DATA SHEET

CITILED COB
Horticulture series

CLU04H-40/85-PW -01
CLU04H-40/85-PRB-01

CITILED®
The Light Engine

CONTENTS

CITIZEN ELECTRONICS CO., LTD.
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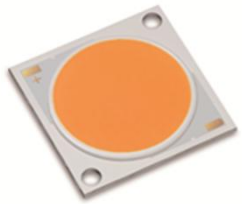
Ref.CE-P3759 09/16



Product Nomenclature

CLU04	H	-	40	/	85	-	PW	-	01
[1]	[2]		[3]		[4]		[5]		

[1]	Product shape	CLU04
[2]	Horticulture series	H
[3]	Wattage at rated current	40
[4]	Wattage at maximum current	85
[5]	Color Type	PW

1. Introduction

1-1. Product Description

CITIZEN ELECTRONICS was the first COB LED manufacture.
Our long-term advanced knowledge on COB LED packaging technology generated high quality and reliable COB LEDs for the horticulture applications.
The high thermal dissipation technology which has been built for the general lighting applications is adopted to this Horticulture COB LED series. As much as 85W from one COB LED gives the high power lighting solution for Horticulture applications. In addition, the spectrum tuning technology provides the optimized spectrum for effective photosynthesis in plants.
There are two types of COBs, Plant RB type and Plant White type, for Horticulture COB LED Series. The Plant RB type pursues the highest photosynthesis effectiveness and The Plant White type prioritizes the human walkability under the lighting.
The Horticulture COB LED Series has longer life service than the conventional lighting which has been used for horticulture applications so far.

1-2. Features

- Mechanical Dimensions : 28.0×28.0×1.4 (mm)
- Package Structure : Aluminum Base Chip on Board
- Reference Assembly : M3 screw, Connector
- Color Type : PW(Plant White) , PRB(Plant RB)
- Thermal Resistance : 0.52C/W
- Maximum drive current : 2160mA
- RoHS compliant
- Optimized die arrangement for optics
- Wide range of luminous flux with high efficacy
- UL recognized component (E358566)

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2. Performance Characteristics

2-1. Electro Optical Characteristics

(Tj=85C)

Product code	Color Type	Forward Current (mA)	Voltage (V)			Luminous flux (lm)		PPF (µmol/sec)		Active-PPF (µmol/sec)		Thermal Resistance Rj-c (C/W)
			Min.	Typ.	Max.	Min.	Typ.	Min.	Typ.	Min.	Typ.	
CLU04H-40/85-PW-01	Plant White	1080	31.8	34.6	37.5	2,949	3,352	57.0	67.0	38.4	45.2	0.52
CLU04H-40/85-PRB-01	Plant RB	1080	31.8	34.6	37.5	1,870	2,125	54.4	64.0	44.5	52.4	0.52

Notes :

1. Citizen Electronics maintains a tolerance of +/-3% on forward voltage,and +/-10% on luminous flux.

*Acutive-PPF

PPF at 400nm-510nm and 610nm-700nm

2-2. Absolute Maximum Ratings

Parameter	Symbol	Rating	
Input Power (W)	Pi	89.6	*1
Forward Current (mA)	If	2160	*1
Reverse Current (mA)	Ir	1	
Operating Temperature (C)	Top	-40 ~ +100	
Storage Temperature (C)	Tst	-40 ~ +100	
Case Temperature (C)	Tc	105	*2
Junction Temperature (C)	Tj	140	*3

*1. Input power and forward current are the values when the LED is used within the range of the derating curve in this data sheet.

*2. Refer to 3. Outline drawing for Tc measurement point.

