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		SPECIFICATION		OPTO-ELECTRONIC DEVICES DIV.

DEVICE SPECIFICATION FOR

PHOTOINTERRUPTER

MODEL No.

GP1S94

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2. Please obey the instructions mentioned below for actual use of this device.
SHARP takes no responsibility for damage caused by improper use of the devices.

(1) This device is designed for general electronic equipment.
Main uses of this device are as follows;

[• OA equipment • AV equipment • Home appliance • Telecommunication equipment (Terminal) • Measuring equipment • Tooling machine . Computer, etc.]

(2) Please take proper steps in order to maintain reliability and safety, in case this device is used for the uses mentioned below which require high reliability.

[• Unit concerning control and safety of a vehicle (air plane, train, automobile etc.)
• Gas leak detection breaker • Traffic signal • Fire box and burglar alarm box
• Other safety equipment, etc.]

(3) Please do not use for the uses mentioned below which require extremely high reliability.

[• Space equipment • Telecommunication equipment (Trunk)
• Nuclear control equipment • Medical equipment etc.]

Contact a SHARP representative of sales office in advance when you intend to use SHARP devices for any applications other than those applications for general electronic equipment recommend by SHARP at (1).

CUSTOMER'S APPROVAL

DATE

BY

DATE PRESENTED BY Oct 18 '95
T. Matsumura

T. Matsumura,
Department General Manager of Engineering Dept.,II
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SHARP CORPORATION

1. Application

This specification applies to the outline and characteristics of transmissive type photointerrupter, Model No. GP 1 S94.

2. Outline

Refer to the attached drawing No. CY7552i02.

3. Ratings and characteristics

Refer to the attached sheet, Page 4 to 6.

4. Reliability

Refer to the attached sheet, Page 7.

5. Incoming inspection

Refer to the attached sheet, Page 8.

6. Supplements

6.1 Parts

Refer to the attached sheet, Page 9.

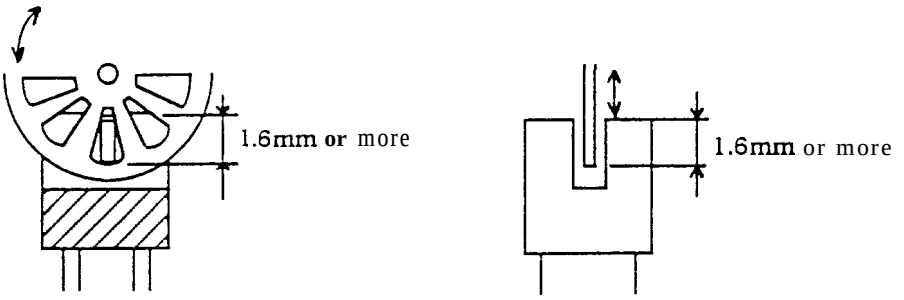
7. Notes

1) In circuit designing, make allowance for the degradation of the light emitting diode output that results from long continuous operation.
(MAX. : 50% degradation/5 years)

2) To prevent photointerrupter from faulty operation caused by external light, do not set the detecting face to the external light.

3) Opaque board shall be installed at place 1.6mm or more from the top of elements.

(Example)



4) To solder onto lead pins, solder at the position of 1 mm or more from the package's bottom at 260 'C for 5 s or less. Please don't bend lead pins from the root of package when soldering. And take please care not to let any external force exert on lead pins. Please don't do soldering with preheating, and please don't do soldering by reflow.

5) Cleaning shall carry out as the below items to avoid keeping solvent, solder and flux on the device.

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

(2) Ultrasonic cleaning : Please don't carry out ultrasonic cleaning.

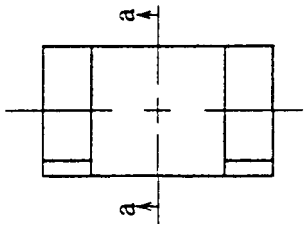
(3) The cleaning shall be carried out with solvent below.

Solvent : Ethyl alcohol, Methyl alcohol

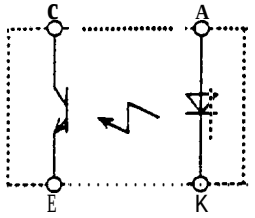
2. Outline Dimensions (Drawing No. CY7552i02)

