

SPEC No.

ED-06G030A

ISSUE : October 24, 2017

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

Product Name Analog Output Type Distance Measuring SensorModel No. GP2Y0A02SKDF

These specifications contain 11 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.

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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.
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(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 the characteristics for analog output type distance measuring sensor ;
Model No. GP2Y0A02SKDF

2. Outline

Refer to the attached drawing No. CY13431i02A.

3. Ratings and characteristics

Refer to the attached sheet, page 4, 5.

4. Reliability

Refer to the attached sheet, Page 6.

5. Outgoing inspection

Refer to the attached sheet, Page 6.

6. Notes

Refer to the attached sheet, page 7.

7. Supplements

7-1 GP2Y0A02SKDF Example of output distance characteristics.

Refer to the attached sheet, page 8.

7-2 GP2Y0A02SKDF Example of output characteristics with the inverse of distance.

Refer to the attached sheet, page 9.

7-3 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 : CFCs, Halon, Carbon tetrachloride 1.1.1-Trichloroethane (Methyl chloroform)

7-4 Product mass : Approx. 4.8g (TYP)

7-5 This product does not contain the chemical materials regulated by RoHS directive.

(Except for the NOT regulated by RoHS directive.)

7-6 Compliance with each regulation

7-6-1 The RoHS directive(2011/65/EU)

This product complies with the RoHS directive(2011/65/EU) .

Object substances: mercury, lead, cadmium, hexavalent chromium, polybrominated biphenyls (PBB)

and polybrominated diphenyl ethers (PBDE)

7-6-2 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)
Distance measuring sensor	×	○	○	○	○	○

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

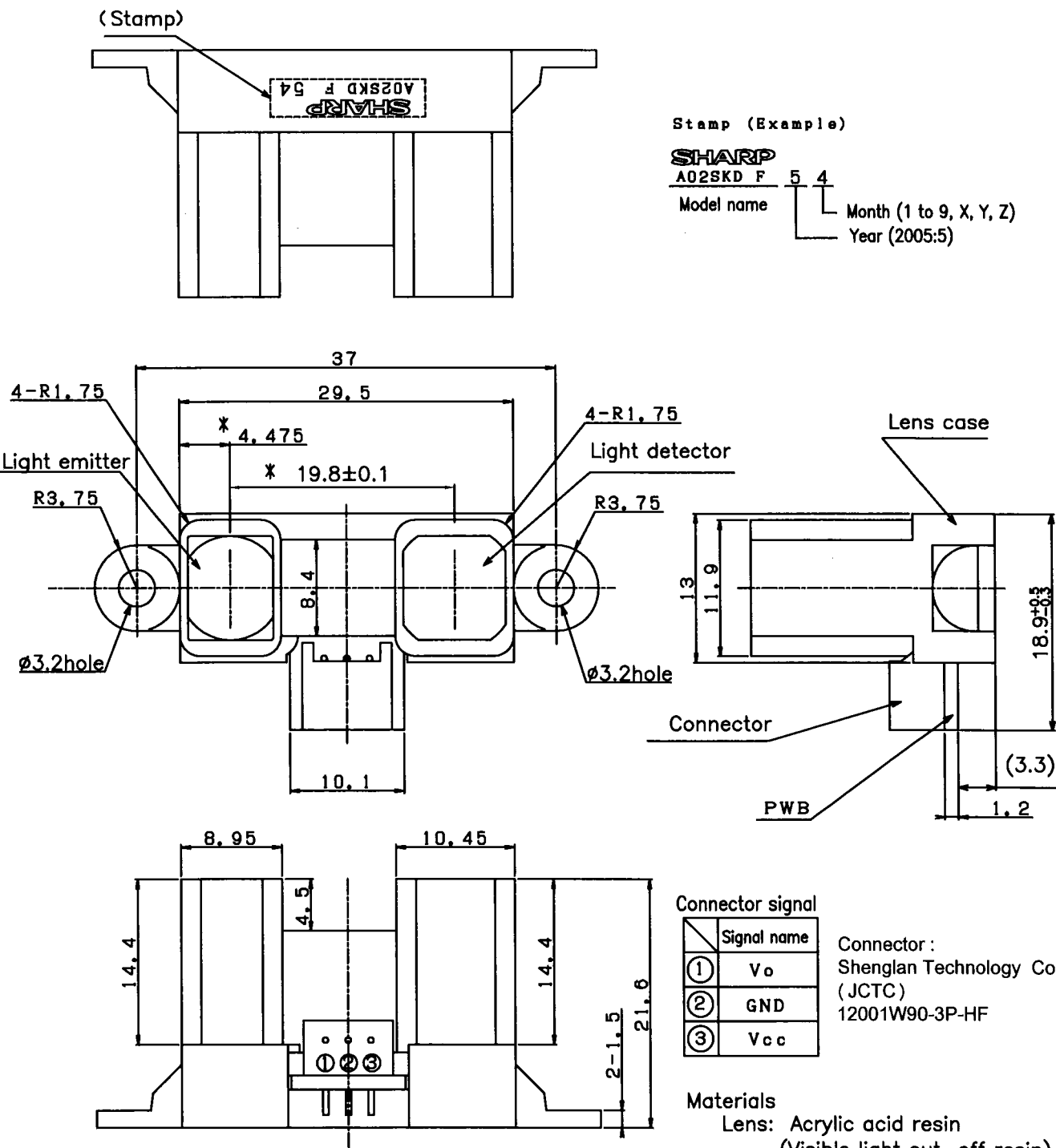
× : Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572

