

SPEC No.

ED-05G171B

ISSUE : May 23 , 2024

TO ;

S P E C I F I C A T I O N S

Product Name PHOT INTERRUPTER

Model No. GP1A57HRJ00F

These specifications contain 12 pages including the cover and appendix.

This specification sheets and attached sheets shall be both side copy.

After confirmation of the contents, please be sure to send back copy of the Specifications with approving signature on each.

If you have any objections, please contact us before issuing purchasing order.

Accepted by:

Sharp Corporation

By: _____
Name: _____
Title: _____
Date: _____By: T. K
Name: T. Kamiyoshi
Title: Senior Manager
Electronic Components and Devices Account Div.
Date: May. 23 2024By: _____
Name: _____
Title: _____
Date: _____

Sharp Semiconductor Innovation Co.,Ltd.

By: T. O
Name: T. Okuda
Title: Division Manager
Development Div.I
Date: May. 23, 2024Reviewed by:
By: Y. O
Name: Y. Orisaka
Title: Senior Manager
Date: May. 23. 2024Prepared by:
By: K. O
Name: K. Okano
Title: Engineer
Date: May. 23. 2024

1. These specification sheets include materials protected under copyright of Sharp Corporation ("Sharp").
Please handle with great care and do not reproduce or cause anyone to reproduce them without Sharp's consent.
2. When using this Sharp product, please observe the absolute maximum ratings, other conditions and instructions for use described in the specification sheets, as well as the precautions mentioned below.
Sharp assumes no responsibility for any damages resulting from use of the product which does not comply with absolute maximum ratings, other conditions and instructions for use included in the specification sheets, and the precautions mentioned below.

(Precautions)

- (1) In making catalogue or instruction manual based on the specification sheets, please verify the validity of the catalogue or instruction manuals after assembling Sharp products in customer's products at the responsibility of customer.
- (2) This Sharp product is designed for use in the following application areas ;
 - Computers • OA equipment • Telecommunication equipment (Terminal) • Measuring equipment
 - Tooling machines • Audio visual equipment • Home appliancesIf the use of the Sharp product in the above application areas is for equipment listed in paragraphs (3) or (4), please be sure to observe the precautions given in those respective paragraphs.
- (3) 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 Sharp product is used for equipment in responsibility of customer 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
- (4) Sharp product is designed for consumer goods and controlled as consumer goods in production and quality.
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
- (5) Please contact and consult with a Sharp sales representative if there are any question regarding interpretation of the above four paragraphs.

3. Disclaimer

The warranty period for Sharp product is one (1) year after shipment.
During the period, if there are any products problem, Sharp will repair (if applicable), replace or refund.
Except the above, both parties will discuss to cope with the problems.

The failed Sharp product after the above one (1) year period will be coped with by Sharp, provided that both parties shall discuss and determine on sharing responsibility based on the analysis results thereof subject to the above scope of warranty.

The warranty described herein is only for Sharp product itself which are purchased by or delivered to customer.
Damages arising from Sharp product malfunction or failure shall be excepted.

Sharp will not be responsible for the Sharp product due to the malfunction or failures thereof which are caused by:

- (1) storage keep trouble during the inventory in the marketing channel.
- (2) intentional act, negligence or wrong/poor handling.
- (3) equipment which Sharp products are connected to or mounted in.
- (4) disassembling, reforming or changing Sharp products.
- (5) installation problem.
- (6) act of God or other disaster (natural disaster, fire, flood, etc.)
- (7) external factors (abnormal voltage, abnormal electromagnetic wave, fire, etc.)
- (8) special environment (factory, coastal areas, hot spring area, etc.)
- (9) phenomenon which cannot be foreseen based on the practical technologies at the time of shipment.
- (10) the factors not included in the product specification sheet.

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

1. Application

This specification applies to the outline and characteristics of transmissive type photointerrupter, Model No. GP1A57HRJ00F.

2. Outline

Refer to the attached drawing No. CY12039i02A.

