CITIZEN
Micro HumanTech

CITILED AC Series

DATA SHEET

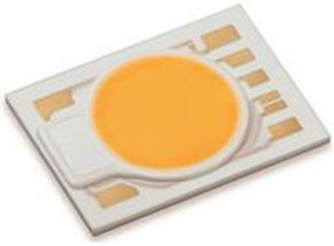
CLC241

CITILED®
The Light Engine

CONTENTS

CITIZEN ELECTRONICS CO., LTD.
1-23-1, Kamikurechi, Fujiyoshida-shi, Yamanashi, 403-0001, Japan Tel. +81-555-23-4121 http://ce.citizen.co.jp

Ref.CE-P3410 12/04



Product Nomenclature

CLC241	-	09	100	27	3	M1	-	B001	Z
[1]		[2]	[3]	[4]	[5]	[6]			

[1]	Product shape	CLC241
[2]	Power Dissipation	07 : 7W 09 : 9W
[3]	Luminous Flux	075 : 750 lm 100 : 1000 lm
[4]	Nominal CCT	2700K
[5]	Chromaticity range	3-step MacAdam Ellipse
[6]	CRI (Ra)	Min.80

1. Introduction

1-1. Product Description

AC Series is the new type of LED package AC-Driver embedded in the standard COB(Chip on Board) package.
AC Series does not require AC/DC converters associated with other standard COB types.

1-2. Features

- Mechanical Dimensions : 26.0 x 19.0 x 1.6 (mm)
- Package Structure : Ceramic Base Chip on Board
- Ceramic Base : material AZ214T(Certificate Number 20140905-E356524)
- Reference Assembly : By Holder + M3screw, Thermally conductive glue
- CRI (Ra) : Min.80, Min.90
- Nominal CCT : 2,700K, 3,000K, 4,000K, 5,000K (CRI(Ra) 80Min.)
  2,700K, 3,000K, 4,000K (CRI(Ra) 90Min.)
- Chromaticity Range : 3-step MacAdam Ellipse, the center refers to ANSI C78.377:2011.
- Thermal Resistance : 3.7C/W
- RoHS compliant

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2. Performance Characteristics

2-1. Electro Optical Characteristics

(Vop=230V[RMS], Tc=65C)

Product code	Nominal CCT	CRI (Ra)		Luminous flux (lm)			Power Dissipation (W)			Power Factor		Thermal Resistance Rj-c (C/W)
		Min.	Typ.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	
CLC241-09100273M1-B001Z	2700K	80	-	930	1,000	1,070	-	10.1	11.1	0.95	-	3.7
CLC241-09100303M1-B002Z	3000K	80	-	930	1,000	1,070	-	9.6	10.6	0.95	-	3.7
CLC241-09100403M1-B003Z	4000K	80	-	930	1,000	1,070	-	9.3	10.2	0.95	-	3.7
CLC241-09100503M1-B004Z	5000K	80	-	930	1,000	1,070	-	9.1	10.0	0.95	-	3.7
CLC241-11100273H3-B013Z	2700K	90	-	930	1,000	1,070	-	12.5	13.8	0.95	-	3.7
CLC241-11100303H3-B014Z	3000K	90	-	930	1,000	1,070	-	11.7	12.9	0.95	-	3.7
CLC241-11100403H3-B015Z	4000K	90	-	930	1,000	1,070	-	10.7	11.8	0.95	-	3.7

(Vop=230V[RMS], Tc=65C)

Product code	Nominal CCT	CRI (Ra)		Luminous flux (lm)			Power Dissipation (W)			Power Factor		Thermal Resistance Rj-c (C/W)
		Min.	Typ.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	
CLC241-07075273M1-B022Z	2700K	80	-	698	750	803	-	7.2	7.9	0.95	-	3.7
CLC241-07075303M1-B023Z	3000K	80	-	698	750	803	-	7.1	7.8	0.95	-	3.7
CLC241-07075403M1-B024Z	4000K	80	-	698	750	803	-	6.7	7.4	0.95	-	3.7
CLC241-07075503M1-B025Z	5000K	80	-	698	750	803	-	6.6	7.3	0.95	-	3.7
CLC241-08075273H3-B034Z	2700K	90	-	638	750	803	-	8.8	9.7	0.95	-	3.7
CLC241-08075303H3-B035Z	3000K	90	-	638	750	803	-	8.2	9.0	0.95	-	3.7
CLC241-08075403H3-B036Z	4000K	90	-	638	750	803	-	7.9	8.7	0.95	-	3.7

Notes :

1. The tolerance of measurement at our tester is Luminous flux +/-10%, Chromaticity (x, y) +/-0.005 and Ra +/-1.

2-2. Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit	
Input Voltage	V_{op}	264.0	V[RMS]	
Power Dissipation	P_d	15.0	W	
Operating Temperature	T_{op}	− 30 ~ +60	C	
Storage Temperature	T_{st}	− 40 ~ +100	C	
Case Temperature	T_c	85	C	*1
Junction Temperature	T_j	140	C	*2
Insulation Voltage	V_{iso}[RMS]	1.5	kV	

*1. Refer to 3. Mechanical Dimensions for Tc measurement point.

