SPEC. No. ED-01042

ISSUE February 26, 20

SHARP

OPTO-ELECTRONIC DEVICES DIVISION
ELECTRONIC COMPONENTS GROUP
SHARP CORPORATION

SPECIFICATION

DEVICE SPECIFICATION FOR

PHOTODIODE

MODEL No.

PD3122F

Specified for

Enclosed please find copies of the Specifications which consists of 11 pages including cover.
After confirmation of the contents, please be sure to send back ☐ copies of the Specifications with approving signature on each.

CUSTOMER'S APPROVAL	PRESENTED
DATE	DATE
BY	BY

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ELECOM Group
SHARP CORPORATION

SPEC. No. ED-01042
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Product name : PHOTODIODE

Model No. : PD3122F

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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 damage 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.

1. Application

This specification applies to the outline and characteristics of position sensitive detector photodiode Model No. PD3122F.

2. Outline

Outline drawing No. : CY7444G02

Mark specification drawing No. : CY7445G06

3. Ratings and characteristics

Refer to the attached sheet, page 6, 7.

4. Reliability

Refer to the attached sheet, page 8.

5. Outgoing inspection

Refer to the attached sheet, page 9.

6. Supplement

6-1 Packaging specifications

Refer to the attached drawing No. CY10247G09.

6-2 Appearance : Such appearance changes as discoloring, rust, smear or blur shall be accepted, which doesn't affect electro-optical characteristics.

6-2 This product is not designed against electromagnetic and ionized-particle irradiation.

6-3 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 : CFC_S, Halon, Carbon tetrachloride
1.1.1-Trichloroethane (Methylchloroform)

6-4 Product mass (Piece) : Approximately 60mg

7. Notes

(7-1) Cleaning conditions :

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

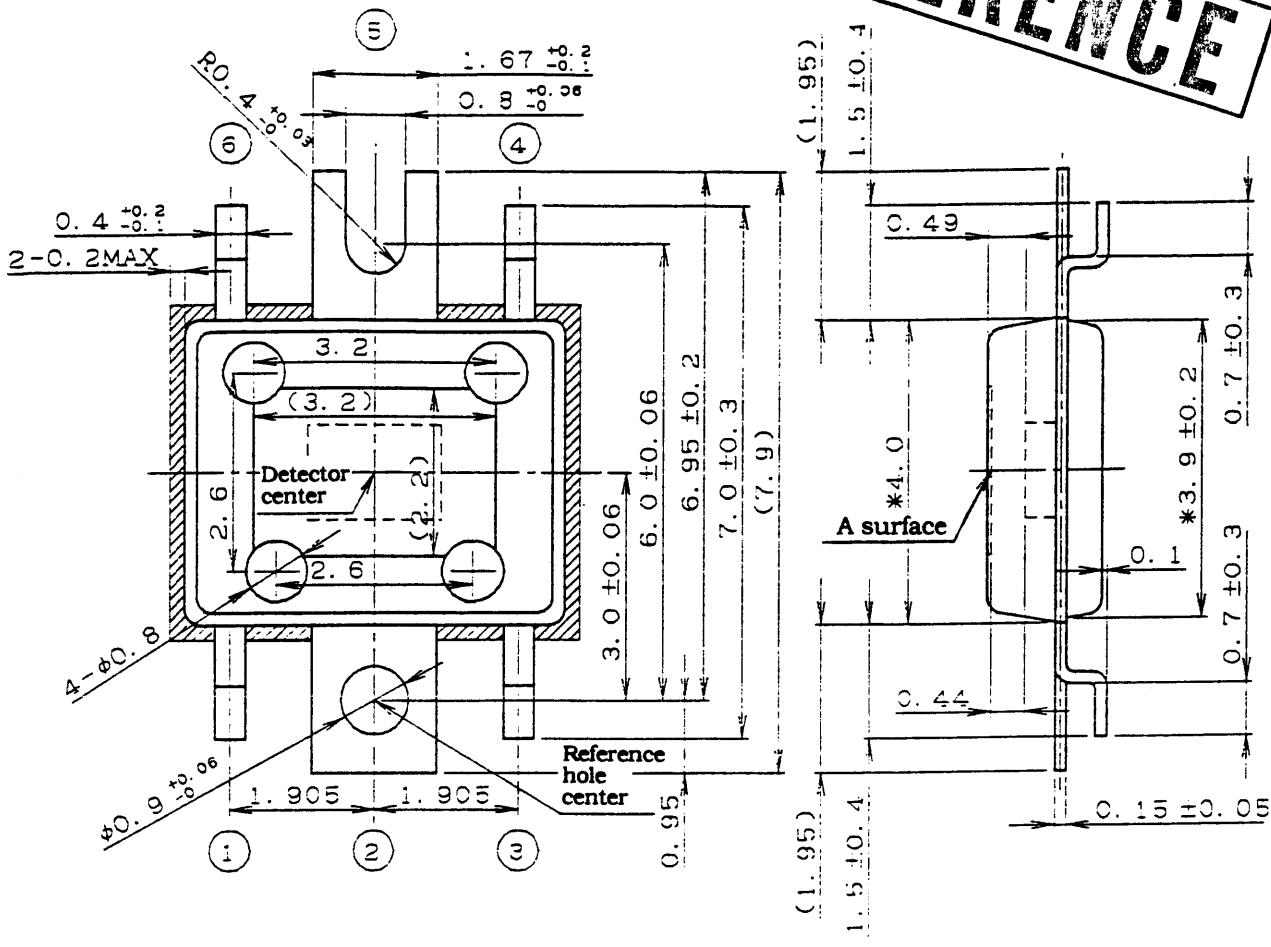
Ultrasonic cleaning : The effect to device by ultrasonic cleaning differs by cleaning bath size, ultrasonic power output, cleaning time, PCB size or device mounting condition etc. Please test it in actual using condition and confirm that doesn't occur any defect before starting the ultrasonic cleaning.

