PRODUCT DOCUMENTATION

SHARP

Sharp Optoelectronic Components

GP2Y0D310K
1 Bit Output Distance Measuring Sensor

Issue Date: January 18, 2005
No: ED-05G009

Product name : 1 bit output distance measuring sensor

Model No. : GP2Y0D310K

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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 etc.

(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 etc.

(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 is applied for the outline and characteristics the 1 bit output distance measuring sensor ; Model No. GP2Y0D310K.

2. Outline

Refer to the attached drawing No. SOE005005.

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. Supplements

6-1 GP2Y0D310K Example of Output distance characteristics

Refer to the attached sheet, page 7.

6-2 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 (Methyl chloroform)

6-3 This manufacture does not contain the chemical materials regurated by RoHS

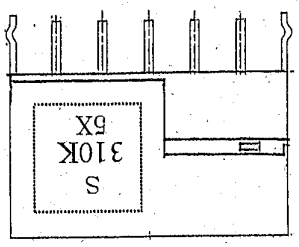
(except for the parts NOT regurated by RoHS)

6-4 Product mass : Approx. 1.5g

7. Notes

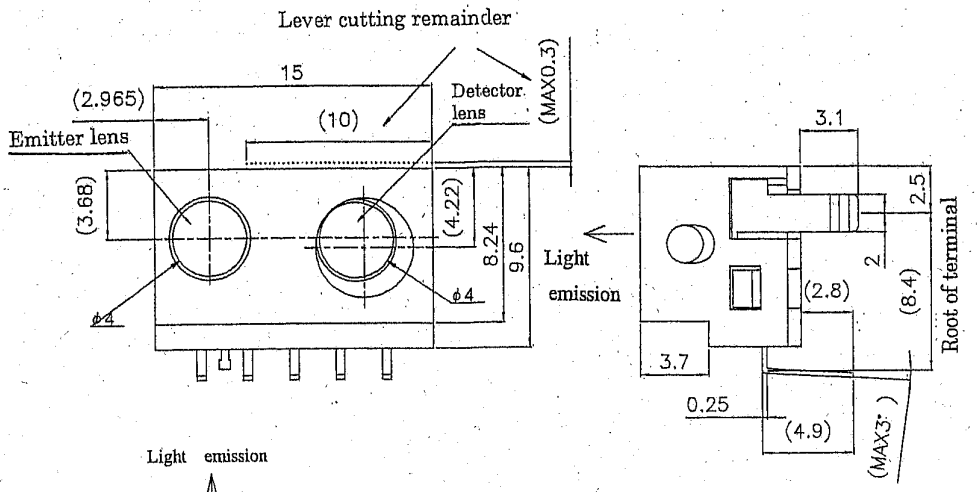
Refer to the attached sheet, page 8.

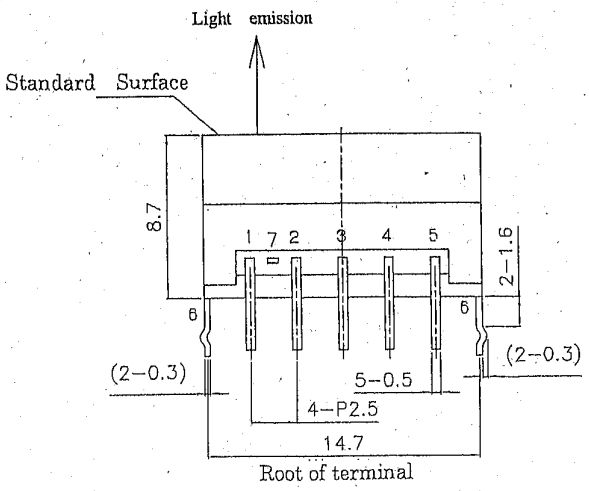
2. Outline Drawing No. SOE005005 Unit : mm Scale : 3/1

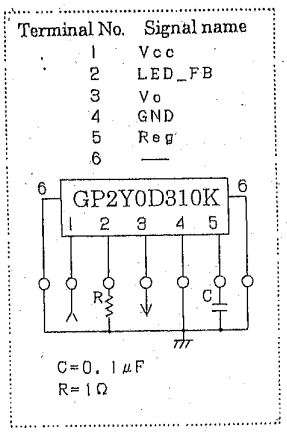


Stamp (Example)

S ..... SHARP
310K ..... Model name
5X
..... Mouth(1to9,X,Y,Z)
..... Year(2005:5)







※ Position of the detector lens is not fixed because the sensor output is adjusted by moving the lens.