*3. D.C. Current : Tj = Tc + Rj-c × Pi

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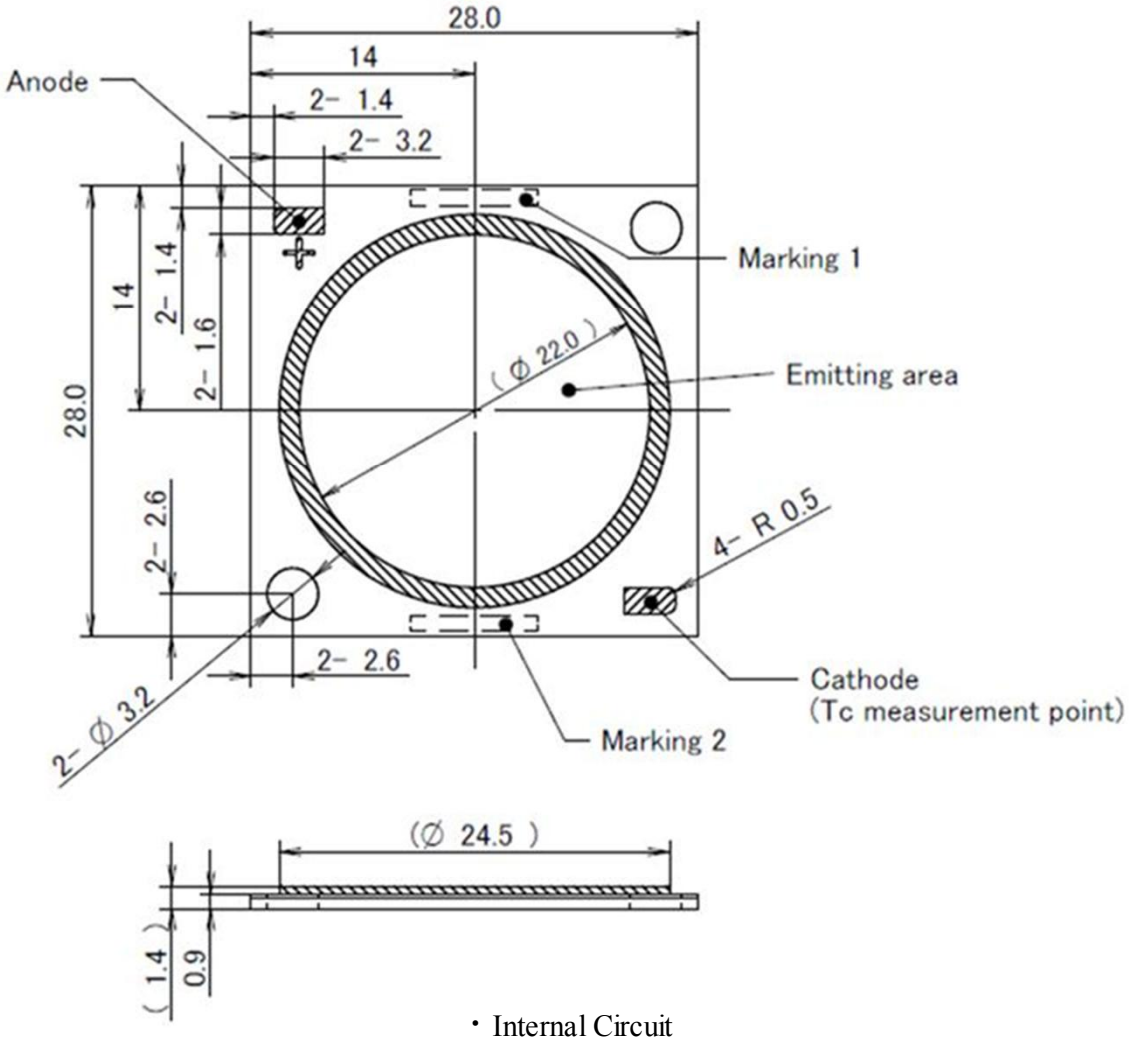
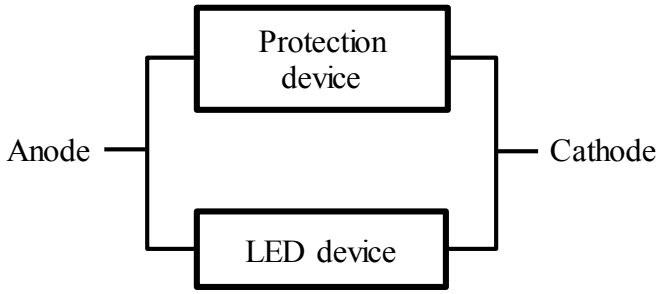
3. Mechanical Dimensions