*2. $T_j = T_c + R_{j\text{-}c} \times P_d$

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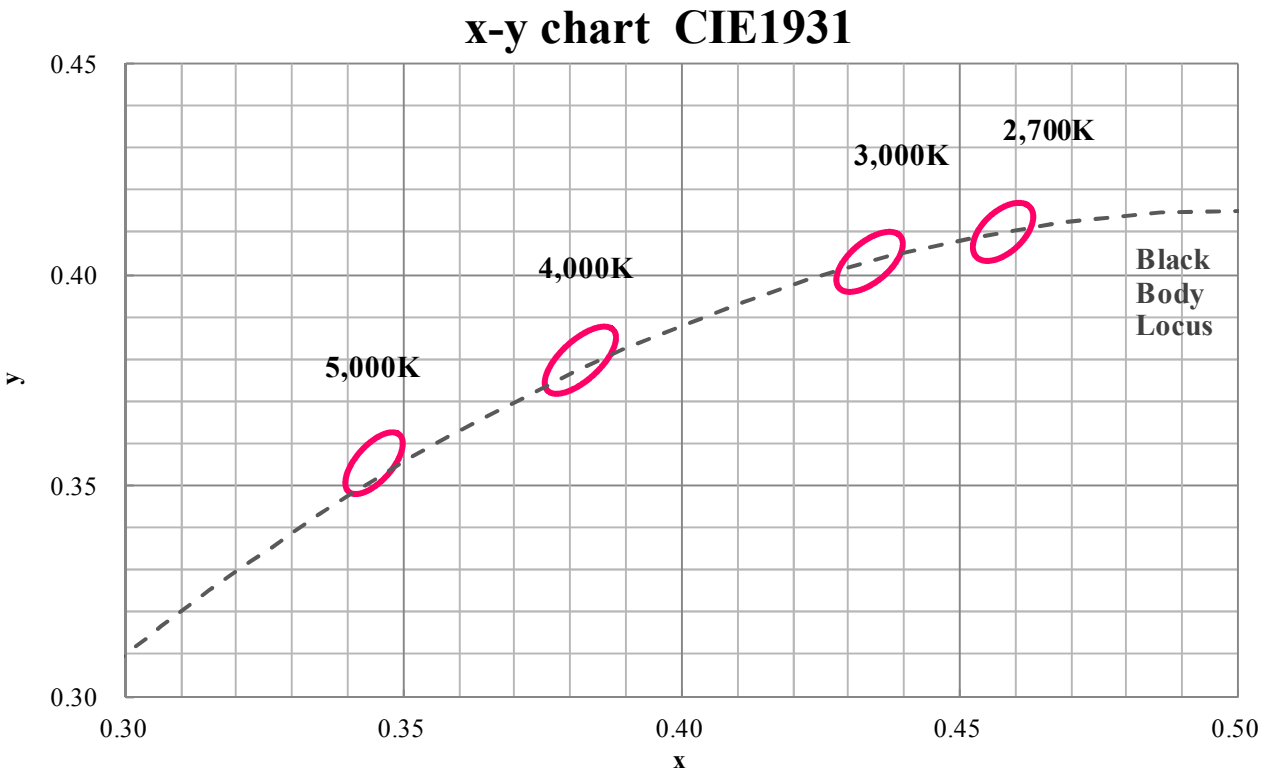
2-3. Chromaticity Characteristics

(Tc=65C)

Color Region	Nominal CCT	Center Point (x, y)	Oval parameter		
			Major Axis a	Minor Axis b	Ellipse Rotation Angle θ
3-step MacAdam ellipse	2700K	(0.4577 , 0.4098)	0.00774	0.00411	57.28
	3000K	(0.4339 , 0.4032)	0.00834	0.00408	53.17
	4000K	(0.3818 , 0.3796)	0.00939	0.00402	54.00
	5000K	(0.3446 , 0.3551)	0.00822	0.00354	59.62

* Color region stay within MacAdam 3-step ellipse from the chromaticity center.
* θ is the angle between the major axis of the ellipse and the x-axis, and a and b are the major and minor semi-axes of an ellipse. (Ref. IEC 60081:1997 AnnexD)



