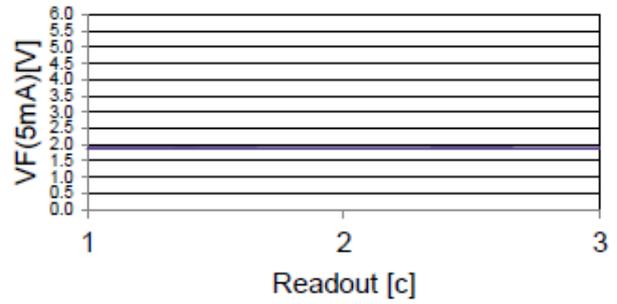
RSH Resistance to Solder Heat

Lot B

B1881USD RTSH
Reflow, 260°C M90M03BT01 30pcs

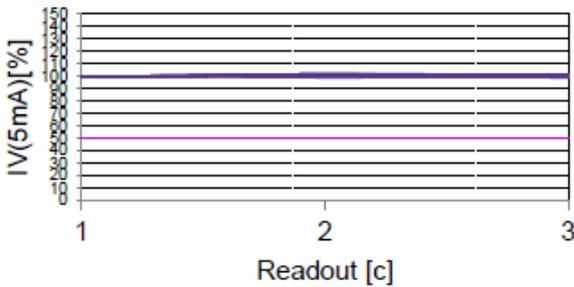


B1881USD RTSH
Reflow, 260°C M90M03BT01 30pcs



Lot C

B1881USD RTSH
Reflow, 260°C M90M03AT01 30pcs

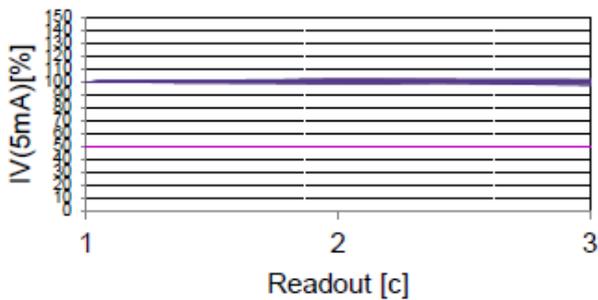


B1881USD RTSH
Reflow, 260°C M90M03AT01 30pcs

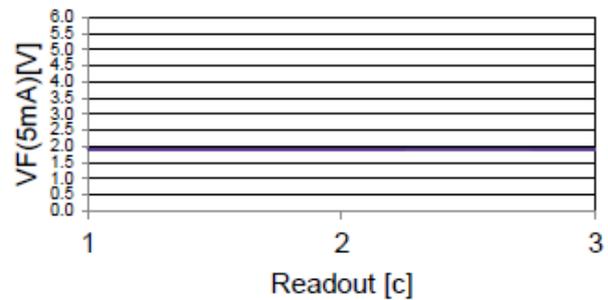


Lot D

B1881USD RTSH
Reflow, 260°C M90M03AT03 30pcs



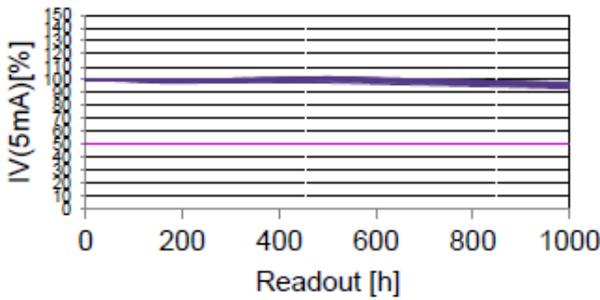
B1881USD RTSH
Reflow, 260°C M90M03AT03 30pcs