Scale : 5/1 unit: 1/1mm

Top View

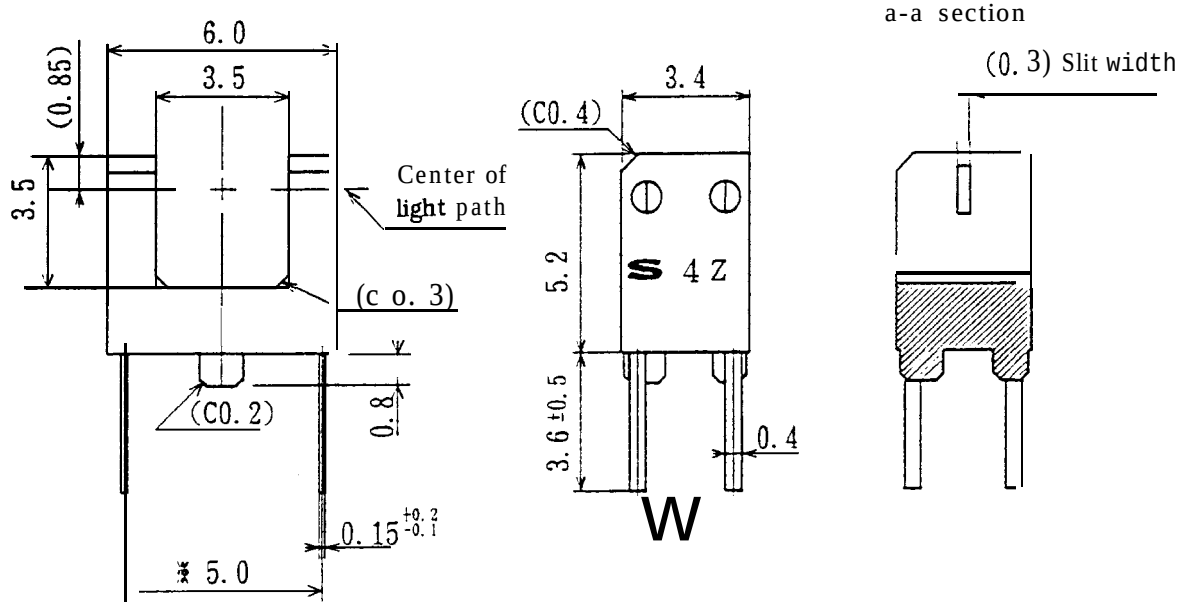


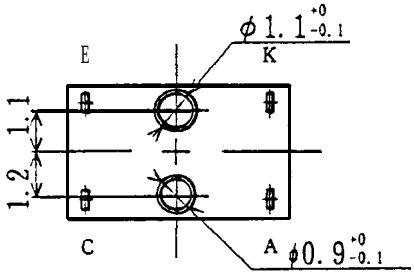
Circuit diagram : Top View



A: Anode
K: Cathode
C: Collector
E: Emitter

a-a section





1) Unspecified tolerance shall be ±0.2.

2) Dimensions in parenthesis are shown for reference.

3) The dimensions indicated by ※ refer to the those measured from the lead base.

4) The dimensions shown do not include those of burrs. Burr's dimensions shall be 0.15 MAX..

5) The marking specifications are shown below.

S4Z Production month: 1 to 9 ; Jan. to Sep.
X; Oct., Y; Nov., Z; Dec.
Production year : Last digit of the year
Sharp mark

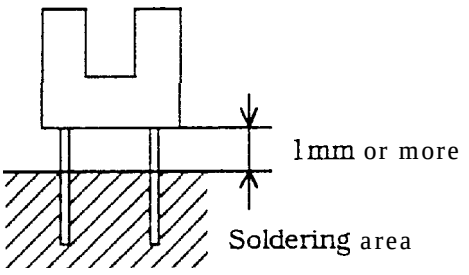
3. Ratings and characteristics

3.1 Absolute maximum ratings

Ta.25°C

Parameter		symbol	Rating	unit
Input	Forward current	I_F	**50**	mA
	Reverse voltage	V_R	6	v
	Power dissipation	P	75	mW
output	Collector-emitter voltage	v_{CEO}	35	V
	Emitter-collector voltage	v_{ECO}	6	V
	Collector current	Ic	20	mA
	Collector power dissipation	Pc	75	mW
Total power dissipation		Ptot	100	mW
Operating temperature		Topr	-25 to +85	℃
Storage temperate		Tstg	-40 to +100	℃
* Soldering temperature		Tsol	260	℃

