1. Scope of Application
These specifications apply to chip type LED lamp, CITILED, model CL-652-C1N.

2. Part code

CL-652-C1N

Series
652 : White power LED for general lighting

Watt Class
C1 : 1 watt package

Lighting color
N : White color around CCT 5000K

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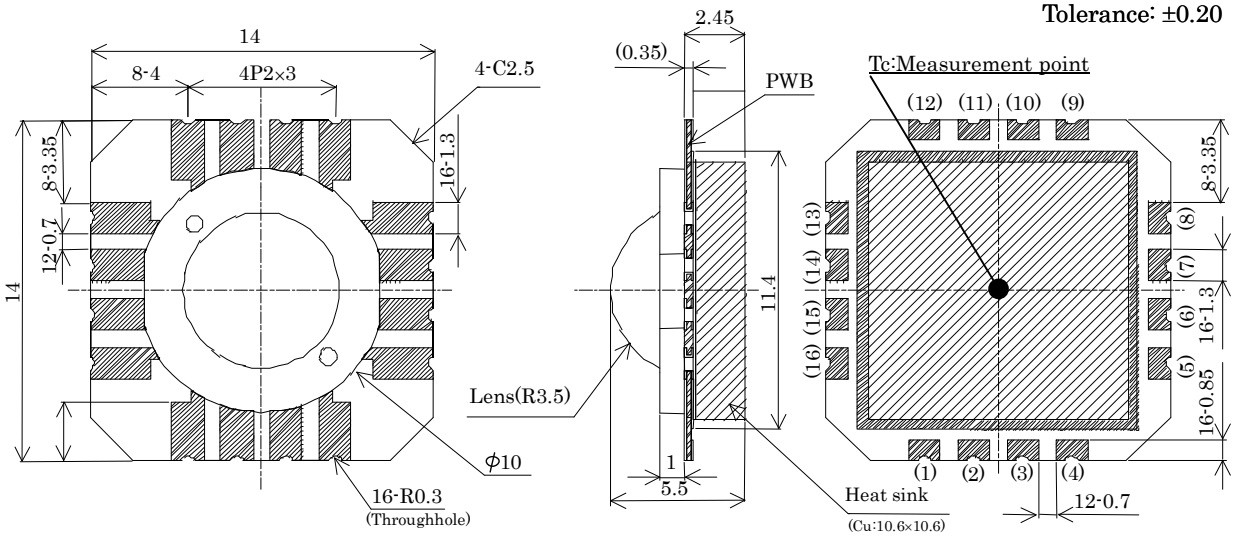
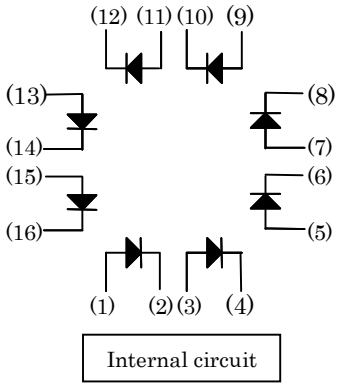
3. Outline drawing

Unit: mm
Tolerance: ±0.20





4. Performance

(1) Absolute Maximum Rating

Parameter	Symbol	Rating Value	Unit
Power Dissipation	Pd	2.0	W
Forward Current *1	I_{FDC}	480	mA
Forward Pulse Current *2	I_{FP}	800	mA
Reverse Voltage *3	V_R	5	V
Operating Temperature	Top	-25 ~ +80	°C
Storage Temperature	Tst	-30 ~ +85	°C
Junction Temperature	T_{jMax}	120	°C

*1 The value is based on 8-dice performances in parallel drive.
*2 The value is based on 8-dice performances in parallel drive.
Duty ≤ 1/10, Pulse width ≤10 msec
*3 The values is based on 1-die performance.

