

1. Scope of Application

This data sheet is applied to the chip type LED lamp , model CL-824-MU1L1-T.

2. Part code

**CL - 824 - MU1L1 - 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

L1 : Compliance with ANSI C78.377-2008,  
Correlated Color Temperature 3000K.

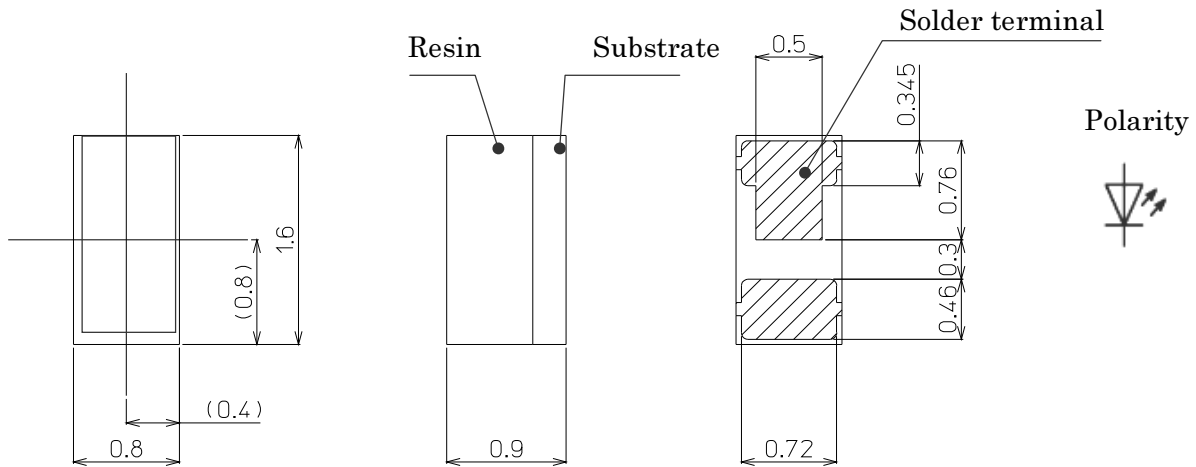
Shipping mode

Non-coded : Bulk  
T : Taping (standard)

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3. Outline drawing

Unit : mm  
Tolerance : ±0.1



4. Performance

(1) Absolute Maximum Rating

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

\*1 Forward Current : Duty ≤ 1/10 , Pulse Width ≤ 10msec

\*2 D.C. Current :  $T_j = T_c + R_{j-c} \times P_D$

Pulse Current :  $T_j = T_c + R_{j-c} \times P_w$  (Power Dissipation / One-Pulse) × Duty

\*Ts : Solder terminal (Anode) temperature

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## (2) Electro-optical Characteristics

T<sub>s</sub>=25C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =20mA	2.8	3.2	3.5	V
Reverse Current	I <sub>R</sub>	V <sub>R</sub> =5V	-	-	100	μA
Thermal Resistance	R <sub>j-s</sub> <sup>*2</sup>	Junction-solder	-	175	-	C/W
Luminous Intensity <sup>*1</sup>	I <sub>v</sub>	I <sub>F</sub> =20mA	1100	1670	-	md
Luminous Flux	φ <sub>v</sub>	I <sub>F</sub> =20mA	-	(4.6)	-	lm
General Color Rendering Index	R <sub>a</sub>	I <sub>F</sub> =20mA	80	85	-	-

\*1 In accordance with NIST standard

\*2 Thermal Resistance : Junction - Solder terminal (Anode)

Ranking (Condition : I<sub>F</sub>=20mA , T<sub>s</sub>=25C)

Parameter	Symbol	Rank	Min.	Max.	Unit
Forward Voltage	V <sub>F</sub>	Q	2.8	3.0	V
		R	3.0	3.2	
		S	3.2	3.5	
Luminous Intensity	I <sub>v</sub>	B	1100	1251	md
		C	1251	1693	
		D	1693	2291	

Chromaticity coordinates ( Condition : I<sub>F</sub>=20mA , T<sub>s</sub>=25C)

Color Rank	x	y	Color Rank	x	y
L1a	0.443	0.421	L1b	0.456	0.426
	0.430	0.417		0.443	0.421
	0.422	0.399		0.435	0.403
	0.435	0.403		0.447	0.408

