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Makiyo	Jun 12, 1996	ELECTRONIC COMPONENTS GROUP SHARP CORPORATION	REPRESENTATIVE DIVISION	OPTO-ELECTRONIC DEVICES DIV.

SPECIFICATION

DEVICE SPECIFICATION FOR

PHOTOCOUPLER

MODEL No.

PC925

(Business dealing name : PC925)

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2. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets, as well as the precautions mentioned below. Sharp assumes no responsibility for any darnage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets, and the precautions mentioned below.

(Precautions)

(1) This product is designed for use in the following application areas :

• OA equipment • Audio visual equipment . Home appliances
• Telecommunication equipment (Terminal) • Measuring equipment
[. Tooling machines • Computers]

If the use of the product in the above application areas is for equipment listed in paragraphs (2) or (3). please be sure to observe the precautions given in those respective paragraphs.

(2) Appropriate measures, such as fail-safe design and redundant design considering the safety design of the overall system and equipment, should be taken to ensure reliability and safety when this product is used for equipment which demands high reliability and safety in function and precision. such as :

• Transportation control and safety equipment (aircraft. train, automobile etc.)
• Traffic signals • Gas leakage sensor breakers • Rescue and security equipment
[• Other safety equipment]

(3) Please do not use this product for equipment which require extremely high reliability and safety in function and precision, such as ;

• Space equipment • Telecommunication equipment (for trunk lines)
[• Nuclear power control equipment . Medical equipment]

(4) Please contact and consult with a Sharp sales representative if there are any questions regarding interpretation of the above three paragraphs.

3. Please contact and consult with a Sharp sales representative for any questions about this product.

CUSTOMER'S APPROVAL

DATE

BY

DATE

PRESENTED BY T. Matsumura

T. Matsumura,
Department General Manager of
Engineering Dept. ,11
Opto-Electronic Devices Div.
ELECOM Group
SHARP CORPORATION

1. Application

This specification applies to the outline and characteristics of OPIC photocoupler Model No. PC925.

2. Outline

Refer to the attached drawing No. CY8055K02.

3. Ratings and characteristics

Refer to the attached sheet, page 4 to 8.

4. Reliability

Refer to the attached sheet, page 9.

5. Incoming inspection

Refer to the attached sheet, page 0.

6. Supplement

6.1 Isolation voltage shall be measured in the following method.

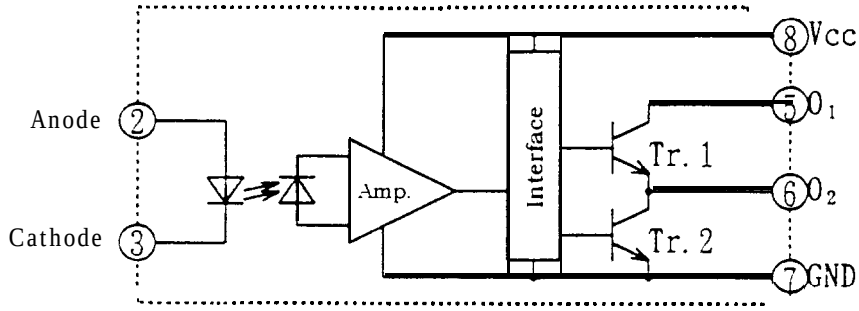
(1) Short among pins 1 to 4 on the primary side and among pins 5 to 8 on the secondary side.

(2) The dielectric withstand tester with zero-cross circuit shall be used.

(3) The wave form of applied voltage shall be a sine wave.
(It is recommended that the isolation voltage be measured in insulation oil.)

6.2 The business dealing name used for this product when ordered or delivered shall be PC925. And high temperature test is carried out at production process.