3. Ratings and characteristics Refer to the attached sheet, Page 5 to 7.

4. Reliability: Refer to the attached sheet, Page 8.

5. Outgoing inspection: Refer to the attached sheet, Page 9.

6. Supplements

6.1 Parts Refer to the attached sheet, Page 10.

6.2 ODS materials

This product shall not contain the following materials.

Also, the following materials shall not be used in the production process for this product.

Materials for ODS : CFCs, Halon, Carbon tetrachloride, 1,1,1-Trichloroethane (Methylchloroform)

6.3 Specified brominated flame retardants

Specified brominated flame retardants (PBB and PBDE) are not used in this device at all.

6.4 Product mass : Approx. 0.7g

6.5 Package drawing : Refer to the attached drawing No. CY12040i09.

6.6 Compliance with each regulation

6.6.1 This product complies with EU RoHS Directive (2011/65/EU) and Commission Delegated Directive (EU)2015/863

6.6.2 Content of six substances specified in Management Methods for Control of Pollution Caused by Electronic Information Products Regulation (Chinese : 电子信息产品污染控制管理办法).

Marking Styles for the Names and Contents of the Hazardous Substances

Category	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr ⁶⁺)	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Photointerrupter	○	○	○	○	○	○

This table is prepared in accordance with the provisions of SJ/T 11364.

○ : Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572

6.7 Country of origin : China

7. Notes

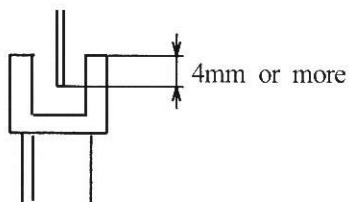
7.1 Power supply line

In order to stabilize power supply line, connect a by-pass capacitor of more than $0.01 \mu\text{F}$ between Vcc and GND near the device.

7.2 Position of opaque board

Opaque board shall be installed at place 4mm or more from the top of elements.

(Example)



7.3 Soldering

To solder onto lead pins, solder at 260°C for 5 seconds or less.

Please take care not to let any external force exert on lead pins when soldering or just after soldering.

Please don't do soldering with preheating, and please don't do soldering by reflow.

