

# REFERENCE

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## SHARP

OPTO-ANALOG DEVICES DIVISION  
ELECTRONIC COMPONENTS GROUP  
SHARP CORPORATION

### SPECIFICATION

DEVICE SPECIFICATION FOR

Distance Measuring Sensor

MODEL No.

GP2Y0A710K0F

Enclosed please find copies of the Specifications which consists of 10 pages including cover.  
After confirmation of the contents, please be sure to send back  copy of the Specifications  
with approving signature on each.

CUSTOMER'S APPROVAL

PRESENTED

DATE

DATE

BY

BY

*H. O*

H. Ogura,  
Department General Manager of  
Engineering Dept., III  
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ELECOM Group  
SHARP CORPORATION

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Product name : Distance Measuring Sensor

Model No. : GP2Y0A710K0F

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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 ;

{
 

- Computers    • OA equipment    • Telecommunication equipment (Terminal)
- Measuring equipment    • Tooling machines    • Audio visual equipment
- Home appliances

 }

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.

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## 1. Application

This specification applies for the outline and characteristics of distance measuring sensor, GP2Y0A710K0F.

## 2. Outline

Refer to the attached drawing No. CY13527i06.

## 3. Ratings and characteristics

Refer to the attached sheet, page 5, 6.

## 4. Reliability

Refer to the attached sheet, Page 7.

## 5. Outgoing inspection

Refer to the attached sheet, Page 7.

## 6. Supplements

### 6-1 GP2Y0A710K0F Example of Output distance characteristics

Refer to the attached sheet, page 8.

### 6-2 Product mass : Approx. 9g (TYP)

### 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 : CFCs, Halon, Carbon tetrachloride, 1-1-1 Trichloroethane (Methyl chloroform)

### 6-4 Specified Brominated flame retardants

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

### 6-5 This product does not contain the chemical materials regulated by RoHS.

(Except for chemical materials NOT regulated by RoHS directive)

### 6-6 Packing

Refer to the attached sheet, Page 9.

## 7. Notes

[Advice for the optics]

7-1 The lens of this device needs to be kept clean. There are cases that dust, water or oil and so on deteriorate the characteristics of this device. Please consider in actual application.

7-2 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. 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.

7-3 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 what the characteristics of this sensor do not change by the object.

[Advice for the characteristics]

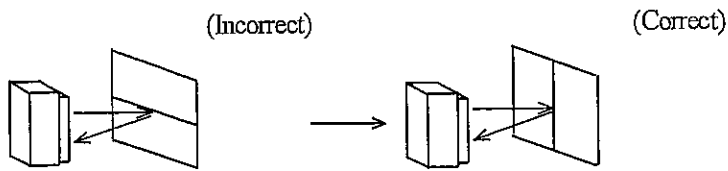
7-4 When the detector surface receive direct light from the sun, tungsten lamp and so on, there are cases that it can not measure the distance exactly. Please consider the design that the detector does not receive direct light from such a light source.

7-5 Distance between sensor and mirror reflector can not be sometimes measured exactly.

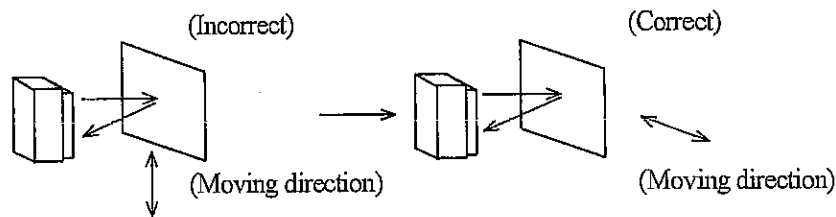
In case of changing the mounting angle of this product, it may measure the distance exactly.

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- 7-6 In case that reflective object has boundary line clearly, there is case that distance can not be measured exactly. At that time, if direction of boundary line and the line between emitter center and detector center parallels, it is possible to decrease deviation of measuring distance.