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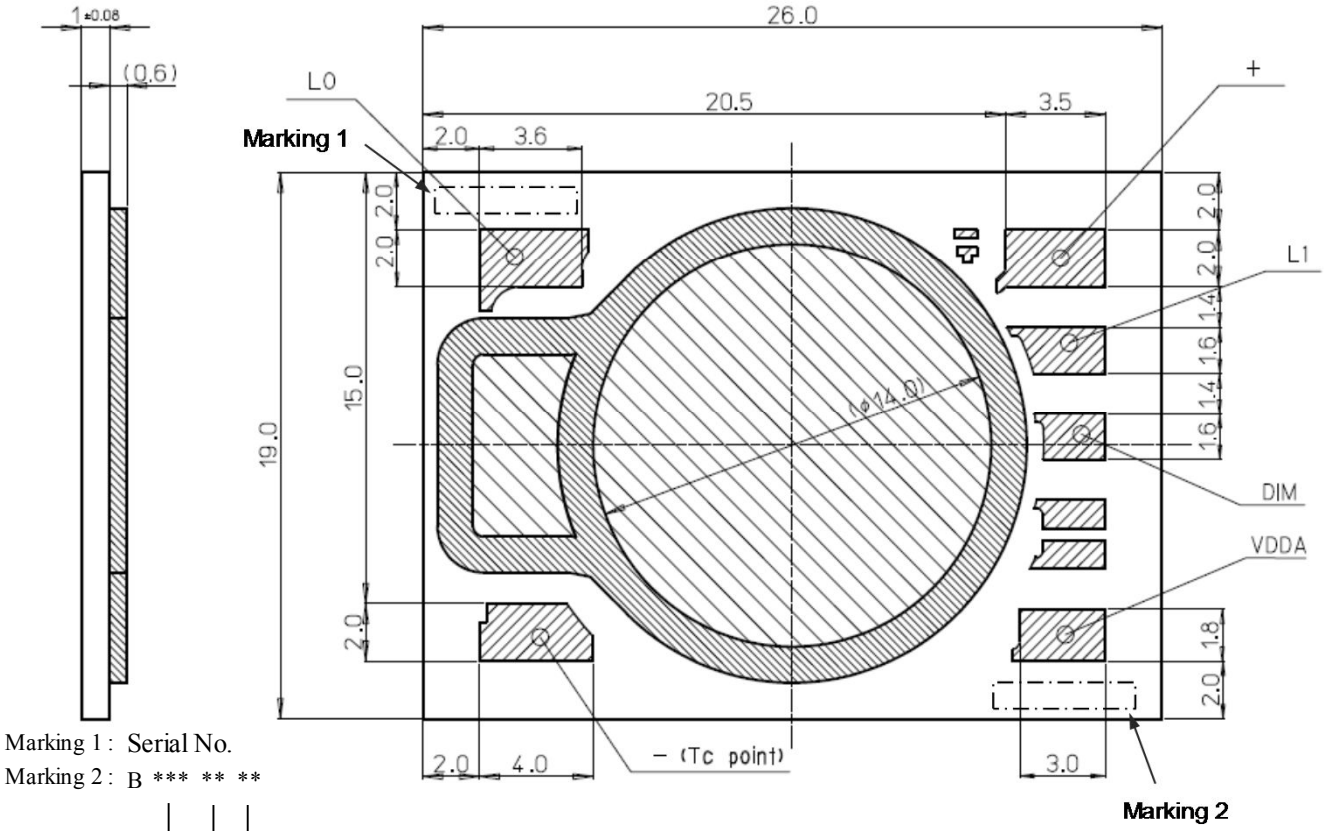
3. Mechanical Dimensions

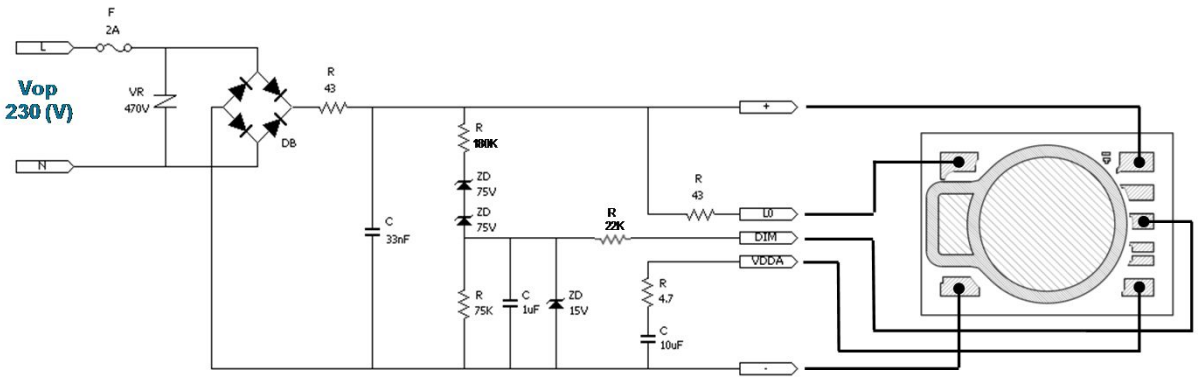
Unit : mm
Tolerances unless otherwise specified : +/-0.3