Color Rank	x	y	Color Rank	x	y
L1c	0.435	0.403	L1d	0.447	0.408
	0.422	0.399		0.435	0.403
	0.415	0.381		0.426	0.385
	0.426	0.385		0.437	0.389

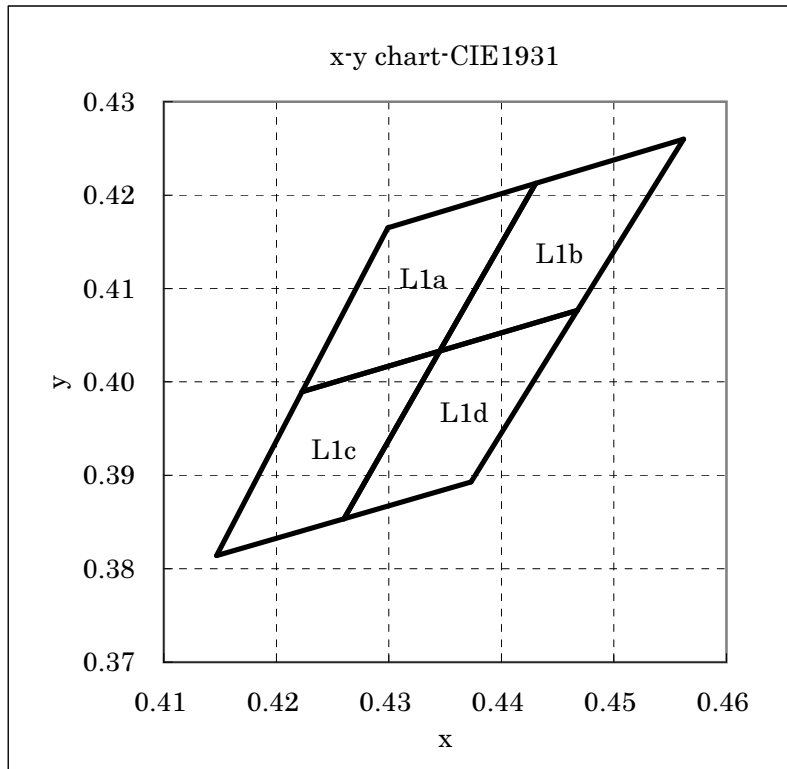
\*1 The tolerance of measurement at our tester is V<sub>F</sub>±3% , φ<sub>v</sub>±10% , Chromaticity(x,y)±0.01.

\*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.

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Rank information




CUSTOMER:  
 TYPE: CL-824-MU1L1  
 P.NO:  
 Lot No: XXXXXX   
 Q'ty: XXX

 PASS

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e.g. B L1a Q

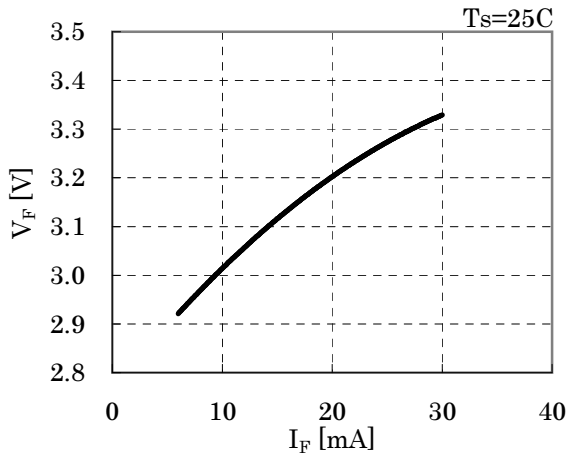
↓  
 B L1a Q  


-  : Ranking by Luminous Intensity
-  : Ranking by Chromaticity coordinates
-  : Ranking by Forward Voltage

