1. Scope of Application

This data sheet is applied to the chip type LED lamp , model CL-824-MU1WW1-T.

2. Part code

CL- 824 - MU1WW1 - T

Series
824 : White LED for general lighting.

Special specifications
M : General Color Rendering Index Typ. 85 Type.

Watt class
U1 : Under 1 watt package.

Lighting color
WW1 : Compliance with ANSI C78.377-2008,
Correlated Color Temperature 3500K.

Shipping mode
Non-coded : Bulk
T : Taping (standard)

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|---|---|
| Name | CL-824-MU1WW1 |
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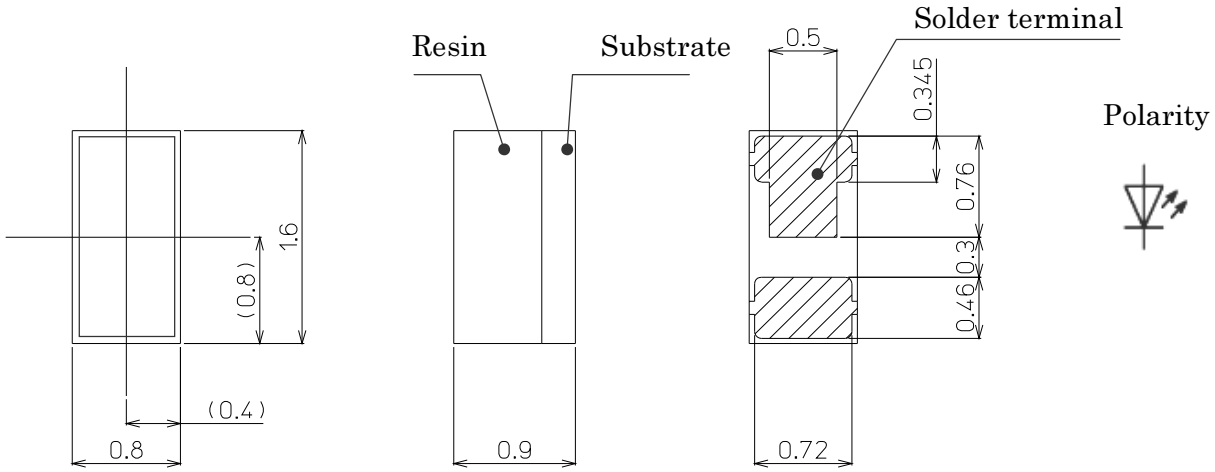
3. Outline drawing

Unit : mm
Tolerance : ±0.1




4. Performance

( 1 ) Absolute Maximum Rating

| Parameter | Symbol | Raiting Value | Unit | |
|---|---|---|---|---|
| Power Dissipation | $P_D$ | 105 | mW | |
| Forward Current | $I_F$ | 30 | mA | |
| Forward Pulse Current | $I_{FP}$ | 100 | mA | *1 |
| Reverse Voltage | $V_R$ | 5 | V | |
| Operating Temperature | $T_{OP}$ | -30 ～ +85 | C | |
| Storage Temperature | $T_{ST}$ | -40 ～ +100 | C | |
| Junction Temperature | $Tj_{Max}$ | 120 | C | *2 |

*1 Forward Current : Duty<=1/10 , Pulse Width<=10msec
*2 D.C. Current : Tj = Tc + Rj-c × $P_D$

Pulse Current : Tj = Tc + Rj-c × Pw(Power Dissipation / One-Pulse) × Duty
*Ts : Solder terminal(Anode)temperature

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( 2 ) Electro-optical Characteristics Ts=25C

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | $I_F$=20mA | 2.8 | 3.2 | 3.5 | V |
| Reverse Current | $I_R$ | $V_R$=5V | - | - | 100 | μA |
| Thermal Resistance | Rj-s *2 | Junction-solder | - | 175 | - | C/W |
| Luminous Intensity *1 | Iv | $I_F$=20mA | 1140 | 1670 | - | mcd |
| Luminous Flux | $\varphi_V$ | $I_F$=20mA | - | (4.7) | - | lm |
| General Color Rendering Index | Ra | $I_F$=20mA | 80 | 85 | - | - |

