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M. Mitsui	August 31, 1987	SHARP	FILE No.
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M. Abe	August 31, 1987	ELECTRONIC COMPONENTS GROUP SHARP CORPORATION	PAGE 9 Pages
			REPRESENTATIVE DIVISION ☒ SEMICONDUCTOR APPLICATION DIV. ☐ COMPOUND SEMICONDUCTOR DIV. ☐ LIQUID CRYSTAL DISPLAY DIV. ☐ ELECTRONIC COMPONENTS DIV. ☐

SPECIFICATION

DEVICE SPECIFICATION FOR

PHOTOCOUPLER

MODEL No. PC849

☐ CUSTOMER'S APPROVAL

DATE _____

BY _____

PRESENTED BY K. Shintani

K. Shintani,
Department General Manager of
Engineering Dept., II
Semiconductor Application Div.
ELECOM Group
SHARP CORPORATION

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1. Application

This specification applies to the outline and characteristics of photocoupler Model No. PC849.

2. Outline

Refer to the attached drawing No. CY2393K02.

3. Ratings and characteristics

3.1 Absolute maximum ratings

Ta=25°C

Parameter		Symbol	Rating	Unit
Input	*1 Forward current	I_F	50	mA
	*1,*2 Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	*1 Power dissipation	P	70	mW
Output	Collector-emitter voltage	V_{CEO}	35	V
	Emitter-collector voltage	V_{ECO}	6	V
	Collector current	Ic	50	mA
	*1 Collector power dissipation	Pc	150	mW
*1 Total power dissipation		Ptot	170	mW
Operating temperature		Topr	-25 ~ +100	°C
Storage temperature		Tstg	-40 ~ +125	°C
*3 Isolation voltage		Viso	5	kVrms
*4 Soldering temperature		Tsol	260	°C

*1 The derating factors of absolute maximum rating due to ambient temperature and duty ratio are shown in Fig. 1 ~ 5.

*2 Pulse width ≦ 100μs, Duty ratio : 0.001

*3 AC for 1 min., 40 ~ 60%RH

*4 For 10 Sec.

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3.2 Electro-optical characteristics

Ta=25°C

Parameter		Symbol	MIN.	TYP.	MAX.	Unit	Conditions
Input	Forward voltage	V_F	-	1.2	1.4	V	I_F=20mA
	Peak forward voltage	V_{FM}	-	-	3.0	V	I_{FM}=0.5A
	Reverse current	I_R	-	-	10	μA	V_R=4V
	Terminal capacitance	Ct	-	30	250	pF	V=0V, f=1kHz
Output	Dark current	I_{CEO}	-	-	100	nA	V_{CE}=20V, I_F=0
	Collector-emitter breakdown voltage	BV_{CEO}	35	-	-	V	Ic=0.1mA I_F=0
	Emitter-collector breakdown voltage	BV_{ECO}	6	8.5	-	V	I_E=10μA I_F=0
Transfer characteristics	Collector current	Ic	2.5	-	20	mA	I_F=5mA, V_{CE}=5V
	Collector-emitter saturation voltage	$V_{CE(sat)}$	-	0.1	0.2	V	I_F=20mA Ic=1mA
	Isolation resistance	Riso	5×10^{10}	10^{11}	-	Ω	DC500V, 40 ∿ 60%RH
	Floating capacitance	Cf	-	0.6	1.0	pF	V=0V, f=1MHz
	Cut-off frequency	fc	-	80	-	kHz	V_{CE}=5V, Ic=2mA R_L=100Ω, -3dB
	Response time (Rise)	t_r	-	4	15	μS	V_{CE}=2V, Ic=2mA
	Response time (Fall)	t_f	-	3	15	μS	R_L=100Ω

4. Incoming inspection

Refer to the attached sheet, Page 7.

5. Reliability

Refer to the attached sheet, Page 8.

6. Supplement

6.1 Isolation voltage shall be measured in the following method.

(1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side.

