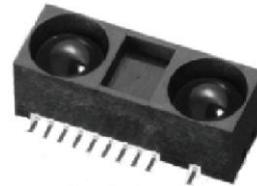# GP2Y0A60SZ0F
GP2Y0A60SZLF

Distance Measuring Sensor Unit
Measuring distance : 10 to 150 cm
Analog output type

■Description

GP2Y0A60SZ0F/GP2Y0A60SZLF is a distance measuring sensor unit, composed of an integrated combination of PSD (position sensitive detector) , IR-LED (infrared emitting diode) and signal processing circuit.
The variety of the reflectivity of the object, the environmental temperature and the operating duration are not influenced easily to the distance detection because of adopting the triangulation method.
This device outputs the voltage corresponding to the detection distance. So this sensor can also be used as a proximity sensor.

■Features

1. Distance measuring sensor is united with PSD, infrared LED and signal processing circuit
2. Distance measuring range : 10 to 150 cm
3. Compact size (22.0 × 8.0 × 7.2mm)
4. Long distance measuring type
   (No external control signal required)
5. Analog output type

■Agency approvals/Compliance

1. Compliant with RoHS directive (2002/95/EC)
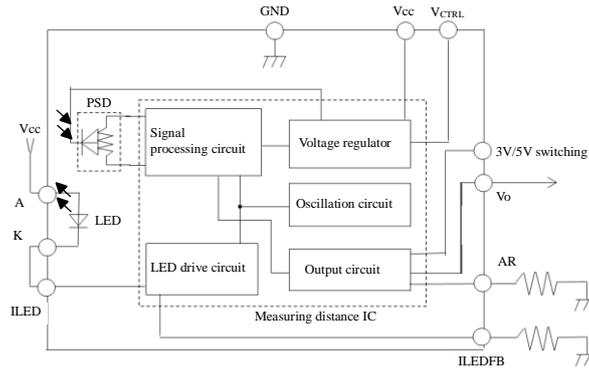
■Applications

1. Touch-less switch
   (Sanitary equipment, Control of illumination, etc)
2. Sensor for energy saving
   (ATM, Copier, Vending machine, Laptop computer, LCD monitor, etc)
3. Amusement equipment
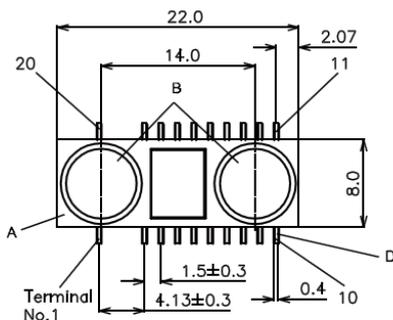   (Robot, Arcade game machine, etc)

■Schematic

・Showing main terminal
・Please use an electric source with an output current of 400mA or more because LED pulse current is more than 300mA.
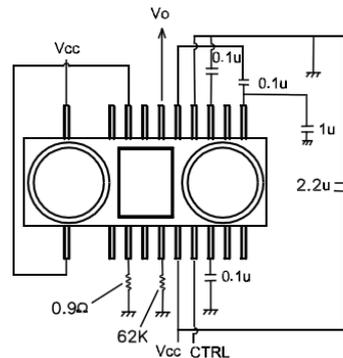
■Outline

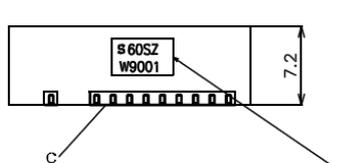GP2Y0A60SZ0F

(Drawing No.CY14442J02)   Scale : 2/1   Unit : mm

Connenction Diagram

Above connection is the case of Vcc = 3V.
In the case of Vcc=5V, terminal No.4 is
connected to GND.

Materials

A	Case	Carbonic ABS (Conductive resin)
B	Lens	Acrylic acid resin(Visible light cut type)
C	Device coding	PPS (color : Black)
D	Terminal	42ALLOY (Pd−Au plating)

1. Unspecified tolerances shall be
±0.3mm.

2.( ):Reference Value

3.Dimension of terminal position is
at the root of terminal.

4.Parallelism of terminal is 0.15.

Stamp (Example)

SHARP : 「S」
GP2Y0A60SZ0F
: 「60SZ」

Lot No.

Month (1 to 9,0,N,D)
(DIN standart symbol)

Year (DIN standard symbol)

DIN standard year production
(It repeats itself by a period for 20 years
except for G,I,O,Q,Y and Z.)