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



・ Internal Circuit



Marking 1 : Serial No.
Marking 2 : S1212 **

- ** : Color Type
- S1212 : CLU04H-40/85 Type

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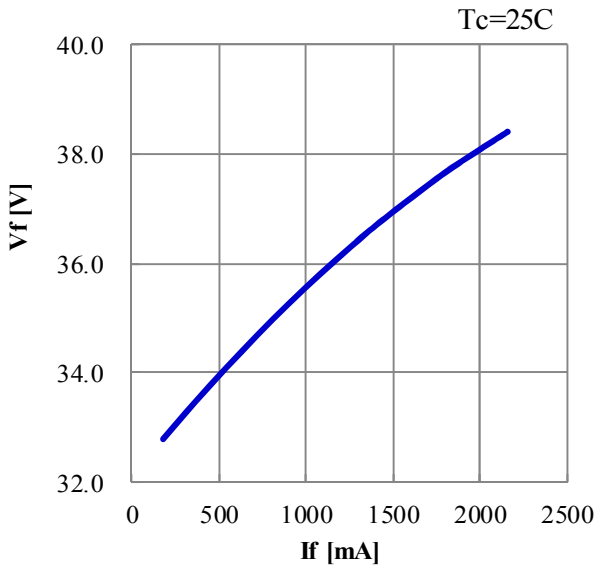
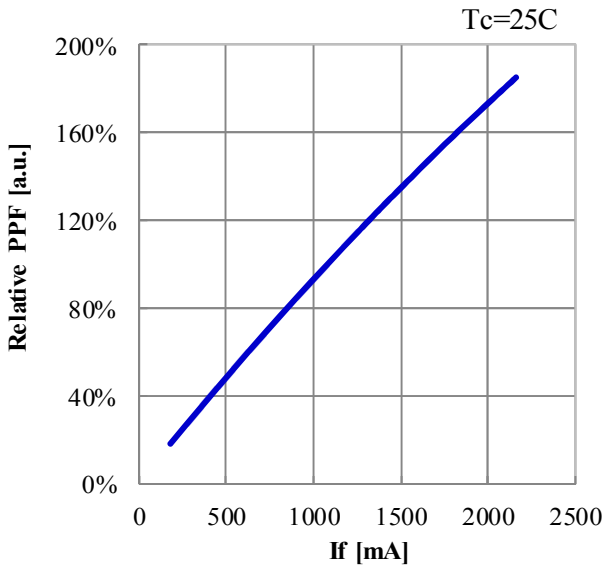
4. Characteristic Curves