7.4 Cleaning conditions :

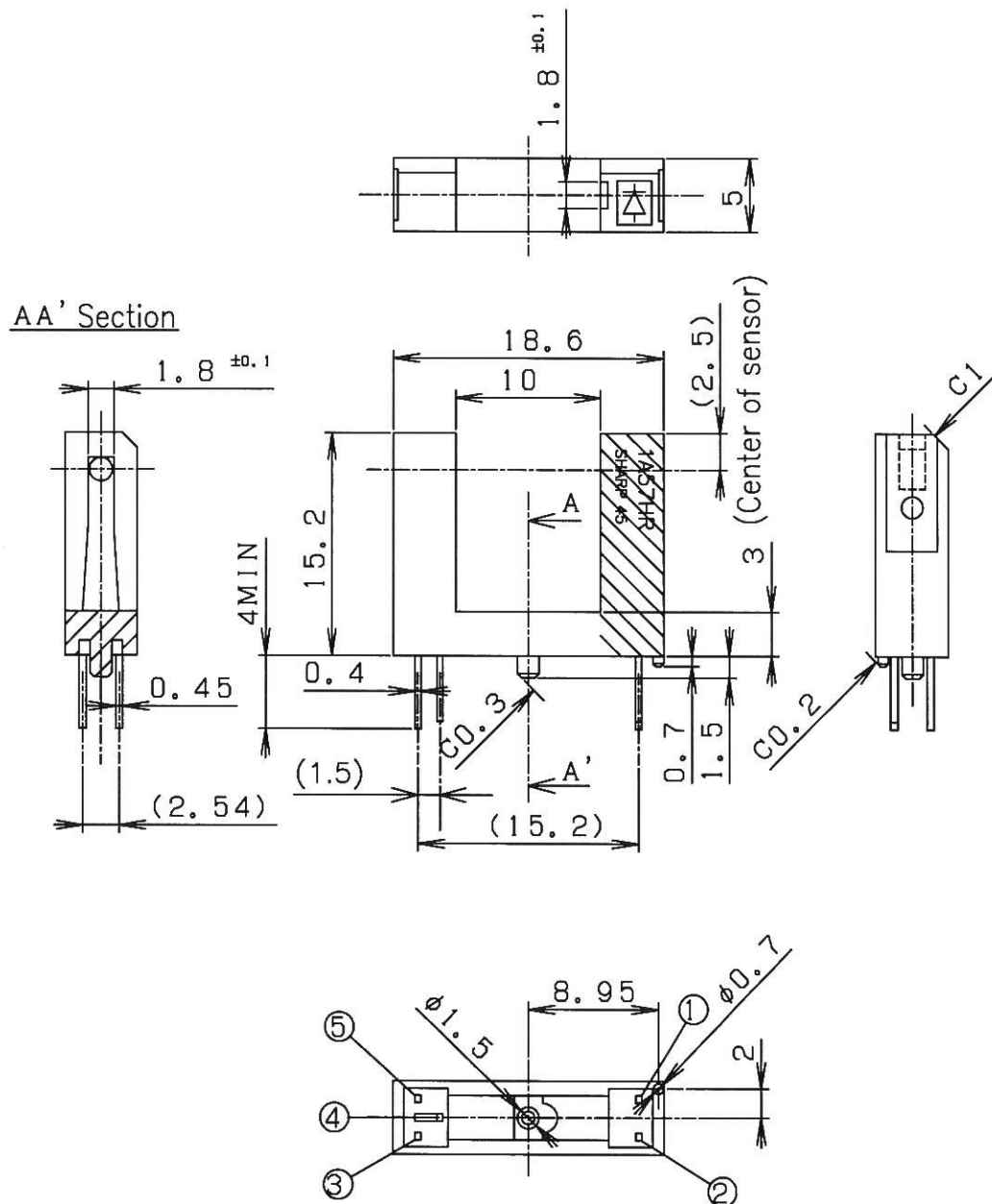
- (1) Solvent cleaning : Solvent temperature 45°C or less
Immersion 3 min. or less
- (2) Ultrasonic cleaning : The effect to device by ultrasonic cleaning differs by cleaning bath size, ultrasonic power output, cleaning time, PCB size or device mounting condition etc.
Please test it in actual using condition and confirm that doesn't occur any defect before starting the ultrasonic cleaning.
- (3) Applicable solvent : Ethyl alcohol, Methyl alcohol, Isopropyl alcohol

7.5 Flux

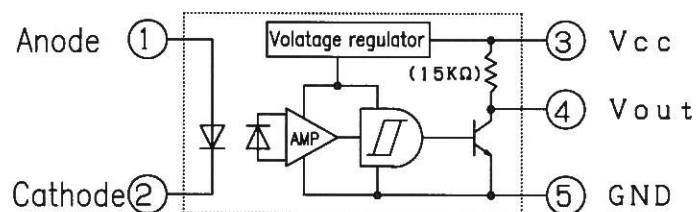
Some flux, which is used in soldering, may crack the package due to synergistic effect of alcohol in flux and the rise in temperature by heat in soldering. Therefore, in using flux, please make sure that it does not have any influence on appearance and reliability of the photointerrupter.

2. Outline (CY12039i02A) Scale: 2/1 Unit: 1/1mm

- 1) Unspecified tolerances shall be $\pm 0.2\text{mm}$.
- 2) Dimensions in parenthesis are shown for reference.



Internal connection diagram



3. Ratings and characteristics

3.1 Absolute maximum ratings

Ta=25°C

Parameter		Symbol	Rating	Unit
Input	*1 Forward current	I_F	50	mA
	*2 Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P	75	mW
Output	Supply voltage	V_{CC}	-0.5 to +17	V
	*1 Output current	I_O	50	mA
	*1 Power dissipation	P_o	250	mW
Operating temperature		T_{opr}	-25 to +85	°C
Storage temperature		T_{stg}	-40 to +100	°C
*3	Soldering temperature	T_{sol}	260	°C