- 7-7 In order to decrease measuring error by moving direction of object, we recommend to mount the sensor like below drawing.



- 7-8 In order to stabilize power supply line, we recommend to connect a by-pass capacitor of 10 $\mu$ F or more between Vcc and GND near this product.

- 7-9 Please use a power supply which can output 350mA or more to operate this product properly since this product requires about 330mA as the sensing peak current to LED.

## [Notes on handling]

- 7-10 Please don't do washing. Washing may deteriorate the characteristics of optical system and so on.

- 7-11 When the lens of the sensor acquire dust on its surface, please wipe dust off from the lens by using dry and soft cloth without scratching its surface.

- 7-12 There are some possibilities that the sensor inside the case package with lens may be exposed to the excessive mechanical force. Please be careful not to cause any excessive pressure on the case package with lens and also on the PCB at the assembly and inserting of the set.



3-1 Absolute maximum ratings

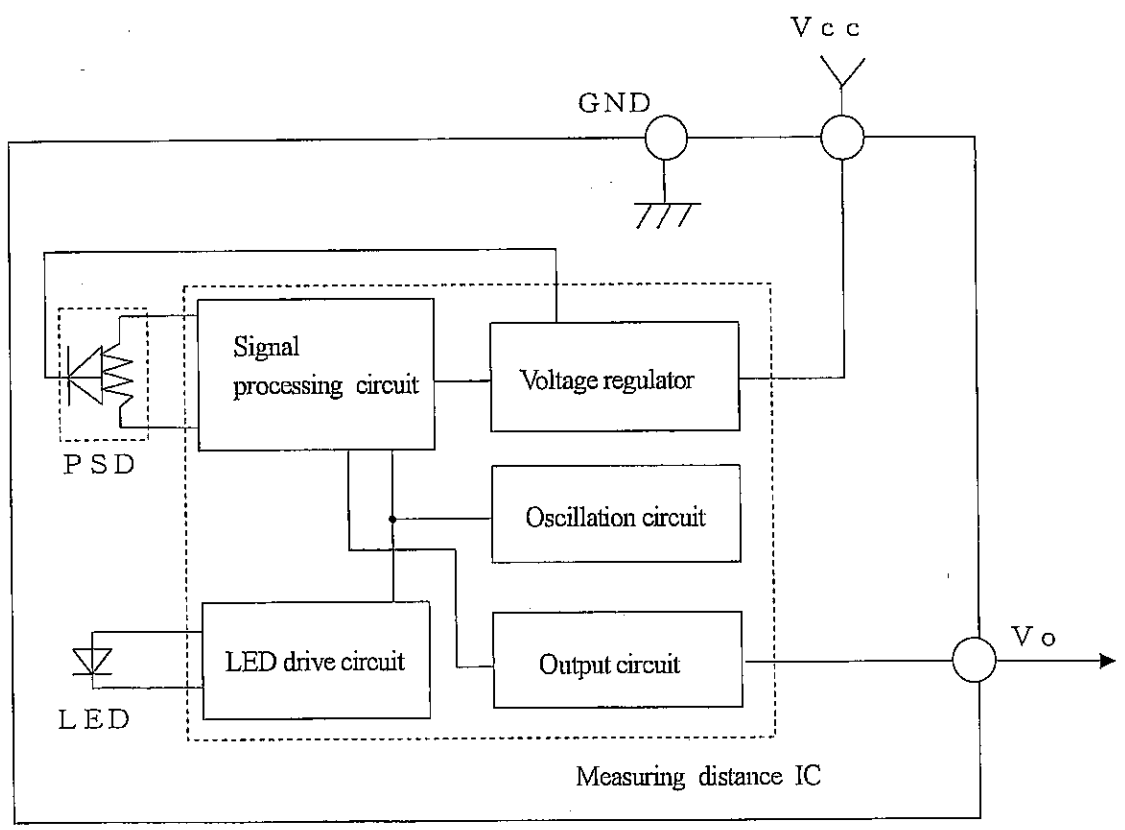
(Ta=25°C, Vcc=5V)