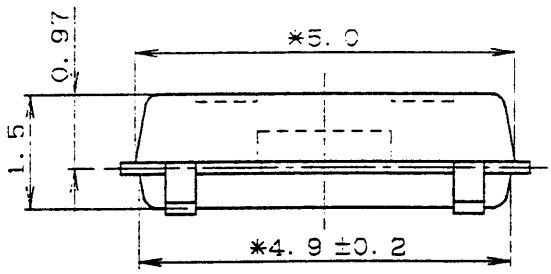
The cleaning shall be carried out with solvent below.

Solvent : Ethyl alcohol, Methyl alcohol, Isopropyl alcohol

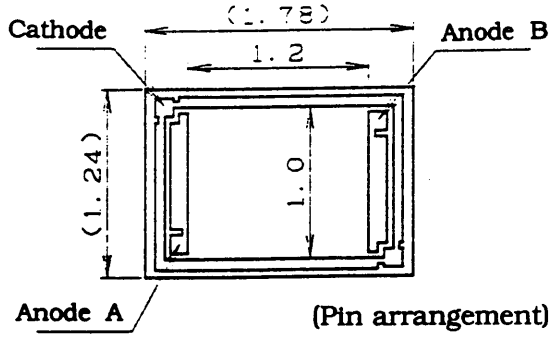
(7-2) Soldering

The lead pins should be soldered according to the absolute maximum ratings.
While or after soldering, the lead pins shall be free from physical stress.
This device shall not be soldered with preheat or reflow.





[Chip drawing (20/1)]

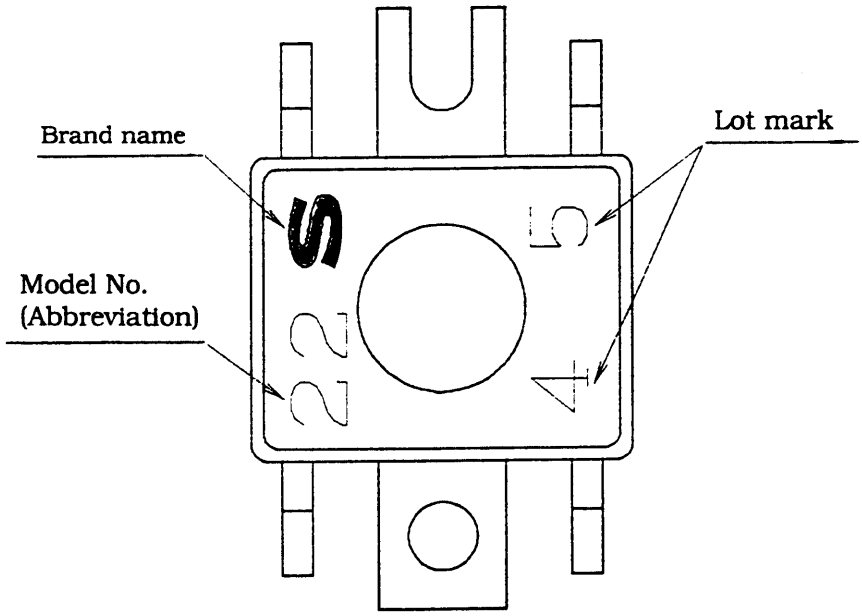


(Pin arrangement)