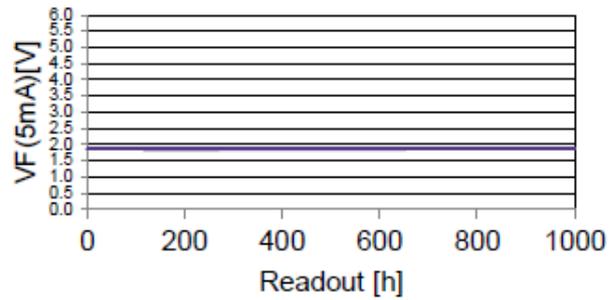
WHTOL 40°C/93%r.H.; 5mA

Lot A

B1881USD T&HB
40°C/93%, If=5mA 07M1A28M14 30pcs

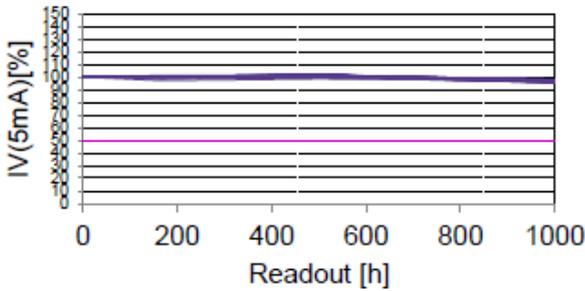


B1881USD T&HB
40°C/93%, If=5mA 07M1A28M14 30pcs

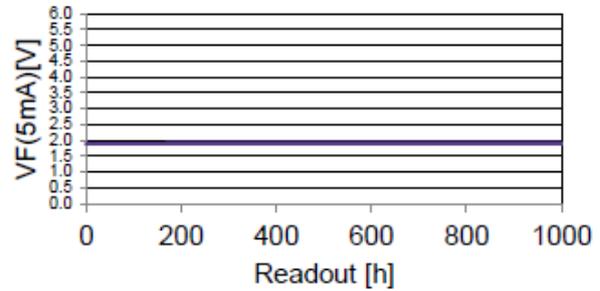


Lot B

B1881USD T&HB
40°C/93%, If=5mA M90M03BT01 30pcs



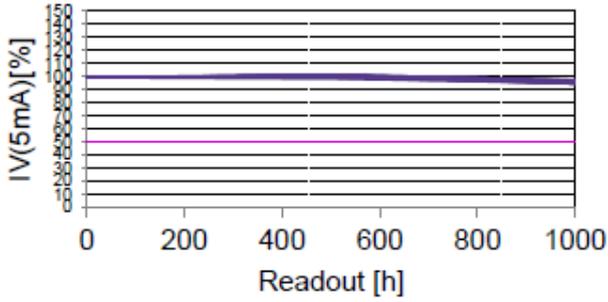
B1881USD T&HB
40°C/93%, If=5mA M90M03BT01 30pcs