(2) Thermal resistance: R_{J-C}=26°C/W

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(3) Electro-optical Characteristics (Ta=25°C)

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Forward Voltage *1	V_F	I_F=350mA	—	3.55	4.5	V
Reverse Current *2	I_R	V_R=5V	—	—	100	μA
Luminous Intensity *3	I_V	I_F=350mA	16.1	28.0	—	cd
Total Luminous Flux		I_F=350mA	58.8	85	—	lm
Chromaticity coordinates *4	x,y	I_F=350mA	※ *See below*			

*1 The values are based on 8-dice performances in parallel drive.
*2 The values are based on 1-die performance.
*3 In accordance with NIST standard
The values are based on 8-dies performance
*4 Chromaticity coordinates is the area surrounded with a,b,c,d.

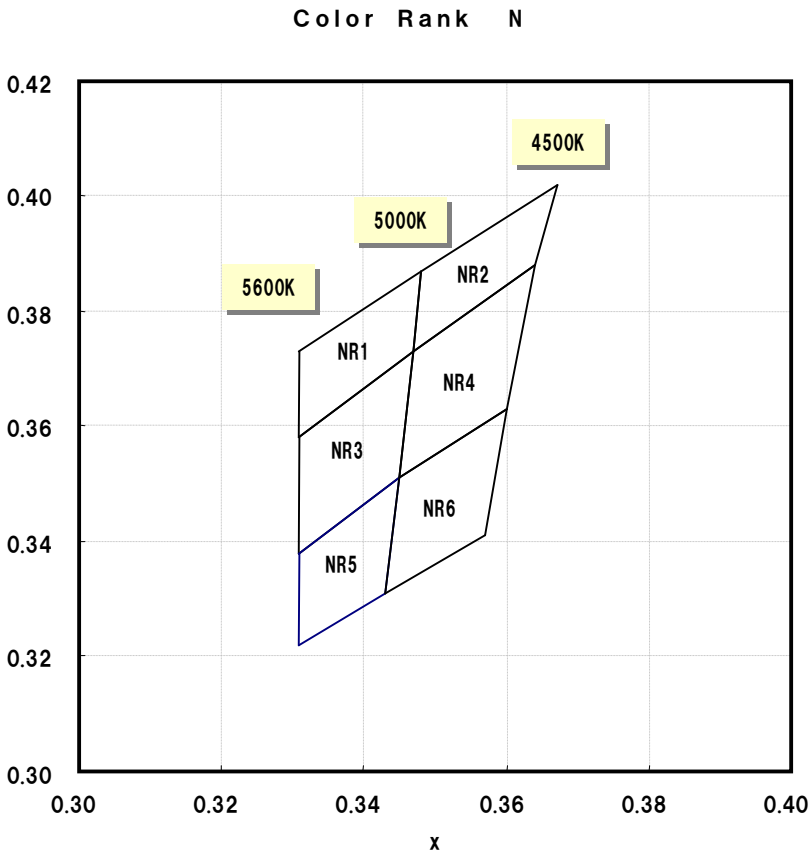
Note 1) The tolerance of Forward Voltage measurement is ±3% at our tester.
Note 2) The tolerance of Luminous Intensity measurement is ±10% at our tester
Note 3) The tolerance of Chromaticity coordinates measurement is ±0.01 at our tester
Note 4) For handling, please apply CMOS LSI or equivalent to prevent any electrostatic effect.

• Chromaticity Coordinates Rank

	NR1		NR2	
	x	y	x	y
a	0.331	0.358	0.347	0.373
b	0.331	0.373	0.348	0.387
c	0.348	0.387	0.367	0.402
d	0.347	0.373	0.365	0.388

	NR3		NR4	
	x	y	x	y
a	0.331	0.338	0.345	0.350
b	0.331	0.358	0.347	0.373
c	0.347	0.373	0.365	0.388
d	0.345	0.350	0.361	0.363