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

*2 Pulse width $\leq 100 \mu s$, Duty ratio : 0.01

*3 For 5s

3.2 Electro-optical characteristics

 $T_a=25^{\circ}\text{C}$

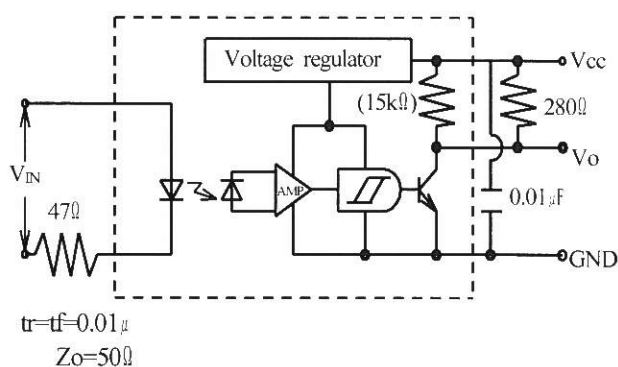
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	$I_F=7\text{mA}$	-	1.14	1.4	V
	Reverse current	I_R	$V_R=3\text{V}$	-	-	10.0	μA
Output	Operating voltage	V_{CC}	-	4.5	-	17.0	V
	Low level output voltage	V_{OL}	$V_{CC}=5\text{V}$, $I_F=0\text{mA}$, $I_{OL}=16\text{mA}$	-	0.15	0.4	V
	High level output voltage	V_{OH}	$V_{CC}=5\text{V}$, $I_F=7\text{mA}$	4.9	-	-	V
	Low level supply current	I_{CCL}	$V_{CC}=5\text{V}$, $I_F=0\text{mA}$	-	1.7	3.8	mA
	High level supply current	I_{CCH}	$V_{CC}=5\text{V}$, $I_F=7\text{mA}$	-	0.7	2.2	mA
Transfer characteristics	*1 "L→H" threshold input current	I_{FLH}	$V_{CC}=5\text{V}$	-	1.0	7.0	mA
	*2 Hysteresis	I_{FHL}/I_{FLH}	$V_{CC}=5\text{V}$	0.55	0.75	0.95	-
	*3 Response time	"L→H" Transmission time	$V_{CC}=5\text{V}$, $I_F=7\text{mA}$ $R_L=280\Omega$	-	3.0	9.0	μs
		"H→L" Transmission time		-	5.0	15.0	μs
		Rise time		-	0.1	0.5	μs
		Fall time		-	0.05	0.5	μs

*1 I_{FLH} is forward current value when output voltage changing from "L" to "H".

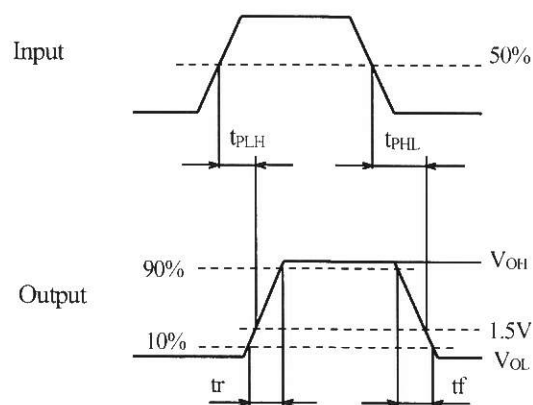
*2 I_{FHL} is forward current value when output voltage changing from "H" to "L".

*3 Test circuit of for response time is shown the below.

note) When the light beam between the light emitter and detector is interrupted, the output voltage becomes Low level.