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	-

3-2 Schematic



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### 3-3 Electro-optical Characteristics

<Distance measuring sensor>

(Ta=25°C, Vcc=5V)

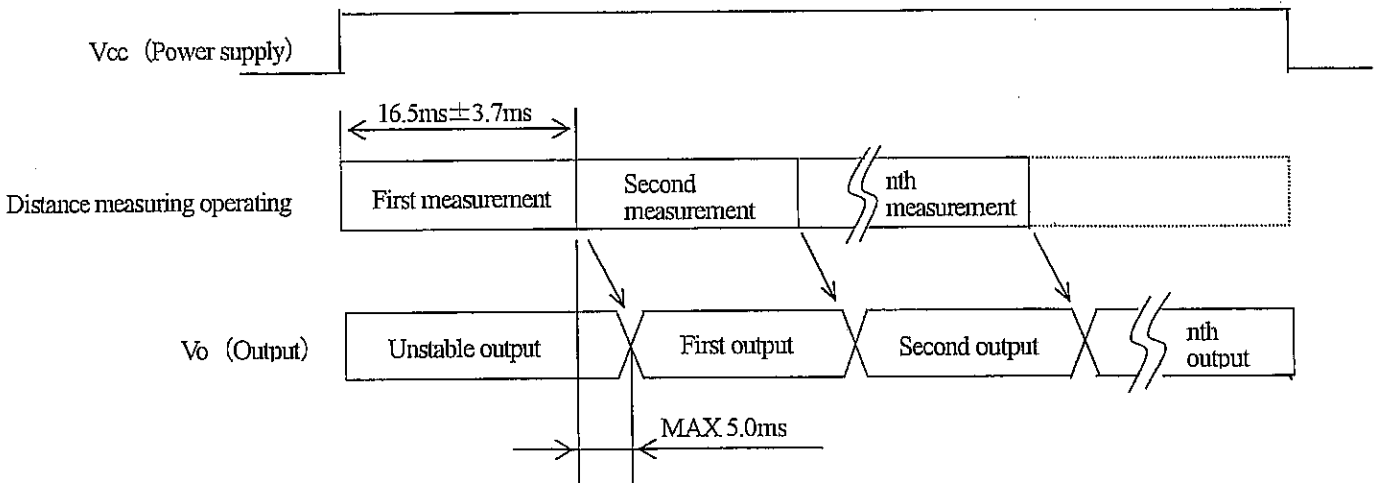
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Average supply current	Icc		-	30	50	mA
Measuring distance range	ΔL	(Note 1)	100	-	550	cm
Output terminal voltage	Vo1	L=100cm (Note 1)	2.3	2.5	2.7	V
Output voltage gap	ΔVo1	Output voltage gap between L=100cm and L=200cm (Note 1)	0.5	0.7	0.9	V
	ΔVo2	Output voltage gap(L=100cm→200cm) / Output voltage gap(L=200cm→550cm) (Note 1)	1.25	1.55	1.85	V

※ L : Distance to reflective object

Note 1 : Reflection : White paper (Made by Kodak Co., Ltd. gray cards R-27·white face, reflectance ; 90%)

Note 2 : The value measured at 550cm is the average value of 20 times of distance measuring operation.

#### Timing chart



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## 4. Reliability

The reliability of products shall meet 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	$\text{Initial} \times 0.8 > V_{o1}$ , $\Delta V_{o1}$ , $\Delta V_{o2}$ $V_{o1}$ , $\Delta V_{o1}$ , $\Delta V_{o2}$ $> \text{Initial} \times 1.2$	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 <sup>2</sup> , 6.0ms 3times/±X, ±Y, ±Z direction		(Note 1) 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) Measuring conditions are according to 3-3 Electro-optical characteristics.