Years	Symbol
2008	W
2009	X
2010	A
2011	B
2025	T
2026	U

No.	terminal name
1	cathode
2	NC
3	ILEDFB
4	Vcc SHIFT
5	AR
6	Vcc
7	CTRL
8	CH1
9	NC
10	NC
11	REG
12	NC
13	CH2
14	GND
15	CINT
16	Vo
17	NC
18	ILED
19	NC
20	anode

GP2Y0A60SZLF

(Drawing No.CY14591i02)   Scale : 2/1   Unit : mm
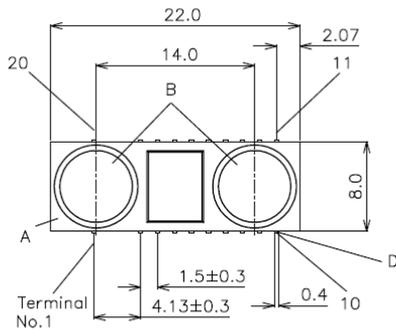
Connection diagram

*1) Above connection is the case of Vcc = 3V.
In the case of Vcc=5V, terminal No.4 is
connected to GND.

*2) The AR terminal connects 36kΩ.

Material

A	Case	Carbonic ABS (Color : Black)
B	Lens	Acrylic acid resin (Visible light cut type)
C	Device coating	PPS (Color : Black)
D	Lead pin	42ALLOY (Pd−Au plating)

Stanp (Example)

S 60SZL — SHARP : 「S」
W9 0 0 1 — GP2Y0A60SZLF : 「60SZLF」
     LOT No.
     Month (1 to 9,O,N,D)
     (DIN Standard symbol)
     Year (DIN Standard symbol)
     DIN Standard year production
     (Remove G,I,O,Q,Y,Z)
     (It repeats itself by a period for 20 years)

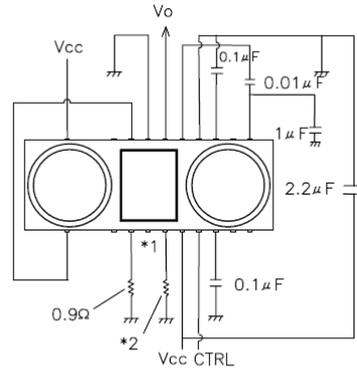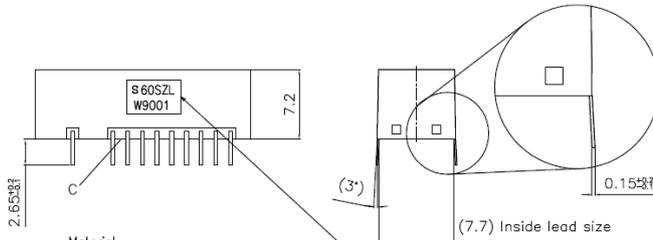| terminal No.	terminal Name
1	cathode
2	GND
3	ILEDFB
4	3V/5V switching
5	AR
6	Vcc
7	CTRL
8	CH1
9	NC
10	REG
11	REG
12	NC
13	CH2
14	GND
15	CINT
16	Vo
17	T
18	ILED
19	GND
20	anode

Year	Symbol
2008	W
2009	X
2010	A
2011	B
⋮	⋮
2025	T
2026	U

Terminals No.2, 14, 19 are connected in device.
Thus GP2Y0A60SZLF operates by connection of
arbitary one terminal to GND.

Terminals No.10, 11 are connected in device.
Thus GP2Y0A60SZLF operates by connection of
either terminal.

(Note1) Unspecified tolerances shall be ±0.2mm.

(Note2) （　）:Reference value

(Note3) lead terminal size is a root size of the lead.

■Absolute maximum ratings

(Ta=25°C)

Parameter	Symbol	Ratings	Unit	Remark
Supply voltage	Vcc	-0.3 to +5.5	V	-
Output terminal voltage	Vo	-0.3 to Vcc+0.3	V	-
Input terminal voltage 1	-	-0.3 to V_{REG} +0.3	V	Terminal (NC,CH1,CH2,CINT,AR,T)
Input terminal voltage 2	-	-0.3 to Vcc+0.3	V	Terminal (CTRL)
Operating temperature	Topr	-10 to +60	°C	-
Storage temperature	Tstg	-40 to +70	°C	-
Soldering temperature	Tsol	260	°C	5s or less/time up 2 times

■Recommended operating conditions

Parameter	Symbol	Rating	Unit	Remark
Supply voltage	Vcc	4.5 to 5.5	V	5V
Supply voltage	Vcc	2.7 to 3.6	V	3V
High level input voltage	$V_{CTRL}H$	2.3 to Vcc	V	Operating
Low level input voltage	$V_{CTRL}L$	MAX 0.2	V	Stand-by state

■Electro-optical Characteristics

(Ta=25°C, Vcc=3V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Measuring distance range	ΔL	(Note 1)	10	-	150	cm
Output terminal voltage	Vo	L=150cm (Note 1)	0.05	0.35	0.65	V
Output voltage difference	ΔVo	Output change at L change (10cm → 150cm) (Note 1)	1.35	1.60	1.85	V
Average supply current	Icc1	Vcc=3V, V_{CTRL} =3V	-	33	50	mA
Stand-by supply current	Icc2	Vcc=3V, V_{CTRL} =0V	-	-	5	μA