*1 In accordance with NIST standard
*2 Thermal Resistance : Junction - Solder terminal (Anode)

Ranking (Condition : $I_F$=20mA , Ts=25C)

| Parameter | Symbol | Rank | Min. | Max. | Unit |
|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | Q | 2.8 | 3.0 | V |
| | | R | 3.0 | 3.2 | |
| | | S | 3.2 | 3.5 | |
| Luminous Intensity | Iv | B | 1140 | 1300 | mcd |
| | | C | 1300 | 1759 | |
| | | D | 1759 | 2380 | |

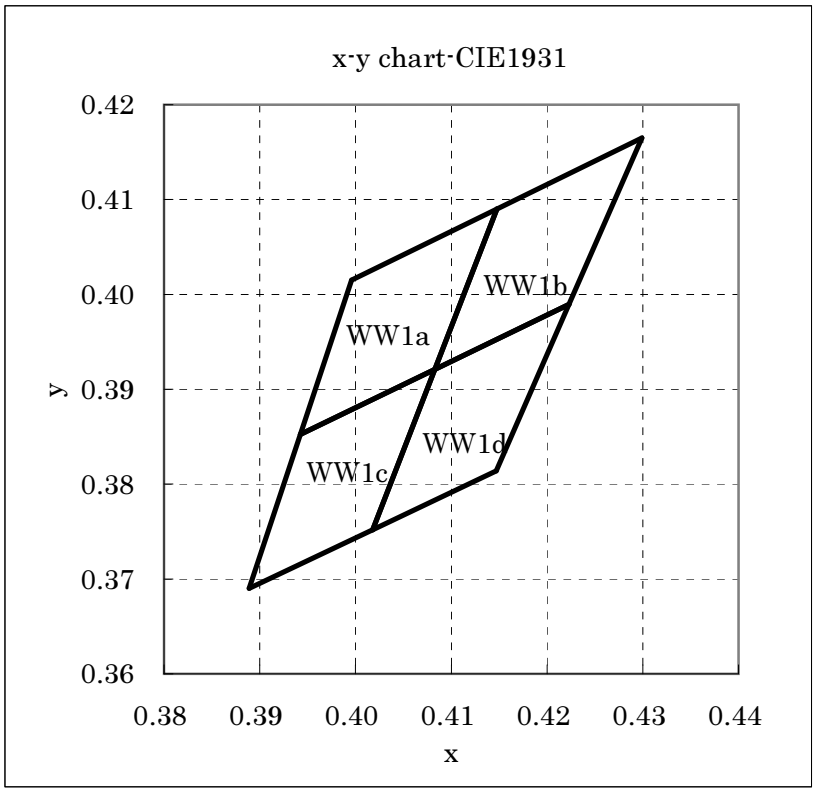
Chromaticity coordinates ( Condition : $I_F$=20mA ,Ts=25C)

| Color Rank | x | y | Color Rank | x | y |
|---|---|---|---|---|---|
| WW1a | 0.415 | 0.409 | WW1b | 0.430 | 0.417 |
| | 0.400 | 0.402 | | 0.415 | 0.409 |
| | 0.394 | 0.385 | | 0.408 | 0.392 |
| | 0.408 | 0.392 | | 0.422 | 0.399 |

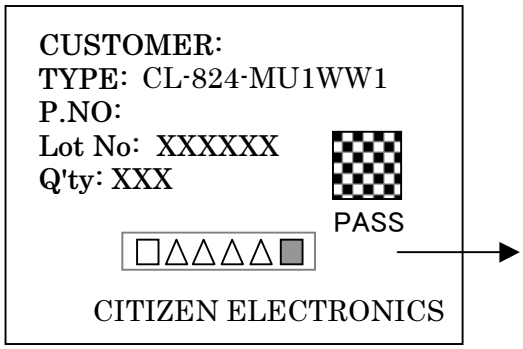
| Color Rank | x | y | Color Rank | x | y |
|---|---|---|---|---|---|
| WW1c | 0.408 | 0.392 | WW1d | 0.422 | 0.399 |
| | 0.394 | 0.385 | | 0.408 | 0.392 |
| | 0.389 | 0.369 | | 0.402 | 0.375 |
| | 0.402 | 0.375 | | 0.415 | 0.381 |

