

1. Scope of Application

These specifications apply to chip type SMD photo-interrupter, type CPI-250-T.

2. Part code

Reference

CPI - 2 5 0 - T

Common code for photo-interrupter

Size code

25 : Out line drawing : 5.0L×4.0W×4.0H
 gap : 2.0mm
 Slit width : 0.3mm(pich0.8mm)

Output mode

0 : Single output

Shipping mode

Non-coded: Bulk packing
 T: Taping

3. Special Note:

- 1) Reflow soldering must be done within 48 hours stored under 30°C, 80% after opening envelop.
- 2) Antiradiation requirement is not specified.
- 3) CPI series are not manufactured with and do not contain any Ozone Depleting Chemicals.
- 4) Country of Origin : Japan/ Fujiyoshida Factory.
- 5) If any questions arise for interpretation of these specifications, it shall be resolved by mutual consultation.

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						Name	CPI-250
						Drawing No	
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4. Rating and Characteristics

Reference

4-1 Absolute maximum rating

(Ta=25°C)

Item		Symbol	Rating value	Unit
Input side	Power dissipation	PD	37.5	mW
	Forward current	IF	25	mA
	Pulse forward current *	IFP	100	mA
	Reverse voltage	VR	5	V
Output side	Collector dissipation	PC	75	mW
	Collector current	IC	20	mA
	Voltage between collector and emittor	VCEO	20	V
	Voltage between emittor and collector	VECO	5	V
Operating temperature range		TOP	-30 - +85	°C
Storage temperature range		TST	-40 - +90	°C

* Duty:1/100, Pulse Width:0.1msec

4-2 Electrooptical characteristics

(Ta=25°C)

Item		Symbol	Condition	Min	TYP	Max	Unit
Input side	Forward Voltage	VF	IF=5mA	-	1.1	1.3	V
	Reverse current	IR	VR=5V	-	-	10	μA
	Capacitance between terminals	Ct	V=0V,f=1KHz	-	30	-	pF
	Peak wave length	λP	IF=20mA	-	940	-	nm
Output side	Collector dark current	ICE	VCE=10V	-	-	0.1	μA
	Peak sensitive wave length	λP	-	-	900	-	nm
Transfer Characteristics	Current transfer ratio	IC1	VCE=5V,IF=5mA	50	150	500	μA
		IC2	VCE=5V,IF=5mA	50	150	500	μA
	Collector to emitter saturation voltage	VCE(S)	IF=20mA,IC=50μA	-	0.1	0.4	V
	Rise time	tr	VCE=5V,IC=0.1mA	-	10	-	μsec
	Fall time	tf	RL=1KΩ	-	10	-	μsec

Approved

Checked

Drawn

Symbol

PHOTO-INTERRUPTER

Name

CPI-250

Drawing No

Mark

Date

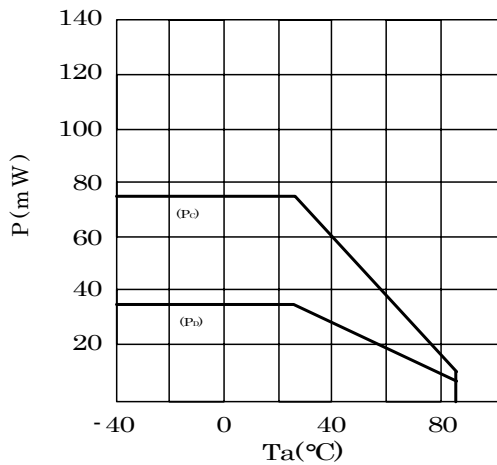
Description Appro.