(Ta=25°C, Vcc=5V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Measuring distance range	ΔL	(Note 1)	10	-	150	cm
Output terminal voltage	Vo	L=150cm (Note 1)	0.15	0.65	1.15	V
Output voltage difference	ΔVo	Output change at L change (10cm → 150cm) (Note 1)	2.75	3.00	3.25	V
Average supply current	Icc1	Vcc=5V, V_{CTRL} =5V	-	33	50	mA
Stand-by supply current	Icc2	Vcc=5V, V_{CTRL} =0V	-	-	5	μA

※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%)

■**Timing Chart**

Vcc (Power supply)

V_CTRL

16.5ms ± 3.7ms

Distance measuring operating | First measurement | Second measurement | | nth measureme

Vo (Output) | Unstable output | First output | | Unstable output | nth output

Second output

MAX 5.0ms
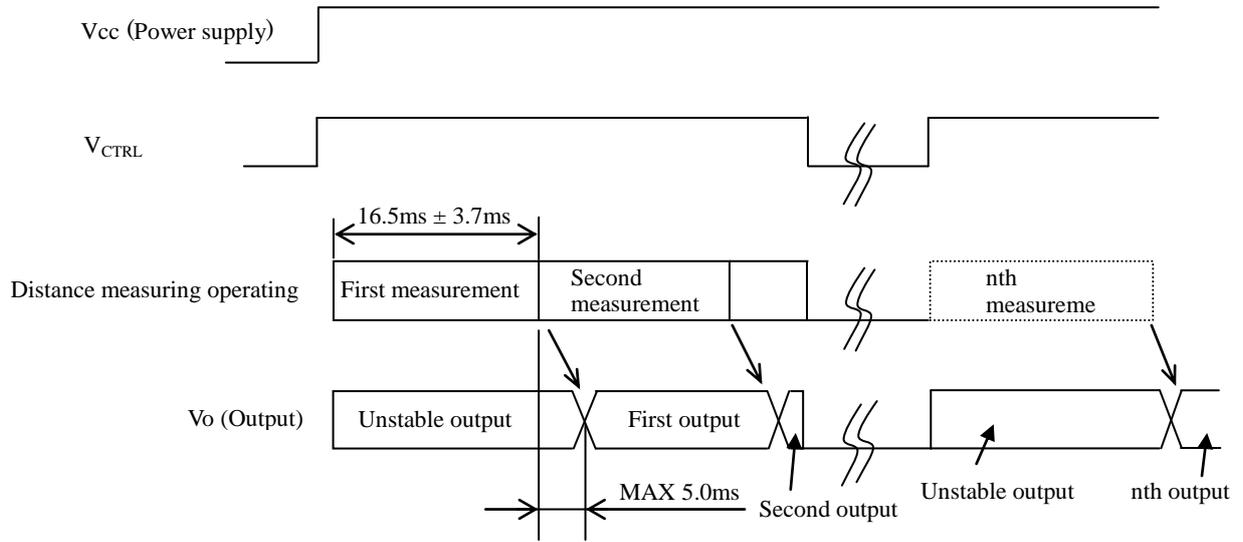
■Supplements

●Example of output distance characteristics
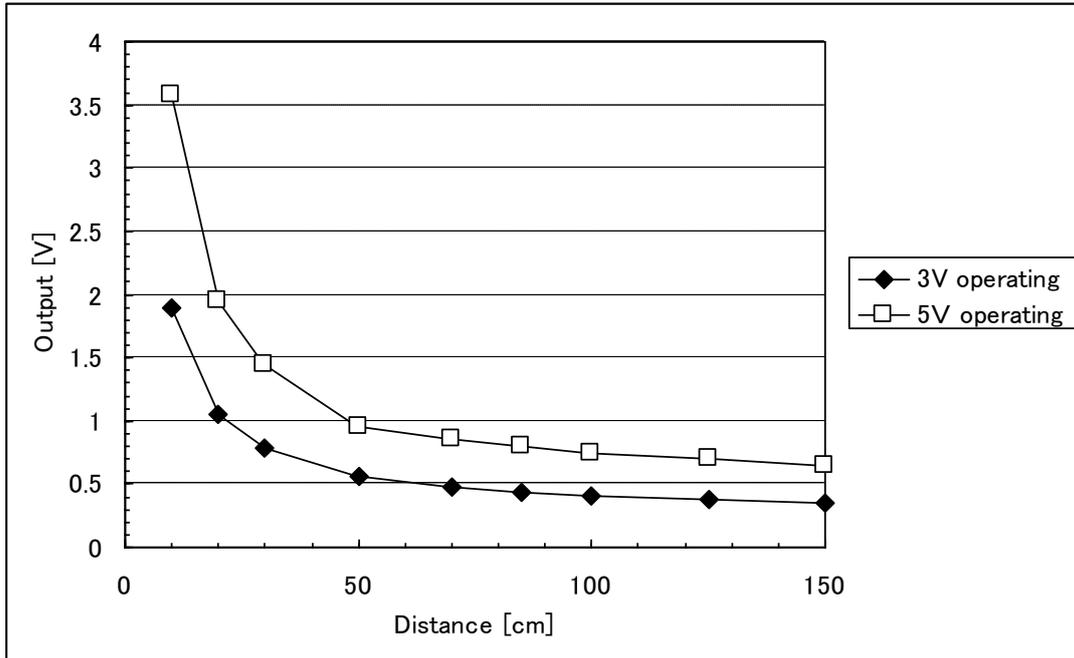
White paper(Reflectance ratio 90%)