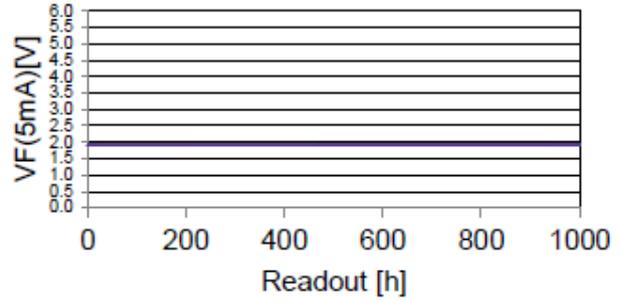
WHTOL 40°C/93%r.H.; 5mA

Lot C

B1881USD T&HB
40°C/93%, If=5mA M90M03AT01 30pcs

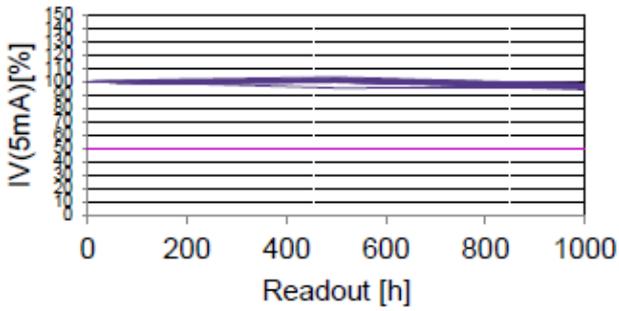


B1881USD T&HB
40°C/93%, If=5mA M90M03AT01 30pcs

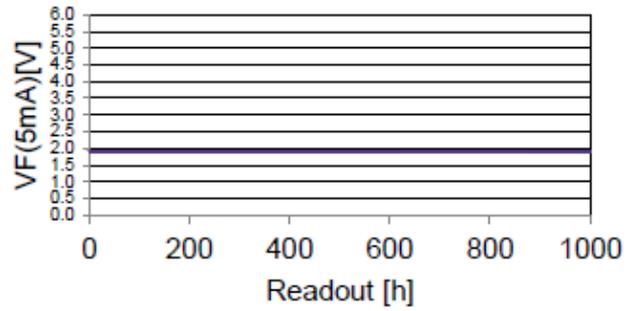


Lot D

B1881USD T&HB
40°C/93%, If=5mA M90M03AT03 30pcs

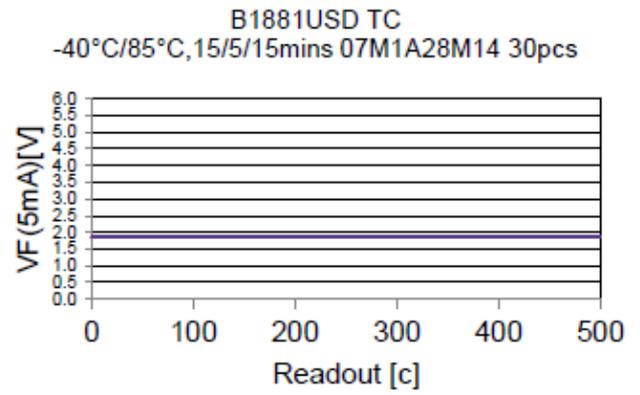
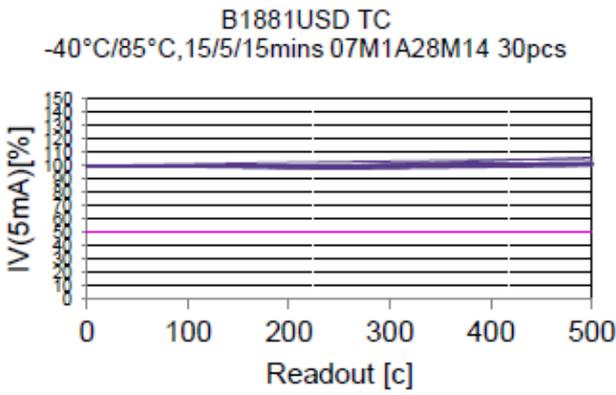


B1881USD T&HB
40°C/93%, If=5mA M90M03AT03 30pcs

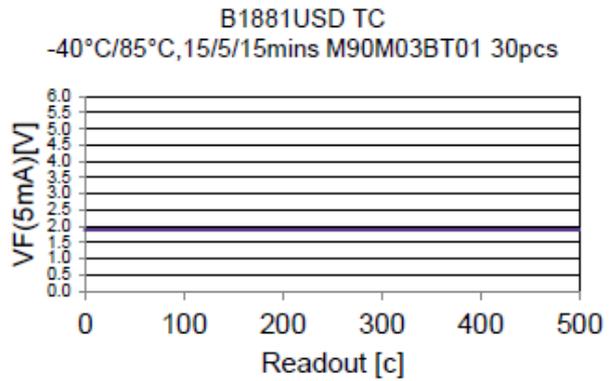
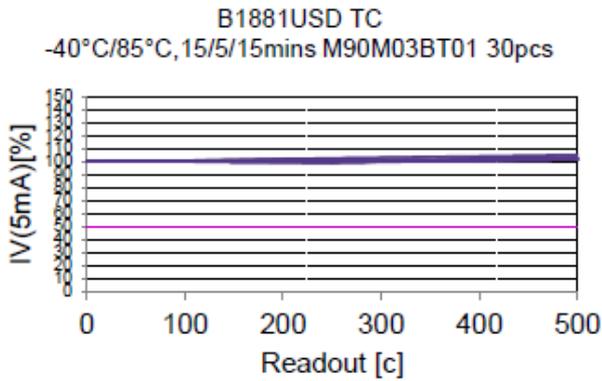


