DATA SHEET

CL-L400-MC1N1-B

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1. Scope of Application
This data sheet is applied to the LED package, model CL-L400-MC1N1-B.

2. Part code

C L - L 4 0 0 - M C 1 N 1 - B
[1] [2] [3]

[1] Part Code

[2] CRI 80 min

[3] Correlated color temperature 5000K

< Features >

- External Dimensions 5.0 x 5.0 x 0.8
- Internal Structure Lead frame

-Luminous Flux: 124 lm @ 350 mA
-CCT: 5000K
-CRI: Ra 80 min
-Thermal Resistance: 9 C/W

- RoHS Compliant

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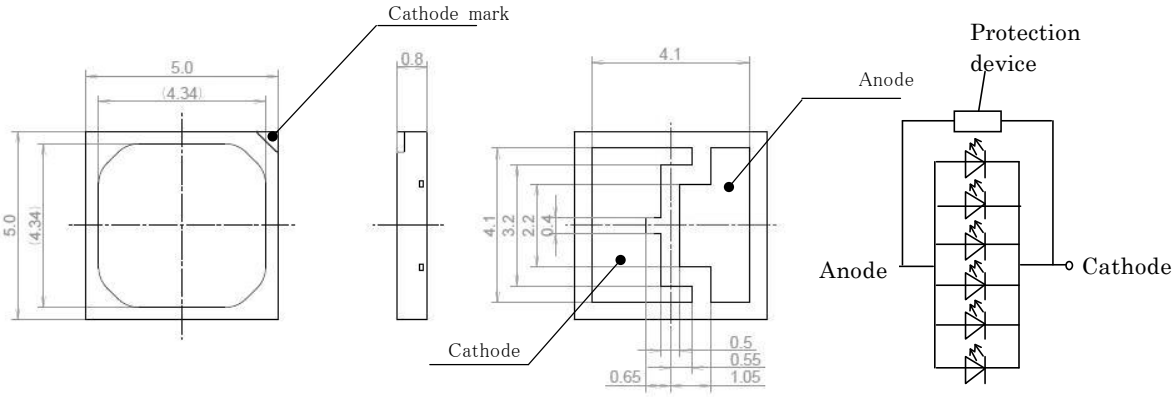
3. Outline drawing

Unit : mm
Tolerances unless otherwise specified : +/-0.1



Ts : Anode soldering terminal.

4. Performance

(1) Absolute Maximum Rating

Parameter	Symbol	Rating Value	Unit	
Input Power	Pi	2.3	W	*1
Forward Current	I_F	600	mA	*1
Minimum current	I_F min	30	mA	
Reverse Current	I_R	1	mA	
Operating Temperature	T_{op}	-30 ~ +85	C	
Storage Temperature	T_{st}	-40 ~ +100	C	
oldering terminal Temperatur	Ts	85	C	*2
Junction Temperature	Tj	120	C	*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 Ts measurement point
*3 D.C. Current : Tj = Ts + Rj-s X Pi

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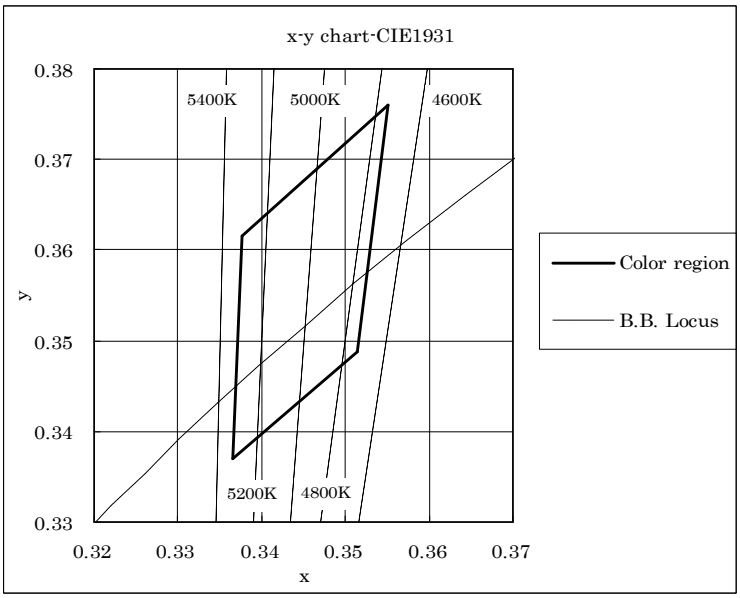
(2) Electro-optical Characteristics Tc=25C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	IF=350mA	2.75	3.01	3.35	V
Luminous Flux	Φv	IF=350mA	93	124	-	lm
CRI	Ra	IF=350mA	80	-	-	-
Thermal Resistance	Rj-s	Junction-Solder	-	9.0	-	C/W