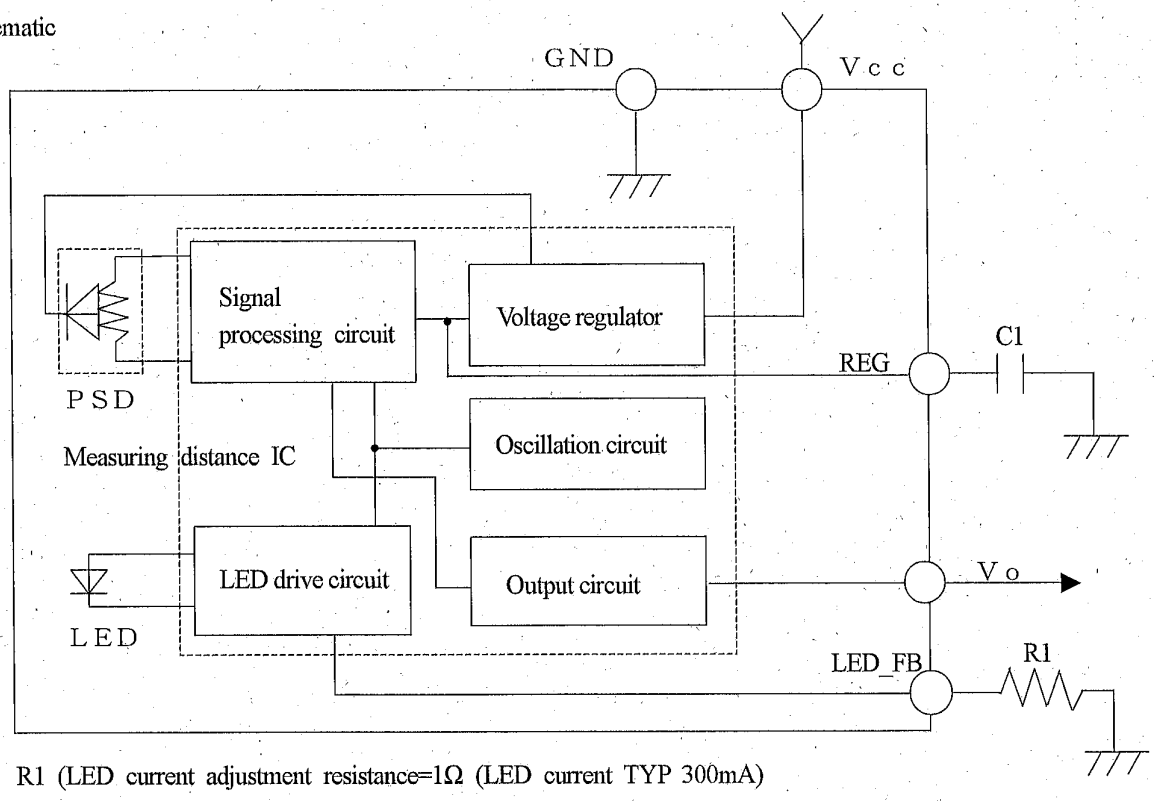
Note 1. This outline dimensions are subject to change due to necessity in development.

Note 2. Unspecified tolerances shall be ±0.3mm.

Note 3. ( ):Reference value.

Note4. Terminal No.7 which connect LED kathode is used for testing .
Please this terminal don't use.

3-1 Schematic



R1 (LED current adjustment resistance=1Ω (LED current TYP 300mA)
C1=0.1μF (It will be 1μF in mass production.)

3-2 Absolute maximum ratings (Ta=25℃, 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	℃	-
Storage temperature	Tstg	-20 to +70	℃	-

Operating supply voltage

Symbol	Rating	Unit	Remark
Vcc	4.5 to 5.5	V	-

3-3 Electro-optical Characteristicscv

(Ta=25℃, Vcc=5V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output terminal voltage	VoH	Output voltage at high level	Vcc-0.3	-	-	V
	VoL	Output voltage at low level	-	-	0.6	V
Output distance characteristics	Vo	(*1) (*2) (*3)	80	100	120	mm
Average supply current	Icc L	R1=1Ω (detection)	-	31	50	mA
Average supply current	Icc H	R1=1Ω (non detection)	-	18	35	mA

