

PREPARED BY: <i>S. Kawanishi</i>	DATE: <i>Feb. 23, 1994</i>	<h1>SHARP'</h1> <p>ELECTRONIC COMPONENTS GROUP SHARP CORPORATION</p> <h2>SPECIFICATION</h2>	SPEC. No. <i>ED-94009</i>
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			PAGE 9 Pages
		REPRESENTATIVE DIVISION OPTO-ELECTRONIC DEVICES DIV.	

DEVICE SPECIFICATION FOR

DISTANCE MEASURING SENSOR

MODEL No.

GP2D05

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2. Please obey the instructions mentioned below for actual use of this device. Contact a SHARP representative of sales office in advance when you intend to use SHARP devices for any applications other than those applications for general electronic equipment recommend by SHARP at (1).
 - (1) This device is designed for general electronic equipment. • Home appliance
Main uses of this device are as follows:
 - OA equipment • AV equipment • Home appliance
 - Telecommunication equipment (Terminal] • Measuring equipment, etc.
 - (2) Please take proper steps in order to maintain reliability and safety, in case this device is used for the uses mentioned below which require high reliability.
 - Unit concerning control and safety of a vehicle (air plane, train, automobile etc.)
 - Gas leak detection breaker • Traffic signal • Fire box and burglar alarm box
 - Other safety equipment. etc.
 - (3) Please do not use for the uses mentioned below which require extremely high reliability.
 - Space equipment • Telecommunication equipment (Trunk)
 - Nuclear control equipment • Medical equipment, etc.

CUSTOMER'S APPROVAL

DATE _____

BY _____

DATE *Feb 23 '94*

PRESENTED BY *T. Matsumura*

T. Matsumura,
Department General Manager of
Engineering Dept.,II
Opto-Electronic Devices Div.
ELECOM Group
SHARP CORPORATION

1. Application

This specification applies to the outline and characteristics of 1bit output type **distance** measuring sensor, Model No. GP2D05.

2. Outline

Refer to the attached drawing No. SOD0009 11.

3. Ratings and characteristics

Refer to the attached sheet, page 4 to 6.

4. Reliability

Refer to the attached sheet, page 7.

5. Incoming inspection

Refer to the attached sheet, page 8.

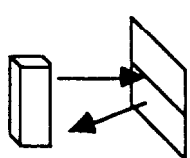
6. Notes

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

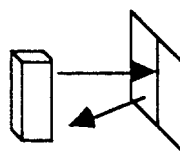
6-2 External disturbing light shall be consider no inside directly to detector.

6-3 Distance between sensor and mirror reflector can not sometimes measure exactly. In case of changing the angle between sensor and mirror reflector, it may measure **distance** exactly.

6-4 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.



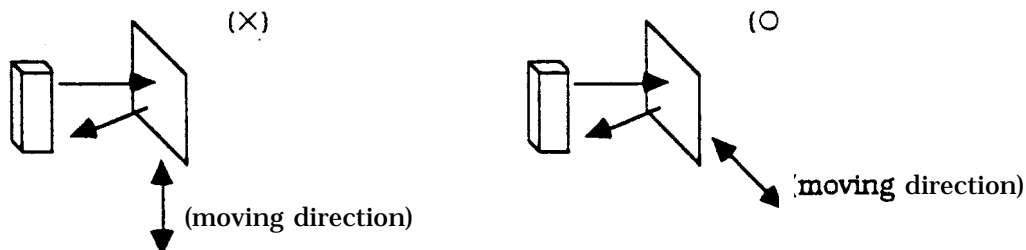
(X)



(O)

REFERENCE

6-5 In order to increase measuring error by moving direction of object. we recommend to mount sensor like below drawing.



6-6 In order to stabilize power supply line, we recommend to connect a by-pass capacitor of 10 μ For more between Vcc and GND near the GP2D05.

6-7 Case material is conductive resin. In order to take away influence of output by external disturbing noise, we recommend to earth case.

6-8 Please don't do washing. Washing deteriorates the characteristics of optical system and so on.

7. Supplement

7-1 GP2D05 Output distance characteristics (Example) :

Refer to the attached sheet, page 9.