Chromaticity coordinates (Condition : IF=350mA, Ts = 25C)

	x	y
Center	0.3447	0.3553
a	0.3551	0.3760
b	0.3376	0.3616
c	0.3366	0.3369
d	0.3515	0.3487



Note: The tolerance of measurement at our tester is VF+/-3% , Φv+/-10% , Chromaticity(x,y)+/-0.005 and Ra+/-1.

(3) Ranking information

Parameter	Synbol	Rank	Min	Max	Unit
Forward Voltage	VF	Q	2.75	2.95	V
		R	2.95	3.15	
		S	3.15	3.35	
Luminous Flux	φv	C	93	124	lm
		D	124	155	

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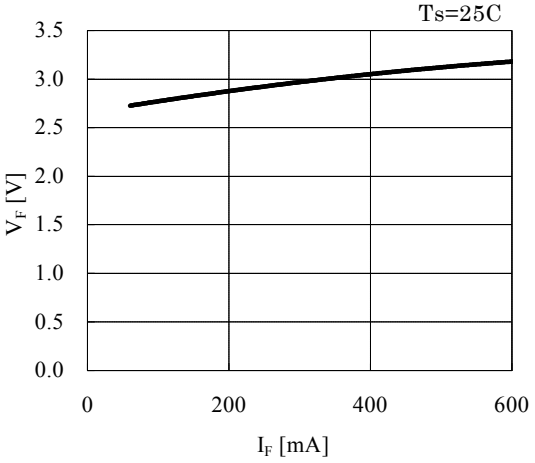
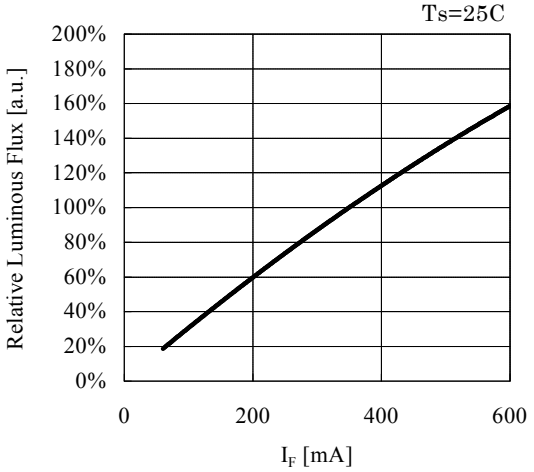
5. Characteristics

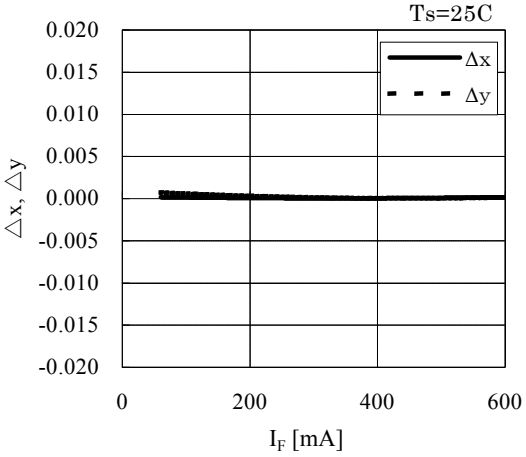
Forward Current vs. Forward Voltage



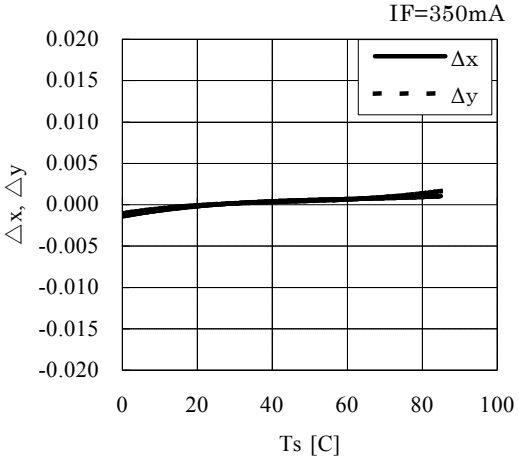
Forward Current vs. Relative Luminous Flux



