

1. Scope of Application

These specifications apply to chip type SMD photo-reflector, CITISENSOR, model PR-40-T.

Reference

2. Part code

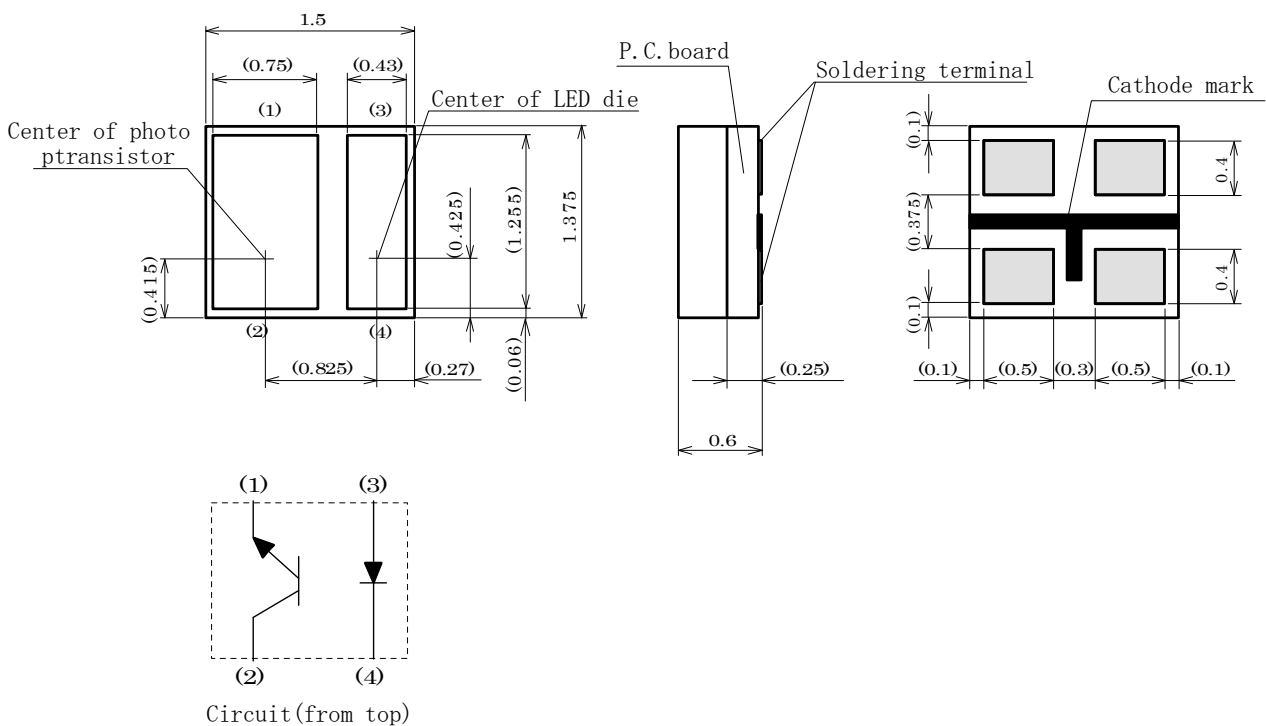
PR-40-T

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

3. Outline drawing , etc

(1) Outline drawing

Unit: mm
 Tolerance: ±0.1



(2) Plating thickness of soldering terminal : Au plate thickness min 0.3um

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Reference

4. Performance

4-1. Absolute Maximum Rating

(Ta=25°C)

Item		Symbol	Rating Value	Unit
Input	Power Dissipation	P_d	32.5	mW
	Forward Current	I_F	25	mA
	Pulse Forward Current *1	I_{FP}	100	mA
	Reverse Voltage	V_R	6	V
Output	Collector Dissipation	P_C	75	mW
	Collector Current	I_C	20	mA
	Voltage between Collector and Emitter	V_{CEO}	18	V
	Voltage between Emitter and Collector	V_{ECO}	4	V
Total Power Dissipation		P	100	mW
Operating Temperature Range		T_{OP}	-30 ~ +80	°C
Storage Temperature Range		T_{ST}	-40 ~ +85	°C

*1) Duty: 1/100 or less

Pulse Width: 0.1msec or less

4-2. Electro-optical Characteristic

(Ta=25°C)