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

## 5. Outgoing inspection

### (1) Inspection item

Characteristics ( $V_{o1}$ ,  $\Delta V_{o1}$ ,  $\Delta V_{o2}$ )

Appearance

### (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

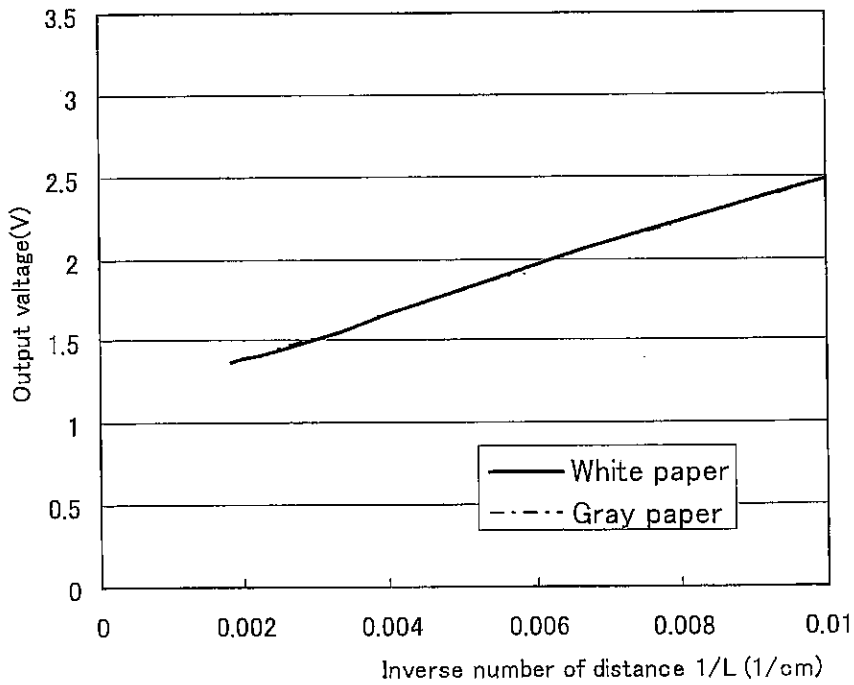
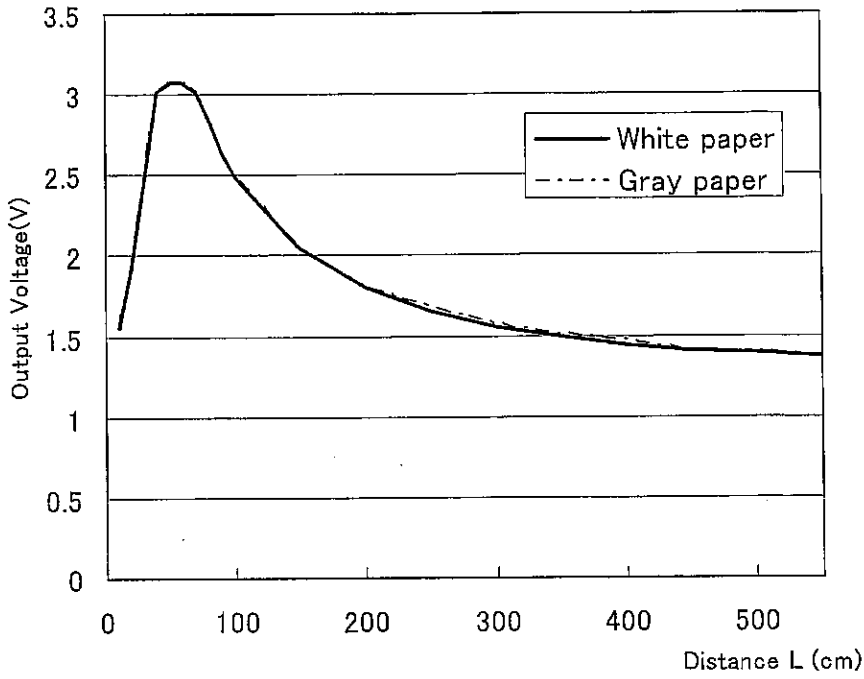
※ Crack, chip, scratch, stain