Lead in glass of electronic components (designated by “×” in the above table) are exempt from the RoHS directive (2011/65/EU) , because there is no effective way to eliminate or substitute them by present scientific technology.

8. Packing specification

Refer to the attached sheet, page 10.

2. Outline



Connector signal

Signal name
① V _o
② GND
③ V _{cc}

Connector :
Shenglan Technology Co.,Ltd
(JCTC)
12001W90-3P-HF

Materials

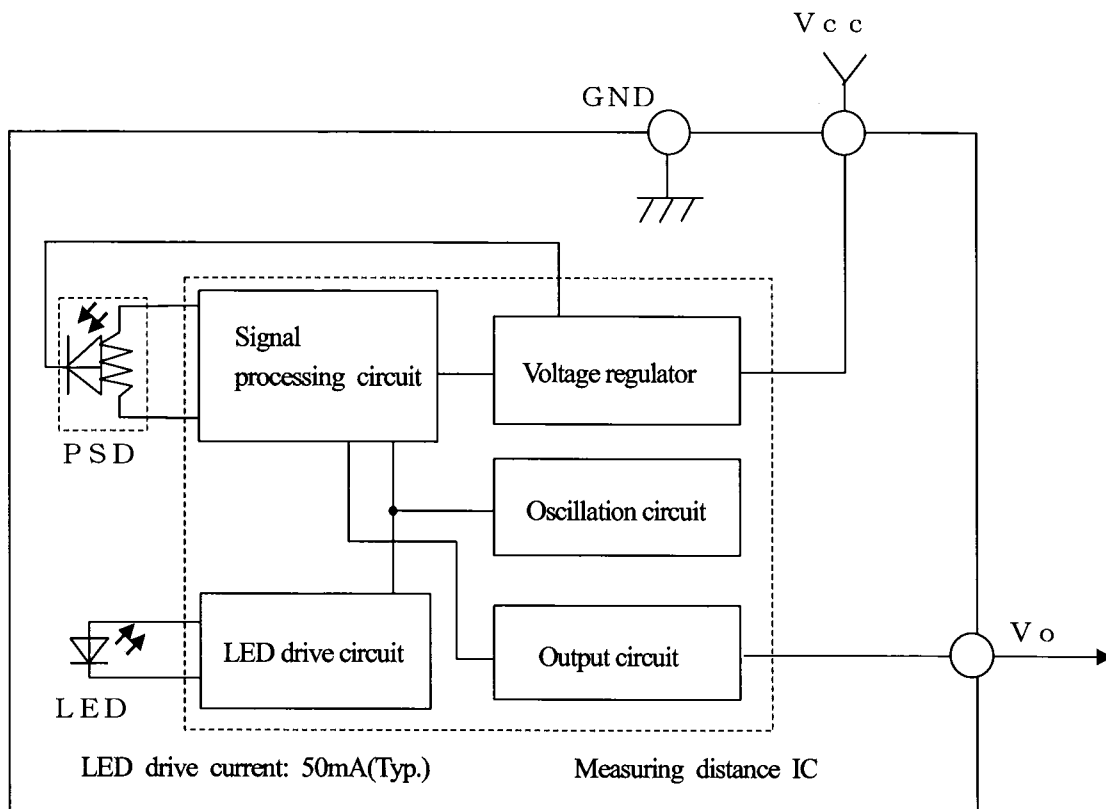
- Lens: Acrylic acid resin
(Visible light cut-off resin)
- Case: Carbonic ABS
(Conductive resin)
- PCB: Paper phenol