(2) The isolation voltage tester with zero-cross circuit shall be used.

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

6.2 This Model is approved by UL and TÜV.

Approved Model No. : PC849

(1) UL file No. : E64380

(2) TÜV file No. : R40006

1) Group name and reference voltage are determined as follows by VDE 0110.

Isolation group : C

Reference voltage : 250V AC, 300V DC

2) Isolation distance between primary and secondary : 0.3mm (TYP.)

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7. Notes

7.1 (1) Recommended cleaning conditions:

Solvent cleaning: Solvent temperature 45°C or less
Immersion 3 min. or less

Ultrasonic cleaning: Ultrasonic output 150W/liter or less
Cleaning time 2 min. or less
Frequency 28 ~ 29 kHz

(2) The cleaning shall be carried out with solvent below.

Solvent: Fleon TE·TF, ethyl alcohol, methyl alcohol, diflon-solvent S3-E

7.2 Precautions for Soldering Photocouplers

Refer to the attached sheet, Page 9.

8. Others

Any doubt as to this specification shall be determined in good faith upon mutual consultation of the both parties.

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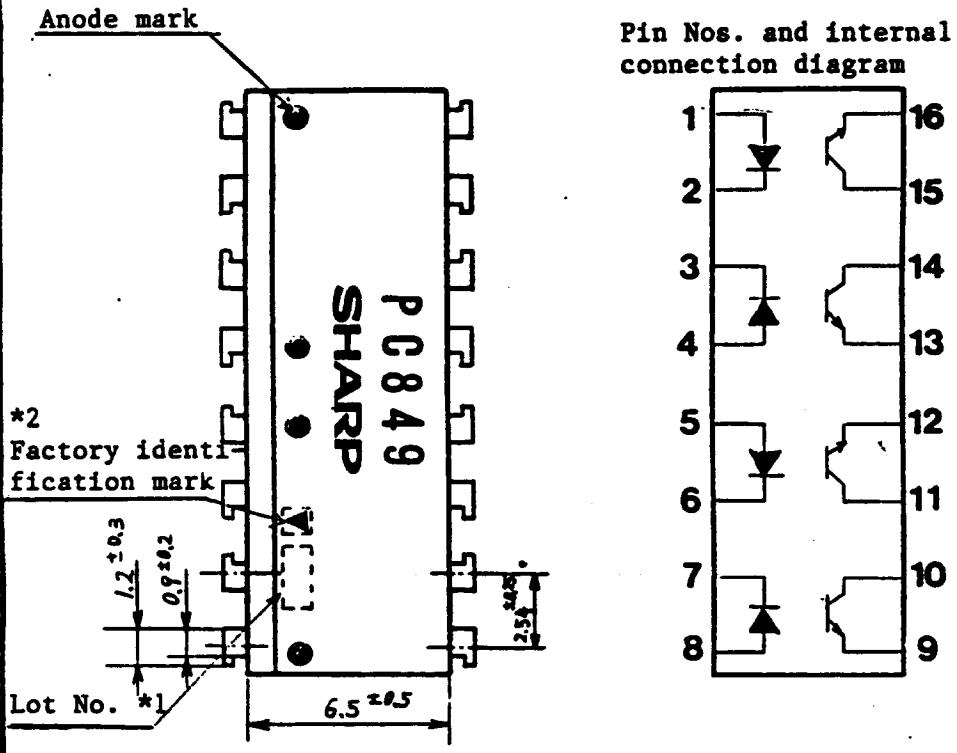
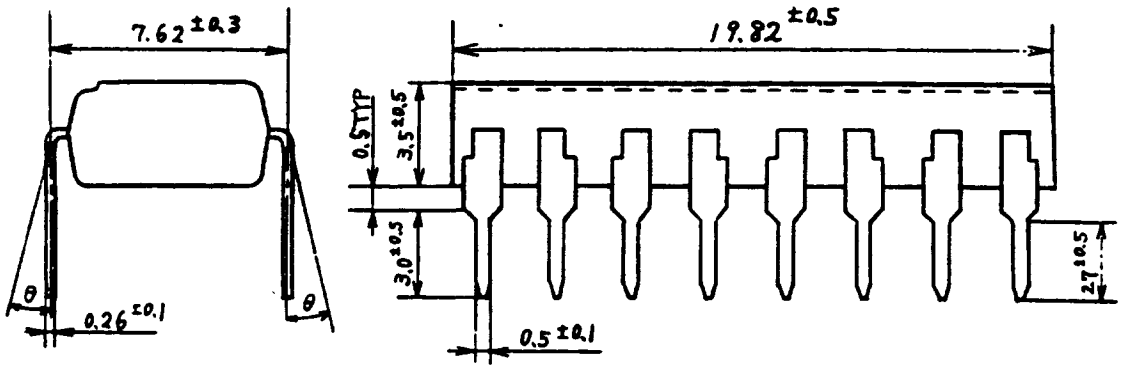


