

PREPARED BY: DATE <i>M. Mitsui August 31, 1987</i>	<h1>SHARP</h1> <p>ELECTRONIC COMPONENTS GROUP SHARP CORPORATION</p> <h2>SPECIFICATION</h2>	SPEC No. SA-82504A
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DEVICE SPECIFICATION FOR

PHOTOCOUPLER

MODEL No. PC849

CUSTOMER'S APPROVAL

DATE _____

BY _____

PRESENTED BY *K. Shintani*

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 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	IF	50	mA
	*1,*2 Peak forward current	IFM	1	A
	Reverse voltage	VR	6	V
	*1 Power dissipation	P	70	mW
Output	Collector-emitter voltage	VCEO	35	V
	Emitter-collector voltage	VECO	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 $\leq 100\mu\text{s}$, 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	C _t	-	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	I _c =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	I _c	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 I _c =1mA
	Isolation resistance	R _{iso}	5×10 ¹⁰	10 ¹¹	-	Ω	DC500V, 40 ~ 60%RH
	Floating capacitance	C _f	-	0.6	1.0	pF	V=0V, f=1MHz
	Cut-off frequency	f _c	-	80	-	kHz	V _{CE} =5V, I _c =2mA R _L =100Ω, -3dB
	Response time (Rise)	t _r	-	4	15	μS	V _{CE} =2V, I _c =2mA
	Response time (Fall)	t _f	-	3	15	μS	R _L =100Ω

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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.

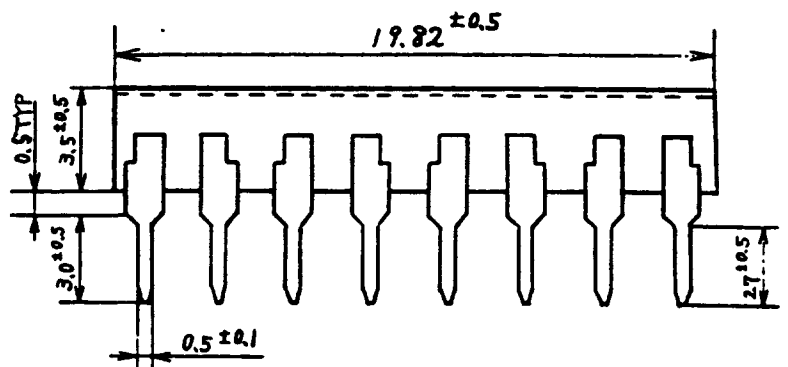
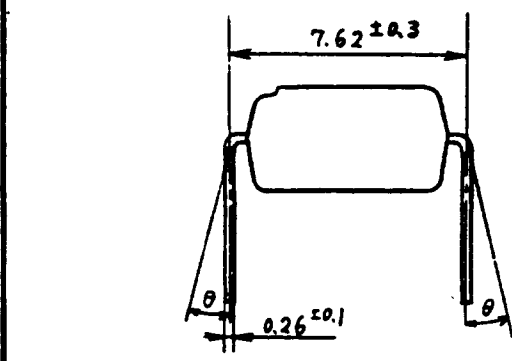
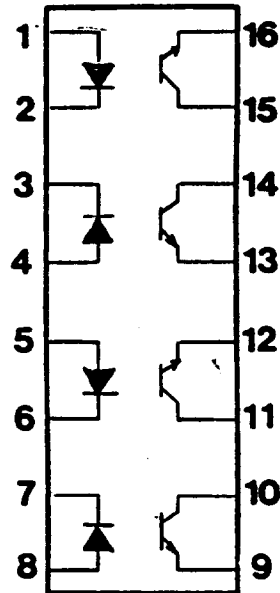
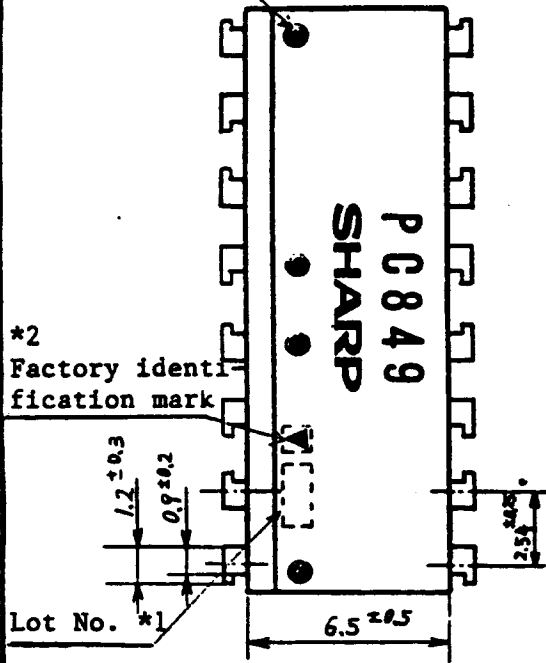
8. Others