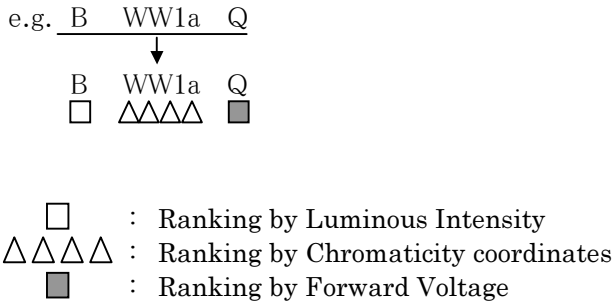
*1 The tolerance of measurement at our tester is VF±3% , φv±10% , Chromaticity(x,y)±0.01.
*2 For handling ,please apply CMOS LSI or equivalent any electrostatic effect.

Measurement Conditions
1) Chip is mounted on board( size 100mm×40mm)
2) Board material is FR-4, covered with green color resist and thickness of copper is 18μm.




Rank information

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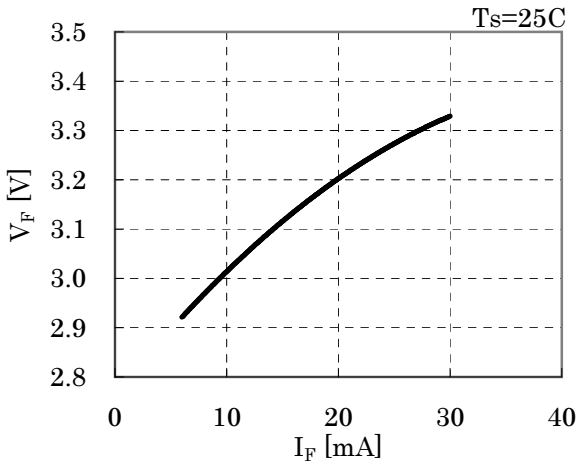
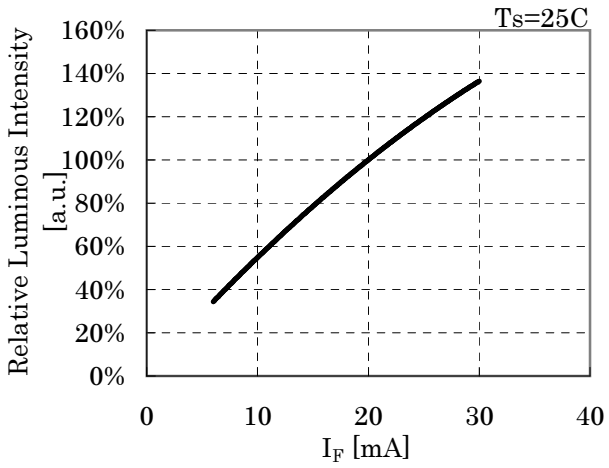
## 5. Characteristics