4-1. Forward Current Characteristics / Temperature Characteristics

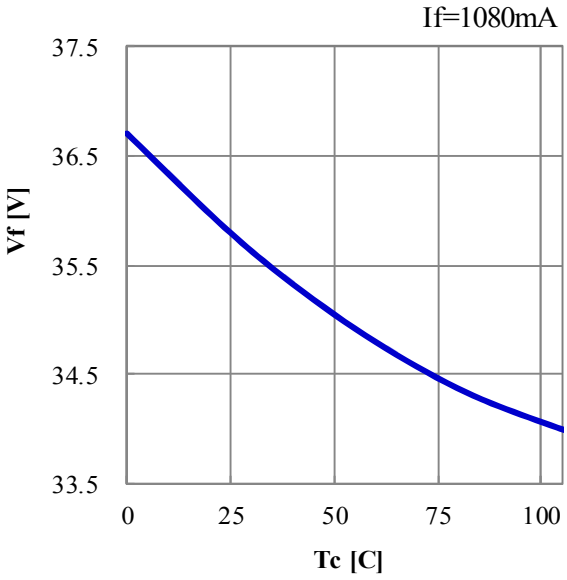
Forward Current vs. Forward Voltage



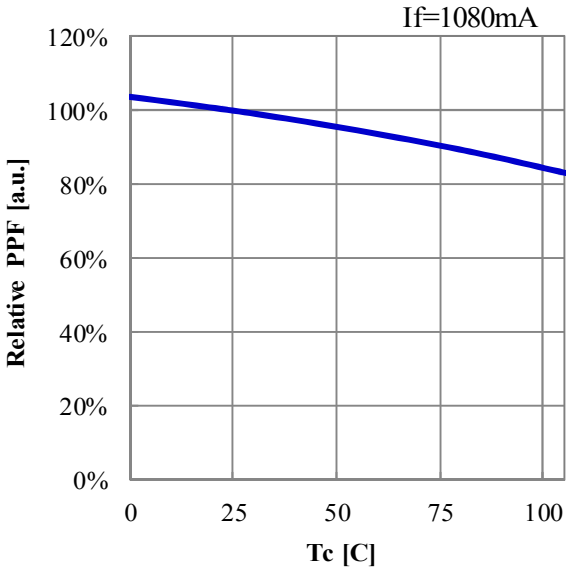
Forward Current vs. Relative PPF



Case Temperature vs. Forward Voltage



Case Temperature vs. Relative PPF



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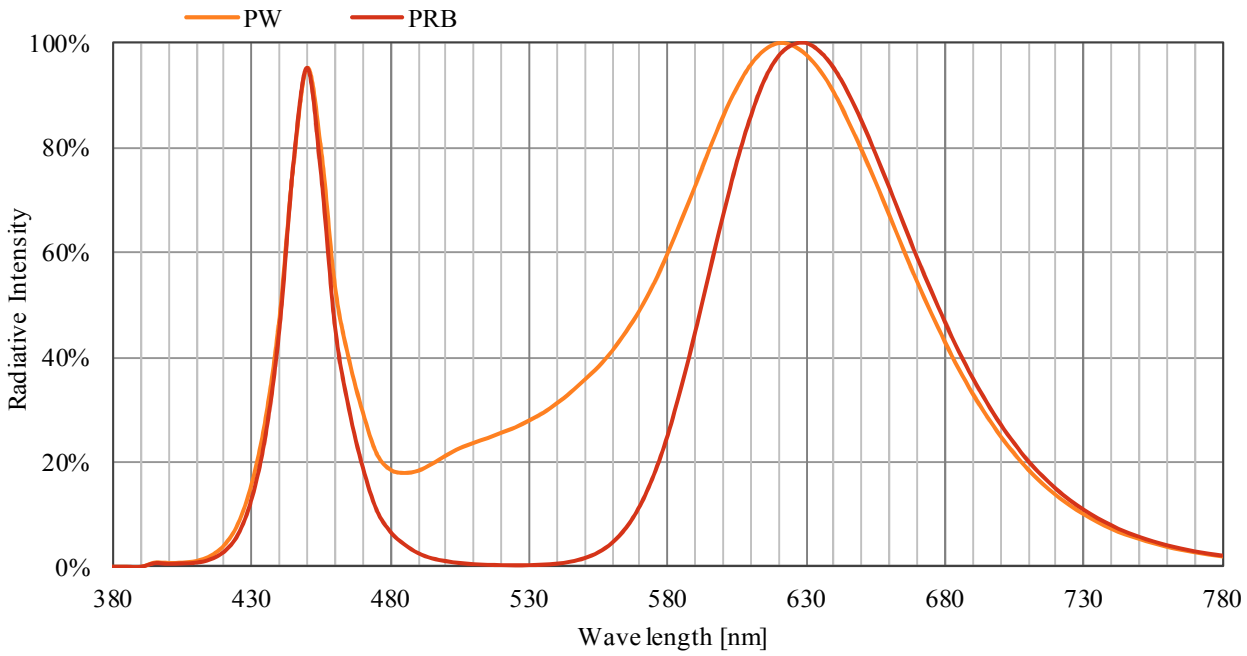
4-2. Optical Characteristics

Spectrum : PW , PRB Tj=85℃ If=1080mA



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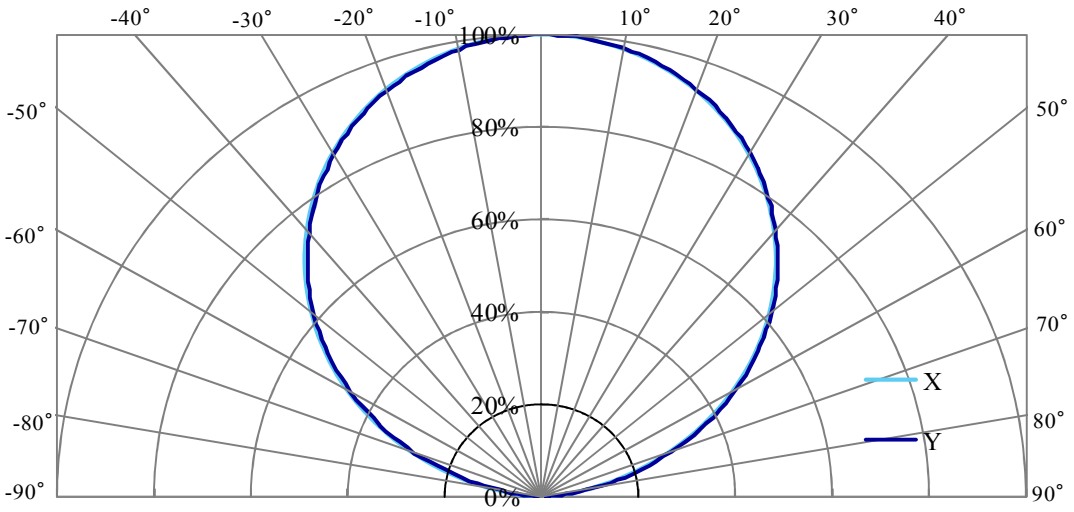
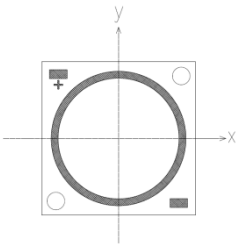
4-2. Optical Characteristics (continued)