- Note 1: The dimensions marked * are described the dimensions of lens center position.
Note 2: Unspecified tolerance shall be ±0.3mm.
Note 3: The dimensions in parenthesis are shown for reference.

Unit: mm Scale: 2/1

Name	GP2Y0A02SKDF Outline Dimensions
Drawing No.	CY13431i02A

3-1 Schematic



3-2 Absolute maximum ratings

(Ta=25°C, Vcc=5V)

Parameter	Symbol	Ratings	Unit	Remark
Supply voltage	Vcc	-0.3 to +7	V	-
Output terminal voltage	Vo	-0.3 to Vcc+0.3	V	-
Operating temperature	Topr	-10 to +60	°C	-
Storage temperature	Tstg	-40 to +70	°C	-

Operating supply voltage

Symbol	Rating	Unit	Remark
Vcc	4.5 to 5.5	V	-

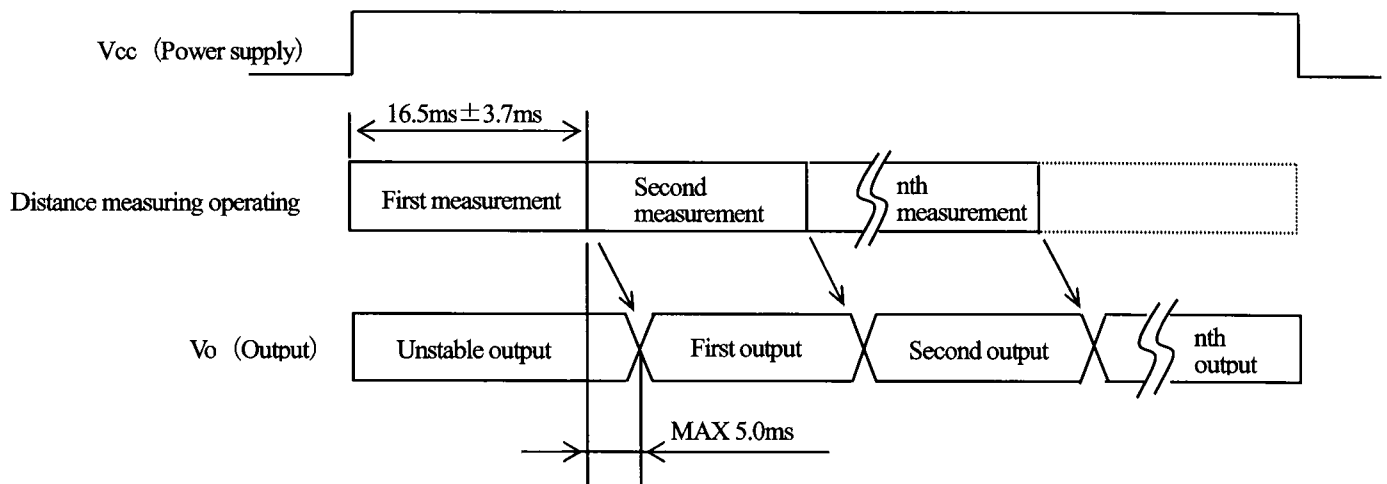
3-3 Electro-optical Characteristics

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Measuring distance range	ΔL	(Note 1)	20	-	150	cm
Output terminal voltage	V_o	L=150cm (Note 1)	0.25	0.4	0.55	V
Output voltage difference	ΔV_o	Output change at L change (150cm→20cm) (Note 1)	1.8	2.05	2.3	V
Average supply current	I_{cc}	L=150cm (Note 1)	-	12	25	mA