Item		Symbol	Condition	MIN	TYP	MAX	Unit	
Input	Power Voltage	V_F	$I_F = 4mA$	—	1.14	1.35	V	
	Reverse Current	I_R	$V_R = 6V$	—	—	10	μA	
	Peak Wavelength	λ_P	$I_F = 20mA$	—	940	—	nm	
Output	Collector Dark Current	I_{CEO}	$V_{CE} = 10V$	—	—	0.1	μA	
Coupling Characteristics	Light Current *2	I_C	$V_{CE} = 2V$	Rank A	105	—	195	μA
			$I_F = 4mA$	Rank B	165	—	315	μA
			$d = 1mm$	Rank C	280	—	515	μA
	Leakage Current	I_{LEAK}	$V_{CE} = 2V$ $I_F = 4mA$	—	—	1	μA	
	Rise Time	t_r	$V_{CE} = 2V$ $I_C = 100\mu A$	—	25	—	μsec	
Fall Time	t_f	$R_L = 1K\Omega$, $d = 1mm$	—	30	—	μsec		

*2) The tolerance of Light Current measurement is $\pm 10\%$ at our tester.

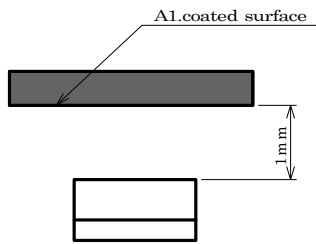
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5. Characteristics

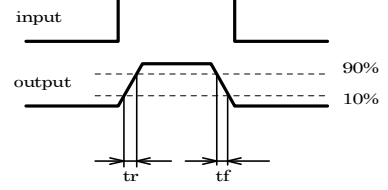
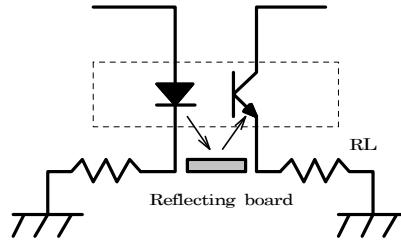
Reference

5-1. Measuring method

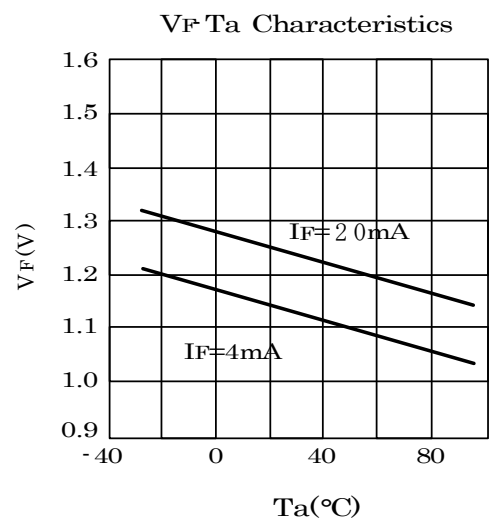
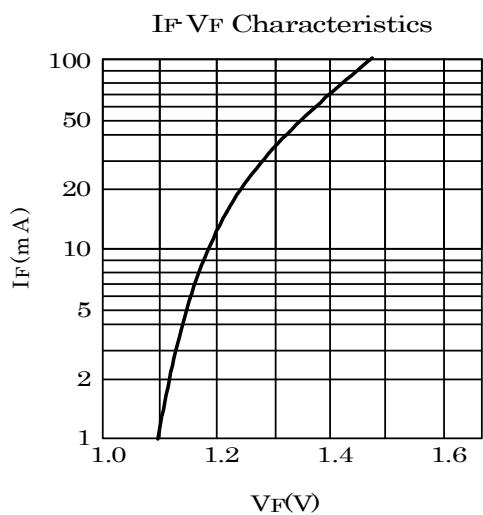
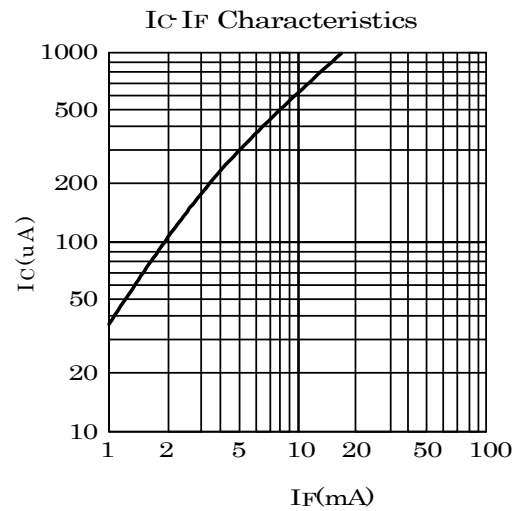
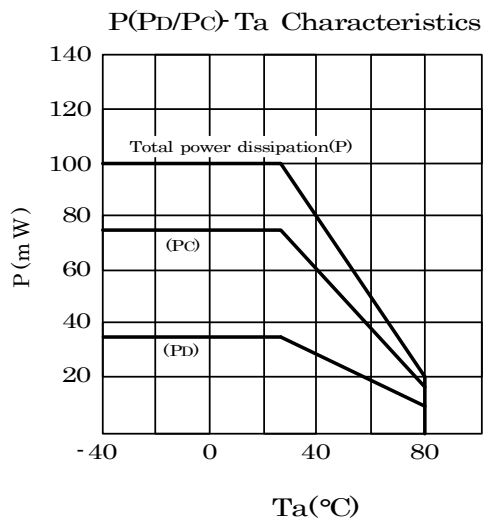
1) Light current