Forward Current vs. Chromaticity Coordinate



Solder Temperature vs. Chromaticity Coordinate



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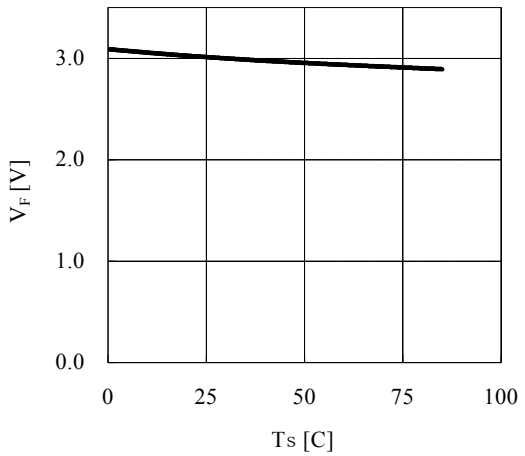
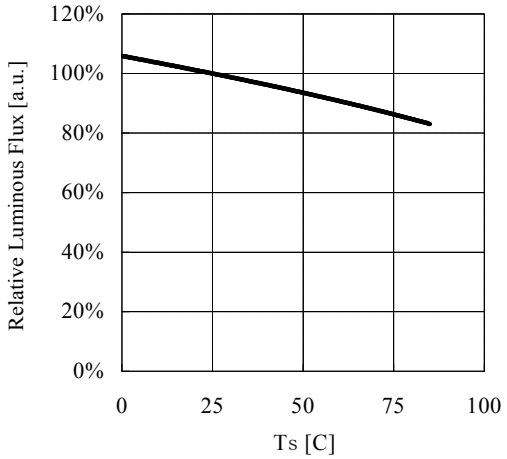
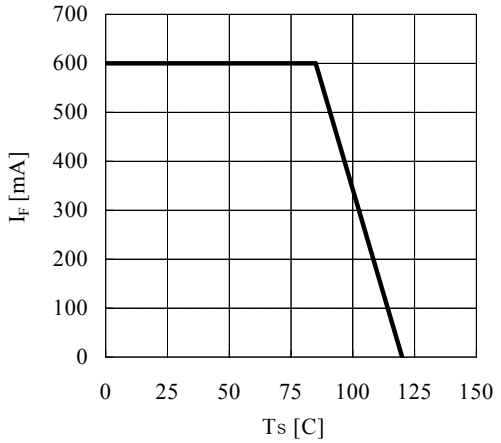
Solder Temperature vs. Forward Voltage
IF=350mA



Solder Temperature vs. Relative Luminous Flux
IF=350mA

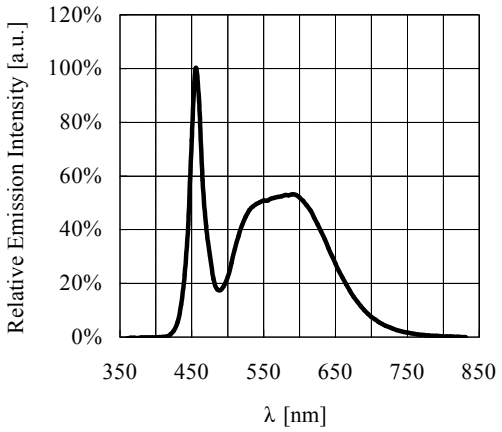


Solder Temperature vs. Allowable Forward Current

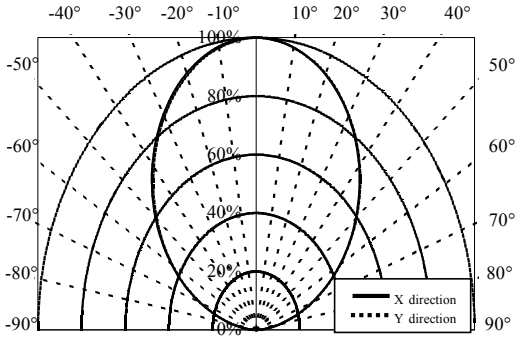


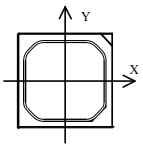
Spectrum

Ts=25C, IF =350 mA



Directive Characteristic





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6. Reliability

(1) Datails of the tests

Test Item	Test Condition
Continuous Operation Test	IF=350mA Ta=25C × 1000 hours
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 cycle
Solder Heat Resistance Test	Recommended temperature profile (reflow soldering) x 2, (2nd test must be started after the samples are stabilized thermarlly.)