Radiation Characteristic

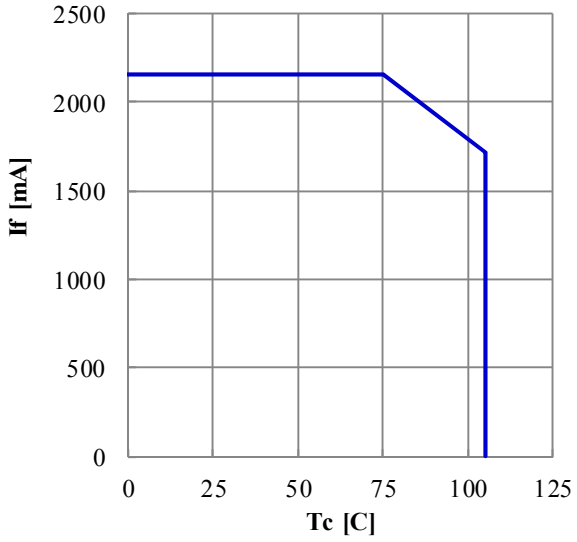




4-3. Derating Characteristics

Case Temperature

vs. Allowable Forward Current



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5. Reliability

5-1. Reliability Test

Test Item	Test Condition
Continuous Operation Test	IF=1080mA Ta=25C (with Al-fin) ×1000hrs
	IF=1080mA Tj=140C (with Al-fin) ×1000hrs
Low Temperature Storage Test	-40 C × 1000 hours
High Temperature Storage Test	100 C × 1000 hours
Moisture-proof Test	85 C, 85 %RH for 500 hours
Thermal Shock Test	-40 C × 30 minutes – 100 C × 30 minutes, 100 cycles

5-2. Failure Criteria

(Tc=25C)

Measuring Item	Symbol	Measuring Condition	Failure Criteria
Forward Voltage	Vf	If=1080mA	>U × 1.1
Total Luminous Flux	Φv	If=1080mA	<S × 0.85