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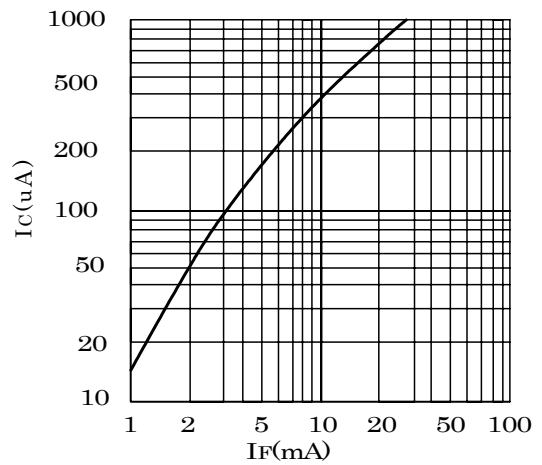
Reference

5. Characteristics

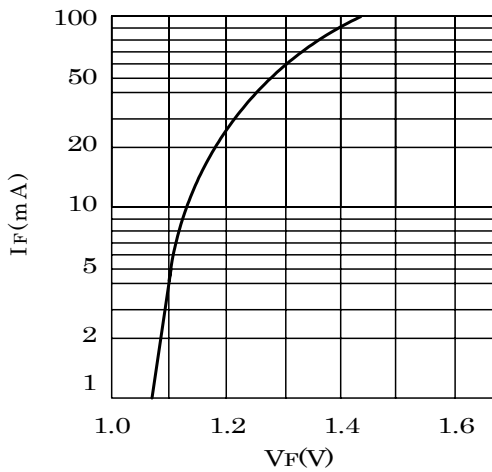
Pd,Pc Ta Characteristics



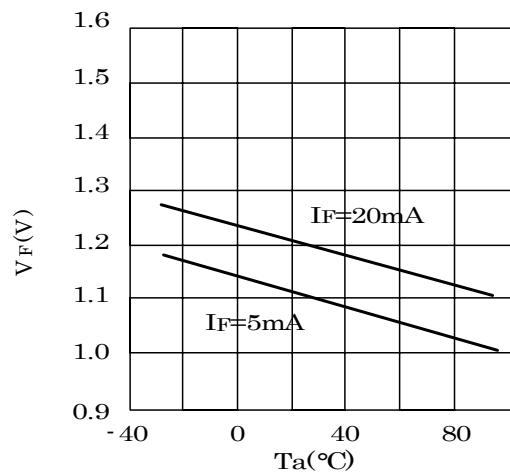
Ic IF Characteristics



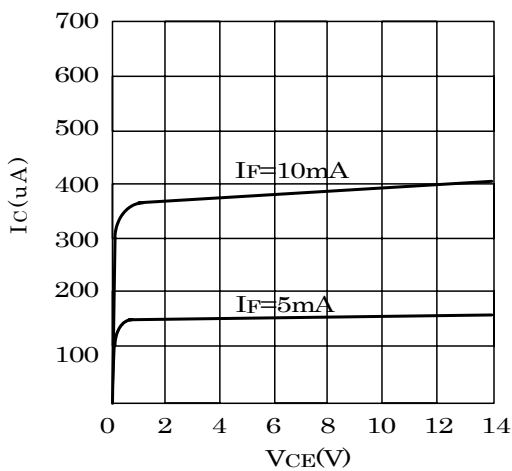
IF VF Characteristics



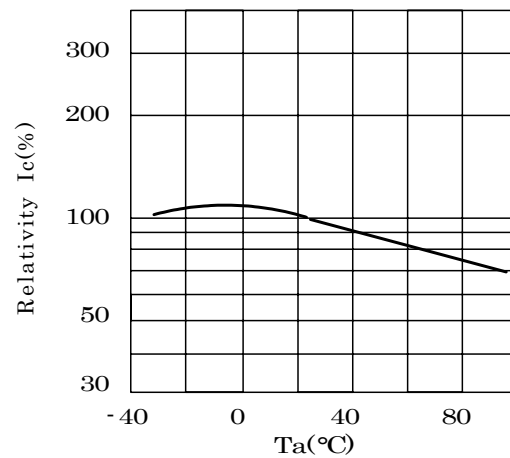
VF Ta Characteristics



Ic VCE Characteristics