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

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Anode mark

Pin Nos. and internal connection diagram



$\theta = 0 \sim 13^\circ$

*1 2-digit number marked according to DIN standard

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

適用規格 APPLICABLE		尺度 SCALE	單位 UNIT	△			
MODEL	PC849	4/1	1 - 1/1 mm	△			
板厚 THICKNESS	枚数 PIECES	材質 MATERIAL	仕上 FINISH	改訂日 DATE	改訂記事 REVISE	担当 CHARGE	
日付 DATE	Sep. 25, 1987		名称 NAME	PC849 Outline Dimension			
設計 DESIGN	製図 DRAW	写真 TRACE	検査 CHECK	承認 APPROVE	コード CODE		
SHARP CORPORATION			図番 DRAWING No.	CY2393K02			

Fig.1 Forward current vs. ambient temperature

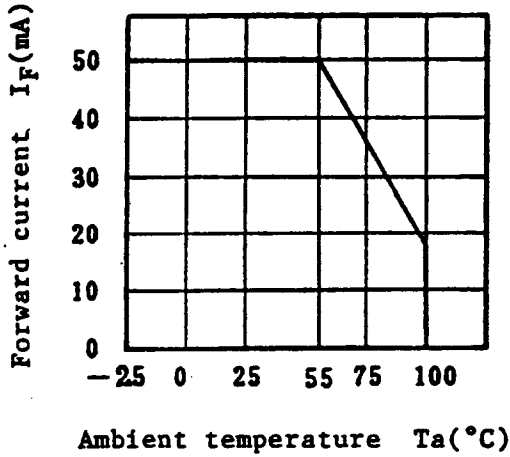


Fig.2 Diode power dissipation vs. ambient temperature

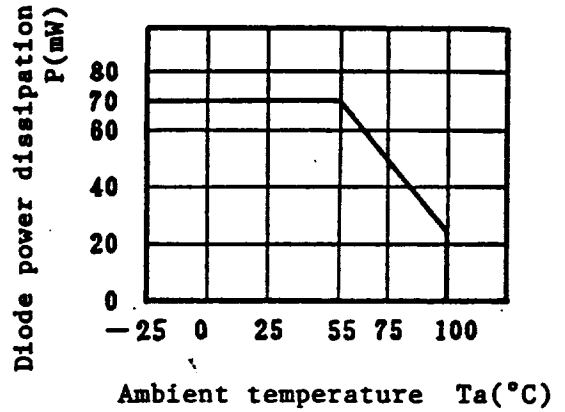


Fig.3 Collector power dissipation vs. ambient temperature

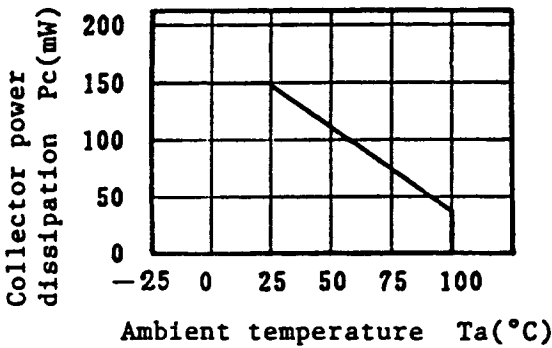


Fig.4 Total power dissipation vs. ambient temperature

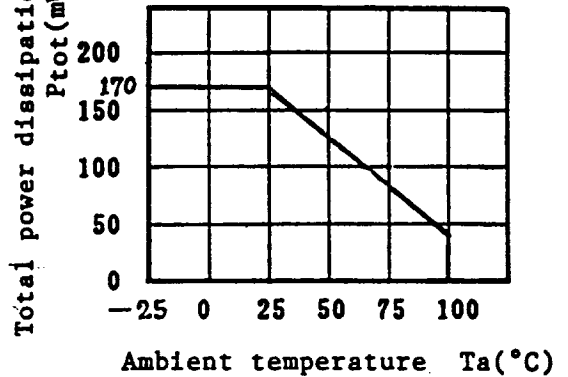
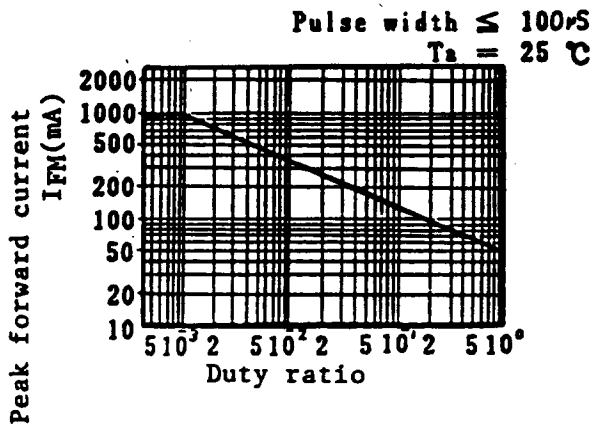


Fig.5 Peak forward current vs. duty ratio



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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

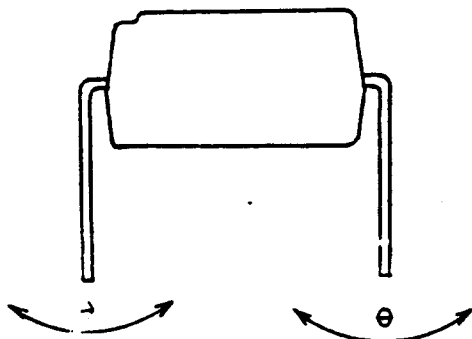
The reliability of products shall be satisfied with items listed below.