Pin Nos. and internal connection diagram



$\theta = 0 \sim 13°$

*1 2-digit number marked according to DIN standard

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

適用機種 APPLICABLE MODEL: PC849		尺度 SCALE: 4/1	単位 UNIT: 1 = 1/1 mm	改訂日 DATE / 改訂記事 REVISE / 担当 CHARGE	
板厚 THICKNESS	員数 PIECES	材質 MATERIAL	仕上 FINISH	名称 NAME: PC849 Outline Dimension	
日付 DATE: Sep. 25, 1987				コード CODE	
設計 DESIGN: M. Matsui	製図 DRAW	写図 TRACE	検図 CHECK	承認 APPROVE	シャープ株式会社 電子部品事業本部 Semiconductor Appli. Div. SHARP CORPORATION
				図番 DRAWING No.	CY2393K02

様式 総--4--A1

Fig.1 Forward current vs. ambient temperature

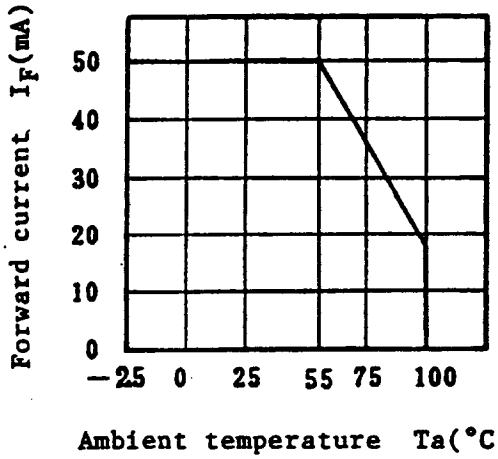


Fig.2 Diode power dissipation vs. ambient temperature

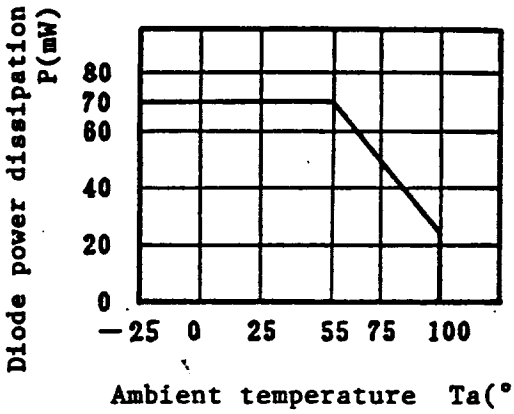


Fig.3 Collector power dissipation vs. ambient temperature

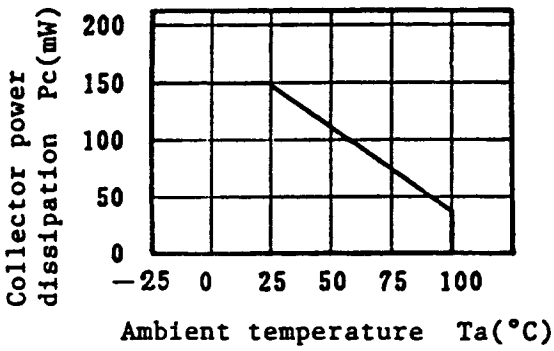


Fig.4 Total power dissipation vs. ambient temperature

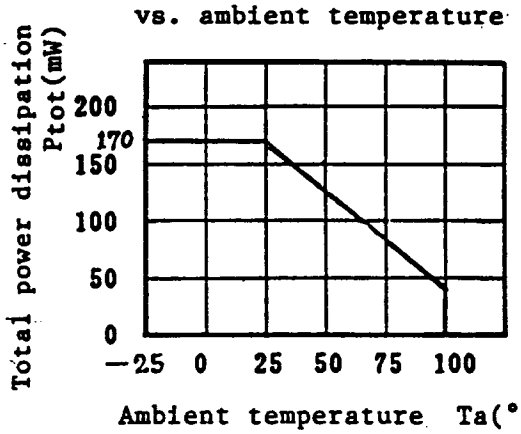
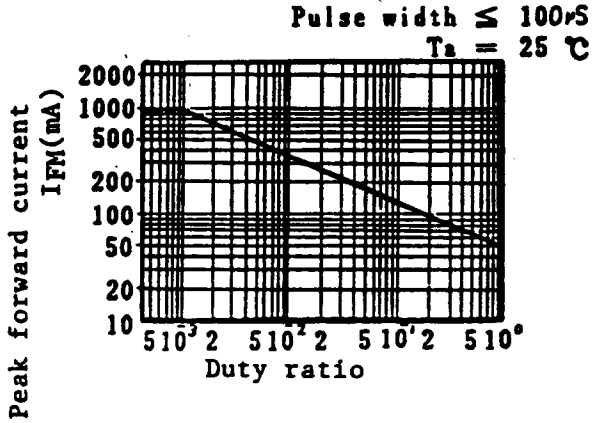


Fig.5 Peak forward current vs. duty ratio



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4. Inspection standard

Incoming inspection standard for Sharp products are shown below.

(1) A single sampling plan, normal inspection level II based on MIL-STD-105D is applied. The AQL according to the inspection items are shown below.

Defect	Inspection item	AQL(%)	Judgement criterion