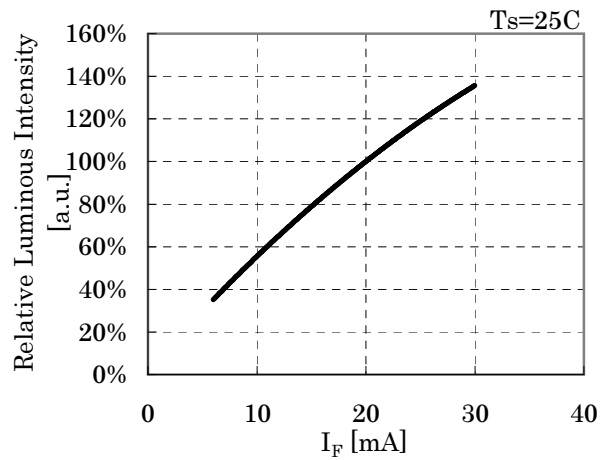
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5. Characteristics

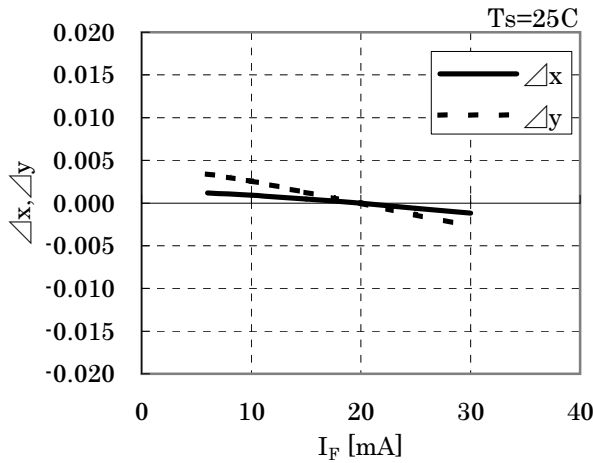
• Forward Current vs. Forward Voltage



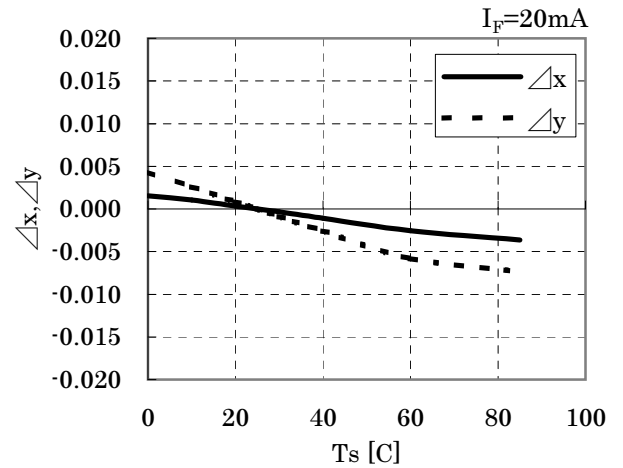
• Forward Current vs. Relative Luminous Intensity



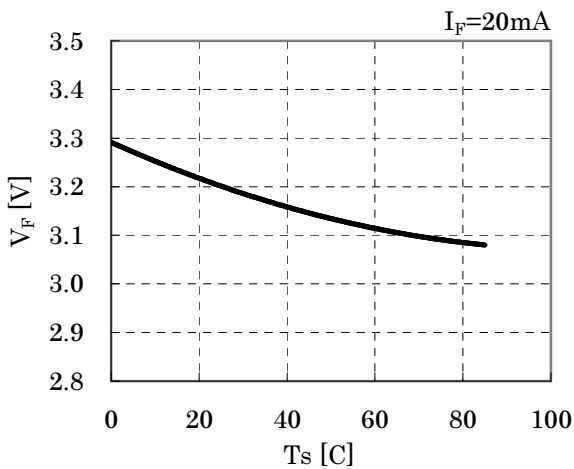
• Forward Current vs. Chromaticity Coordinate



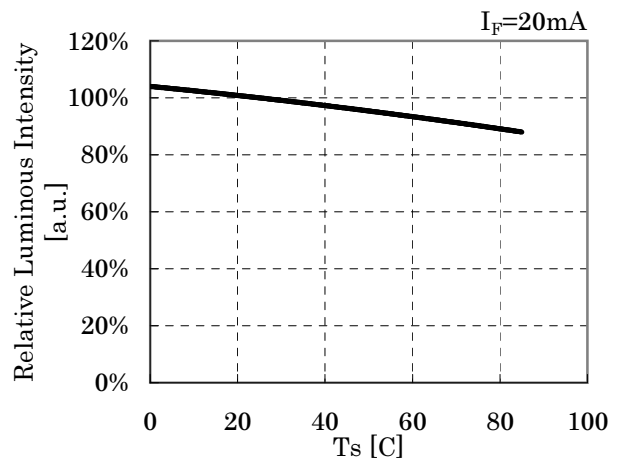
• Solder Temperature vs. Chromaticity Coordinate