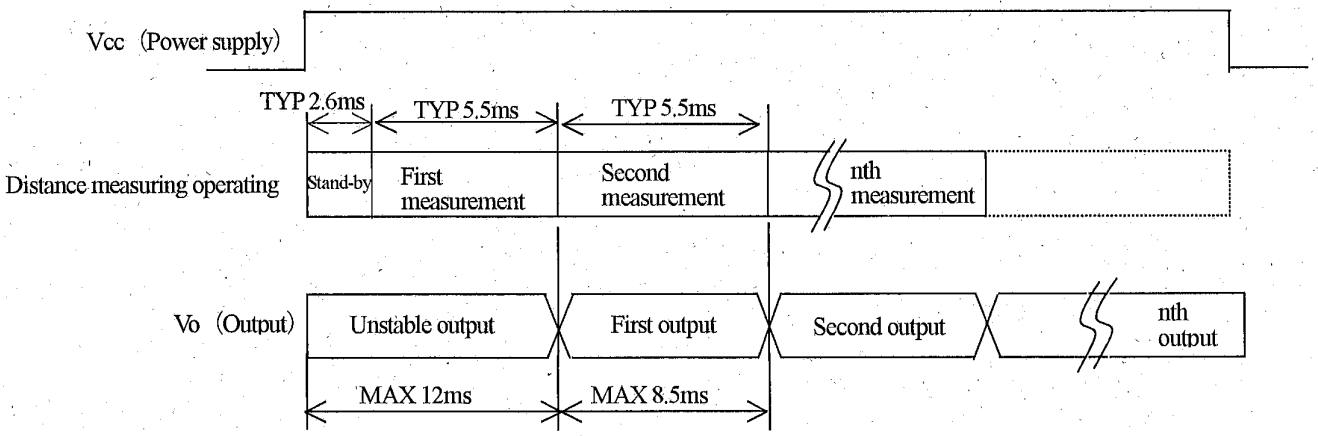
※ L : Distance to reflective object

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

(*2) We ship the device after the following adjustment: Output switching distance L=400mm±80mm must be measured by the sensor.

(*3) Output switching has a hysteresis width.
The distance specified by Vo should be the one with which the output L switches to the output H.

3-4 Timing chart



4. Reliability

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

Confidence level : 90%
LTPD : 20 or 40

No.	Test Items	Test Conditions	Failure Judgement Criteria	Samples (n) / Defective (c)
1	Temperature cycling	1 cycle -20℃ to +70℃ (30min.) (30min.) 25 cycle test	Initial × 0.8 > Vo Vo > Initial × 1.2 (Note 1)	n=11, c=0
2	High temp. and high humidity storage	+40℃, 90%RH, 500h		n=11, c=0
3	High temp. storage	+70℃, 500h		n=11, c=0
4	Low temp. storage	-20℃, 500h		n=11, c=0
5	Operation life (High temp.)	+60℃, Vcc=5V, 500h		n=11, c=0
6	Mechanical shock	1000m/s^2, 6.0ms 3times/±X, ±Y, ±Z direction		n=6, c=0
7	Variable frequency vibration	10 to 55 to 10Hz/1min. 2h/X, Y, Z direction overall amplitude : 1.5mm		n=6, c=0

(Note 1) Test conditions are according to 3-3 Electro-optical characteristics.
Vo : L=400mm±80mm at initial

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

5. Outgoing inspection

(1) Inspection lot

Inspection shall be carried out per each delivery lot.