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	$I_c \geq L \times 0.7$	0/10
Terminal strength (Bending) *3	Weight : 250g 2 times/each terminal	$V_{CE(sat)} \leq U \times 1.2$	0/10
Mechanical shock	1500G, 0.5ms. 3 times/ $\pm X, \pm Y, \pm Z$ direction	$I_R \leq U \times 2$	0/10
Variable frequency vibration	100 ~ 2000 ~ 100 Hz/4 min. 20G, 4 times/X,Y,Z direction	$I_{CEO} \leq U \times 2$	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	$I_F=50mA, P_{tot}=170mW$ $T_a=25^\circ C, 1000H.$		0/20

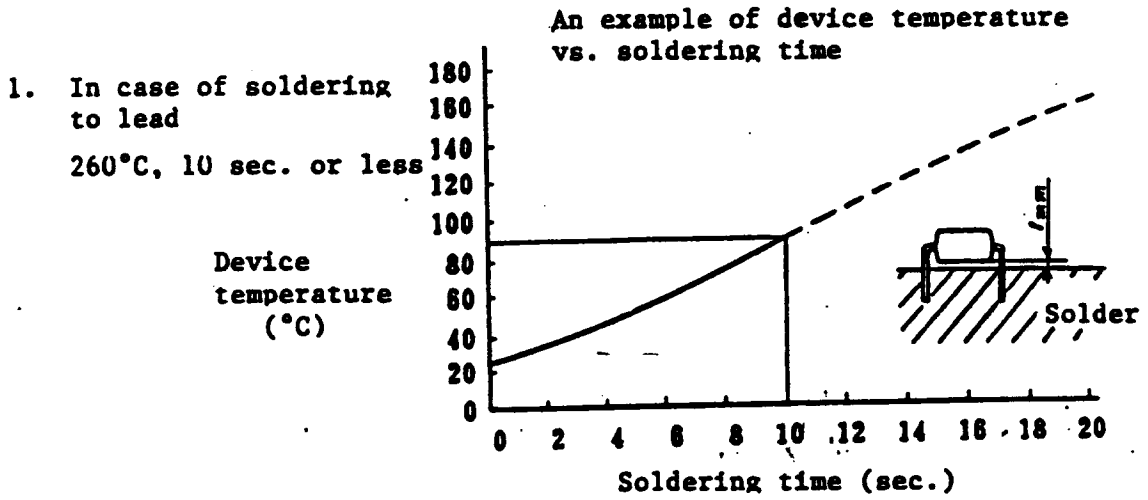
*1 For details, conforms to JIS C 7021.

*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.

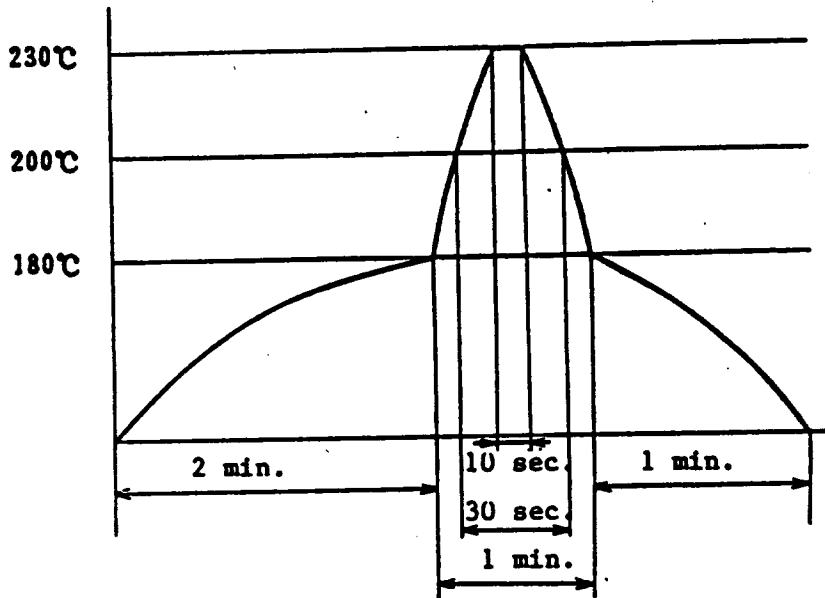


Precautions for Soldering Photocouplers



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.