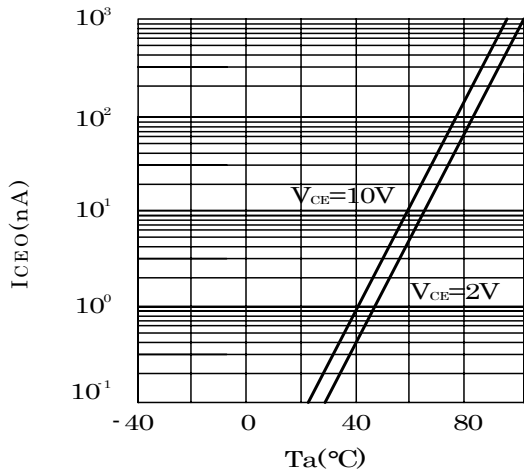
Ic Ta Characteristics



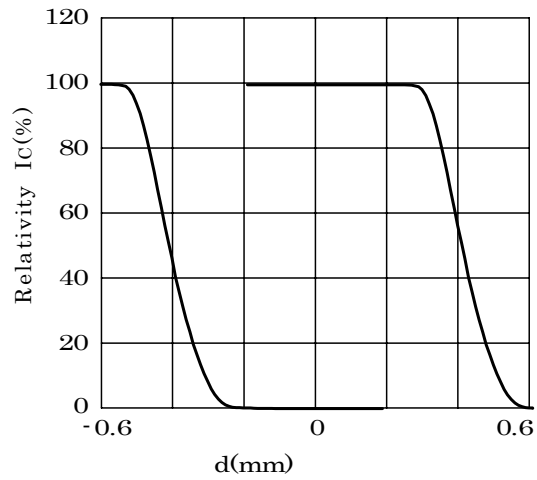
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						Name	CPI-250
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Mark	Date	Description	Appr.	CITIZEN ELECTRONICS CO.,LTD.			

Reference

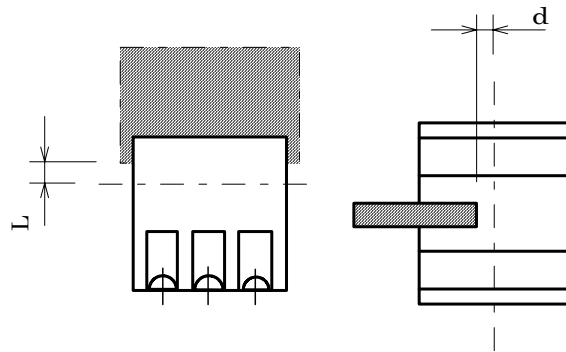
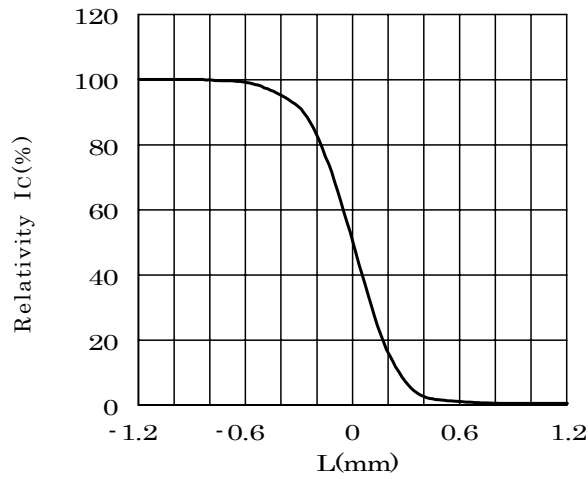
ICEO-Ta Characteristics