※ L: Distance to reflective object

(Note 1) Using reflective object: White paper (Made by Kodak Co., Ltd. gray cards
R-27・white face, reflective ratio ; 90%)

3-4 Timing chart



4. Reliability

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

Confidence level : 90%

LTPD : 20 or 30

No.	Test Items	Test Conditions	Failure Judgement Criteria	Samples (n)
				Defective (c)
1	Temperature cycling	1 cycle -40°C to +70°C (30min.) (30min.) 25 cycle test	$\text{Initial} \times 0.8 > V_o$ $V_o > \text{Initial} \times 1.2$ (Note 1)	n=11, c=0
2	High temp. and high humidity storage	+40°C, 90%RH, 500h		n=11, c=0
3	High temp. storage	+70°C, 500h		n=11, c=0
4	Low temp. storage	-40°C, 500h		n=11, c=0
5	Operation life (High temp.)	+60°C, Vcc=5V, 500h		n=11, c=0
6	Mechanical shock	1000m/s ² , 6.0ms 3times/±X, ±Y, ±Z direction		n=8, c=0
7	Variable frequency vibration	10 to 55 to 10Hz/1min. 2h/X, Y, Z direction overall amplitude : 1.5mm		n=8, c=0

(Note 1) Test conditions are according to 3-3 Electro-optical characteristics.

(Note 2) After test, measurement shall be carried out after leaving under the normal temperature and the normal humidity for two hours. But no dew point.

(Note 3) These test results are sampling examples from a specific lot for reference purpose only, and do not constitute any warranty or assurance in connection with the products.

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 ISO 2859 is applied.

The AQL according to the inspection items are shown below.

Defect	Inspection item	AQL (%)
Major defect	Electro-optical characteristics defect (In para. 3-3)	0.4
Minor defect	Defect on appearance and dimension ※ Crack, chip, scratch, stain	1.0

※ Crack, chip, scratch, stain

One which affects the characteristics of para. 3-3 shall be defect.

6. Notes

[Advice for the optics]

6-1 Lens of this device shall be kept cleanly. There are cases that dust, water or oil and so on deteriorate the characteristics of this device. Please consider it at actual application.

6-2 In case that protection is set in front of the emitter and detector portion, the protection cover which has the most efficient transmittance at the emitting wavelength range of LED for this product ($\lambda=870\text{nm}\pm 70\text{nm}$), shall be recommended to use. The face and back of protection cover should be mirror polishing. Also, as there are cases that the characteristics may not be satisfied with according to the distance between the protection cover and this product or the thickness of the protection cover, please use this product after confirming the operation sufficiently in actual application.

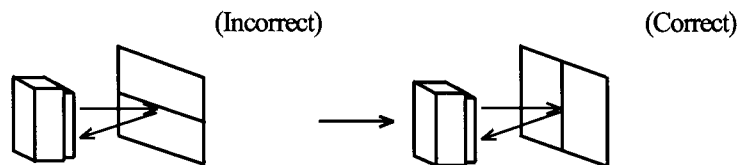
[Advice for the characteristics]

6-3 In case that there is an object near to light exits of the sensor between the sensor and the detected object, please use this device after confirming sufficiently whether the characteristics of this sensor do not change by the object.

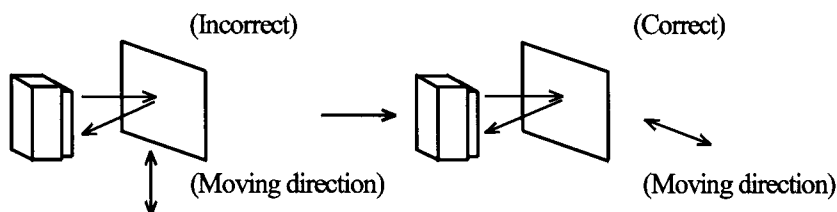
6-4 When the detector surface receive direct light from the sun, tungsten lamp and so on, there are cases that the distance can not be measured exactly. Please consider the design that the detector does not receive direct light from such light source.