① Anode A
② Cathode
③ Cathode
④ Anode B
⑤ Cathode
⑥ Cathode

1) Unspecified tolerance shall be ±0.1.
2) Dimensions in parenthesis are shown for reference.
3) Chip position tolerance : ±0.06
   chip rotary tolerance : ±3°
4) ▨ area : Burr
5) Resin burr shall not be included in outline dimensions.
6) Refractive index of the resin. n=1.52 (λ=5893Å NaD)
7) A surface is transparent and flat finish, the other portion is sand brushing finish.
8) Dimensions of * mark are excluded the parting surface.
9) Package taper : 10°
10) Horizontal tolerance : MAX. ±0.15
    Vertical tolerance : MAX. ±0.2

SCALE	MATERIAL	FINISH	NAME	PD3122F Outline Dimensions
10/1	Lead: 42 Alloy	Lead: solder plating		
UNIT			Drawing No.	CY7444G02
1=1/1mm				



Name	PD3122F Marking specification
Drawing No.	CY7445G06

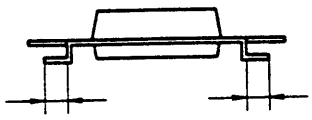
3. Ratings and characteristics

3.1 Absolute maximum ratings

Ta=25℃

Parameter	Symbol	Rating	Unit
Reverse voltage	V_R	30	V
Operating temperature	Topr	-25 to +85	℃
Storage temperature	Tstg	-40 to +85	℃
Soldering temperature *	Tsol	260	℃

* MAX. for 3 seconds at soldering area



Solderable area

3.2 Electro-optical characteristics

Ta=25℃

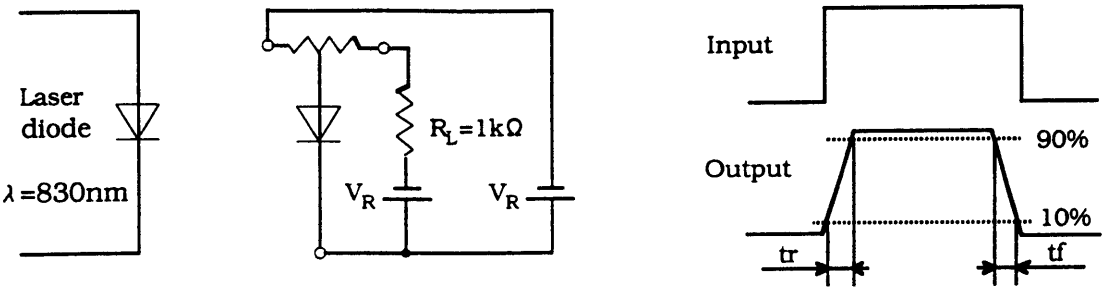
Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Reverse voltage	V_R	I_R=10 μA	30	-	-	V
Dark current	Id	V_R=1V	-	-	2.0	nA
Output current	I_L *1	V_R=1V, Ev=1000 ℓx	6.4	9.2	12	μA
Terminal capacitance	Ct	V_R=1V, f=10kHz	-	10	30	pF
Peak sensitivity	λp	V_R=0V	-	940	-	nm
Response time	tr, tf *2	V_R=1V, R_L=1kΩ	-	5	35	μs
Resistance between electrode	Rie	V_R=1V, Va=0.5V	110	140	170	kΩ
Error of position detection	- *3	-	-	-	±25	μm
Sensitivity	R	-	-	0.5	-	A/W
Forward voltage	V_F	I_F=1mA	-	-	1.0	V

*1 $I_L=I_1+I_2$

However, I_1 and I_2 are output current of Anode A and Anode B

Ev: Illuminance by CIE standard light source A (tungsten lamp)

*2 Test circuit for response time is shown below.