" Soldering time :5 s or less

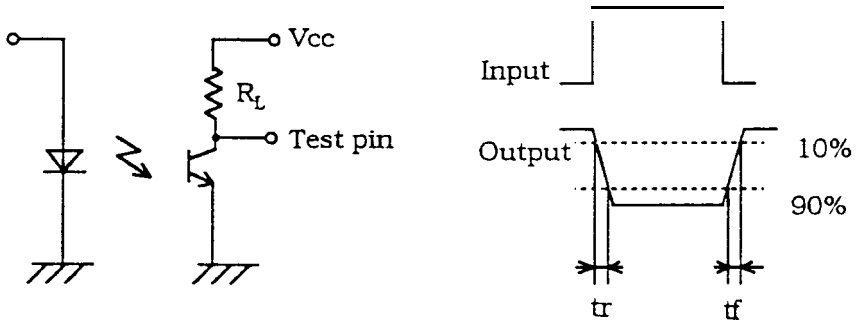


3.2 Electro-optical characteristics

Ta=25°C

Parameter			symbol	Conditions	MIN.	TYP.	MAX.	unit
Input	Forward voltage		V_F	I_F=20mA		1.2	1.4	V
	Reverse current		I_R	V_R=3V			10	μA
output	Collector dark current		I_{CEO}	V_{CE}=20V			10Q	nA
Transfer character-is tics	Collector current		Ic	V_{CE}=5V, I_F=5mA	40	-	400	μA
	Response time	(Rise)	tr	V_{CE}=5V, Ic= 100/u A R_L= 1000Ω	-	50	150	μs
		(Fall)	tf			50	150	μs
	Collector-emitter saturation voltage		V_{CE}(sat)	I_F=10mA, Ic=40μA	-	-	0.4	v

(Test circuit for response time)



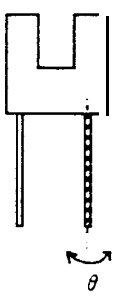
4. Reliability

The reliability of products shall be satisfied with items listed below. Confidence level :90%.
LTPD :10%/20%

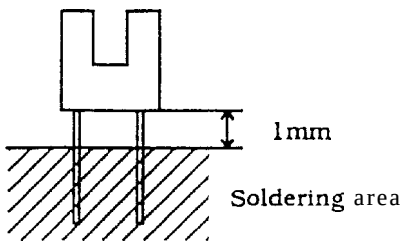
Test Items	Test Conditions	Judgement Criteria	Samples (n) / Defective (c)
Temperature cycling	1 cycle -40 °C to +100°C (30min) (30min) 20 cycles test	$I_R \geqq U \times 2$ $I_{CEO} \geqq U \times 2$ $V_F \geqq U \times 1.2$ $Ic \leqq L \times 0.8$ U: Upper specification limit L: Lower specification limit	n=22, c=0
humidity storage	+60℃, 90%RH, 500h		n=22, c=0
High temp. storage	+100 ℃, 500h		n=22, c=0
Low temp. storage	-40℃, 500h		n=22, c=0
Operation life	I_F=20mA, Ta=25℃, 500h		n=22, c=0
Mechanical shock	15000m/s², 0.5ms 3 times/ ±X, ±Y, ±Z direction		n=11, c=0
Variable frequency vibration	100 to 2000 to 100Hz/20min 2h/X, Y, Z direction 100m/s²		n=11, c=0
Terminal strength (Tension)	Weight: 3N 30s/each terminal		n=11, c=0
Terminal strength (Bending)	Weight: 1 N 0° →90° →0° 2 times bending		n=11, c=0
Soldering heat	260 °C, 5s Immerse up to 1 mm from the bottom face of package.		n=11, c=0
Solderability	230 ℃, 5s Prior disposition: Dip rogin flux. Then immerse up to 1mm from the bottom face of package.	Judgement only appearance Solder shall adhere at the area of 95% less than of dipped portion	n=11, c=0

For details, conforms to JIS C 7021.

* Terminal bending direction is shown below.



* Soldering area is shown below.



5. Incoming inspection

5.1 Inspection items

(1) Electrical characteristics

V_F, I_R, BV_{ECO}, BV_{CEO}, Ic, I_{CEO}, $V_{CE(sat)}$

(2) Appearance

5.2 Sampling method and Inspection level

A single sampling plan, normal inspection level II based on 1S02859 is applied. The AQL according to the inspection items are shown below.

Defect	Inspection item	Inspection level	AQL (Ye)
Major defect	Characteristics defect Unreadable marking	Normal inspection II	**0.1**
Minor defect	Defects on appearance except shown above. *	Normal inspection II	**0.4**

* Crack ··· Visible crack shall be defect.

* split chip Scratch The others . . . One which affects the electrical characteristics shall be defect.

6. Supplements

6.1 Parts

This product uses the below parts.

6.1.1 Light detector (Q'ty : 1)

Type	Material	Maximum sensitivity (nm)	Sensitivity (nm)	Response time (μs)
Phototransistor	Silicon (Si)	930	700 to 1200	20

6.1.2 Light emitter (Q'ty : 1)

Type	Material	Maximum light emitting wavelength (nm)	I/O Frequency (MHz)
Infrared light emitting diode (non-coherent)	GaAs	950	0.3

6.1.3 Material

Case	Lead frame	Lead frame plating
Black PPS resin (UL 94V-0)	42 Alloy	Solder plating

6.1.4 Others

This product shall not be proof against radiation flux.