	NR5		NR6	
	x	y	x	y
a	0.331	0.322	0.343	0.331
b	0.331	0.338	0.345	0.350
c	0.345	0.350	0.361	0.363
d	0.343	0.331	0.357	0.341



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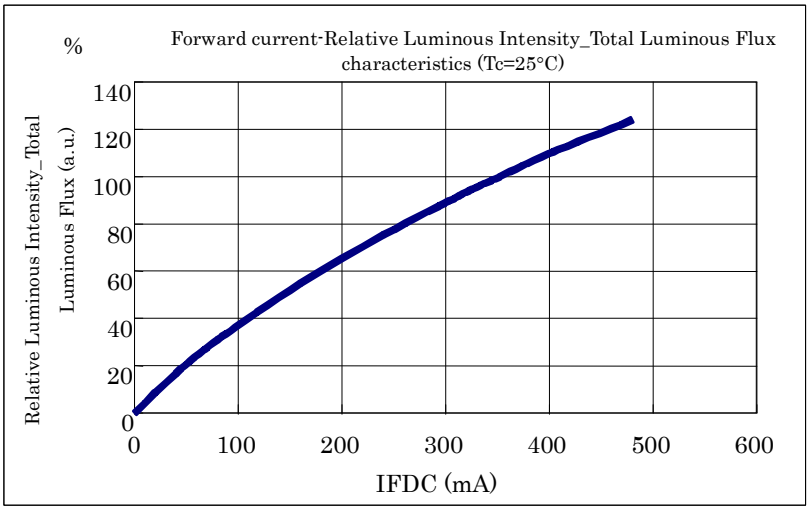
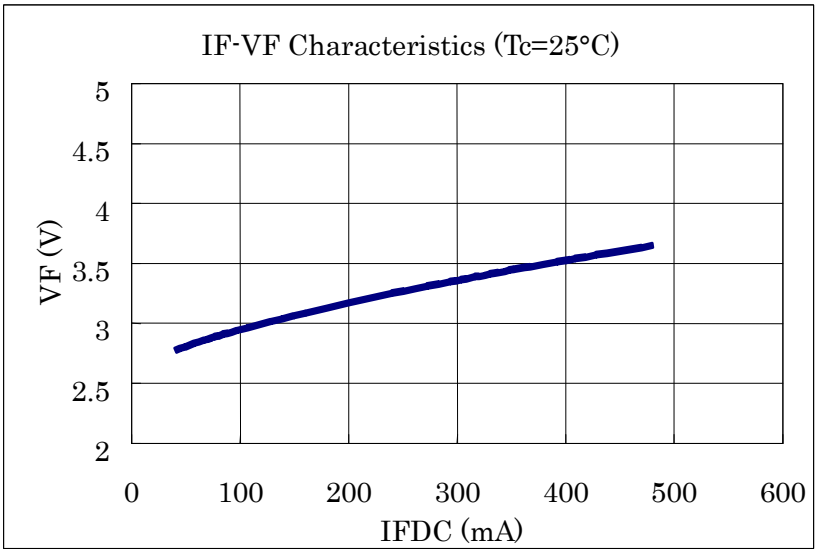
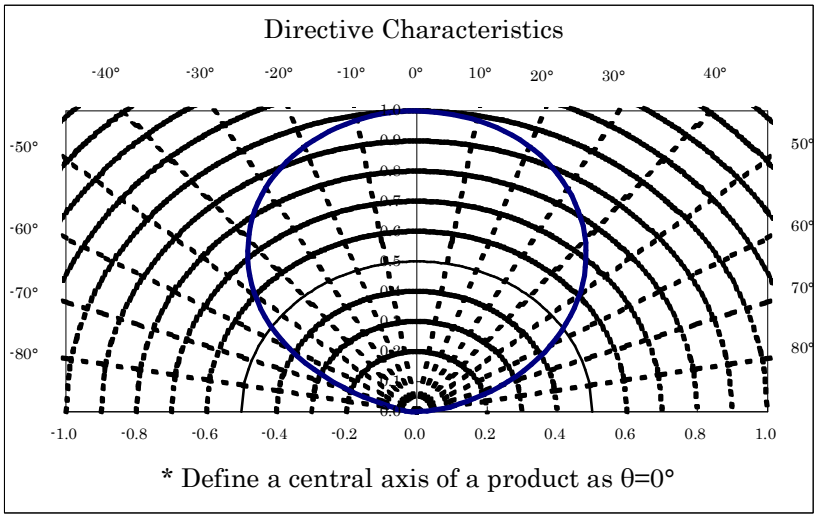
5. Characteristics