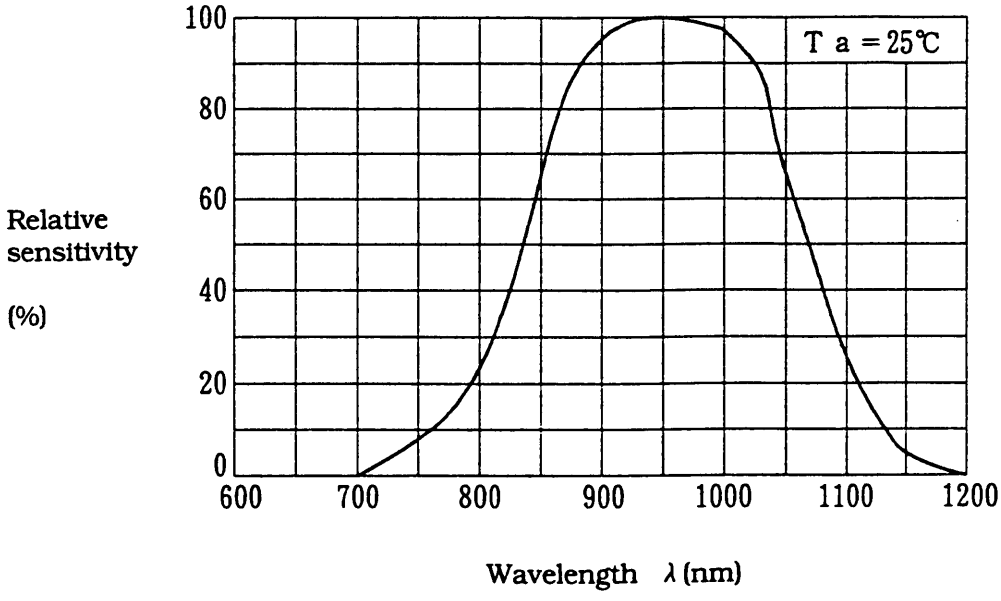


*3 75% area from detecting portion center to the edge of detecting portion
Definition of error of position detection (λ=830nm, ϕ200 μm spot)
Error of position detection of each incident light position defines the following formula if electrical center position is $I_1=I_2$.

$$\text{Error of position detection } (\mu\text{m}) = \frac{L}{2} \times \frac{I_1-I_2}{I_1+I_2} - \text{incident light position } (\mu\text{m})$$

L : Length of light detector surface=1.2mm

(3-3) Spectral sensitivity (TYP.)



4. Reliability

The reliability of products shall satisfy items listed below.

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

Test Items	Test Conditions	Failure Judgement Criteria	Samples (n) / Defective(C)
Temperature cycling	1 cycle -40℃←→+85℃ (30min) (30min) 20 cycles test	Rie≧U×1.2 Rie≦L×0.8 V_R≦L×0.8 Id≧U×2.0 I_L≦L×0.8 I_L≧U×1.2 U: Upper specification limit L: Lower specification limit	n=22, C=0
High temp. and high humidity storage	+60℃,90%RH, 500h		n=22, C=0
High temp. storage	+85℃, 500h		n=22, C=0
Low temp. storage	-40℃, 500h		n=22, C=0
Operation life	Ev=3000ℓx, Ta=25℃, 500h		n=22, C=0
High temp. reverse bias	+85℃, V_R=10V, R_L=100kΩ 500h		n=22, C=0
Mechanical shock	1000m/s^2, 6ms, Sine wave 3 times/±X, ±Y, ±Z direction		n=11, C=0
Variable frequency vibration	200m/s^2 100 to 2000 to 100Hz/4 min 48 min/X, Y, Z direction		n=11, C=0
Terminal strength (Tension)	Weight: 2.5N 10 s/each terminal		n=11, C=0
Terminal strength (Bending)	Weight: 1.25N 0° →90° →0° →-90° →0° The one test should be performed.		n=11, C=0
Solvent resistivity	Immerse in Isopropyl alcohol and Ethyl alcohol for 1 minute each		n=11, C=0
Soldering heat	260℃, 3 s Soldering area : Refer to page 6		n=11, C=0
Solderability	230±5℃, 5±0.5 s Dipped area : Soldering area (Refer to page 6)	Solder shall be adhere at the area of 95% or more of dipped portion.	n=11, C=0

5. Outgoing inspection

(1) Inspection lot

Inspection shall be carried out per each delivery lot.

(2) Inspection method

A single sampling plan, normal inspection level II based on ISO2859 shall be adopted.

Parameter		Inspection items and test method	AQL(%)
Major defect	1	Disconnection, short	0.065
	2	Inverse polarity on terminal	
	3	Soldering defect (Obstacle to use)	
	4	Characteristics defect (I_L, Id) in parameter 3.2.	
Minor defect	1	Appearance ※ (Crack, Split, Chip, Scratch, Stain, Blur, Foreign matter, Bubble)	0.65

※ · Crack ···Visible crack irrespective of its position shall be defect.