Marking 1 : Serial No.
Marking 2 : B *** ** **

- CRI
- CCT
- TYPE

Reference circuit

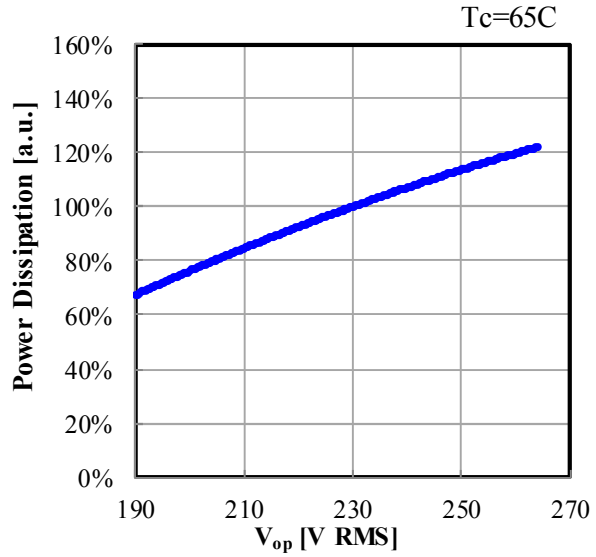


4. Characteristic Curves

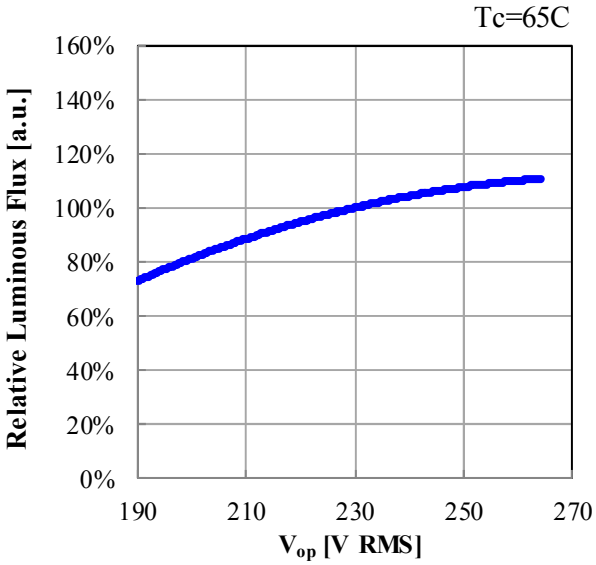
4-1. Forward Voltage Characteristics / Temperature Characteristics

【Representative Characteristics Ra80 3000K】

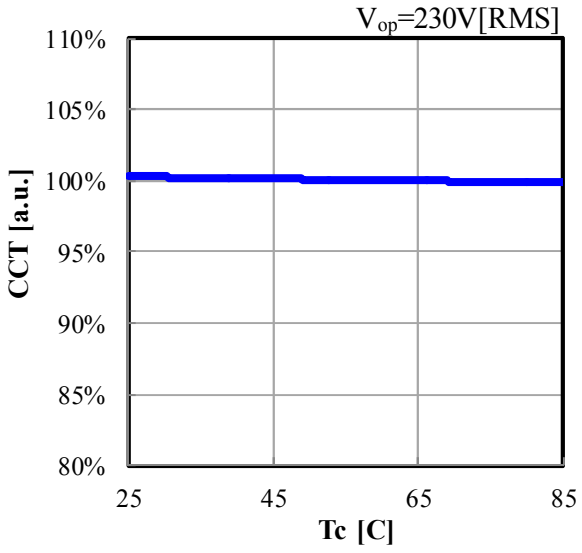
Forward Voltage vs. Relative Power Dissipation



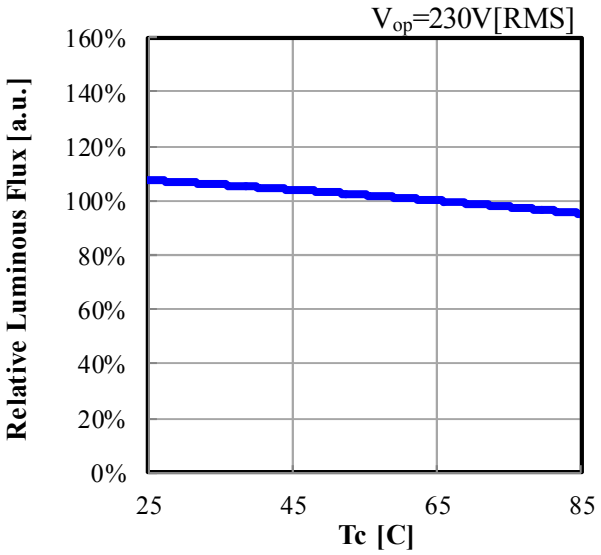
Forward Voltage vs. Relative Luminous Flux