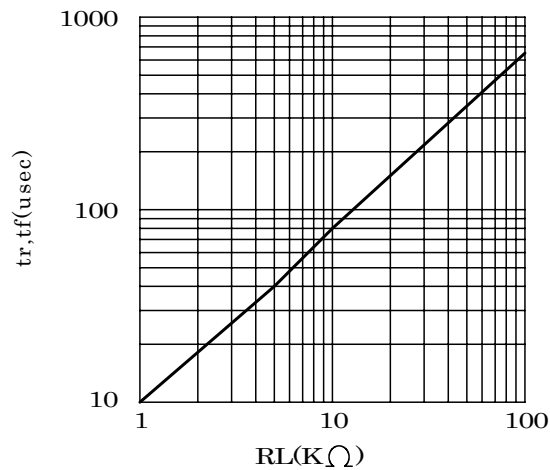
IC-d Characteristics



Ic-L Characteristics



tr,tf Characteristics



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6. Reliability

Reference

6-1. Details of Test

Test Item	Test Condition
Current Carrying life cycle test	$25^{+5}_{-3}^{\circ}\text{C}$, $I_F=25\text{ mA}$ $V_{CE}=5\text{V}\times 500^{+24}_{-12}$ hours
Low temperature shelf test	$-40^{+3}_{-5}\text{ }^{\circ}\text{C} \times 1000^{+24}_{-12}$ hours
High temperature shelf test	$90^{+5}_{-3}\text{ }^{\circ}\text{C} \times 1000^{+24}_{-12}$ hours
Humidity shelf test	$60 \pm 2^{\circ}\text{C}$, $90 \pm 5\% \text{RH} \times 1000^{+24}_{-12}$ hours
Thermal shock test	$-40^{\circ}\text{C} \times 30$ minutes - $90^{\circ}\text{C} \times 30$ minutes, 5-cycle
Solder heat resistance test	$260^{\circ}\text{C} \times 1$ seconds (reflow soldering) or less

6-2. Judgment Criteria of Failure for Reliability Test

Measuring Items	Symbol	Measuring Condition	Judgement Criteria for Failure
Forward voltage	VF	$I_F=5\text{mA}$	$>U \times 1.2$
Reverse current	IR	$V_R=5\text{V}$	$>U \times 2$
Current transfer ratio	IC	$I_F=5\text{mA}, V_{CE}=5\text{V}$	$<S \times 0.7$
Collector dark current	ICEO	$V_{CE}=10\text{V}$	$>U \times 2$

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.

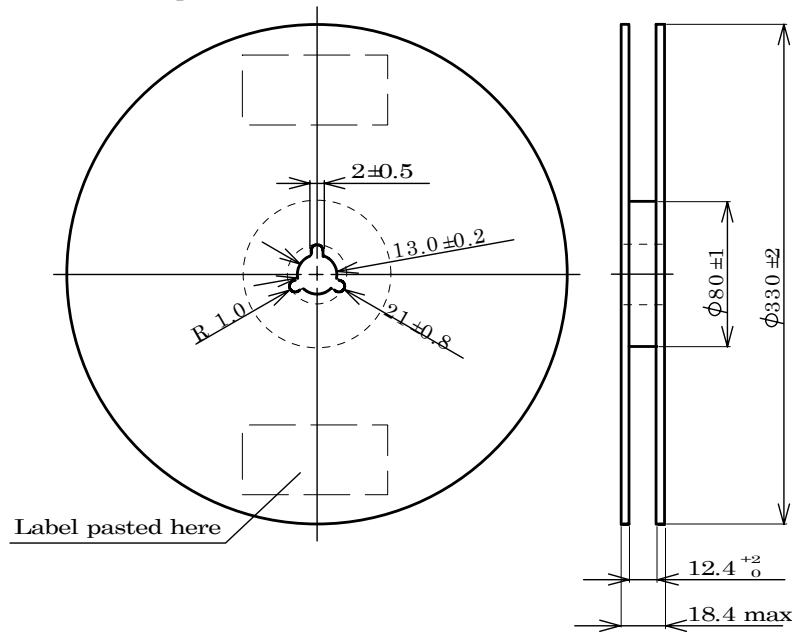
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						Name	CPI series
						Drawing No	
Mark	Date	Description	Appro.	CITIZEN ELECTRONICS CO.,LTD.			