Test circuit for response time



Timing chart

Fig.1 Forward current vs. ambient temperature

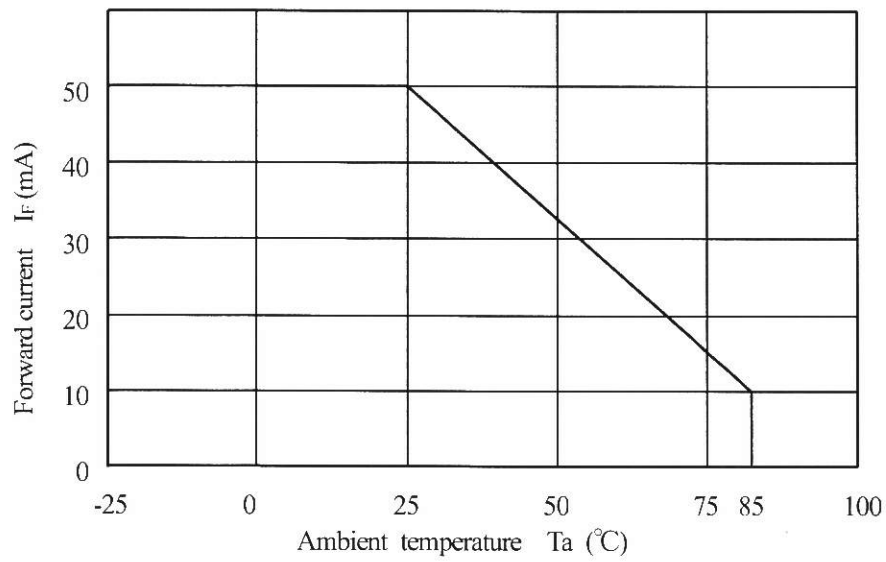


Fig.2 Power dissipation vs. ambient temperature

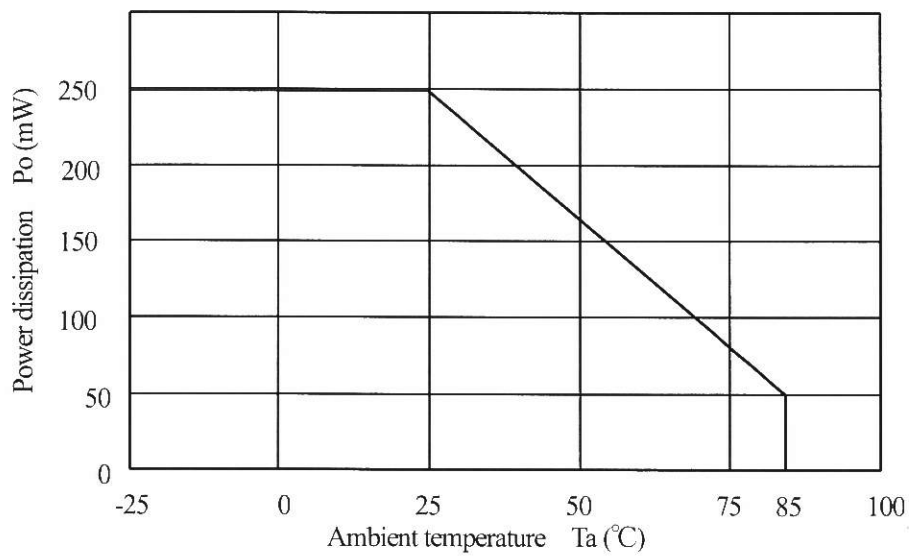
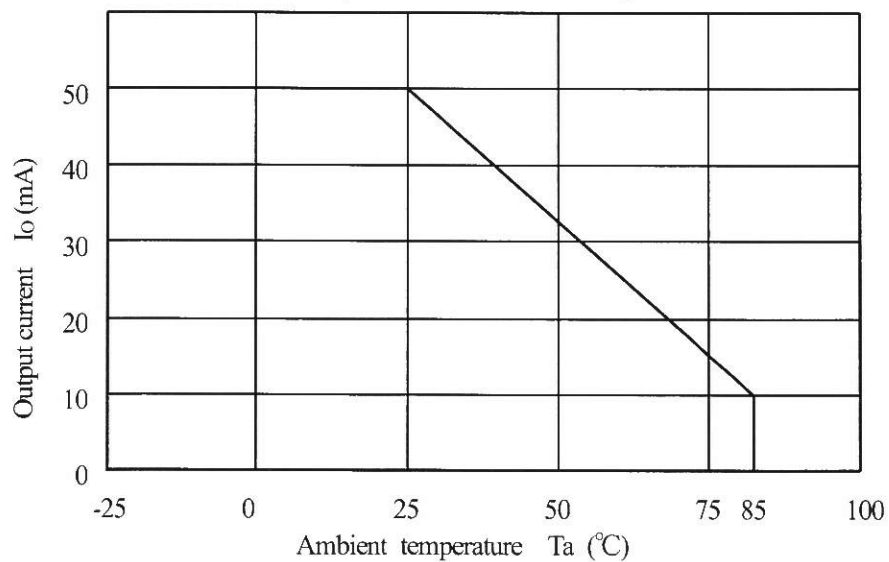