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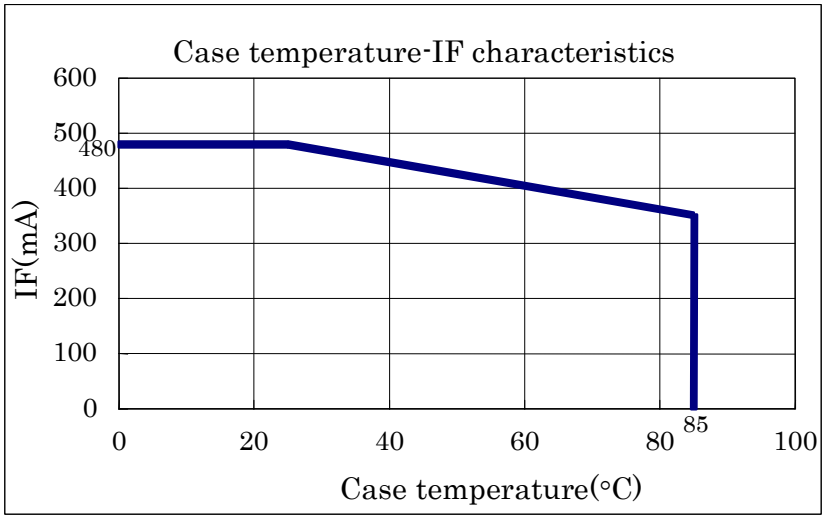