• Solder Temperature vs. Forward Voltage

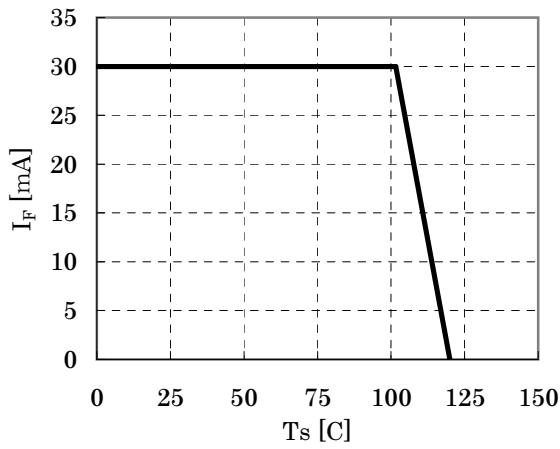


• Solder Temperature vs. Relative Luminous Intensity

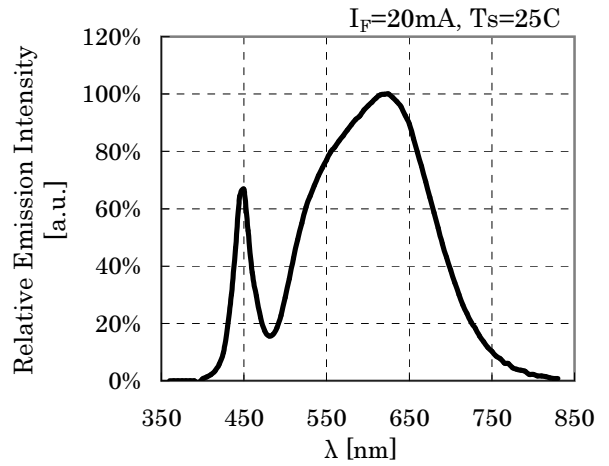


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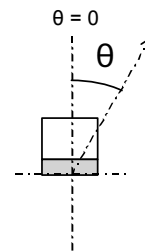
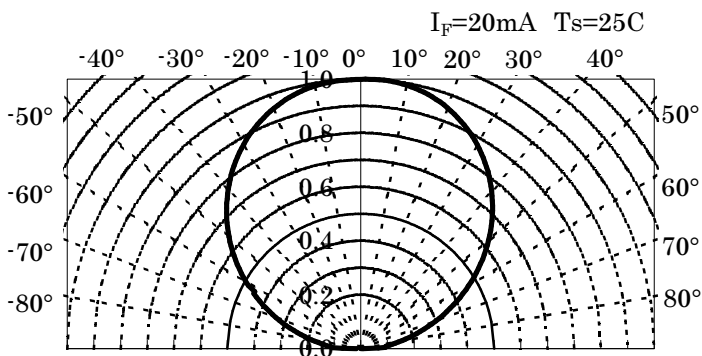
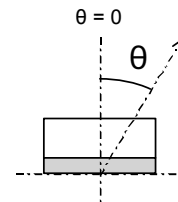
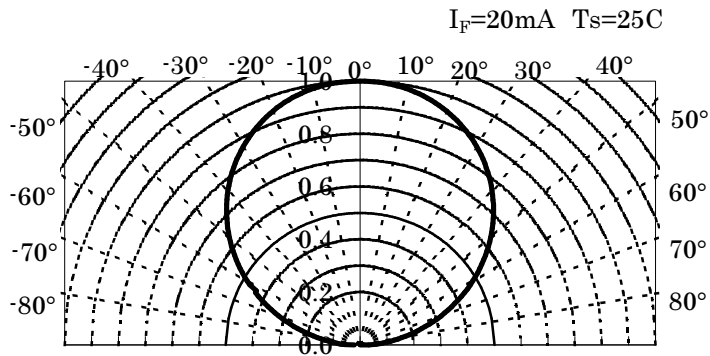
• Solder Temperature vs. Allowable Forward Current