(2)Judgement Criteria of Failure for Reliability Test

(Ta=25C)

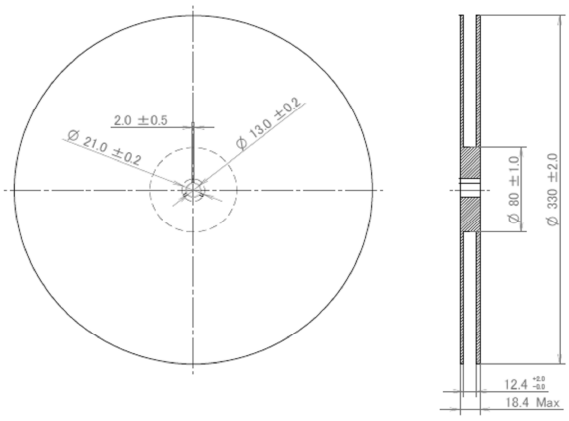
Measuring Item	Symbol	Measuring Condition	Judgement Criteria for Failure
Forward Voltage	VF	IF=350mA	>U X 1.2
Total Luminous Flux	Φv	IF=350mA	<S X 0.7

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

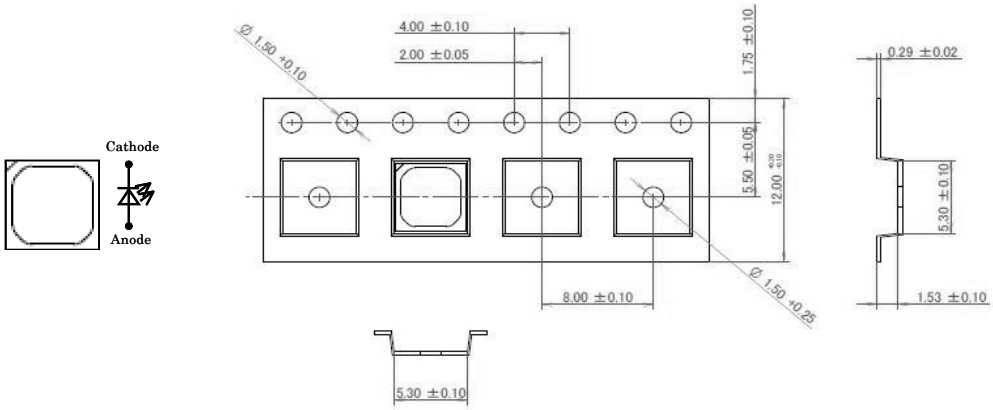
Note : Measurement shall be taken between 2 hours and 24 hours, and the test pieces should be return to the normal ambient conditions after the completion of each test.

7. Taping Specifications

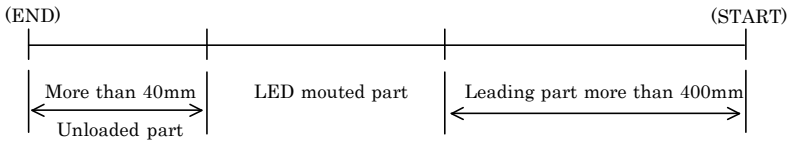
(1) Shape and dimensions of Reel Unit:mm



(2) Dimensions of Career Tape Unit:mm



(3) Configration of Tape



(4) Quantity : 4000 pcs/reel

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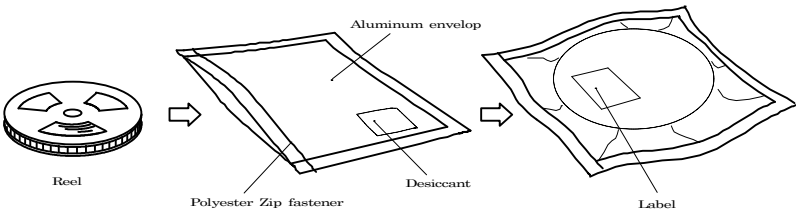
8. Packing Specifications

(1) Moisture proof packing

-To prevent moisture absorption during transportation and storage, reels are packed in aluminum envelopes which contain a desiccant with a humidity indicator.