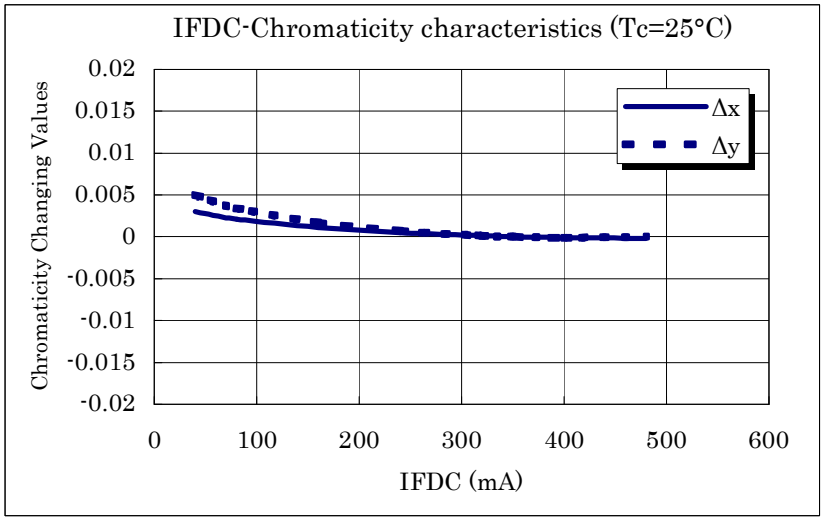

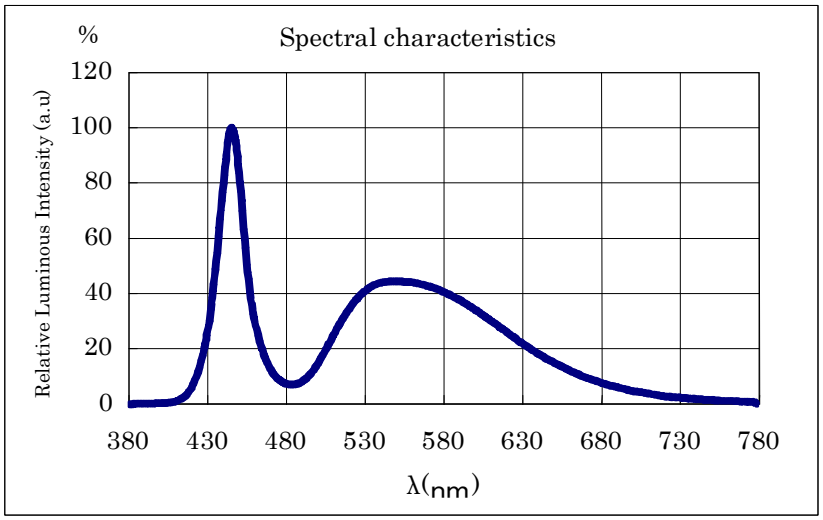

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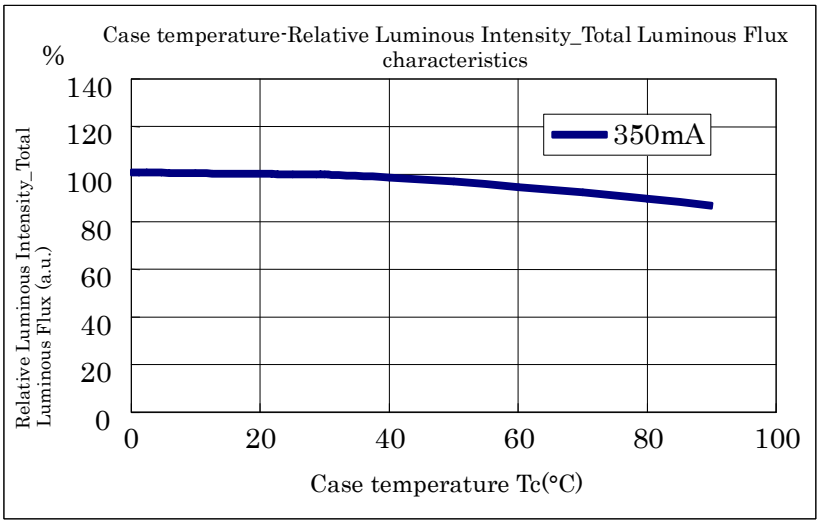