• Spectrum



• Directive Characteristic



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

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6. Reliability

(1) Details of the tests

Test Item	Test Condition
Continuous Operation Test	Ta=-30C, I <sub>F</sub> =20mA , 1000 hours(with Al-fin)
	Ta=25C, I <sub>F</sub> =20mA , 1000 hours(with Al-fin)
	Ta=85C, I <sub>F</sub> =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 <sub>F</sub>	I <sub>F</sub> =20mA	> U×1.2
Reverse Current	I <sub>R</sub>	V <sub>R</sub> =5V	> U×2
Luminous Intensity	I <sub>V</sub>	I <sub>F</sub> =20mA	< S×0.7

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

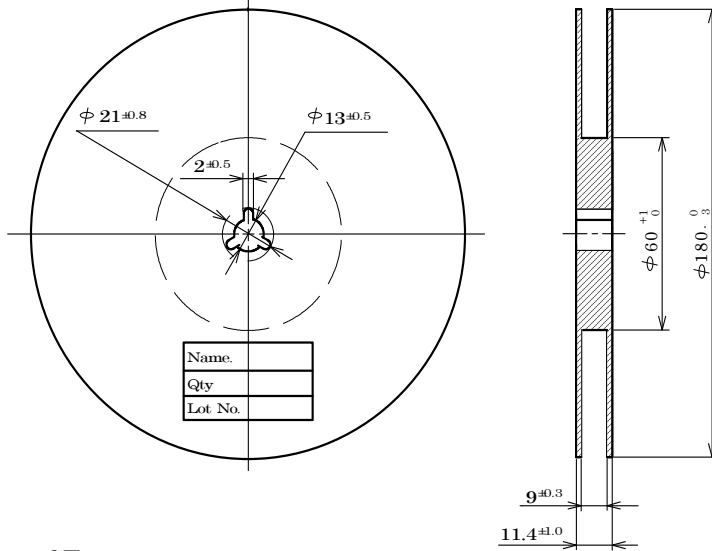
\* Measurement shall be taken between 2 hours and 24 hours, and the test pieces should be returned to the normal ambient conditions after the completion of each test.

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7. Taping Specifications (in accordance with JIS standard)

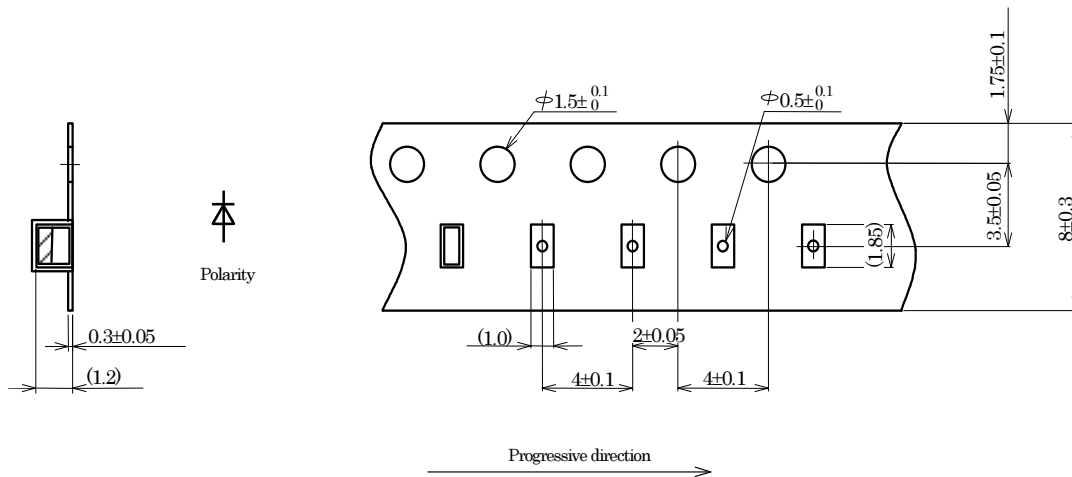
(1) Shape and Dimensions of Reel

(Unit: mm)