6.3 The block diagram, Table truth



Input	O_2 Output	Tr.1	Tr.2
ON	High level	ON	OFF
OFF	Low level	OFF	ON

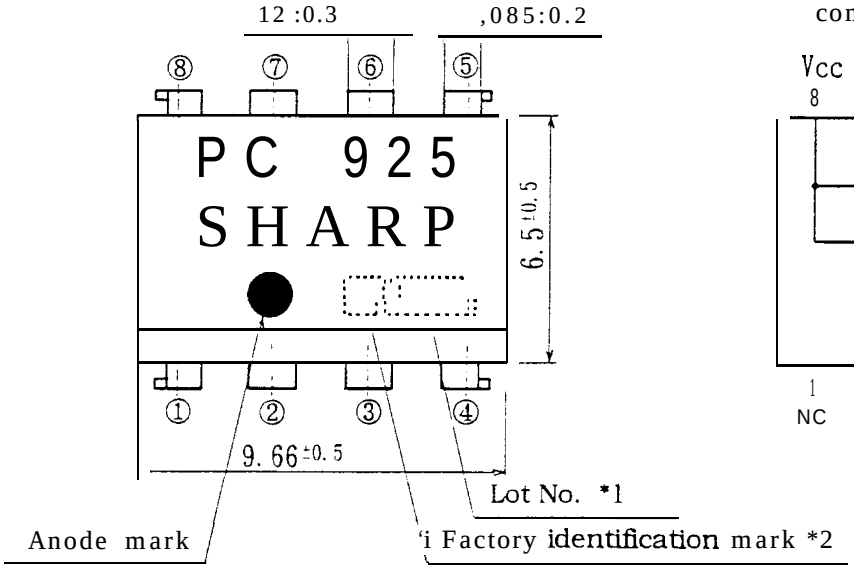
6.4 This product is not designed against irradiation.

This product is assembled with electrical input and output.

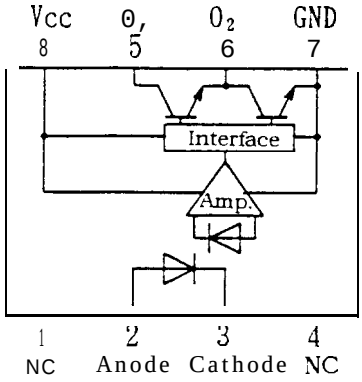
This product incorporates non-coherent light emitting diode.

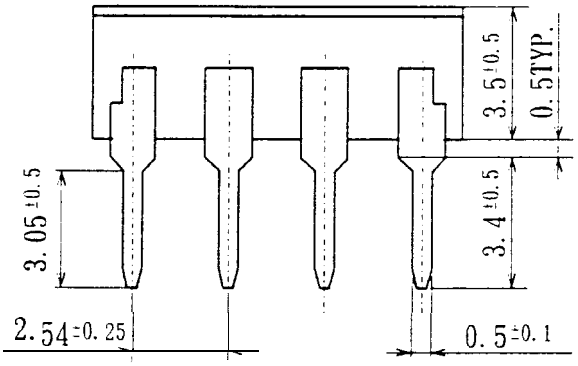
7. Notes

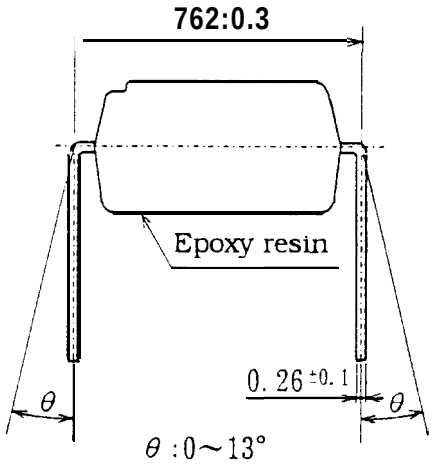
Refer to the attached sheet-1 -1, 2.



Pin Nos. and internal connection diagram







*1) 2-digit number shall be marked according to DIN standard.

*2) Factory identification mark shall be or shall not be marked.