2) Response speed

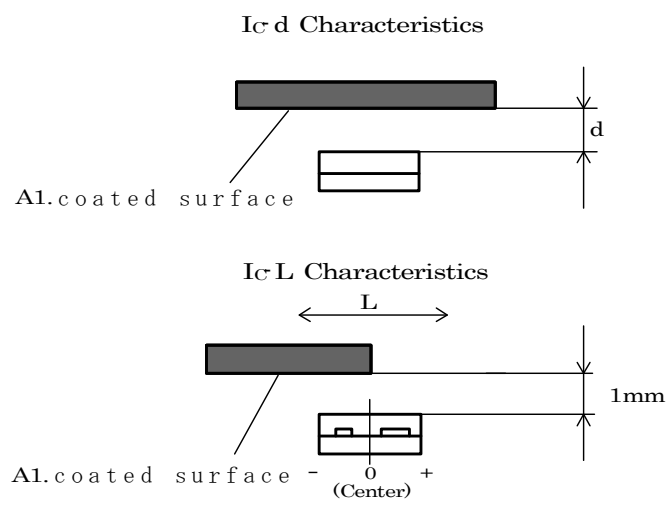
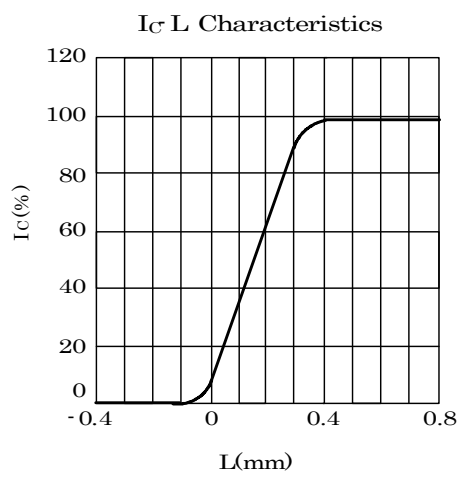
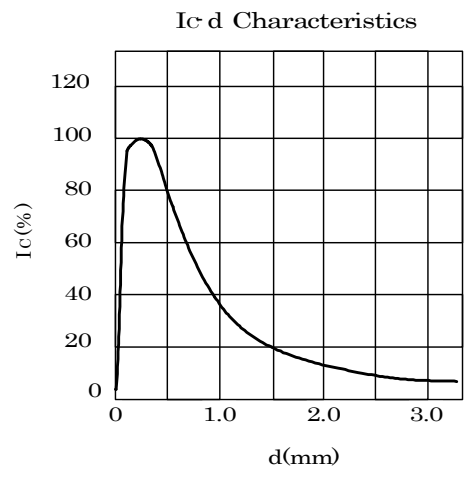
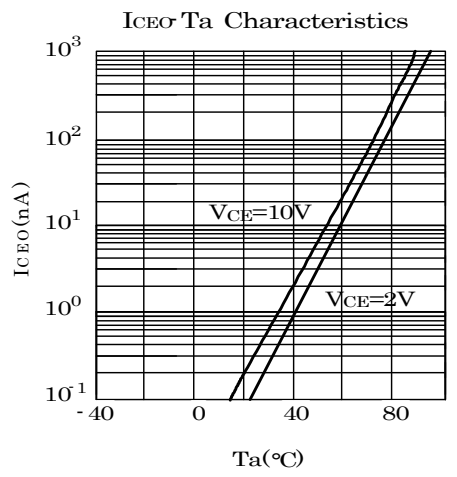
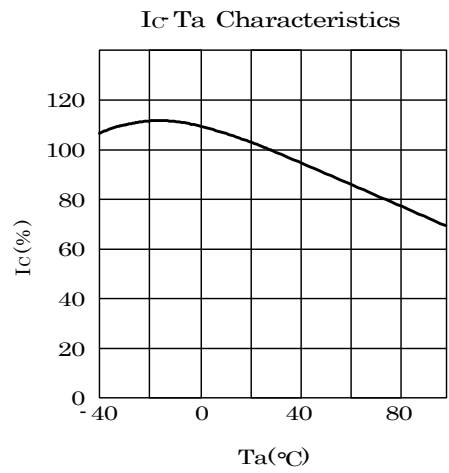
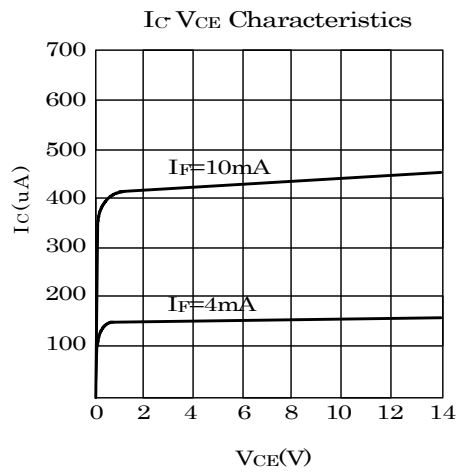