6-5 Distance between sensor and mirror reflector cannot be measured exactly.

6-6 In case that reflective object has boundary line clearly, there is cases that distance cannot be measured exactly. At that time, if direction of boundary line and the line between emitter center and detector center are parallels, it is possible to decrease deviation of measuring distance.



6-7 In order to decrease measuring error due to moving direction of object, we recommend that the sensor shall be mounted like the drawing below.



6-8 In order to stabilize power supply line, we recommend that a by-pass capacitor of 10 μF or more shall be connected between Vcc and GND near this product.

[Notes on handling]

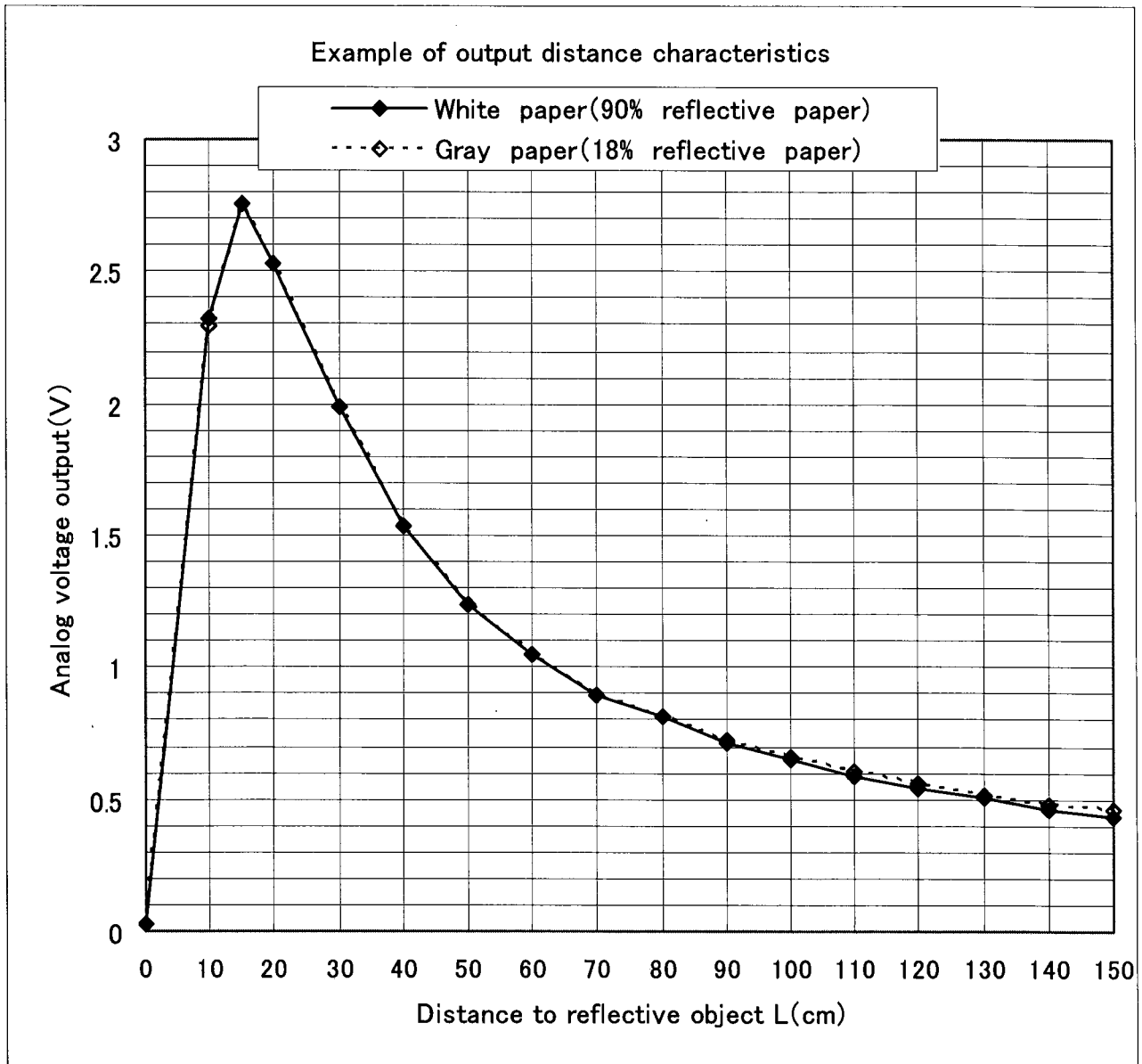
6-9 Please don't do washing. Washing may deteriorate the characteristics of optical system and so on.