Reference

7. Taping specifications (In accordance with JIS C 0806-3)

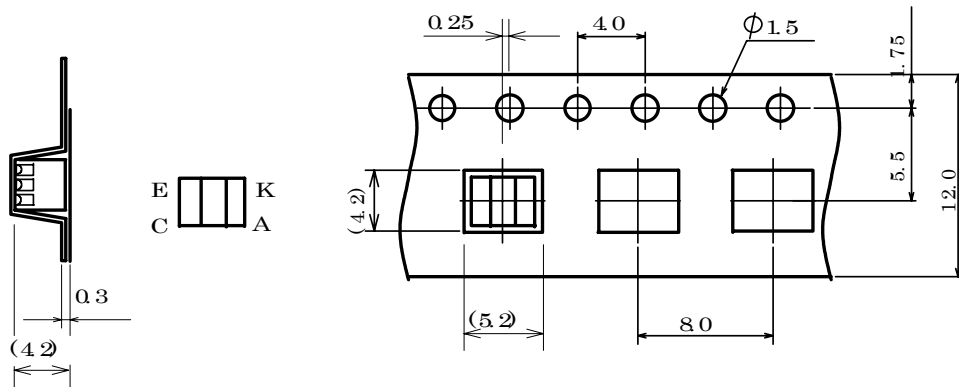
7-1. Dimensions and shape

(Unit: mm)

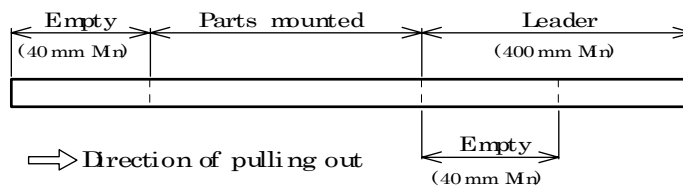


7-2. Dimensions of Tape

(Unit: mm)



7-3. Configuration of Tape



7-4. Quantity : 2,000pcs/reel

7-5. Net weight : 0.1g/Piece 600g/reel

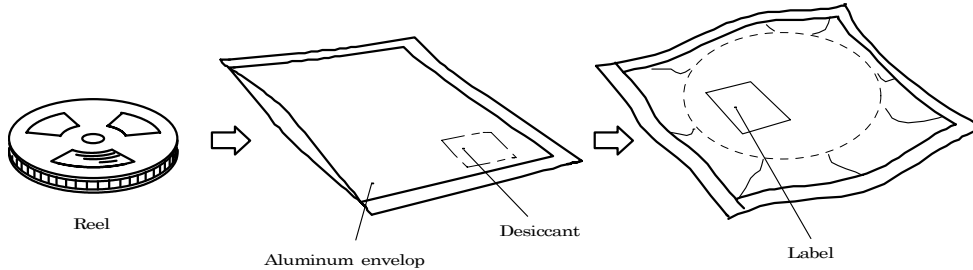
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Reference

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. The indicator changes color from blue to pink as moisture is absorbed.



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: 10 ~ 30 °C
 Humidity: 60%RH max.

It is recommended to solder photo-interrupters as soon as possible after unpacking the aluminum envelope, but in case that photo-interrupters have to be left unused after unpacking, to store them in the dry box or to seal the aluminum envelope again is requested.

8-3. Baking

If photo-interrupters packed in an aluminum envelope is stored over 6 months, or if it passes more than 48 hours after aluminum envelope is opened, it is requested to make baking per following conditions.

Baking conditions: 60°C × 12 hours or more (reeled one)
 80°C × 4 hours or more (loose one)

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Reference

9. Precautions to be taken

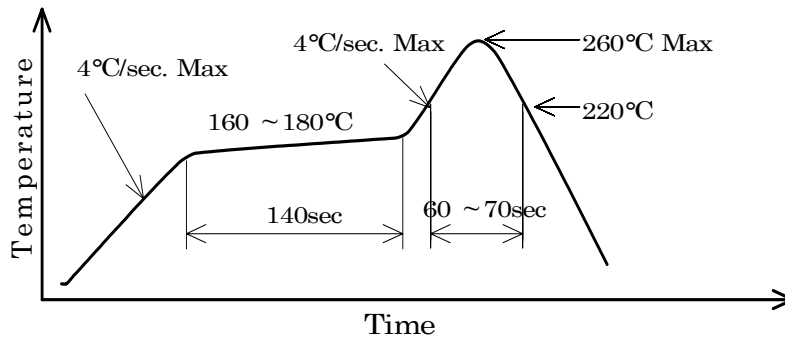
9-1. Precautions on designing

- 1) Current limiting resistor should be placed in the circuit so that is driven within its rating Also avoid reverse voltage (overcurrent) applied instantaneously when ON or OFF.
- 2) When pulse driving current is applied, average current consumption should be within the rating.