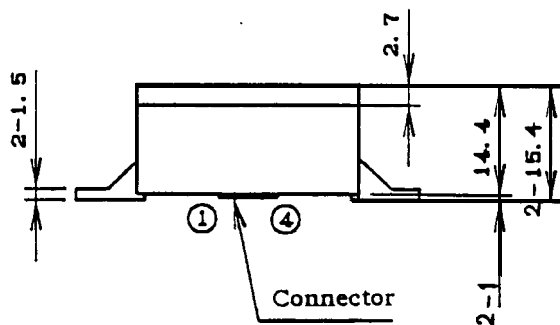
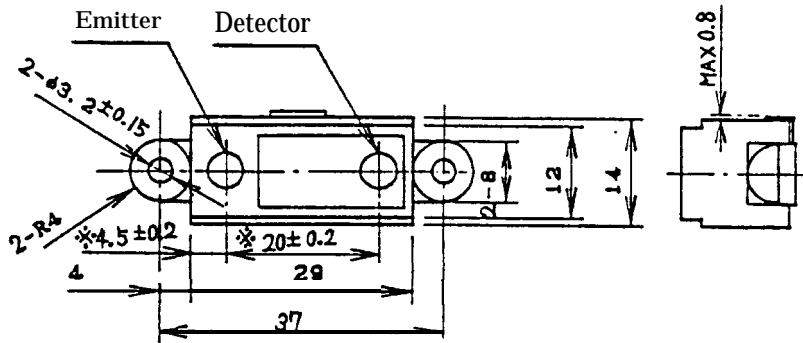
8. Others

8-1 Any doubt as to this specification shall be determined in good faith upon mutual consultation of the both parties.

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2. Outline (Drawing No. SODOO0911) unit : mm

- 1) * dimension shall be reference lens center.
- 2) Unspecified tolerance shall be $\pm 0.3\text{mm}$.



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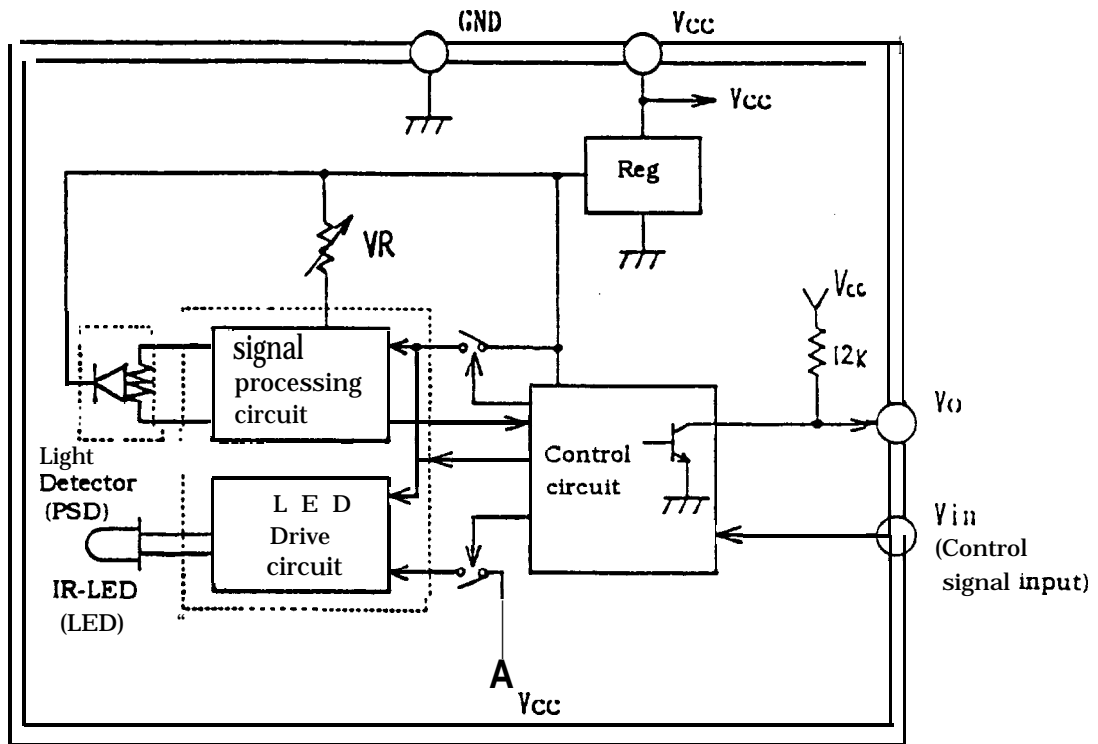
Connector arrangement

	Pin name
①	V _{in}
②	GND
③	V _o
④	V _{cc}

REFERENCE

3. Ratings and characteristics

3-1 Constitution diagram



3-2 Absolute maximum ratings

(Ta=25°C, Vcc=5V)

Parameter	Symbol	Rating	unit	Remark
Supply voltage	Vcc	-0.3 to +10	V	
Input terminal voltage	Vin	-0.3 to +3	V	Open Drain drive input
Output terminal voltage	BVO	-0.3 to +10	V I	
Operating temperature	Topr	-10 to +60	°C	
Storage temperature	Tstg	-20 to +70	°C	

.Operating Supply Voltage

symbol	Rating	unit	Remark
Vcc	4.4 to 7	v	

3-3 Electro-optical Characteristics

(Ta=25°C, Vcc=5V)