Case Temperature vs. CCT



Case Temperature vs. Relative Luminous Flux



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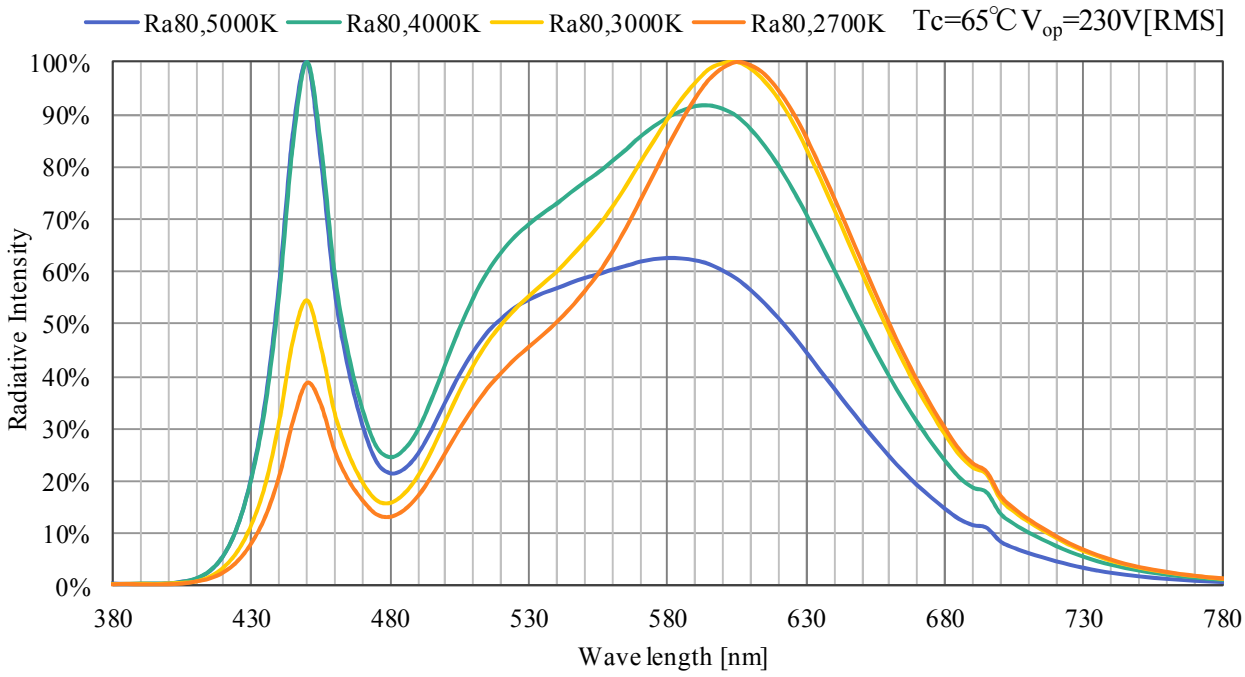
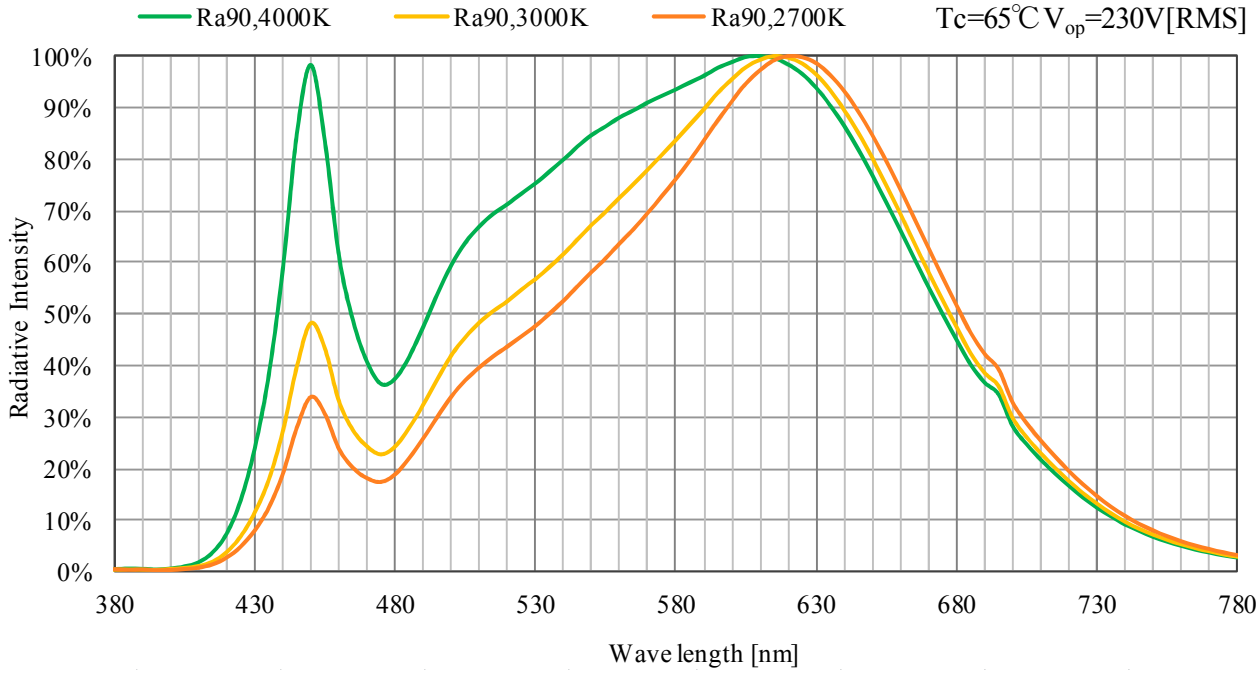
4-2. Optical Characteristics

Spectrum : CRI(Ra) 80Min.



Spectrum : CRI(Ra) 90Min.