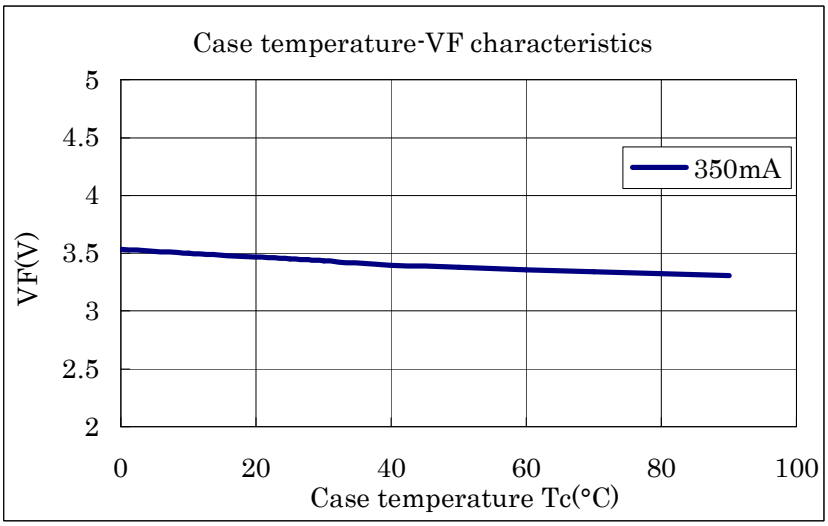

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6. Reliability

(1) Details of the tests

Test Item	Test Condition
Life Test in Continuous Operation	25°C, I_F=60mA *1 × 1000 $^{+24}_{-12}$ hours 0°C, I_F=44mA *2 × 1000 $^{+24}_{-12}$ hours 75°C, I_F=44mA *3 × 1000 $^{+24}_{-12}$ hours
Low Temperature Storage Test	-30 $^{+3}_{-5}$ °C × 1000 $^{+24}_{-12}$ hours
High Temperature Storage Test	85 $^{+5}_{-3}$ °C × 1000 $^{+24}_{-12}$ hours
Moisture-proof Test	60 ±2°C, 90 ±5%RH for 1000 $^{+24}_{-12}$ hours
Thermal Shock Test	-30°C × 30 minutes - 85°C × 30 minutes, 100-cycle
Solder Heat Resistance Test	Recommended temperature profile (reflow soldering) × 1

*1 The value is based on serial drive usage. (Nearly equal to 480mA on parallel drive usage.)
*2 The value is based on serial drive usage. (Nearly equal to 350mA on parallel drive usage.)
*3 The value is based on serial drive usage. (Nearly equal to 350mA on parallel drive usage.)

(2) Judgment Criteria of Failure for Reliability Test (Ta=25℃)

Measuring Item	Symbol	Measuring Condition	Judgment Criteria for Failure
Forward Voltage	V_F	I_F=44mA *1	>U×1.1
Reverse Current	I_R	V_R=5V	>U×2
Luminous Intensity	I_V	I_F=44mA *2	<S×0.7

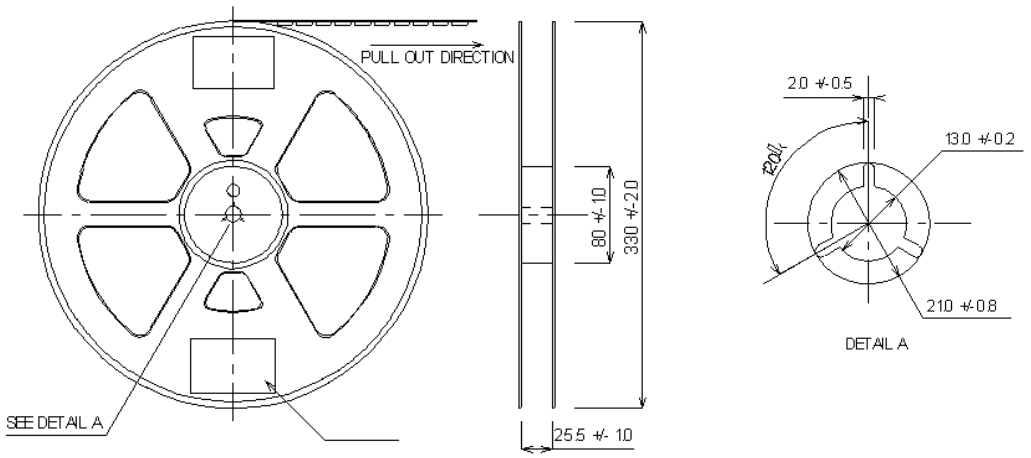
*1 The value is based on serial drive usage. (Nearly equal to 350mA on parallel drive usage.)
*2 The value is based on serial drive usage. (Nearly equal to 350mA on parallel drive usage.)