●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)

●Product mass : Approx. 1.1g (TYP)

●This product does not contain the chemical materials regulated by RoHS directive.

　　(Except for the NOT regulated by RoHS directive.)

●Compliance with each regulation

　　1) The RoHS directive(2002/95/EC)

　　　This product complies with the RoHS directive(2002/95/EC) .

　　　Object substances: mercury, lead (except for lead in high melting temperature type solders and glass of electronic components), cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

　　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).

Category	Toxic and hazardous substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr^{6+})	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Distance measuring sensor	✓	✓	✓	✓	✓	✓

　✓: indicates that the content of the toxic and hazardous substance in all the homogeneous materials of the part is below the concentration limit requirement as described in SJ/T 11363-2006 standard .
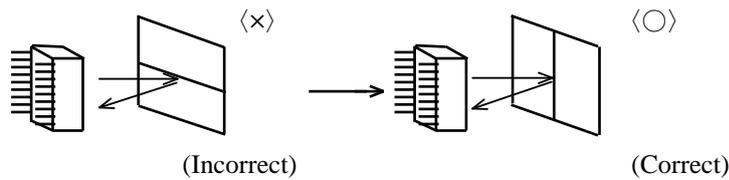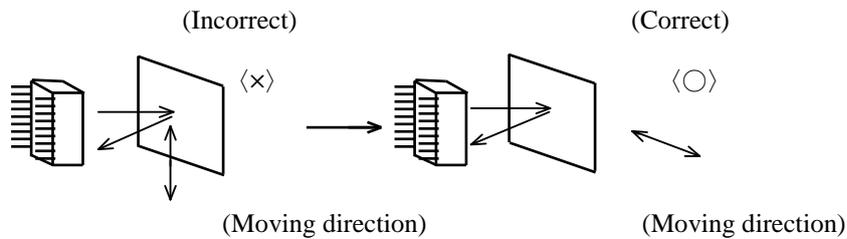
■Notes

[Advice for the optics]
- 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.
- 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 (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 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]
- 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.
- 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.
- Distance between sensor and mirror reflector cannot be measured exactly.
- 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 are parallels, it is possible to decrease deviation of measuring distance.

⟨×⟩ (Incorrect)　　　　⟨○⟩ (Correct)

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

(Incorrect) ⟨×⟩　　　　(Correct) ⟨○⟩
(Moving direction)　　　　(Moving direction)

[Notes on handling]
- 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.
- Please solder under the condition below within 2 times.
  - ・below 260°C at the tip of soldering tool
  - ・less than 5 seconds

  Please take care not to let any external force exert on lead pins when soldering.
  Please do not do soldering by reflow and flow-soldering.

■Packing specification

GP2Y0A60SZ0F

20 sleeves (5 lines×5stairs)

Sleeve

Product

Packing case

Indication side

1. Packing number
   MAX 20 pieces per sleeve.
   MAX 500 pieces per case.
2. Close the lid of case and seals with kraft tape, and fill in the blanks of Model No., Quantity and Date.
3. Outside : 486×64×77 （mm）
4. Indication
   The content of the 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

GP2Y0A60SZLF

20 sleeves (5 lines×4stairs)

Sleeve

Product

Packing case

Indication side

1. Packing number
   MAX 20 pieces per sleeve
   MAX 400 pieces per case.
2. Close the lid of case and seals with kraft tape, and fill in the blanks of Model No., Quantity and Date.
3. Outside ： 486×64×77 （mm）
4. Indication
   The content of the 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

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--- Office automation equipment
--- Telecommunication equipment [terminal]
--- Test and measurement equipment
--- Industrial control
--- Audio visual equipment
--- Consumer electronics
(ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection

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--- Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
--- Traffic signals
--- Gas leakage sensor breakers
--- Alarm equipment
--- Various safety devices, etc.
(iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
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--- Telecommunication equipment [trunk lines]
--- Nuclear power control equipment
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