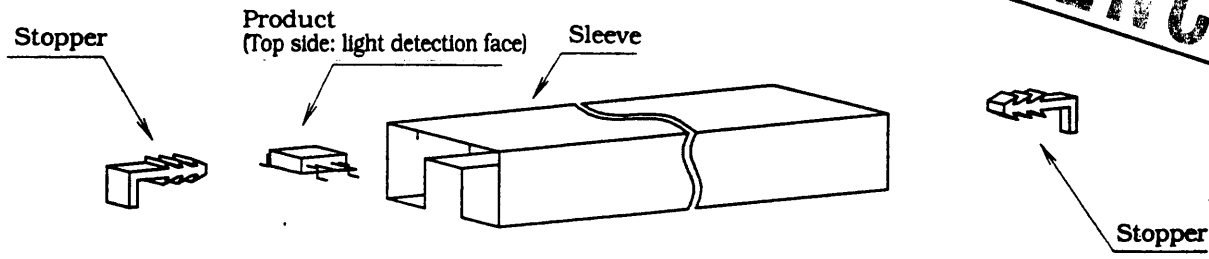
※ · Split, Chip,
· Scratch,
· Stain, Blur
] ···One which affects the characteristics of characteristics of parameter 3.2 shall be defect.

· Bubble
Foreign matter (One on resin surface which can wipe off shall not be applied.)

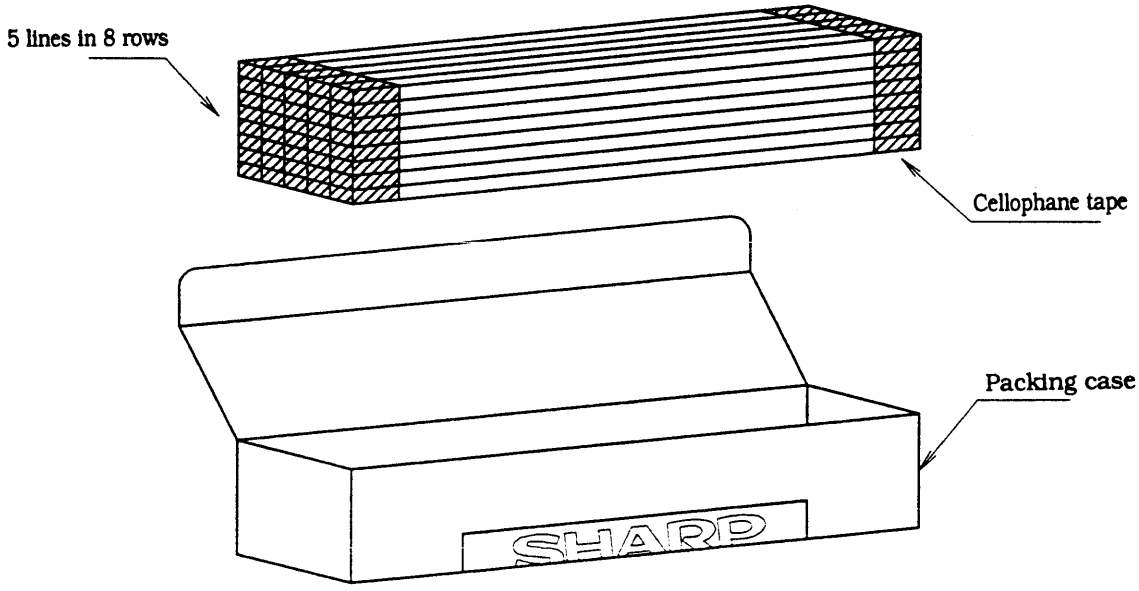
1. On light detector : ϕ0.2mm or more shall be defect.

2. Area excepting on light detector : ϕ0.4mm or more shall be defect.

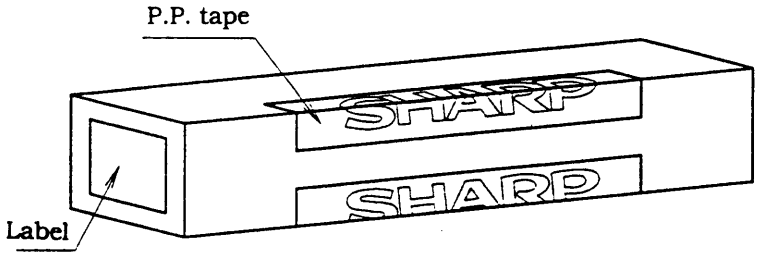
Packaging (Drawing No. : CY10247G09)



(Fig.1)



(Fig.2)



(Fig.3)

Package method (Quantity per a packing case : 2000pcs.)

(1) 50pcs. products shall be packaged in a sleeve and both of sleeve edges shall be fixed by stoppers. (Fig. 1

(2) MAX. 40 sleeves (5 lines in 8 rows) above shall be packaged in a packaging case. (Fig.2)

(3) Model No., quantity and inspection date shall be marked on the label and this label shall be put on the side of the packaging case. Case shall be closed with the lid and enclosed with P.P. tape. (Fig.3)

(4) Formal packeged mass : Approximately 400g