Fig.3 Output current vs. ambient temperature



4. Reliability

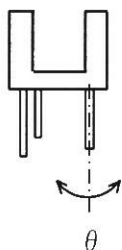
The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 10 or 20

Test Items	Test Conditions	Failure Judgement Criteria	Samples (n)
			Defective (c)
Temperature cycling	1 cycle -40°C to +100°C (30min.) (30min.) 20 cycle test	$V_F \geq U \times 1.2$ $I_R \geq U \times 2$ $V_{OL} \geq U \times 1.2$ $V_{OH} \leq L \times 0.8$ $I_{CCL} \geq U \times 1.2$ $I_{CCH} \geq U \times 1.2$ $I_{FLH} \geq U \times 1.2$ $I_{FHL} / I_{FLH} \geq U + 0.04$ $I_{FHL} / I_{FLH} \geq L - 0.04$ U: Upper specification limit L: Lower specification limit	n=22, c=0
High temp. and high humidity storage	+60°C, 90%, 500h		n=22, c=0
High temp. storage	+100°C, 500h		n=22, c=0
Low temp. storage	-40°C, 500h		n=22, c=0
Operation life	$I_F=20\text{mA}$, $T_a=25^\circ\text{C}$, 500h		n=22, c=0
Mechanical shock	15000m/s ² , 0.5ms 3times/±X, ±Y, ±Z direction		n=11, c=0
Variable frequency vibration	100 to 2000 to 100Hz/20min. 2h/X, Y, Z direction 100m/s ²		n=11, c=0
Terminal strength (Tension)	Weight: 10N 30s/each terminal		n=11, c=0
Terminal strength (Bending) *1	Weight: 5N 0° → 90° → 0° → -90° → 0° 1 time bending		n=11, c=0
Soldering heat	260°C, 5 s		n=11, c=0
Solderability *2	245°C, 5 s	Judgement only appearance. Solder shall adhere at less than 95% area of immersed portion of lead.	n=11, c=0

*1 Terminal bending direction is shown below.



*2 The alloy composition of solder used should be Sn-3.0Ag-0.5Cu.

Flux used for precleaning should be equivalent to EC-19S(TAMURA KAKEN CORPORATION).

5. Outgoing inspection

5.1 Inspection items

(1) Electro-optical characteristics

 V_F , I_R , V_{OL} , V_{OH} , I_{CCL} , I_{CCH} , I_{FLH}

(2) Appearance

5.2 Sampling method and Inspection level

Defect	Inspection item	Inspection level	AQL (%)
Major defect	Characteristics defect Unreadable marking	II	0.1
Minor defect	Appearance defect except the above mentioned.	II	0.25

A single sampling plan, normal inspection based on ISO 2859 is applied.

6. Supplements

6.1 Parts

This product uses the below parts.

6.1.1 Light detector (IS486, Quantity : 1)

(Using a silicon photodiode as light detecting portion, and a bipolar IC as signal processing circuit.)

Type	Maximum sensitivity wavelength (nm)	Sensitivity wavelength (nm)	Response time (μ s)
Photodiode	900	400 to 1200	3