TC -40°C/85°C

Lot A

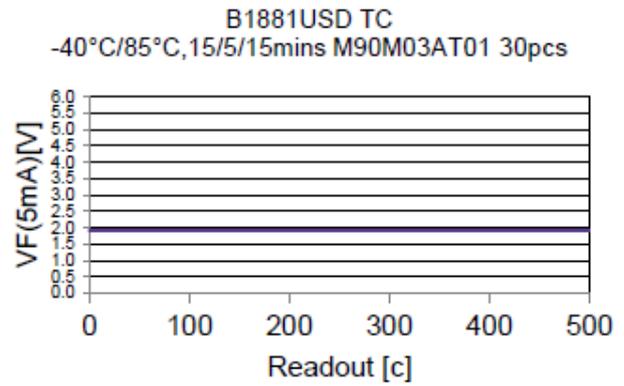
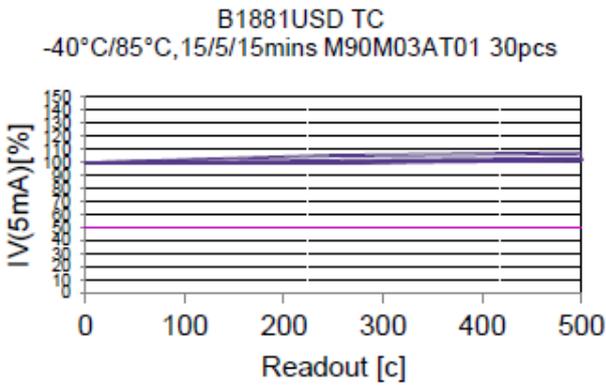


Lot B

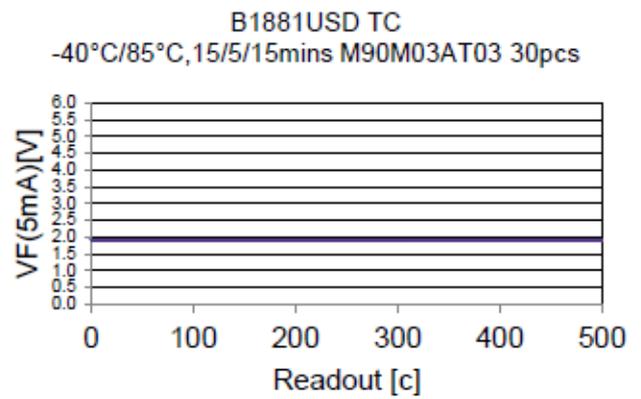
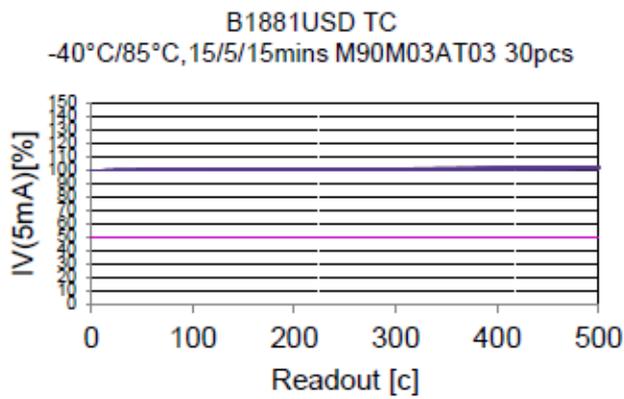