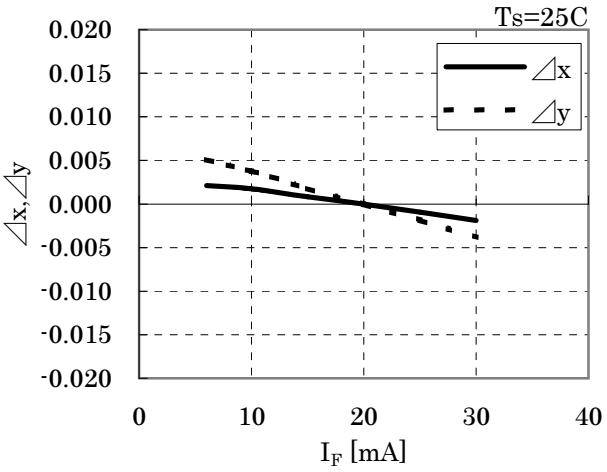
・Forward Current vs. Forward Voltage



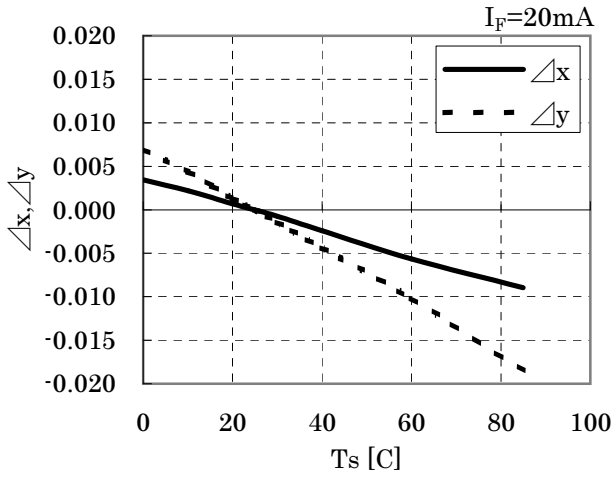

・Forward Current vs. Relative Luminous Intensity



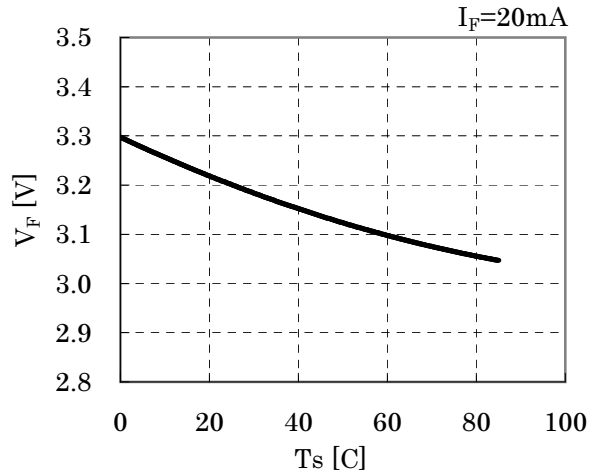

・Forward Current vs. Chromaticity Coordinate



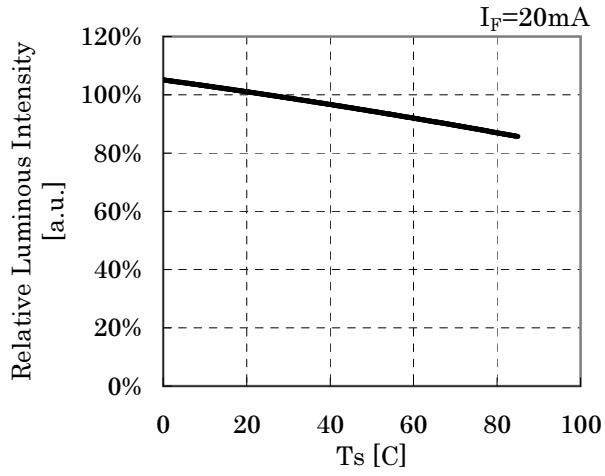

・Solder Temperature vs. Chromaticity Coordinate




・Solder Temperature vs. Forward Voltage




・Solder Temperature vs. Relative Luminous Intensity




| Symbol | CITILED |
|---|---|
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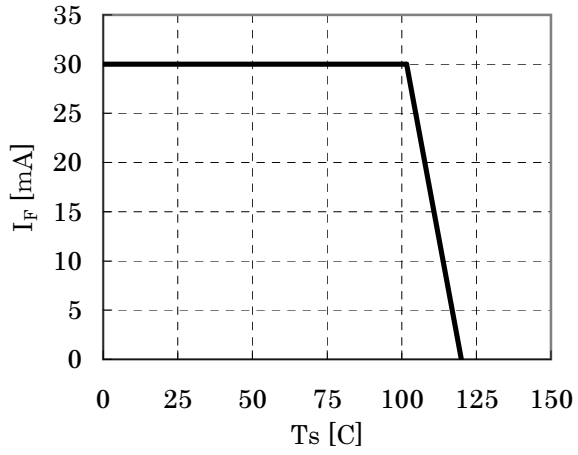
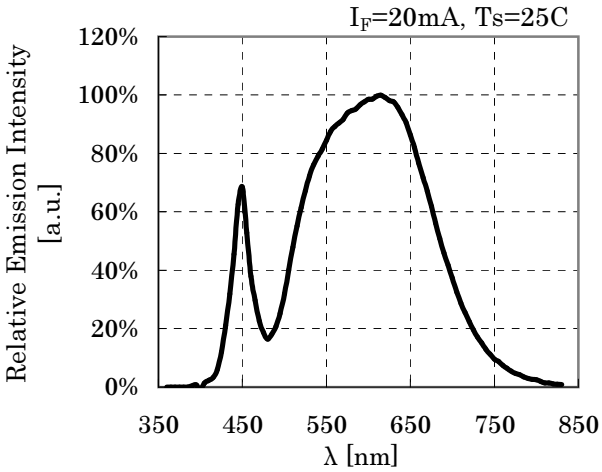
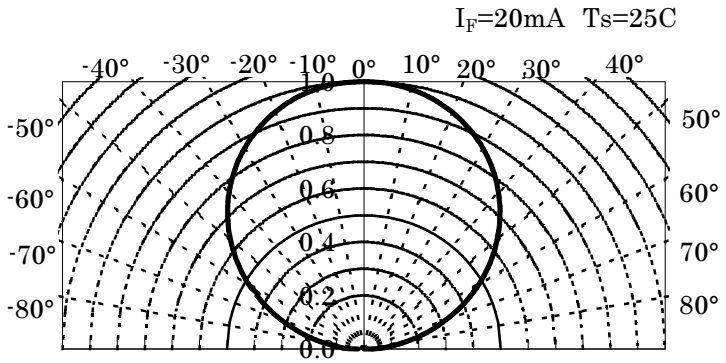
・Solder Temperature vs. Allowable Forward Current

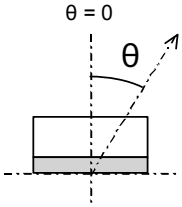


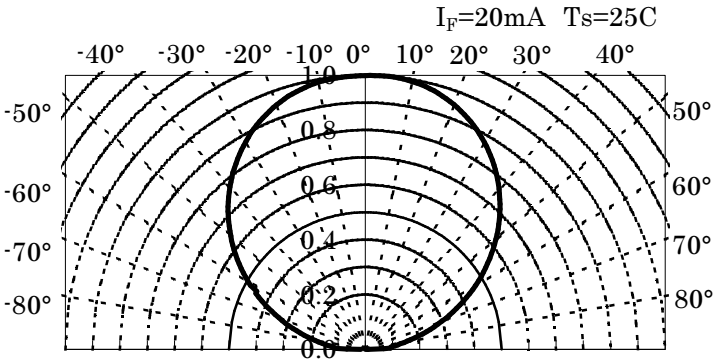

・Spectrum

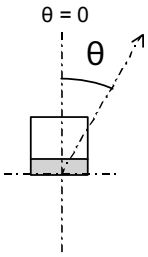



・Directive Characteristic




*Measurement condition (Directive characteristic)
LED chip is mounted on black color PCB.

| Symbol | CITILED |
|---|---|
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6. Reliability

(1) Details of the tests

| Test Item | Test Condition |
|---|---|
| Continuous Operation Test | Ta=-30C, $I_F$=20mA , 1000 hours(with Al-fin) |
| | Ta=25C, $I_F$=20mA , 1000 hours(with Al-fin) |
| | Ta=85C, $I_F$=20mA , 1000 hours(with Al-fin) |
| Low Temperature Storage Test | Ta=-40C , 1000 hours |
| High Temperature Storage Test | Ta=100C, 1000 hours |
| Moisture-proof Test | Ta=60C, 90%RH, 1000 hours |
| Thermal Shock Test | Ta=-40C 30minutes～100C 30minuets, 100cycle |
| Solder Heat Resistance Test | Recommended temperature profile (reflow soldering) × 2, (2nd test must be started after the samples are stabilized thermally.) |