Please confirm resistance to chemicals under the actual usage since this product has not been designed against washing.

6-10 There are some possibilities that the sensor inside the case package with lens may be exposed to the excessive mechanical outer force. Please be careful not to cause any excessive pressure on the case package with lens and also on the sensor's PCB at the assembly and inserting of the set.

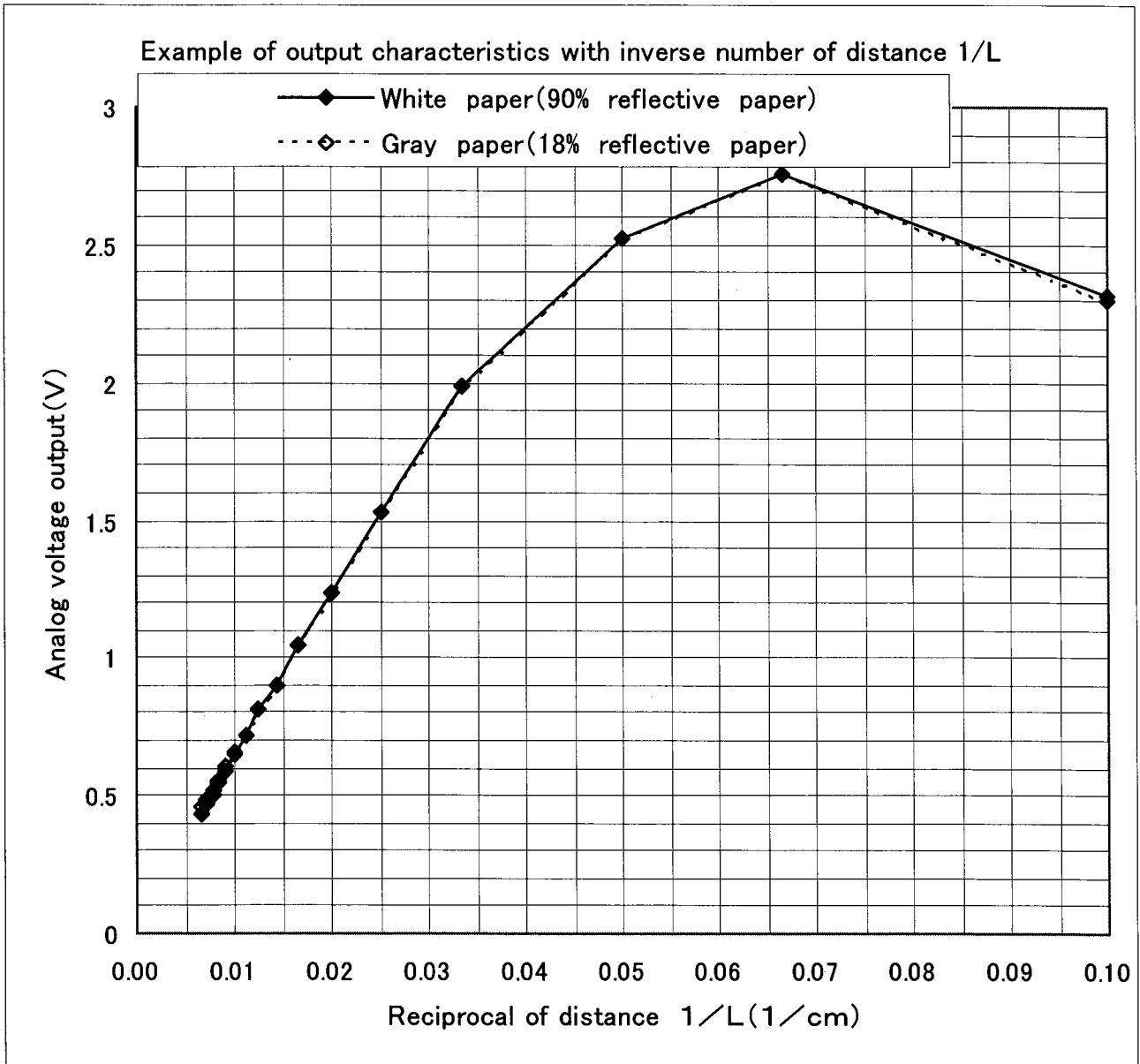
7-1 GP2Y0A02SKDF Example of output distance characteristics