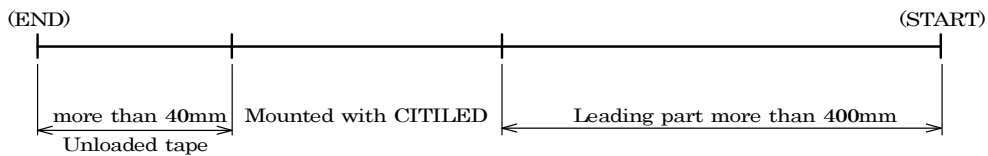


(2) Dimensions of Tape

(Unit: mm)



(3) Configuration of Tape



(4) Quantity: 2500pcs/reel

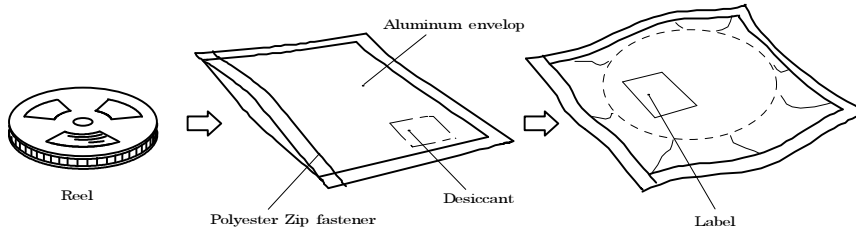
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8. Packing Specifications

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)

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9. Precautions

9-1. Soldering

(1) Lead free soldering

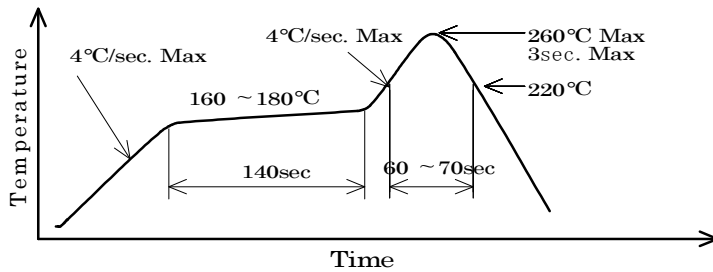
1) Following soldering paste is recommended

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

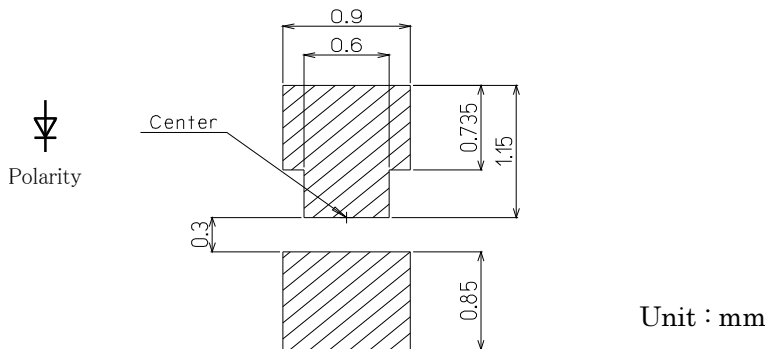
- (1) It is requested to avoid any stress added to the resin portion while it is heated.
- (2) It is requested to avoid any friction by sharp metal nail etc. to the resin portion.

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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. 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

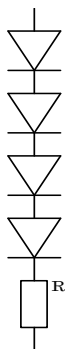
< For reflow soldering >



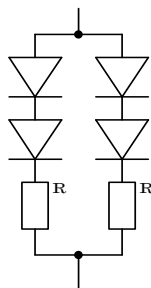
The above dimensions are not the one which guarantee the performance of mount ability. The use of the above pattern is recommended to use after deep study at your site.

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.

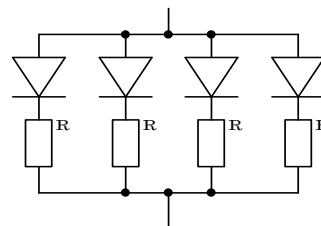
(ex-1)



(ex-2)



(ex-3)



6. Other

This product complies with RoHS directives.

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11. Precautions with regard to product use

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