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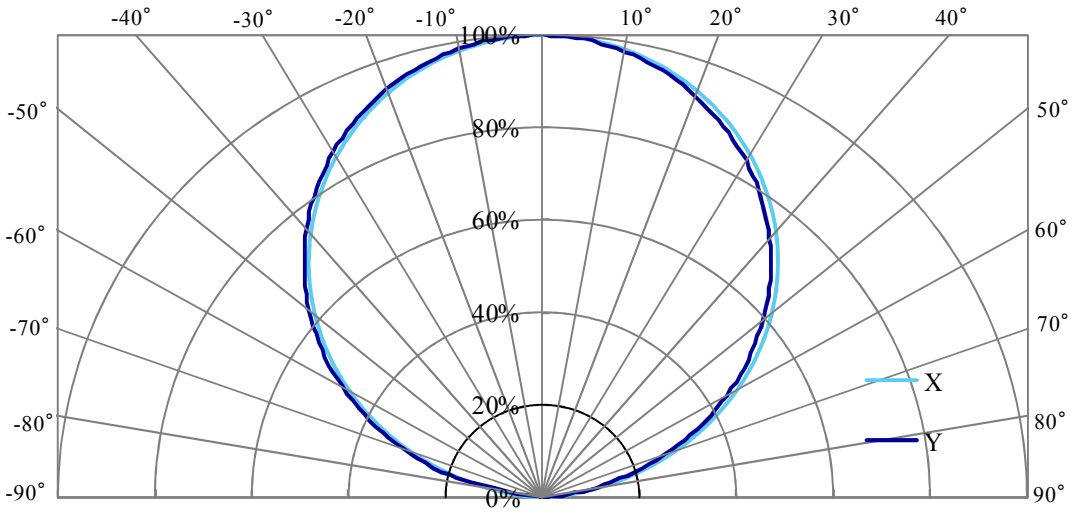
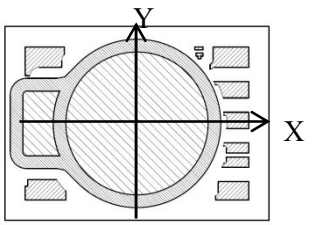
4-2. Optical Characteristics (continued)

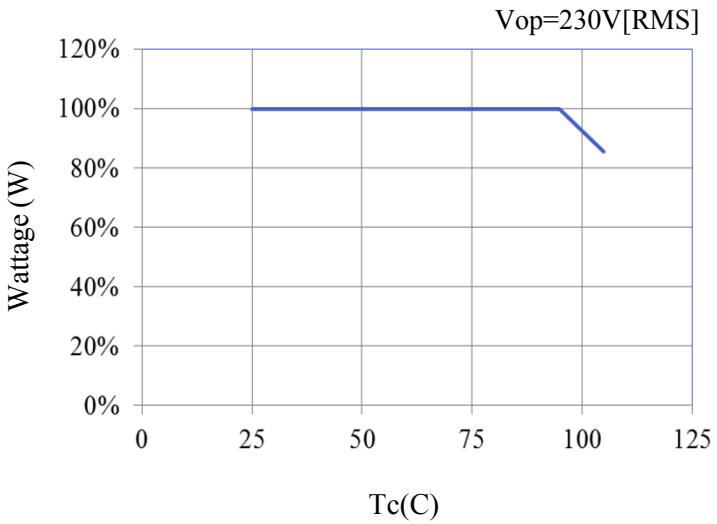
Radiation Characteristic





4-3. Derating Characteristics

Case Temperature vs. Wattage



5. Reliability

5-1. Reliability Test

Test Item	Test Condition
Continuous Operation Test	V_{op} = 230 V[RMS] T_a=25C ×1000 hours
	V_{op}= 230 V[RMS] T_j=150C × 1000 hours
Low Temperature Storage Test	T_a=-40 C × 1000 hours
High Temperature Storage Test	T_a=100 C × 1000 hours
Moisture-proof Test	T_a=60 C , 95% RH × 500 hours
Thermal Shock Test	-30 C × 30 minutes – 85 C × 30 minutes , 100cycle

5-2. Failure Criteria

(Tc=25C)

Measuring Item	Symbol	Measuring Condition	Failure Criteria
Forward Voltage	Vf	Vop = 230 V[RMS]	>U × 1.2
Total Luminous Flux	Φv	Vop = 230 V[RMS]	<S × 0.8

U defines the upper limit of the specified characteristics. S defines the initial value.

Note : Measurement shall be taken between 2 hours and 24 hours, and the test pieces should be return to the normal ambient conditions after the completion of each test.