Major defect	Electrical characteristics Unreadable marking Open, short.	0.1	Depend on the specification
Minor defect	Appearance Dimension	0.4	

(2) Disposal of rejected lot

In case that an object lot is judged rejected in user's incoming inspection and Sharp accepts it, a rejected lot shall be able to be returned to Sharp within 2 weeks after delivery.

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5. Reliability

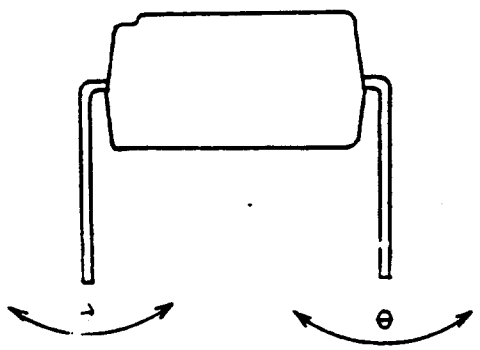
The reliability of products shall be satisfied with items listed below.

Test Items	Test Conditions *1	Judgement Criteria	Defective Samples
Solderability *2	230°C, 5 sec.		0/10
Soldering heat	260°C, 10 sec.	$V_F \leq U \times 1.2$	0/10
Terminal strength (Tension)	Weight : 500g 5 sec./each terminal	$Ic \geq L \times 0.7$	0/10
Terminal strength (Bending) *3	Weight : 250g 2 times/each terminal	$V_{CE(sat)} \leq U \times 1.2$ $I_R \leq U \times 2$	0/10
Mechanical shock	1500G, 0.5ms. 3 times/±X, ±Y, ±Z direction	$I_{CEO} \leq U \times 2$	0/10
Variable frequency vibration	100 ∼ 2000 ∼ 100 Hz/4 min. 20G, 4 times/X,Y,Z direction		0/10
Temperature cycling	1 cycle -40°C ∿ +125°C (30min.) (30min.) 20 cycle test	U: Upper specification limit	0/20
High temp. and high humidity storage	+60°C, 90%RH, 1000H.	L: Lower specification limit	0/20
High temp. storage	+125°C, 1000H.		0/20
Low temp. storage	-40°C, 1000H.		0/20
Operation life	I_F=50mA, Ptot=170mW Ta=25°C, 1000H.		0/20