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

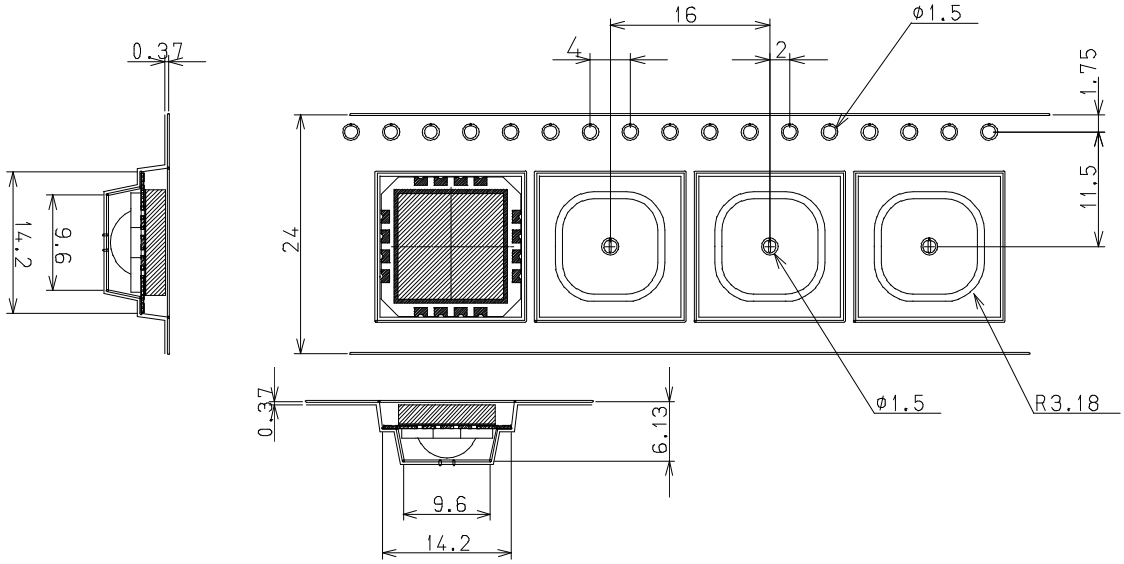
Note: Measurement shall be taken between 2 hours and 24 hours, having returned the test pieces to the normal ambient conditions after the completion of each test.

7. Taping Specifications (in accordance with JIS standard)

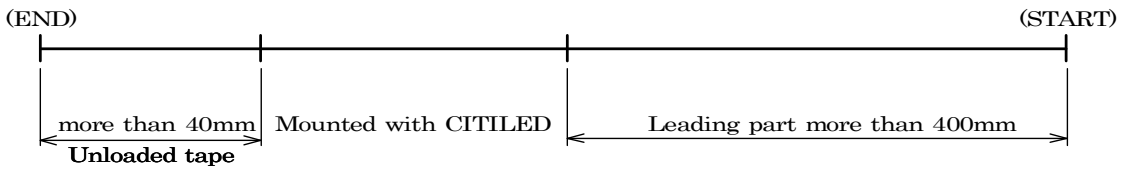
(1) Shape and Dimensions of Reel (Unit: mm)



(2) Dimensions of Tape (Unit: mm)



(3) Configuration of Tape (700pcs/Reel)



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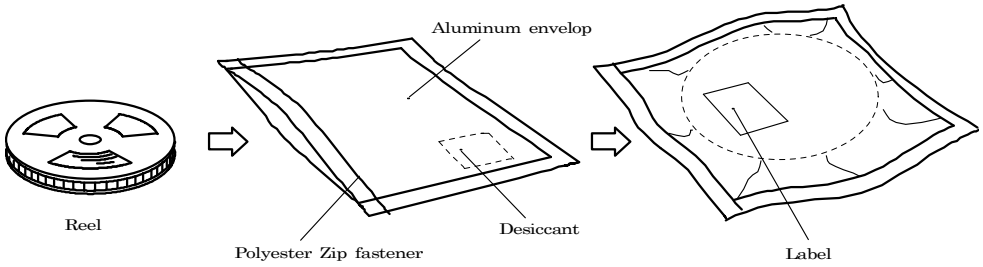
8. Packing Specifications

8-1. 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.



8-2. 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 as soon as possible after unpacking. If you store the unpacked reels, please store them in the dry box or seal them into the envelop again.