UNIT: 1/1mm	
Name	PC925 Outline Dimensions (Business dealing name : PC925)
Drawing No	CY8055K02

3. Ratings and characteristics

3.1 Absolute maximum ratings

(Unspecified : Ta=Topr)

Parameter		Symbol	Rating	unit
Input	* 1 Forward current	I_F	**20**	mA
	Reverse voltage	V_R	6 (Ta=25 "C)	v
Ou· put	Supply voltage	Vcc	35	v
	O* Output current	Io ,	**0.5**	A
	***4 O** $_1$ Peak output current	10_{1P}	1.5	A
	O_2 Output current	10_2	0.5	A
	*4 O_2 Peak output current	Io_{2P}	1.5	A
	O, Output voltage	Vo ,	35	v
	*2 Power dissipation	Po	**500**	mW
***3** Total power dissipation		Ptot	**550**	mW
*5 Isolation voltage		Viso	**5.0**	kVrms
Operating temperature		Topr	-25 to +80	c
Storage temperature		Tstg	-55 to +125	'c
Soldering temperature		Tsol	260 (For 10 s)	'c

*1, **2, 3** The derating factors of absolute maximum ratings due to ambient temperature are shown in Fig. 1, 2, 3.

*4 Pulse width $\leqq 0.15\ \mu$s, Duty ratio :0.01

*5 AC for 1 rein, 40 to 60%RH, Ta=25 C

3.2 Electro-optical characteristics

[Unspecified : Ta=Topr)

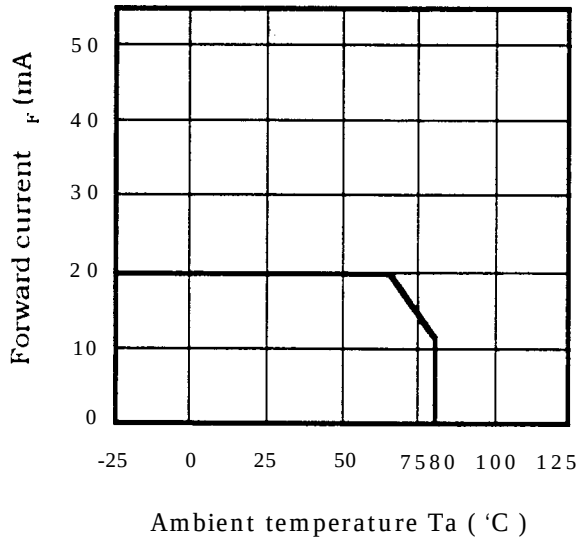
	Parameter	symbol	MIN.	TYP.	MAX.	unit	Fig.	Conditions
Input	Forward voltage	V_{F1}		1.6	1.75	v		Ta=25℃, I_F=10mA
		V_{F2}	1.2	1.5		V		Ta=25℃, I_F=0.2mA
	Reverse current	I_R			10	μA		Ta=25°C, V_R=5V
	Terminal capacitance	Ct		30	250	pF		Ta=25℃, V=O, f=1 kHz
Output	Operating supply voltage range	Vcc	15		30	v		Ta=-10 to 60℃
			15		24	V		
	O_1 Low level output voltage	V_{OIL}		0.4	1.0	VV	1	Vcc_1 = 12V, Vcc_2=- 12V I_{O1}=0.5A, I_F=5mA
	O_2 High level output voltage	V_{02H}	18	21		V	2	Vcc.vo,=24V, I_{O2}=-0.5A, I_F=5mA
	O_2 Low level output voltage	V_{02L}		0.3	0.8	V	3	Vcc=24V, I_{O2}=0.5A I_F=0mA
	O_1 Leak current	I_{O1L}			500	μA	4	Ta=25 'C, Vcc=V_{O1}=35V I_F=0mA
	O_2 Leak current	I_{O2L}			500	μA	5	Ta=25℃, Vcc=V_{O2}=35V I_F=5mA
	High level supply current	I_{CCH}		8	13	mA	6	Ta.25°C, VCC.24V I_F=5mA
					16	mA		Vcc=24V, I_F=5mA
	Low level supply current	I_{CCL}		10	16	mA		Ta.25'C, VCC.24V I_F=0mA
					19	mA		Vcc=24V, I_F=0mA