*1 For details, 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.

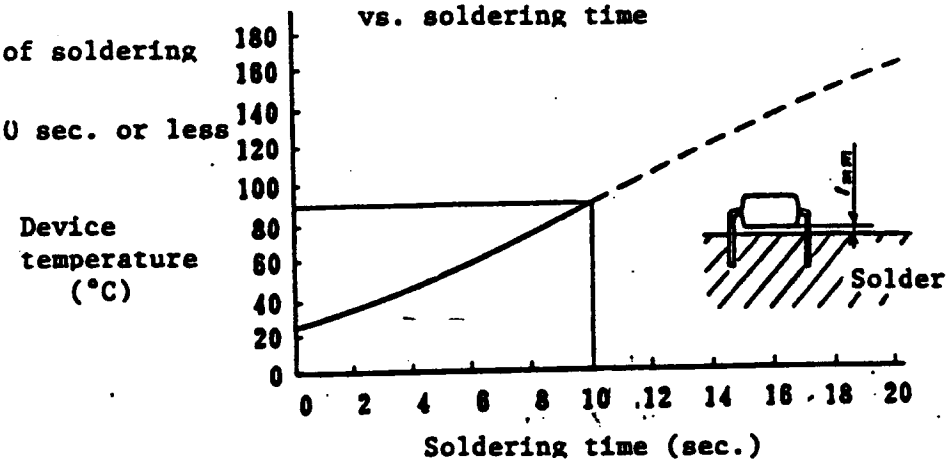


Precautions for Soldering Photocouplers

1. In case of soldering to lead

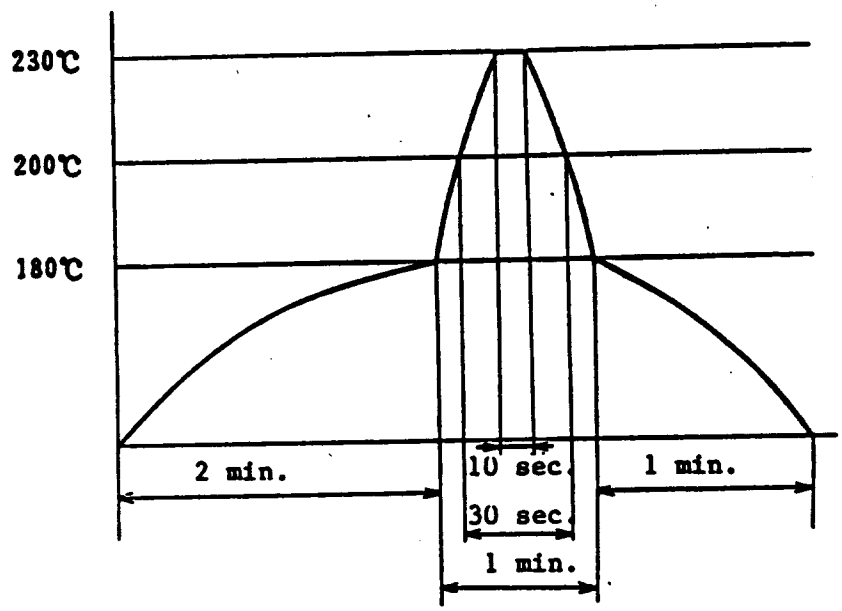
   260°C, 10 sec. or less

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 shown 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.