TC -40°C/85°C

Lot C



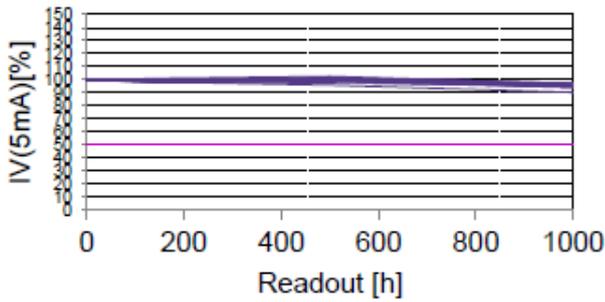
Lot D



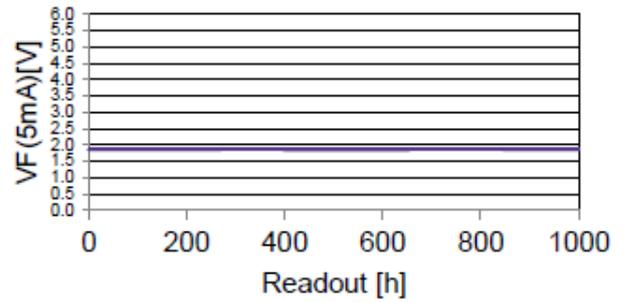
HTOL 25°C/15mA

Lot A

B1881USD SSLT
25°C, If=15mA 07M1A28M14 30pcs

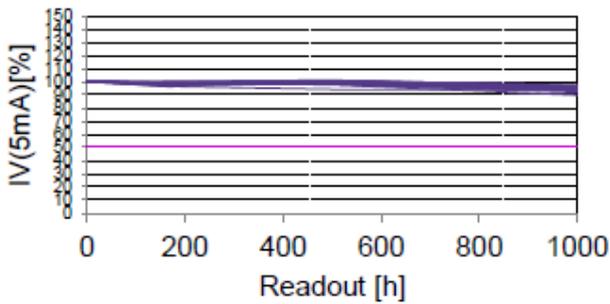


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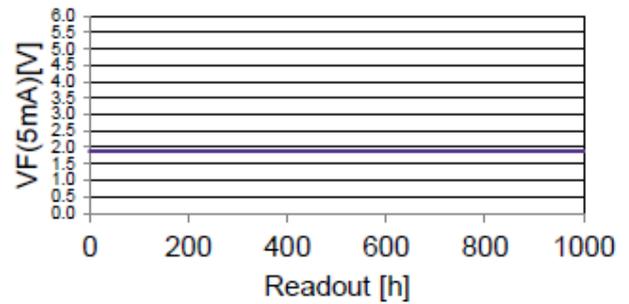


Lot B

B1881USD SSLT
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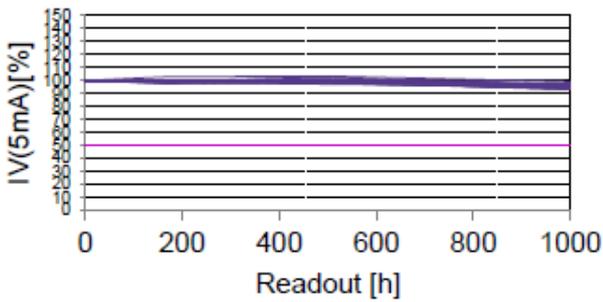
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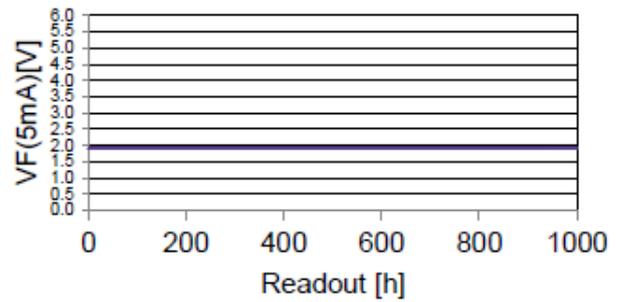
HTOL 25°C/15mA

Lot C

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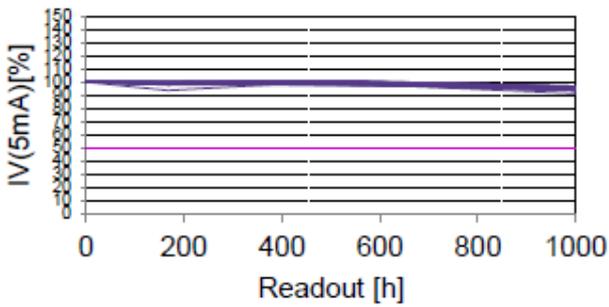


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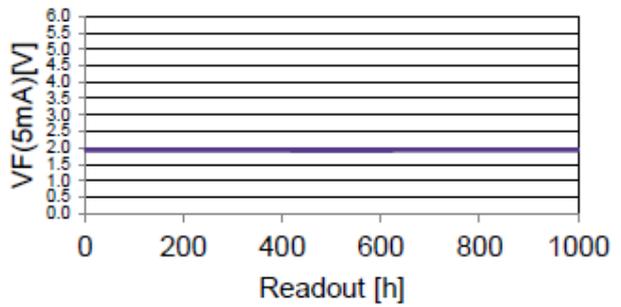