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

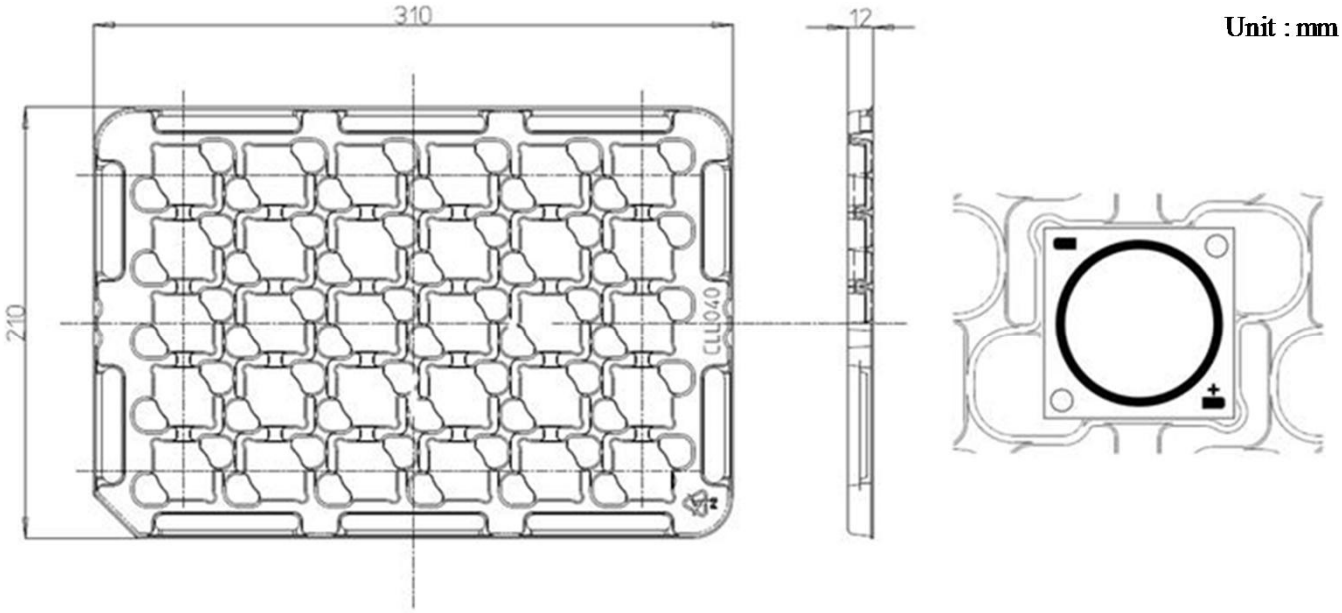
6-1. Packing

An empty tray is placed on top of a 6-tier tray which contain 30 pieces each.
(Smallest packing unit: 180 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)

Unit : mm



Product 30 pcs/tray

Example of indication label

CUSTOMER

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

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1. TYPE e.g. CLU04H-40/85-PW-01
2. P.No. (Cutomer's P/N)
3. Lot No.

   e.g. 1 6 9 5 0 0 1
   (1) (2) (3)

   (1) Last two digit of the year 16 : year 2016

   (2) Production month 9 : September

   Note: October, November and December are designated X,Y and Z.

   (3) CE's control number
4. Quantity

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7. Precaution

7-1. Handling with care for this product

-Both the light emitting area and white rim around 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.
-Please be aware that careful handling is required after the attachment of lead wires to prevent the application of any load to the connections.
-For more information, please refer to application note "Instruction Manual(COB LED Package)".

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.
-ESD sensitivity of this product is over 1000V (HBM, based on JEITA ED-4701/304).
-After assembling the LEDs into your final product(s), it is recommended to check whether the assembled LEDs are damaged by static electricity (electrical leak phenomenon) or not.
-It is easy to find static damaged LED dies by a light-on test with the minimum current value.

7-3. Caution of product assembly

-Regarding this product assembling on the heat sink, it is recommended to use M3 screw.
It might be good for screw tightening on the heat sink to do temporary tightening and final tightening.
In addition, please don't press with excess stress on the product.
-The assembling conditions of this product to the heat sink and the control of screw tightening torque needs to be optimized according to the specification of the heat sink.
-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 are confirmed by checking the mounting surface or measuring the case temperature of the product.
-In order to reduce the thermal resistance during assembly, it might be good to use TIM (Thermal Interface Material) on whole contact surface of the product.
In case of using grease type a TIM, please apply uniformly on the contact surface of the product.
In case of using sheet type a TIM, please make sure that the product is NOT strained by stress when the screws are tightened for assembly.
-For further information, please refer to application note "Instruction Manual(COB LED Package)".

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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 further information, please refer to application note "Thermal Management", "Instruction Manual(COB LED Package)".

7-5. Driving Current

-A constant current is recommended as an applying driving current to this product.
In the case of constant voltage driving, please connect current-limiting resistor to each LED row in series and control the driving current to keep under the absolute maximum rating forward current value.
-Electrical transient might apply excess voltage, excess current and reverse voltage to the product(s).
They also affect negative impact on the product therefore please make sure that neither excess voltage, no excess current nor reverse voltage is applied to the product when the LED driving power on or power off.
-For more information, please refer to application note "Driving", "Instruction Manual(COB LED Package)".

7-6. Lighting at a minimum current value

-A minimum current value of lighting of all dice is 15mA
When a minimum current is applied, LED dice may look different in their brightness due to the individual difference This is not a failure mode

7-7. Electrical Safety

-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 aluminum section of the product, and to pass at least 500V.
-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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7-8. 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 350C, and shall be finished within 3.5 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.
Contacts number of soldering bit should be within twice for each terminal.

* 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.

-For more information, please refer to application note "Instruction Manual(COB LED Package)".

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 take appropriate protective actions.
-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.

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