(2) Storage

-To prevent moisture absorption, it is strongly recommended that reels (in bulk or taped should be stored in the dry box (or the desiccator) with a desiccant as the appropriate storage place. If not, the following is recommended.

Temperature : 5-30 C
Humidity : 60%RH max

The devices should be mounted within 168H (7days) after unpacking.

If you store the unpacked reels, please store them in the dry box or seal them into the envelop again.

(3) Environmental conditions

-This device contain silver plated electrode. So, when being exposed to enviroment which contains corrosive gases, the silver plating becomes tarnished.
Tarnished plating may lead to poor solderbility and degradation of optical characteristics.

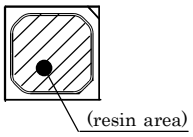
-Please DO NOT expose this device to corrosive atomosphere anytime (during storage, after mounting). Please take care the above when designing your product.

-For outdoor use, necessary measures should be taken to prevent water, moisture and salt air damage.

-This product is NOT designed with following conditions in mind.
In water, oil, medicament, organic solvent and dust-laden environment.

9. Precautions

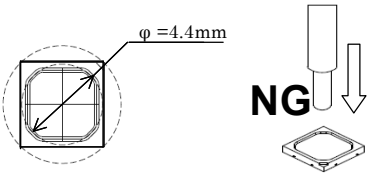
(1) Handling with care for this product



-The light emitting area is encapsulated with soft resin materials. Please avoid the resin area from being pressed, stressed, rubbed, come into contact with sharp metal nail because the function, performance and reliability of this product are negatively impacted.

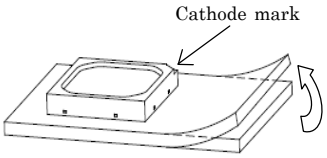
-Please be aware that this product should not come into contact with any other parts while incorporating in your lighting apparatus or your other products.

-When pick and place this product, it is recommended that using the pick up nozzle with inner radius more than 4.4mm.



-Please avoid using narrow pick up nozzle, and pushing the resin area directly.

-Bending the circuit board with soldered LEDs may cause breakage of package. Please take care to bow, twist and warpage the PCB.



(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-satatic gloves when handling this product.

-Every manufacturing facility in regard to the product (plant, equipment, machine, career machine and conveyane 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 products, it is recommended to check AB34 whether the assembled LEDs are damaged by static electricity (electirical leak phenomenon) or not.

-It is easy to find static damaged LED dies by a light-on test with the minimum current value.

9. Precautions (Continued)

(3) 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-s), 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".

(4) 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 products 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(s) therefore please make sure that no excess voltage, excess current and reverse voltage is applied to the product(s) when the LED driver is turn-on and/or turn-off.

-For more information, please refer to application note "Driving".

(5) Lighting at a minimum current value

-In a case where the minimum current (IF min) is applied to the product, some of LED dice in the product might look different in their brightness due to the individual difference of the LED dice, and they are not failed.

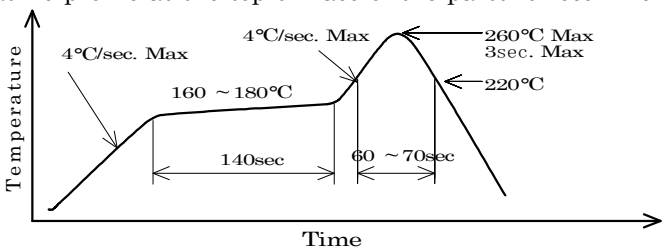
9. Precautions (Continued)

(6) Soldering

-This product is adaptable to reflow process, and please use lead-free soldering.
Following soldering paste is recommended.

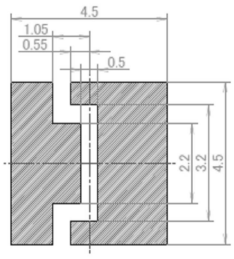
Melting temperature : 216 - 220 C.
Composition : Sn-3.5Ag-0.75Cu

-The temperature profile at the top surface of the parts is recommended as shown below.



-Next process of soldering should be carried out after the product has return to ambient temperature.

-Recommemded soldering pattern is shown to the right, but mountability and solderability need to be optimized with actual conditions such as amount of solder, reflow temperature the process.



9) 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.

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10. Precautions with regard to product use

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