Lot D

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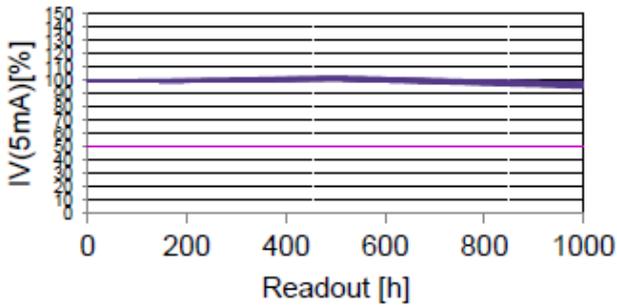
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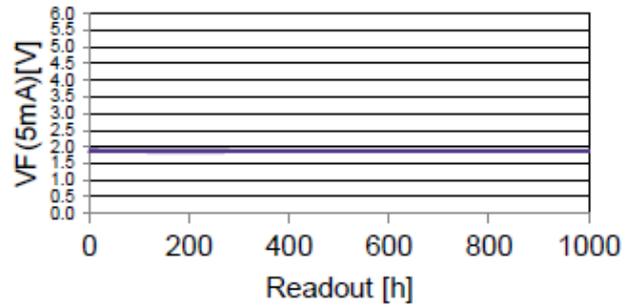
HTOL 85°C/5mA

Lot A

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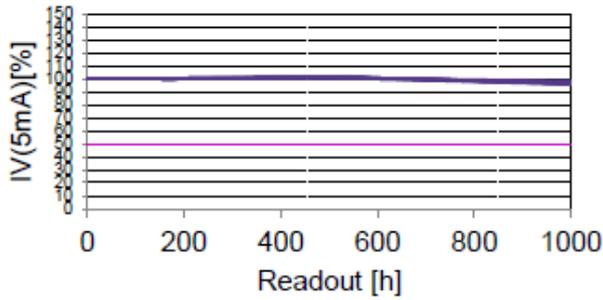


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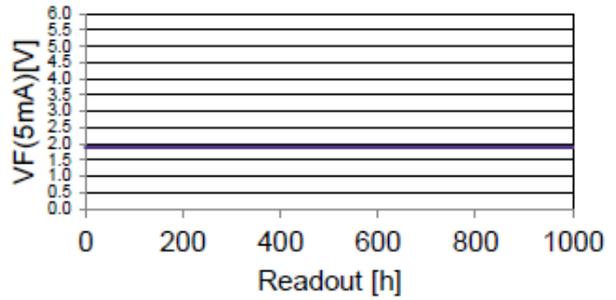


Lot B

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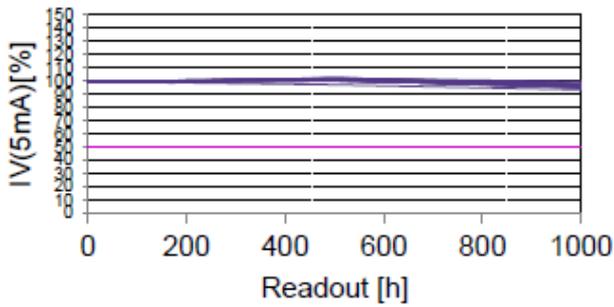
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85°C, If=5mA M90M03BT01 30pcs