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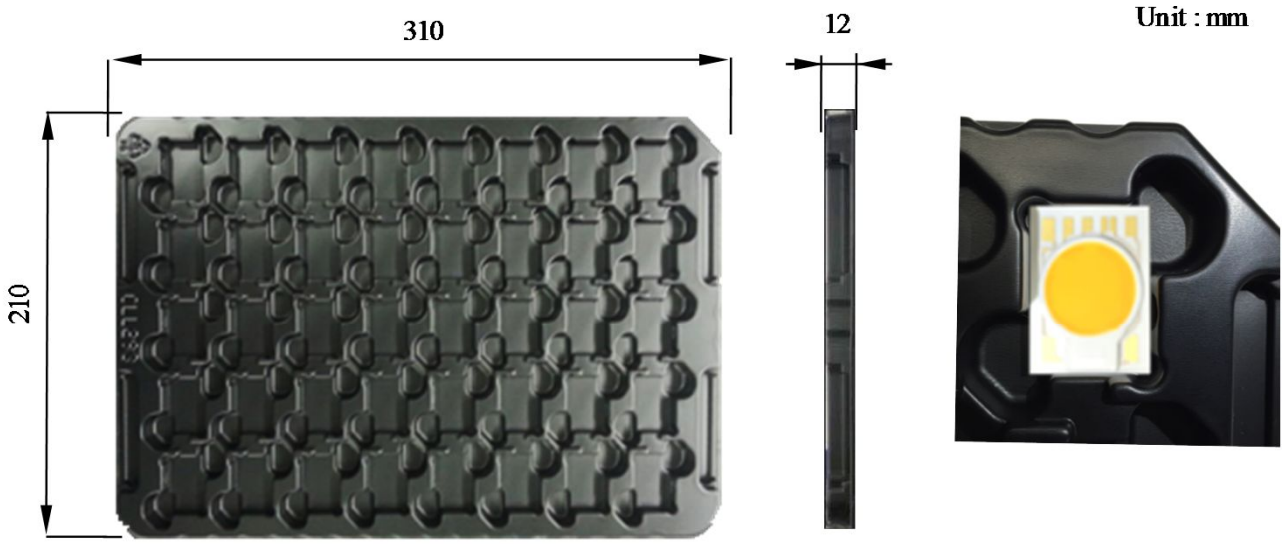
6. Packing Specification

6-1. Packing

An empty tray is placed on top of a 6-tier tray which contain 40 pieces each.
(Smallest packing unit: 240 pieces)

A label with product name, quantity and lot number is placed on the upper empty tray.

Tray (Dimensions: 310 x 210 x 12 mm / Materials: Electrically conductive PS)



Product 40pcs/tray

Example of indication label

CUSTOMER

TYPE	: CLC***-******-*******	--- (1)
P.NO	: ******	--- (2)
Lot No	: *******	--- (3)
Q'ty	: ***	--- (4)

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1. TYPE e.g. CLC241
2. P.No. (Cutomer's P/N)
3. Lot No.
   e.g. 1 6 4 5 0 0 1
   (1) (2) (3)
   (1) Last digit of the year 16 : year 2016
   (2) Production month 4 : April
   Note: October, November and December are designated X,Y and Z.
   (3) CE's control number
4. Quantity

7. Precaution

7-1. Handling with care for this product

-Both the light emitting area and white dam over the light emitting area is composed of resin materials.
Please avoid the resin area from being pressed, stressed, rubbed, come into contact with sharp metal nail (e.g. edge of reflector part) because the function, performance and reliability of this product are negatively impacted.
-Please be aware that this product should not come into contact with any other parts while incorporating in your lighting apparatus or your other products.

7-2. Countermeasure against static electricity

-Handling of this product needs countermeasures against static electricity because this is a semiconductor product.
-Please take adequate measures to prevent any static electricity being produced such as the wearing of a wristband or anti-static gloves when handling this product.
-Every manufacturing facility in regard to the product (plant, equipment, machine, carrier machine and conveyance unit) should be connected to ground and please avoid the product to be electric-charged.

7-3. Caution of product assembly

-Regarding this product assembling on the heat sink, it is recommended to use thermal conductivity glue or grease, and please optimize the assembly conditions according to the specifications of the thermal conductivity glue or grease.
Please don't fix this product on Heat sink by screw directly to prevent breaking ceramic substrate.
In addition, please don’t press with excess stress on the product while the assembly.
And, the surfaces of thermal conductivity glue or grease, should be kept clean, therefore please remove pollution, fluid and oil on the surfaces.
-Roughness, unevenness and burr of surface negatively impact thermal bonding between the product and heat sink and increase heat thermal resistance between them.
Confidence of thermally and mechanical coupling between the product and heat sink might be confirmed by checking the mounting surface and measuring the case temperature of the product.
-Heat sink should be covered under the yellow resin area locating on the side of center light emitting area because it generates heat as same as emitting area.

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7-4. Thermal Design

-The thermal design to draw heat away from the LED junction is most critical parameter for an LED illumination system. High operating temperatures at the LED junction adversely affect the performance of LED's light output and lifetime. Therefore the LED junction temperature should not exceed the absolute maximum rating in LED illumination system.
-The LED junction temperature while operation of LED illumination system depends upon thermal resistance of internal LED package (Rj-c), outer thermal resistances of LED package, power loss and ambient temperature. Please take both of the thermal design specifications and ambient temperature conditions into consideration for the setting of driving conditions.
-For more information, please refer to application note "Thermal Management".

7-5. Driving Voltage

-Stable full rectified AC Voltage is recommended as an applying driving voltage to this product.
-Electrical transient might apply excess voltage, excess current and reverse voltage to the product(s). They also affect negative impact on the product(s) therefore please make sure that no excess voltage, excess current and reverse voltage is applied to the product(s) .