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

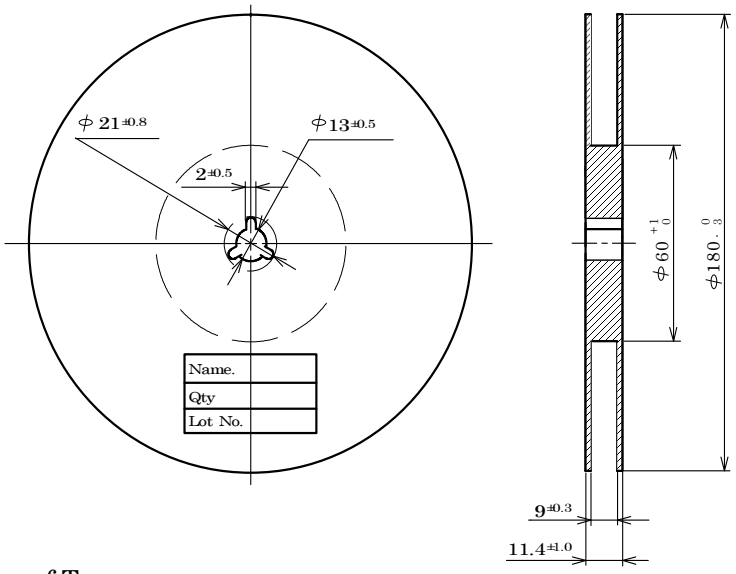
| Measuring Item | Symbol | Measuring Condition | Judgment Criteria for Failure |
|---|---|---|---|
| Forward Voltage | $V_F$ | $I_F$=20mA | > U×1.2 |
| Reverse Current | $I_R$ | $V_R$=5V | > U×2 |
| Luminous Intensity | $I_V$ | $I_F$=20mA | < S×0.7 |

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

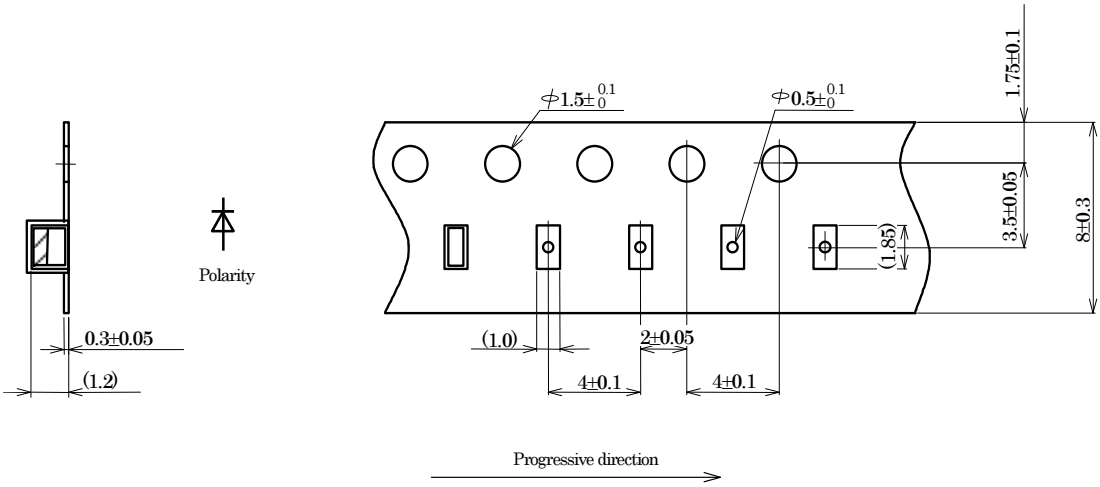
* Measurement shall be taken between 2 hours and 24 hours, and the test pieces should be returned to the normal ambient conditions after the completion of each test.

7. Taping Specifications (in accordance with JIS standard)

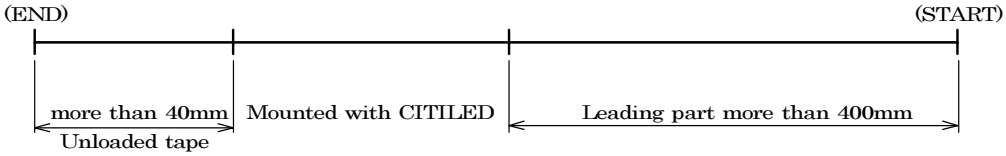
(1) Shape and Dimensions of Reel (Unit: mm)




(2) Dimensions of Tape (Unit: mm)