6.1.2 Light emitter (GL480, Quantity : 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

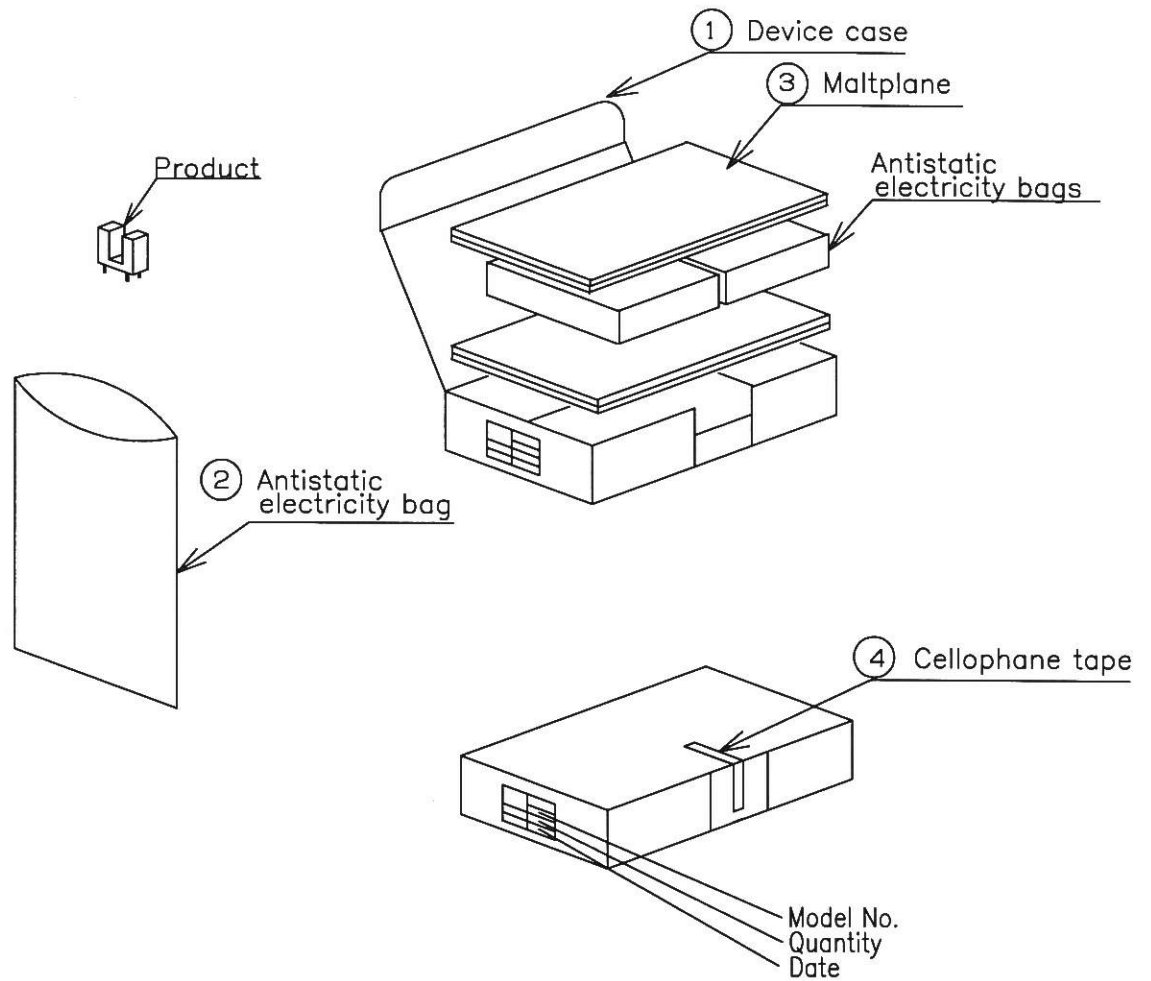
Case	Lead flame finish
Black NORYL resin	Solder dip (Sn-3.0Ag-0.5Cu)

6.1.4 Others

This product shall not be proof against radiation flux.

Laser generator is not used.

6. 5 Package Drawing(Drawing No.:CY12040i09)



1. Packing material

No	Name	Item	Quantity
1	Device case	Corrugated cardboard	1
2	Antistatic electricity bag	Polyethylene	2
3	Maltplane	Urethane	4
4	Cellophane tape	Cellophane	-

2. Packing Quantity

Packing bag: 50pcs./bag

Packing case: 100pcs. /case (Total weight: applox. 153g)

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Sharp Microelectronics:](#)

[GP1A57HRJ00F](#)