7-6. Electrical Safety

-Please attach a varistor and Fuse for protecting surge according to reference circuit.
-Please note LED modules run on high voltage so use caution when near the leads or if a dome is inadvertently removed while circuit is active
-Please do not touch any of the circuit board, components or terminals with bare hands or metal while circuit is electrically active.
-Please do not add or change wires while LED modules circuit is active.
-Please do not touch wire on solder pad at driving AC source.
-This product is designed and produced according to IEC 62031:2008 (IEC 62031:2008 LED modules for general lighting. Safety specification)
-Dielectric voltage withstand test has been conducted on this product to see any failure after applying voltage between active pads and ceramic section of the product, and to pass at least 1500V.
-Considering conformity assessment for IEC62031:2008, almost all items of the specification depend upon your final product of LED illumination system.
Therefore, please confirm with your final product for electrical safety of your product.
As well, the products comply with the criteria of IEC62031:2008 as single LED package.

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7-7. Recommended soldering Condition (This product is not adaptable to reflow process.)

-For manual soldering
Please use lead-free soldering. Soldering shall be implemented using a soldering bit at a temperature lower than 380C, and shall be finished within 5 seconds for one land.
No external force shall be applied to resin part while soldering is implemented.
Next process of soldering should be carried out after the product has return to ambient temperature.
-For soldering correction
Regarding soldering correction, above conditions shall be applied.
Contacts number of soldering bit should be within twice for each terminal as a correction.

* Citizen Electronics cannot guarantee if usage exceeds these recommended conditions.
Please use it after sufficient verification is carried out on your own risk if absolutely necessary.

7-8. Eye Safety

-The International Electrical Commission (IEC) published in 2006 IEC 62471
”2006 Photobiological safety of lamps and lamp systems ” which includes LEDs within its scope.
When sorting single LEDs according to IEC 62471, almost all white LEDs can be classified as belonging to either Exempt Group (no hazard) or Risk Group 1 (low risk).
-However, Optical characteristics of LEDs such as radiant flux, spectrum and light distribution are factors that affect the risk group determination of the LED, and especially a high-power LED, that emits light containing blue wavelengths, might have properties equivalent to those of Risk Group 2 (moderate risk).
-Great care should be taken when directly viewing an LED that is driven at high current, has multiple uses as a module or when focusing the light with optical instruments, as these actions might greatly increase the hazard to your eyes.
-It is recommended to regard the evaluation of stand-alone LED packages as a reference and to evaluate your final product.

7-9. This product is not designed for usage under the following conditions.

If the product might be used under the following conditions, you shall evaluate its effect and appropriate them. In places where the product might:
-directly and indirectly get wet due to rain and/or at place with the fear.
-be damage by seawater and/or at place with the fear
-be exposed to corrosive gas (such as Cl2, H2S, NH3, SOx, NOx and so on) and/or at place with the fear.
-be exposed to dust, fluid or oil and/or at place with the fear.
-be put in the enclosed space with halogenated substance and/or gas (such as Br, Cl and so on).

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8, Warranty

(1) CITIZEN ELECTRONICS guarantees the term of the reliability test results and elementary substances of the supplies to be within the set conditions.
Please note that any accident/damage that occurs during or because of usage that deviates from the conditions contained in the specifications are not warrantable.
(2) Although CITIZEN ELECTRONICS will deliver products of quality assured by the terms included in these specifications, incorporation in actual machines, lifetime in actual use and another quality shall be confirmed sufficiently by customers.
Customers are responsible for ensuring quality and to meet the specifications such as with regard to the security / the performance to standards of safety / reliability of the finished product.
(3) The use of this product is intended for use in general electronics such as business machines, communication equipment, audio-visual equipment, household electrical appliances and measurement devices, etc.
(4) If this product is considered to be used in applications where high reliability is required and failure or malfunction have a direct influence on human life or health such as aerospace instrument, medical equipment, atomic energy control devices and so on, please contact Citizen Electronics beforehand.

9. Action for failed product

(1) If a failed product is found, action shall be taken after consultation between both sides.
However, in cases where it is obvious that the relevant failed product is attributed to CITIZEN ELECTRONICS, action will be limited to product replacement delivery.
(2) When a failed product is returned, the failure phenomenon should be specified in writing and attached.
CITIZEN ELECTRONICS will review the condition promptly and report the result to the customer.

10. Others

(1) All matters of this product's quality with regard to the customer are mentioned in these specifications, and any matters which are not mentioned in these specifications in items stated prior to receipt shall lose efficacy.
(2) When a question occurs about the contents of these specifications, please contact CITIZEN ELECTRONICS.
In addition, if there is any discrepancy in the contents of these specifications, both sides shall handle the matter with gentlemanlike discussion.
(3) Please do not conduct any actions equal to reverse-engineering such as the disassembling or the analysis of this product without CITIZEN's permission.
Please contact CITIZEN directly without disassembling in any way if a failure is found in this product.
(4) If this product is not returned within three weeks after this specification has been published, it is judged that the contents have been accepted.

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11, Use of this product

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inquiry@ce.citizen.co.jp

Website for LEDs for lighting
http://ce.citizen.co.jp/lighting_led/jp/

Ref.CE-P3410 12/04