8-3. Baking

If the devices have been stored over 6 months or unpacked over 7days, it should be baked under the following conditions.

Baking conditions: 60°C × 12 hours or more (reeled one)
100°C × 45 minutes or more (loose one)
150°C × 15 minutes or more (loose one)

9. Precautions

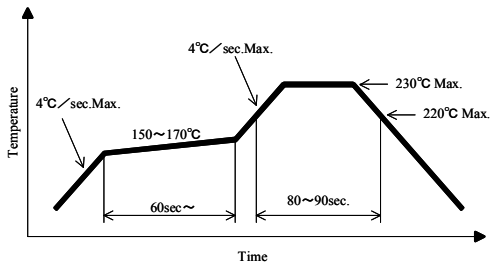
9-1. Soldering

(1) Manual soldering

1) Use 6/4 solder or solder containing silver (Ag)
2) Before soldering every time, make baking to units. By manual soldering, it is the possibility of crack due to the moisture absorption in the resin portion.
3) Use a soldering iron of 25W or smaller. Adjust the temperature of the soldering iron below 300°C.
4) Force or stress must not be applied to the resin portion while soldering.
5) Finish soldering within 3 seconds.
6) Handle the devices only after temperature is cooled down.

(2) Reflow soldering

1) The temperature profile at the top surface of the parts is recommended as shown below.
2) It is requested that products should be handled after their temperature has dropped down to the normal room temperature.



9-2. Other directions

(1) It is requested to avoid any stress added to the lens portion.
(2) It is requested to avoid any friction by sharp metal nail etc. to the lens portion.

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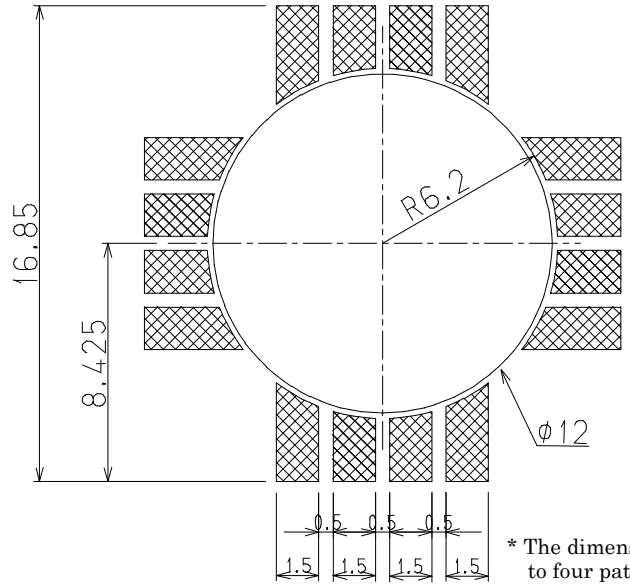
10. Designing precautions

(1) The current limiting resistor should be placed in the circuit so that is driven within its rating. Also avoid reverse voltage (over-current) applied instantaneously when ON or OFF.

(2) Recommended soldering pattern

<For reflow soldering>



* The dimensions are common to four patterns.

Unit : mm

The above dimensions are not the one which guarantee the performance of mountability.
The use of the above pattern is recommended to use after deep study at your site.

(3) When assembling the circuit board into the finished products, care must be taken to avoid the component parts from touching other parts.

(4) Other

- This product complies with RoHs directives.
- This product is intended for the application of general electronic devices (office automation equipment, communication devices, audio-video equipment, home electric appliances, measurement hardware and others). In cases where this product is used for the application that requires high reliability or could directly affect human life and body due to failure or malfunction (aerospace hardware, medical equipment, atomic control equipment and others), please consult with our sales representatives beforehand.
- When this product is secondarily fabricated such as change in shape, it is not included in our warranty.
- The agreement of formal product specifications is required prior to mass production.
- The specifications and appearance of this product are subject to change without advanced notice.

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