(Ta=25°C, Vcc=5V)

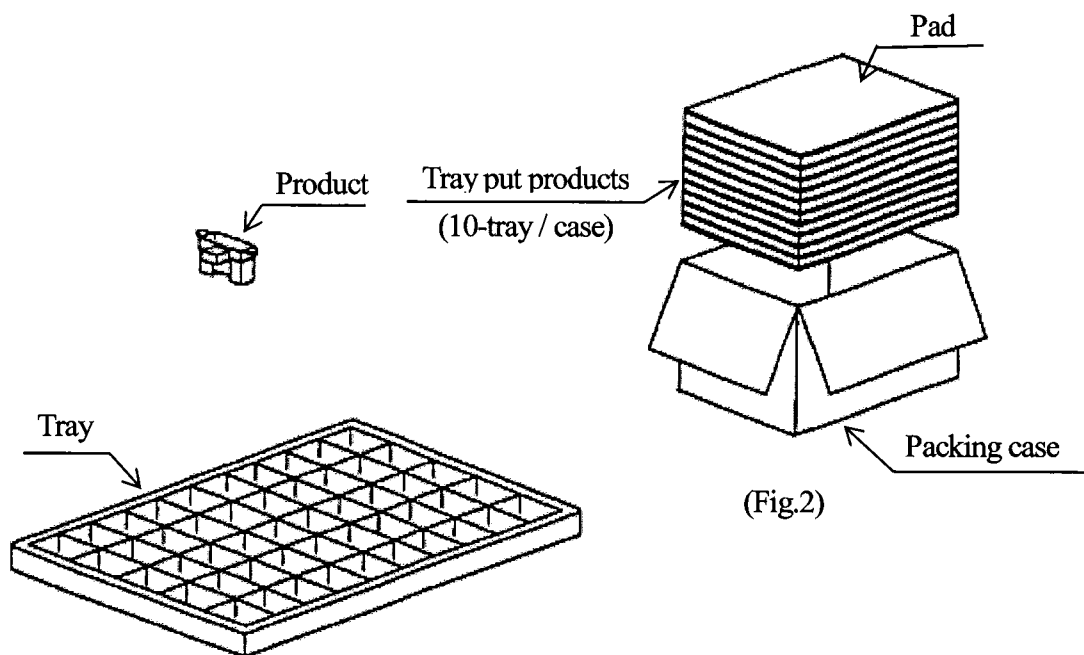


7-2 GP2Y0A02SKDF Example of output distance characteristics with the inverse of distance

(Ta=25°C、Vcc=5V)

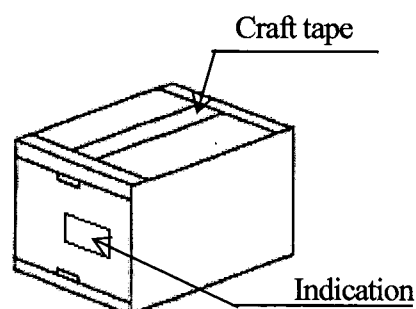


8 Packing specification



(Fig.1)

(Fig.2)



Parts name	Material
Packing case	Corrugated cardboard
Pad	Corrugated cardboard
Tray	Polystyrene

1. Packing numbers

MAX. 50 pieces per tray

MAX 500 pieces per case

2. Arranges in 10 stages of trays containing products into the outer case.

Put pads between trays.

Closes the lid of case and seals with kraft tape.

3. Indication items

The contents of the carton indication conforms to EIAJ C-3 and the following items are indicated.

Model No., Internal production control name, Quantity, Packing date, Corporate name, Country of origin

(Formal packaged mass : Approximately 4kg)