(3) Configuration of Tape




(4) Quantity: 2500pcs/reel

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|---|---|
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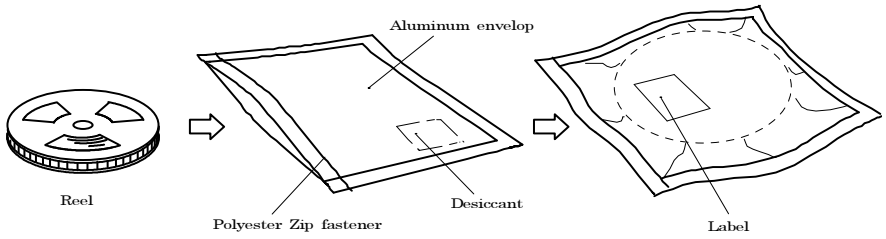
## 8. Packing Specifications

### 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 : 5~30C
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.
MSL 1 (IPC/JEDEC J-STD-020C)

9. Precautions

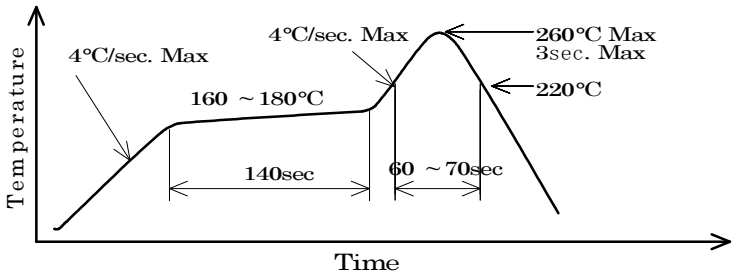
9-1. Soldering

(1) Lead free soldering

1) Following soldering paste is recommended
Melting temperature : 216 ~ 220C.
Composition : Sn 3.5Ag 0.75Cu

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

3) It is requested that products should be handled after their temperature has dropped down to the normal room temperature




9-2. Washing

(1) When washing after soldering is needed, following conditions are requested.

a) Washing solvent: Pure Water

b) Temperature, time: 50C or less × 30 seconds max.

c) Ultrasonic washing: 300W or less

9-3. Other directions

(1) It is requested to avoid any stress added to the resin portion while it is heated.

(2) It is requested to avoid any friction by sharp metal nail etc. to the resin portion.

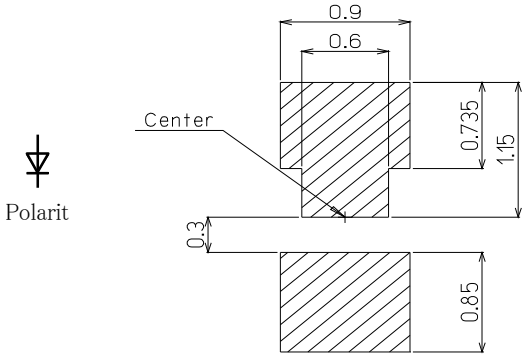
10. Designing precautions

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. When pulse driving current is applied, average current consumption should be within the rating. Also avoid reverse voltage applied when put off.

3. Recommended soldering pattern

< For reflow soldering >



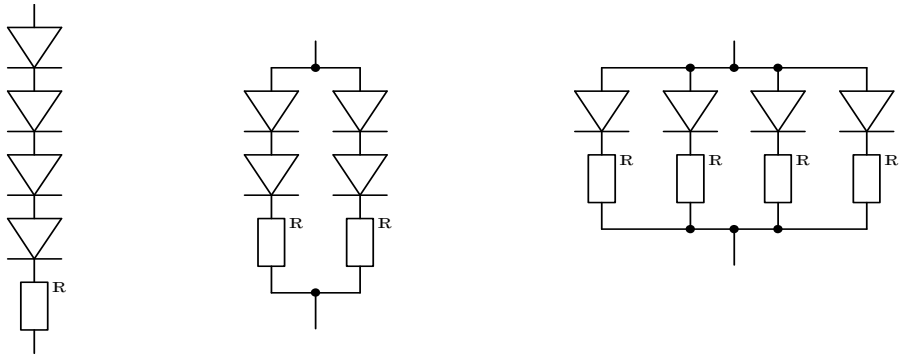

Unit : mm

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

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

5. When using multiple LEDs, it is required to connect a current limiting resistor on each path which the current flows to the LEDs.

(ex-1) (ex-2) (ex-3)




6. Other
This product complies with RoHS directives.

| Symbol | CITILED |
|---|---|
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## 11. Precautions with regard to product use

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