Transfer characteristics	"LowHigh" threshold input current *2	I_{FLH}	**0.3**	1.5	**3.0**	mA	7	Ta=25℃,Vcc=24V
			0.2	·	5.0			Vcc=24V
	Isolation resistance	Riso	5×10^{10}	10^{11}	-	Ω		Ta=25℃, DC=500V 40 to 60%RH
	Response time "Low→High" propagation time	t_{PLH}		**0.3**	**0.5**	μs	8	Ta=25 ℃ Vcc=24V, I_F=5mA R_G=47Ω, C_G=3000pF
	Response time "High→Low" propagation time	t_{PHL}		**0.3**	**0.5**			
	Response time Rise time	tr	-	0.2	**0.5**			
	Response time Fall **time**	tf	-	0.2	0.5			
	Instantaneous common mode rejection voltage (High level output)	CM_H	·	-30000	-	V/ μs	9	Ta=25°C V_{CM}=600V(peak) I_F=5mA, Vcc=24V ΔV_{O2H}=2.0V
	Instantaneous common mode rejection voltage (Low level output)	CM_L	-	30000	-	V/ μs		Ta=25℃ V_{CM}=600V(peak) I_F=0mA, Vcc=24V ΔV_{O2L}=2.0V

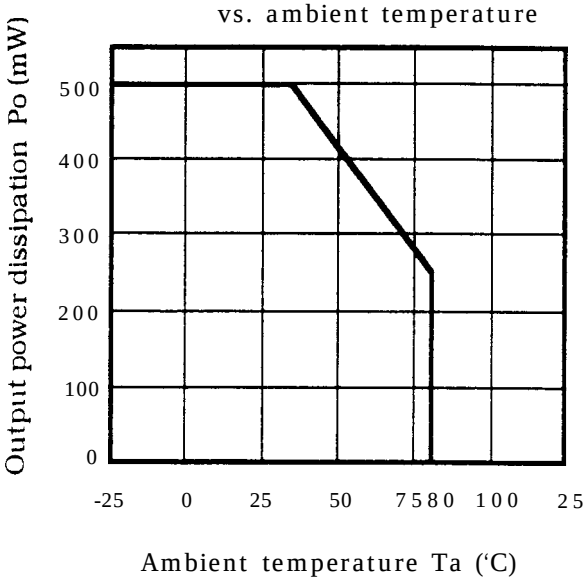
*1 It shall connect a by-pass capacitor of 0.01 μF or more between Vcc (Pin No. 8) and GND (Pin No. 7) near the device, when it measures the transfer characteristics and the output side characteristics.

*2 I_{FLH} is the value of forward current when output becomes from "Low" to "High".

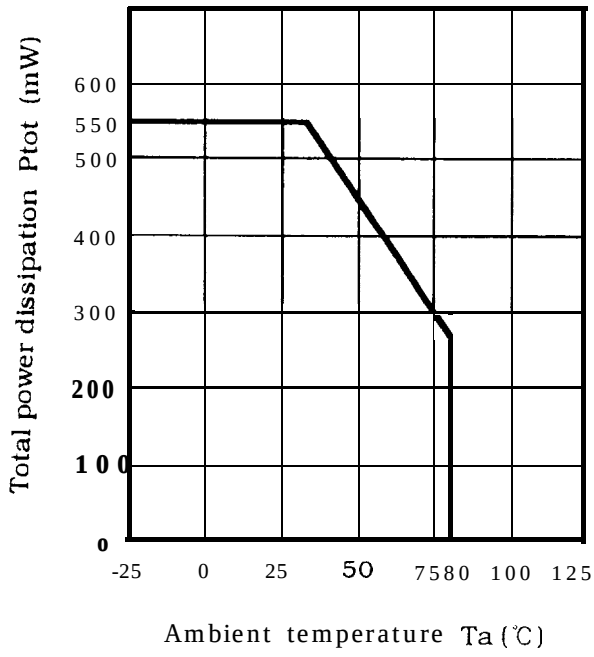
(Fig. 1) Forward current vs. ambient temperature