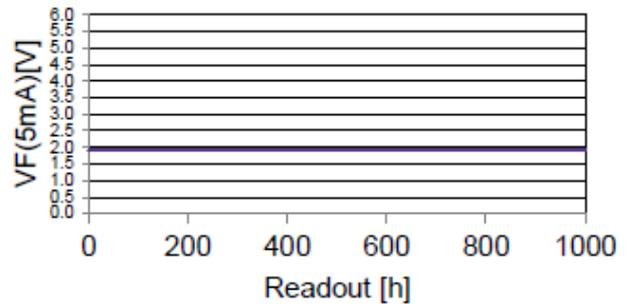
HTOL 85°C/5mA

Lot C

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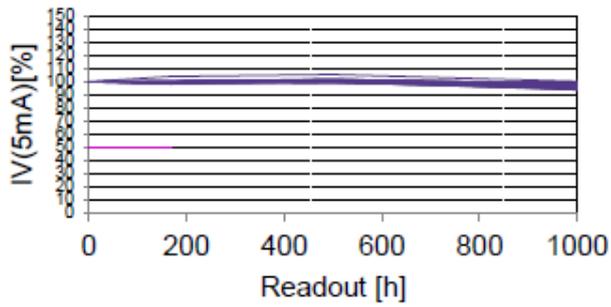


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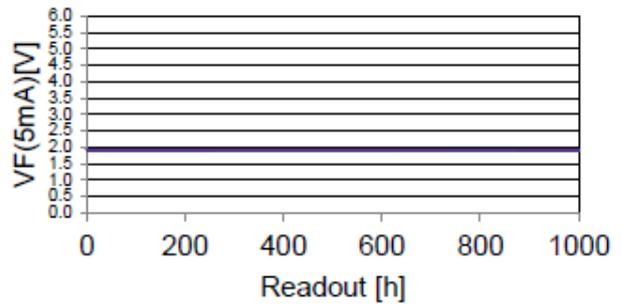


Lot D

B1881USD SSLT
85°C, If=5mA M90M03AT03 30pcs

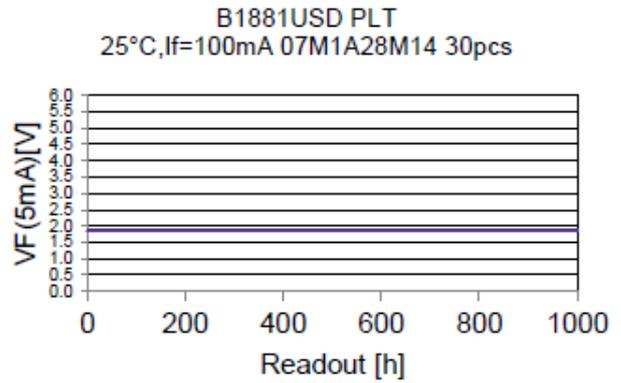
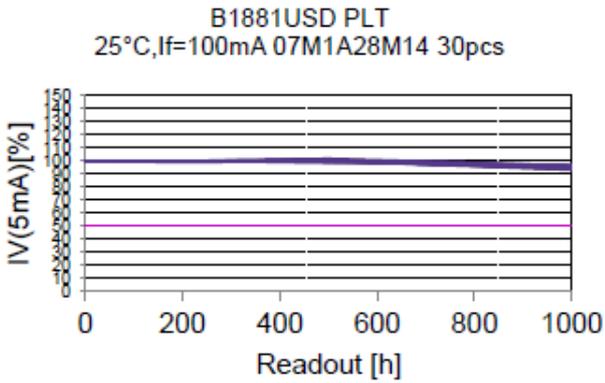


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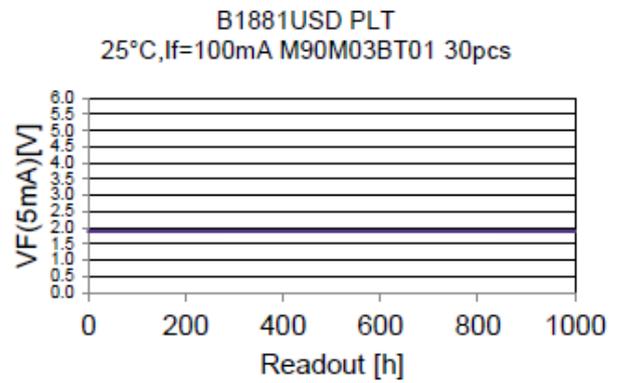
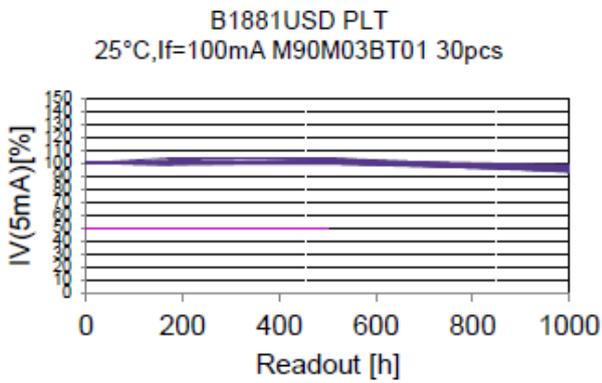