(2) Inspection items

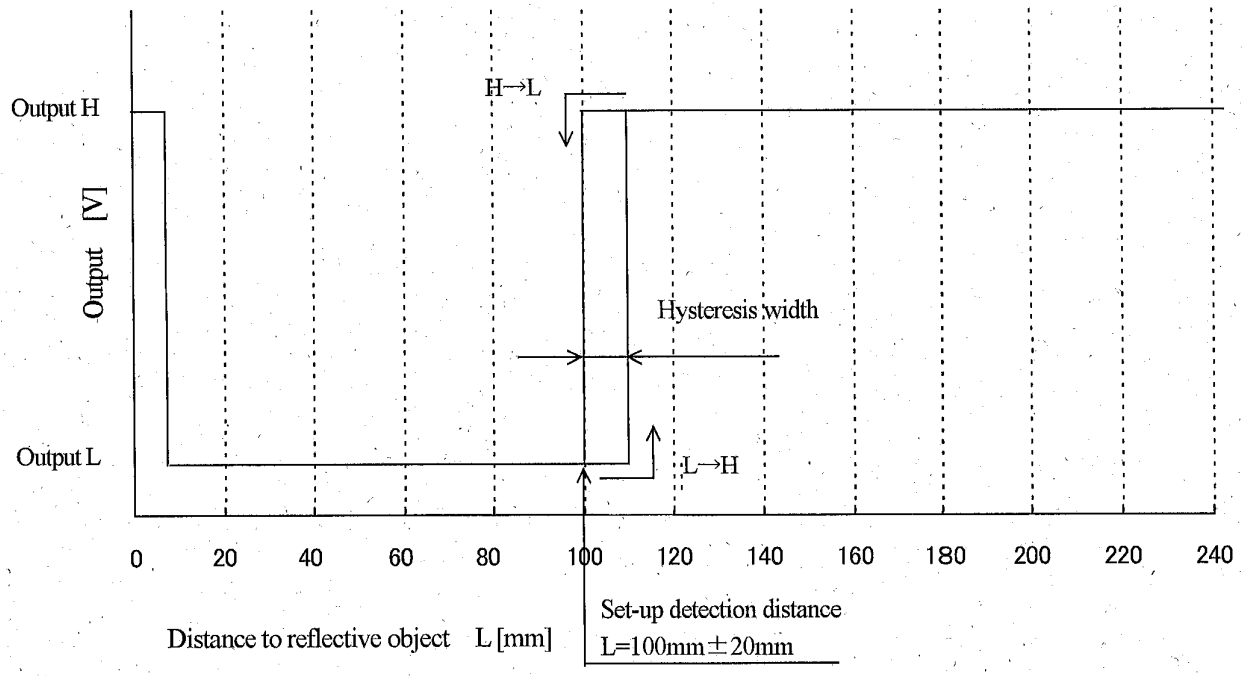
A single sampling plan, normal inspection level II based on ISO 2859 is applied.
The AQL according to the inspection items are shown below.

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.

6-1. GP2Y0D310K Example of Output distance characteristics



7. Notes

7-1 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 in actual application.

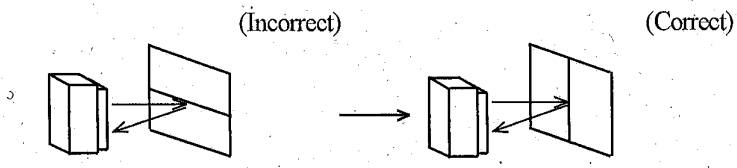
7-2 In case that protection is set in front of the emitter and detector portion, the protection cover which has the most efficient transmittance at the emitting wavelength range of LED for the GP2Y0D310K (λ=870nm±70nm), shall be recommended to use. The face and back of protection cover should be mirror polishing. Also, as there are cases that the characteristics may not be satisfied with according to the distance between the protection cover and the GP2Y0D310K or the thickness of the protection cover, please use the GP2Y0D310K 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.

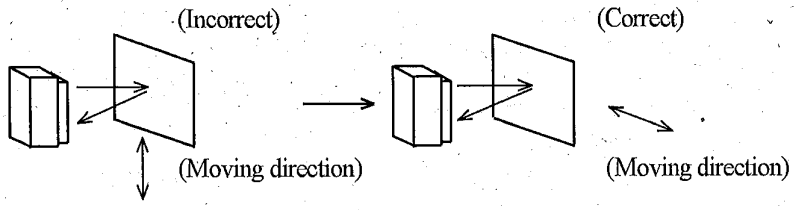
7-4 When the detector surface receive direct light from the sun, tungsten lamp and so on, there are cases that it can not measure the distance exactly. Please consider the design that the detector does not receive direct light from such light source.

7.5 Distance between sensor and mirror reflector can not sometimes measure exactly.
In case of changing the mounting angle of the GP2Y0D310K, it may measure the distance exactly.

7.6 In case that reflective object has boundary line clearly, there is cases that distance can not measure 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 47μF or more between Vcc and GND near the GP2Y0D310K.

7-9 Please don't do washing. Washing may deteriorate the characteristics of optical system and so on.

7-10 Soldering shall be done with a soldering iron and below 260°C, less than 5s and maximum 2 times.
Also, please pay attention not to put stress on lead terminals while soldering.
Please do not apply flow soldering because it may damage optical lens of the device.

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