5-2. Characteristic



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6. Reliability

Reference

(1) Details of the tests

Test Item	Test Condition
Life Test in Continuous Operation	$25 \pm 3^\circ\text{C}$, $I_F=25 \text{ mA}$, $V_{CE}=18\text{V} \times 500$ $^{+24}_{-12}$ hours
Low Temperature Storage Test	-40 $^{+3}_{-5}$ $^\circ\text{C} \times 500$ $^{+24}_{-12}$ hours
High Temperature Storage Test	85 $^{+5}_{-3}$ $^\circ\text{C} \times 500$ $^{+24}_{-12}$ hours
Moisture-proof Test	$60 \pm 2^\circ\text{C}$, $90 \pm 5\% \text{RH}$ for 500 $^{+24}_{-12}$ hours
Thermal Shock Test	$-40^\circ\text{C} \times 30 \text{ minutes} - 85^\circ\text{C} \times 30 \text{ minutes}$, 5-cycle
Solder Heat Resistance Test	Recommended temperature profile (reflow soldering) $\times 2$, (2 nd test must be started after the samples are stabilized thermally.)

(2) Judgment Criteria of Failure for Reliability Test

Measuring Item	Symbol	Measuring Condition	Judgement Criteria for Failure
Forward Voltage	V_F	$I_F=4 \text{ mA}$	$>U \times 1.2$
Reverse Current	I_R	$V_R=6\text{V}$	$>U \times 2$
Light Current	I_C	$I_F=4\text{mA}$, $V_{CE}=2\text{V}$, $d=1\text{mm}$	$<S \times 0.7$
Collector Dark Current	I_{CED}	$V_{CE}=10\text{V}$	$>U \times 2$