9-2. Precautions to be taken on mounting

9-2-1. Reflow soldering

- 1) Following soldering paste is recommended.
 Melting temperature: 216 ~ 220°C.
 Composition: Sn 3.5Ag 0.75Cu
- 2) Recommended thickness of metal mask is between 0.2 mm and 0.25 mm for screen printing.
- 3) The below illustrated temperature profile at the top surface of the products is requested for soldering.



9-2-2. Manual soldering

- 1) SN60(60% tin and 40% lead) or solder with silver content is recommended.
 If using Pb-free solder, solder of Sn 3.5Ag 0.75Cu is recommended.
- 2) The use of a soldering iron of less than 25W and the temperature of iron tip must be Kept at no higher than 350°C.
- 3) It is requested to solder one land within 3 seconds.
- 4) It is requested that products should be handled after their temperature has dropped down to the normal room temperature.

9-2-3. Washing

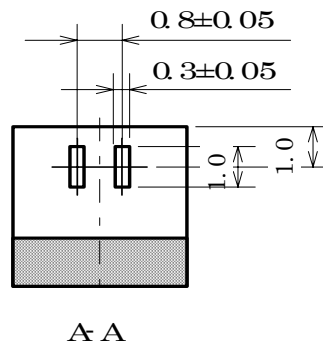
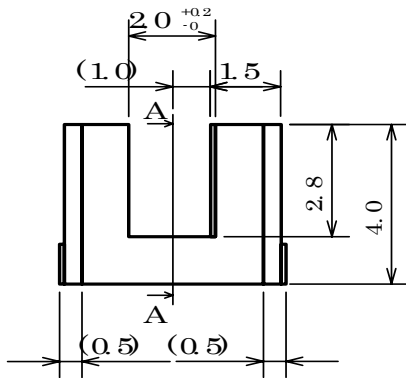
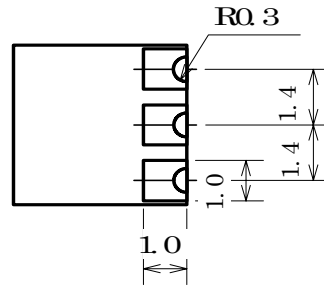
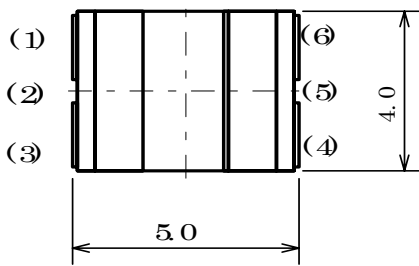
- 1) When washing after soldering is needed, following conditions are requested.
 - Washing solvent : Alcohol
 - Temperature and time : 50°C or less × 30 seconds max.
 or 30°C or less × 3 minutes max.
 - Ultrasonic washing : 300W max

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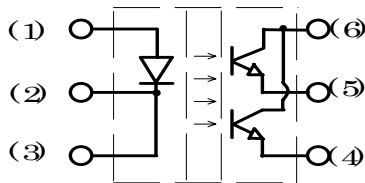
10. Out line drawing

Unit:mm
Tolerance:±0.15

Reference

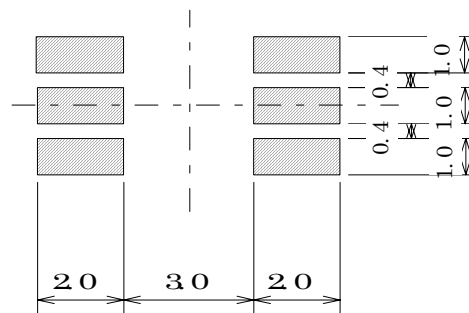


<Internal circuit>



- (1) Anode
- (3) Cathode
- (4) Emitter2
- (5) Emitter1
- (6) Collector

<Recommended soldering patterns>



Finish of soldering terminal : Au Plating

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