(Fig. 2) Output power dissipation vs. ambient temperature

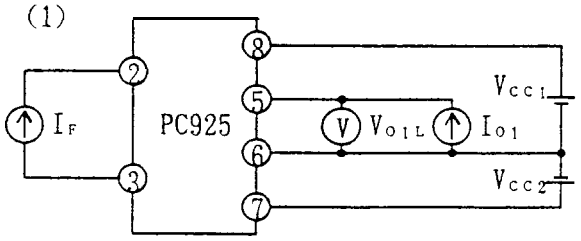


(Fig. 3) Total power dissipation vs. ambient temperature

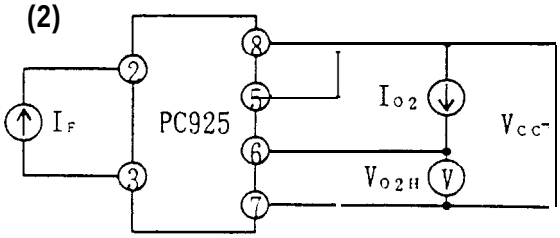


Test circuit

(1)



(2)



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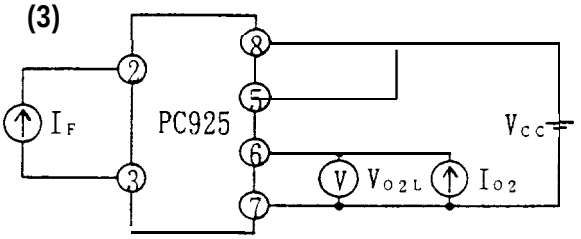

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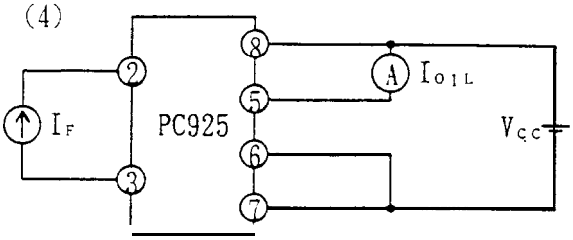

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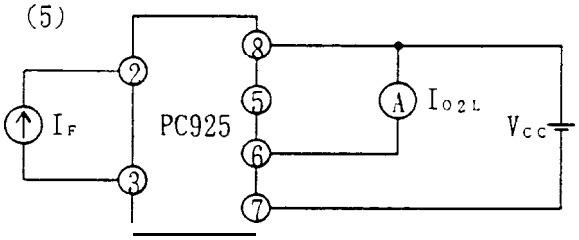
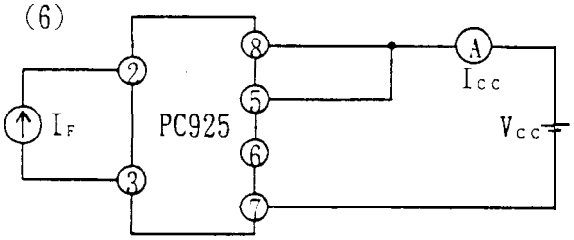


(6)



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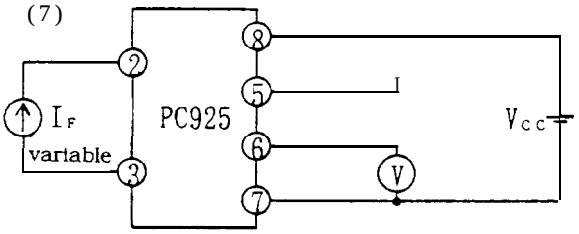

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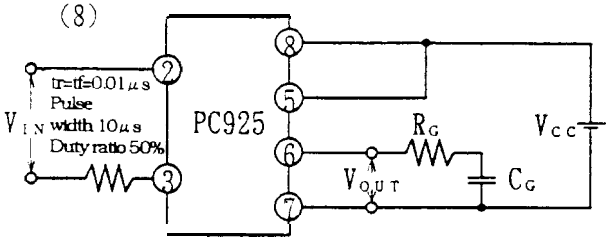