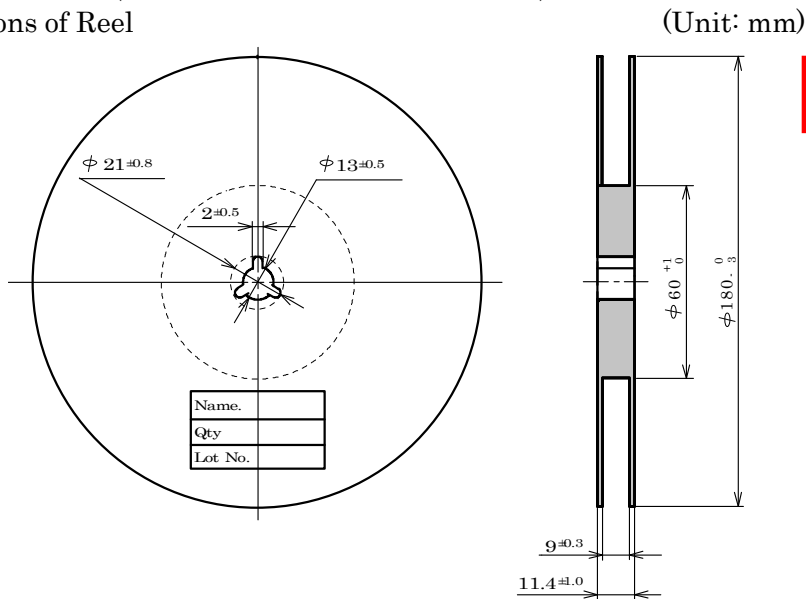
U means the upper limit of the specified characteristics. S means the initial value.

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.

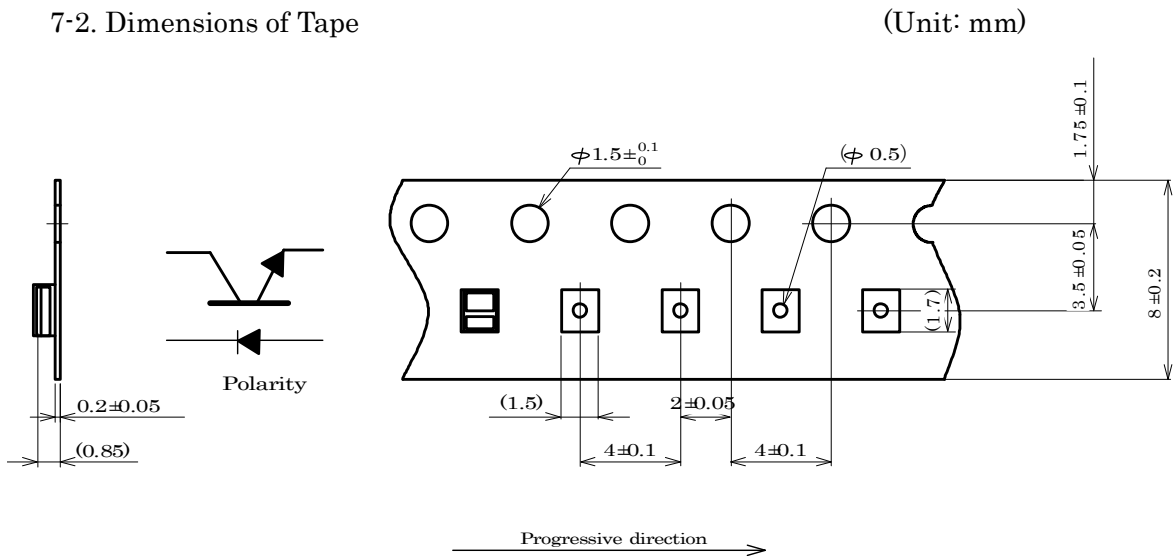
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7. Taping Specifications (in accordance with JIS standard)

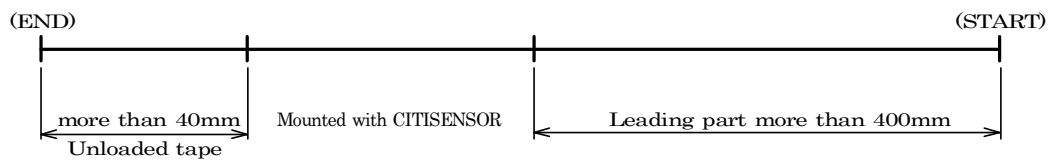
7-1. Dimensions of Reel



7-2. Dimensions of Tape



7-3. Configuration of Tape



7-4. Quantity: 5,000pcs/reel

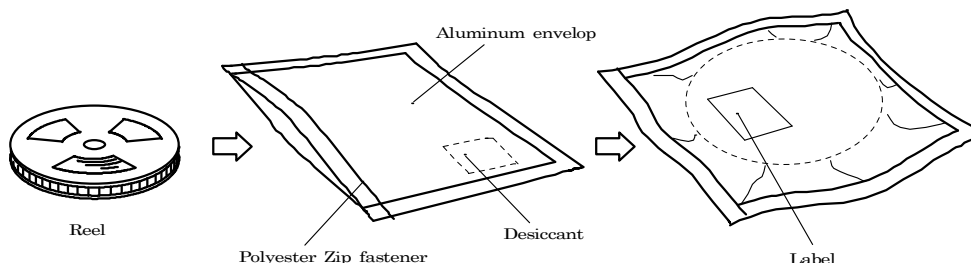
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8. Packing Specifications