PLT 25°C/100mA; tp=0,01ms;D=3%

Lot A

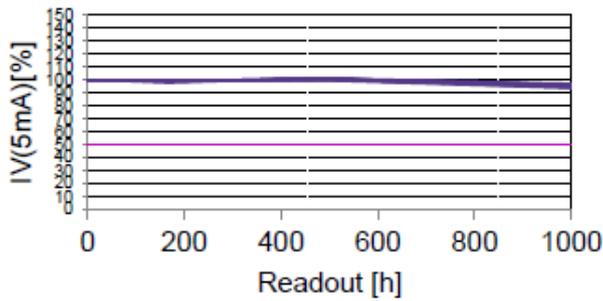
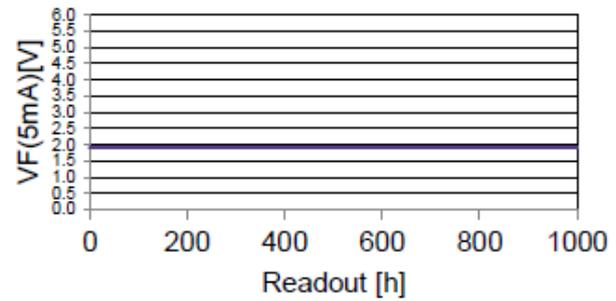


Lot B

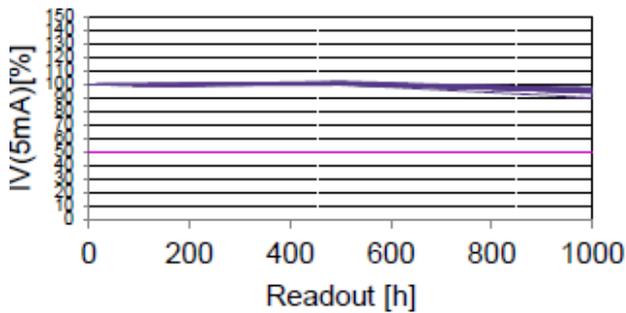
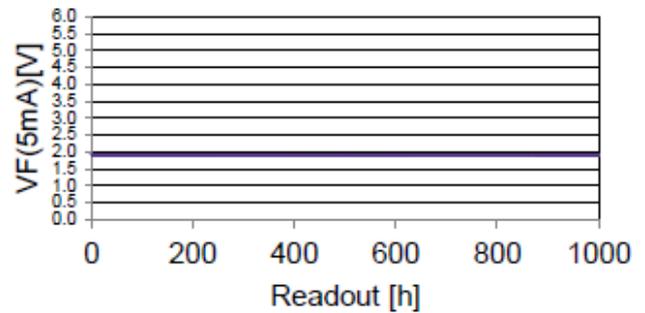


PLT 25°C/100mA; $t_p=0,01\text{ms}$; $D=3\%$

Lot C

B1881USD PLT
25°C, $I_f=100\text{mA}$ M90M03AT01 30pcsB1881USD PLT
25°C, $I_f=100\text{mA}$ M90M03AT01 30pcs

Lot D

B1881USD PLT
25°C, $I_f=100\text{mA}$ M90M03AT03 30pcsB1881USD PLT
25°C, $I_f=100\text{mA}$ M90M03AT03 30pcs

END OF DOCUMENT

Notification	Material (Q-no.)	Q Description
AO-IN-2022-035-A	Q65110A8992	LR VH9F-M1N1-1-2A3B-2-R18-NK
AO-IN-2022-035-A	Q65110A8088	LR VH9F-P2R1-1-0-5-R18-Z
AO-IN-2022-035-A	Q65113A2156	LR VH9F-Q2-1-0-5-R18-Z-XX