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



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6-1. Example of distance measuring characteristics (output)



Note. Reflection : White paper (reflectance : 90%)  
: Gray paper (reflectance: 18%)

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6-6

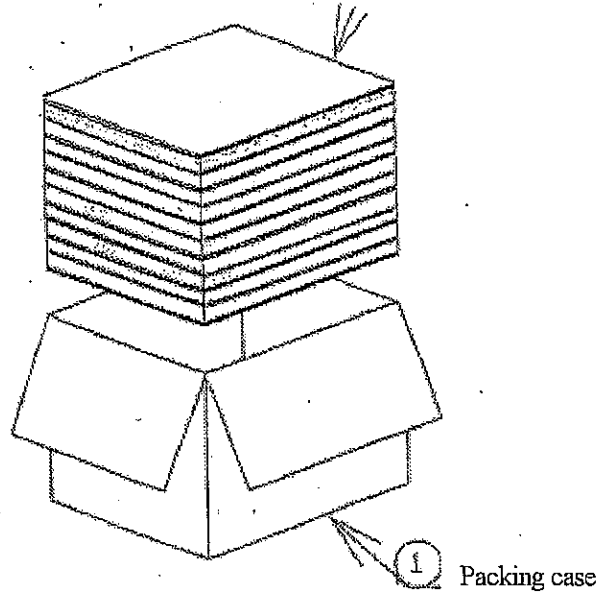
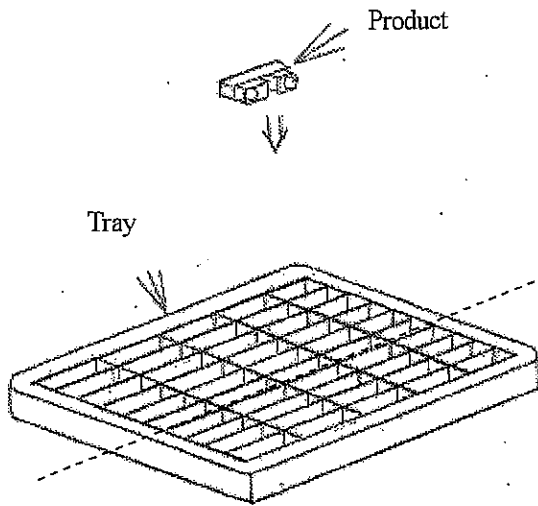


Fig.2

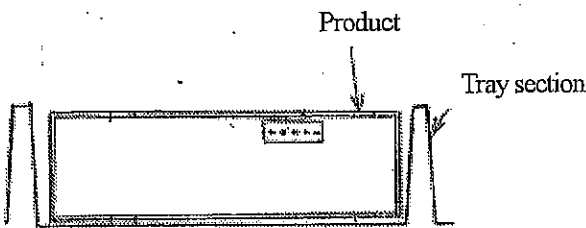


Fig.1

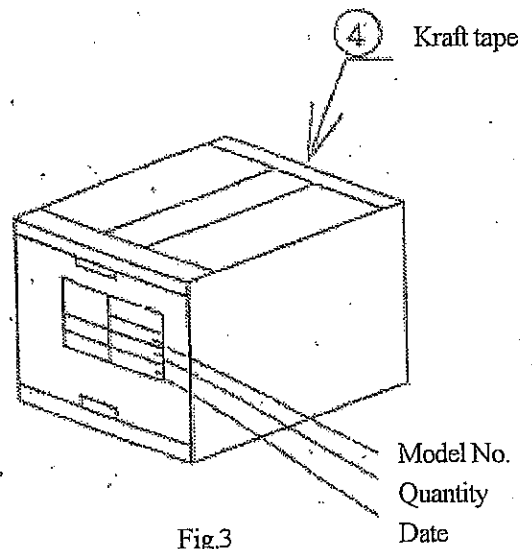


Fig.3

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. Indicates on the case "Model No.," "Quantity," "Inspection date"

4. Outside dimension : (364×344×218) mm