Parameter	symbol	Conditions	Min.	Typ.	Max.	Unit
Measuring distance range	ΔL	(*1) (*3)	10	-	80	cm
Output terminal voltage	V_{OH}	Output voltage at high level (*1)	Vcc -0.3	-	-	v
	V_{OL}	Output voltage at low level (*1)	-	-	0.3	
Output distance characteristics	L	(*1) (*2)		24	-	cm
Average supply current	Icc	(*4)		10	22	mA
Waiting mode supply current	Iccoff	(*5)		3	8	μA
Vin terminal current	Ivin	Vin=0V		-160	-270	μA

※ L : Distance to reflective object

(*1) Using reflective object : White paper (Made in Kodak Co. Ltd. gray chart R-27 .white surface, reflective ratio ; 90%)

(*2) To switch output, and adjustable to 24cm adjusting VR in the sensor

(*3) Distance measuring range (Condition; To adjust output changing distance L=24cm)

(*4) Average current during distance measure applying following Vii input signal

(*5) Current consumption when Vin terminal is high (current off) condition

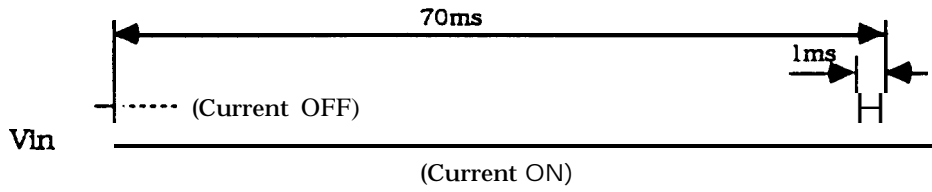
(*6) Vin terminal : Open drain drive input

Drive condition ; Vin off: Vin terminal voltage $\geq 2.6V$

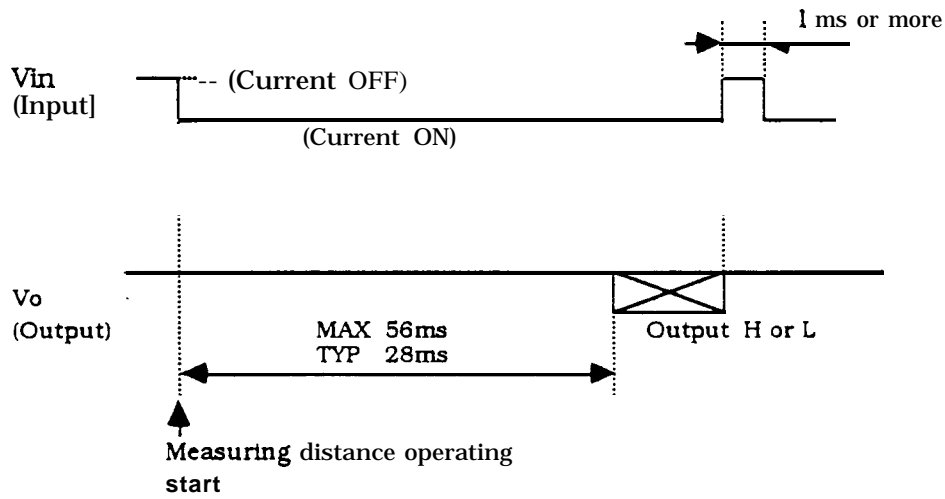
Vin on : Vin terminal voltage $\leq 0.2V$

REFERENCE

3-4 V_{in} input signal using for measurement



3-5 Timing chart



4. Reliability

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

Confidence level : 90%

LTPD : 20%/ 40%

No.	Test Items	Test Conditions	Failure Judgement criteria	Samples (n)
				Defective(C)
1	Temperature cycling	1 cycle -20°C ↔ +70°C (30min.) (30min.) 20 cycle test	Initial $\times 0.8 \leq V_o$ $\leq \text{Initial} \times 1.2$ (*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	-20°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 {100G}, 6.0ms 3times / ±X, ±Y, ±Z direction		n= 6, C=0
7	Variable frequency vibration	10 to 55 to 10Hz/1min. Overall amplitude : 1.5mm 2h/X, Y, Z direction		n= 6, C=0

- 1 Test conditions are according to 3-3 Electro-optical characteristics.
Vo : $L=24 \pm 2\text{cm}$ at initial
- 2 After test, measurement shall be measured after leaving under the normal temperature and the normal humidity for two hours. But, no dew point.
- 3 Vin input signal at operating test (No. 5) is accordance with 3-4.
However, cycle of Vii input signal is one seconds.

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5. Incoming 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 MIL-STD- 105D shall be adopted.

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

※ split

Chip

Scratch

stain

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

REFERENCE PAGE

GP2D05 Output distance characteristics (Example)

Reflective object
White : ○ (Reflection ratio 90%)
Gray : × (Reflection ratio 18%)