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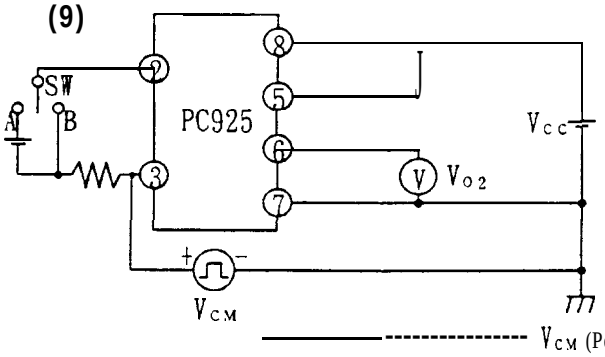
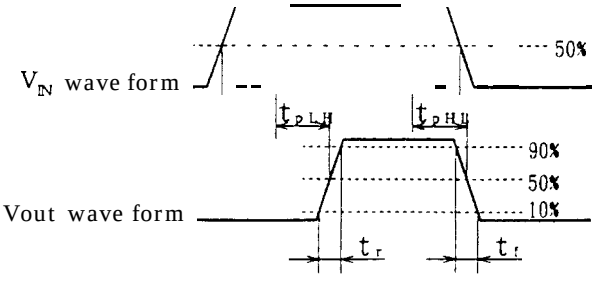
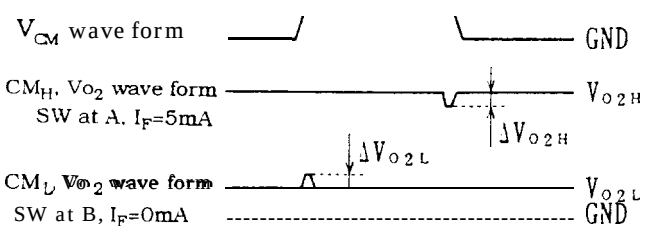






4. Reliability

The reliability of products shall be satisfied with items listed below.

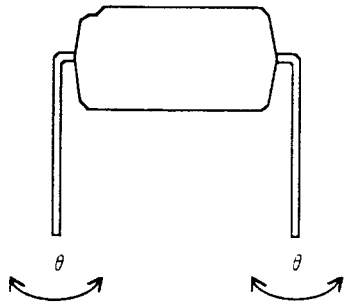
Confidence level : 90%
LTPD : 10%/20%

Test Items	Test Conditions *1	Failure Judgement Criteria	Samples (n) Defective(C)
Solderability *2	230℃, 5 s	——	n=11, C=0
Soldering heat	260℃, 10 s	V_F>U×1.2	n=11, C=0
Terminal strength (Tension)	Weight : 5N 5 s/each terminal	I_R>U×2	n=11, C=0
Terminal strength (Bending) *3	Weight : 2.5N 2 times/each terminal	V_{O1L}>U×1.2 V_{O2H}<L×0.8	n=11, C=0
Mechanical shock	15000m/s^2, 0.5ms 3 times/ ±X, ±Y, ±Z direction	V_{O2L}>U× 1.2 I_{O1L}>U×1.2	n=11, C=0
Variable frequency vibration	100 to 2000 to 100Hz/4min 200m/s^2 4 times/ X, Y, Z direction	I_{O2L}>U× 1.2 I_{CCH}>U×1.2	n=11, C=0
Temperature Cycling	1 cycle -55℃ to +125℃ (30min) (30min) 20 cycles test	I_{CCL}>U×1.2 I_{FLH}>U×1.3	n=22, C=0
High temp. and high humidity storage	+60℃, 90%RH, 1000h	U : Upper specification limit	n=22, C=0
High temp. storage	+125℃, 1000h		n.22, C=0
Low temp. storage	-55℃, 1000h	L : Lower specification limit	n=22, C=0
Operation life	I_F=20mA, VCC=24V Ta=25℃, 1000h		n=22, C=0

*1 Test method, conforms to JIS C 7021.

*2 Solder shall adhere at the area of 95% or more of immersed portion of lead and pin hole or other holes shall not be concentrated on one portion,

*3 Terminal bending direction is shown below.



5. Incoming inspection

5.1 Inspection items

(1) Electrical characteristics

V_F, I_R, V_{O1L}, V_{O2H}, V_{O2L}, V_{OIL}, I_{O2L}, I_{CCH}, I_{CCL}, I_{FLH}, Rise, Viso

(2) Appearance

5.2 Sampling method and Inspection level

A single sampling plan, normal inspection level II based on 1S0 2859 is applied. The AQL according to the inspection items are shown below.