Reference

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 devices packed on an aluminum envelope are stored over 6 month, or if it passes more than 168 hours after aluminum envelope is open, it is requested to make the baking as 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)

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Reference

9. Precautions

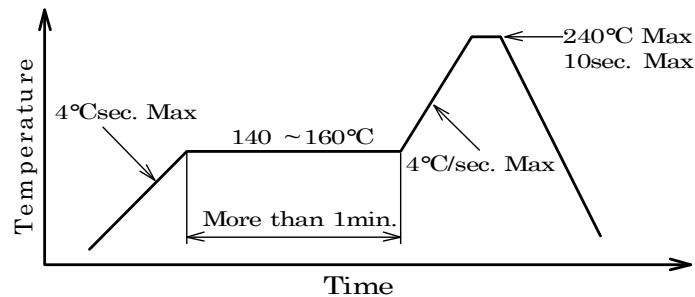
9-1. Soldering

(1) Manual Soldering

- 1) Solder with silver content is recommended.
- 2) As to CITISENSORS that have absorbed moisture by any chance, baking is recommended prior or the soldering process to prevent CITISENSORS from the possible crack problem due to the absorbed moisture.
- 3) The use of the soldering iron in less than 25W and the temperature of iron tip must be kept at no higher than 350°C.
- 4) Force or stress must not be applied to the resin portion while soldering.
- 5) It is requested to solder each land within 3 seconds.
- 6) It is requested that products should be handled after their temperature has dropped down to the normal room temperature.

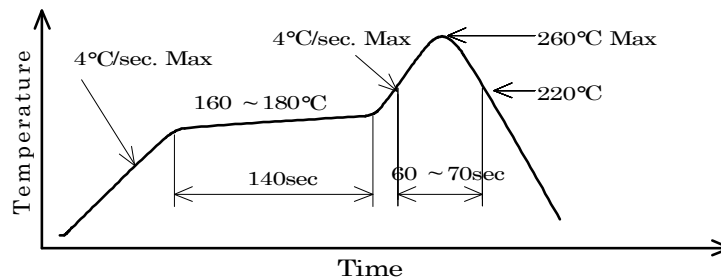
(2) Reflow soldering

- 1) Following soldering paste is recommended
 Melting temperature: 178 ~ 192°C.
 Composition: Sn 63 %, Pb 37 %
- 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.



(3) Lead free soldering

- 1) Following soldering paste is recommended
 Melting temperature: 216 ~ 220°C.
 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.



Reflow soldering of the above profile is allowed two times.

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9-2. Cleaning

Perform the cleaning after soldering strictly in conformity to the following conditions:

- Cleaning Agent : Alcohol
- Temperature and Time: 30 seconds under the temperature below 50°C or 3 minutes below 30°C.
- Ultrasonic Cleaning : 300W or less

Reference

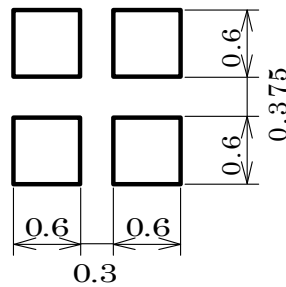
9-3. Other Precaution

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

10. Precautions on Designing

- 1) The Current limiting Resistor should be placed on the circuit to drive within the rating. Also the design should be done to avoid the reverse voltage (over-current) applied instantaneously when turned ON or OFF.
- 2) When the Pulse Driving Current is applied, the average current consumption should be within the rating. Also the design should be done to avoid the reverse voltage applied when put off.

- 3) Recommended Soldering Pattern
<For Reflow Soldering>



The above dimensions are recommended, but the mountability study should be conducted in advance at your site.

- 4) When assembling the circuit board into the finished products, pay attention to avoid the component parts from touching with other parts.

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