Defect	Inspection item	AQL (%)
Major defect	Electrical characteristics Unreadable marking	0.1
Minor defect	Appearance defect except the above mentioned.	0.4

Precautions for Photocouplers

1. For cleaning

   (1) Solvent cleaning : Solvent temperature 45℃ or less
   Immersion for 3 min or less

   (2) Ultrasonic cleaning : The affect to device by ultrasonic cleaning is different by cleaning bath size, ultrasonic power output, cleaning time, PWB size or device mounting condition etc. Please test it in actual using condition and confirm that doesn't occur any defect before starting the ultrasonic cleaning.

   Applicable solvent : Ethyl alcohol, Methyl alcohol
   Freon TE TF, Diflon-solvent S3-E

   Please refrain form using Chloro Fluoro Carbon type solvent to clean device as much as possible since it is internationally restricted to protect the ozonosphere. Before you use alternative solvent you are requested to confirm that it does not attack package resin.

2. Please use the same as normal integration circuit about static electricity in order that this device is OPIC photocoupler.

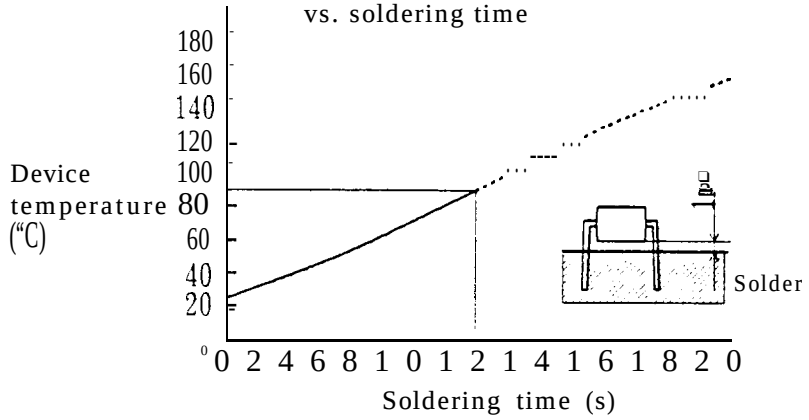
3. In order to stabilize power supply line, we should certainly recommend to connect a by-pass capacitor of 0.01 μF or more between V-cc and GND near the device.

4. The LED used in the Photocoupler generally decreases the light emission power by operation. In case of long operation time, please design the circuit with considering the decreases of the light emission power of the LED. (50% / 5years)

5. Precautions for Soldering Photocouplers

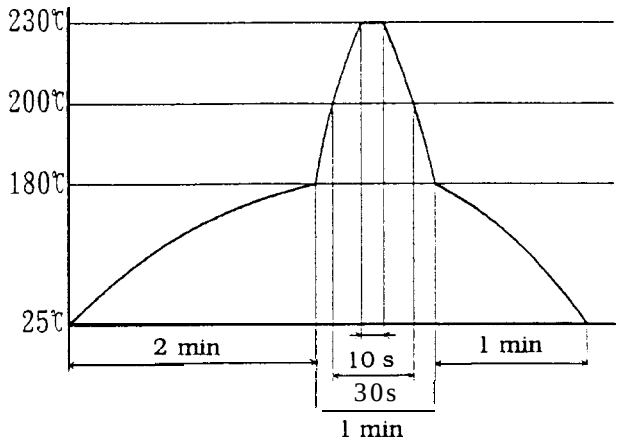
(1) In case of soldering to lead 260 'C 10 s or less

An example of device temperature vs. soldering time



(2) If solder reflow :

It is recommended that only one soldering be done at the temperature and the time within the temperature profile as s hewn in the figure.



(3) Other precautions

An infrared lamp used to heat up for soldering may cause a localized temperature rise in the resin. So keep the package temperature within that specified in Item (2). Also avoid immersing the resin part in the solder.