GP2Y5D91S00F

Distance Measuring Sensor Unit
Digital output (15 mm) type
Capable of operation at high
temperature

■Description

GP2Y5D91S00F is distance measuring sensor unit,
composed of an integrated combination of PSD
(position sensitive detector), IRED (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.
The output voltage of this sensor stays high in case
an object exists in the specified distance range. So
this sensor can also be used as proximity sensor.

■Agency approvals/Compliance

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

■Applications

1. Touch-less switch
   (Sanitary equipment, Control of illumination, etc.)
2. Robot cleaner

■Features

1. Digital output type
2. Short distance type
   Detecting distance : Typ. 15 mm
3. Capable of operation at high temperature
   Operating temperature : -30 to +105 °C
4. Low profile
   Package size : 14.7×9.8×9.3 mm
5. Consumption current : Typ. 7 mA
6. Battery drive compatible
   Supply voltage : 2.7 to 6.2 V
7. Sunlight tolerance

■Outline

1) Unspecified tolerance shall be ±0.3mm.
2) The dimensions in parenthesis are shown for reference.
3) The dimensions value in ※1 does not include Burr of the board. (Max. value of burr is 0.3.)

Pin arrangement

	Signal name
①	Vcc
②	GND
③	Vo

Connector : J.S.T.TRADING COMPANY, LTD.　S3B-ZR

(Scale : 3/1)　　(Unit : mm)

Drawing No. CY13550i02
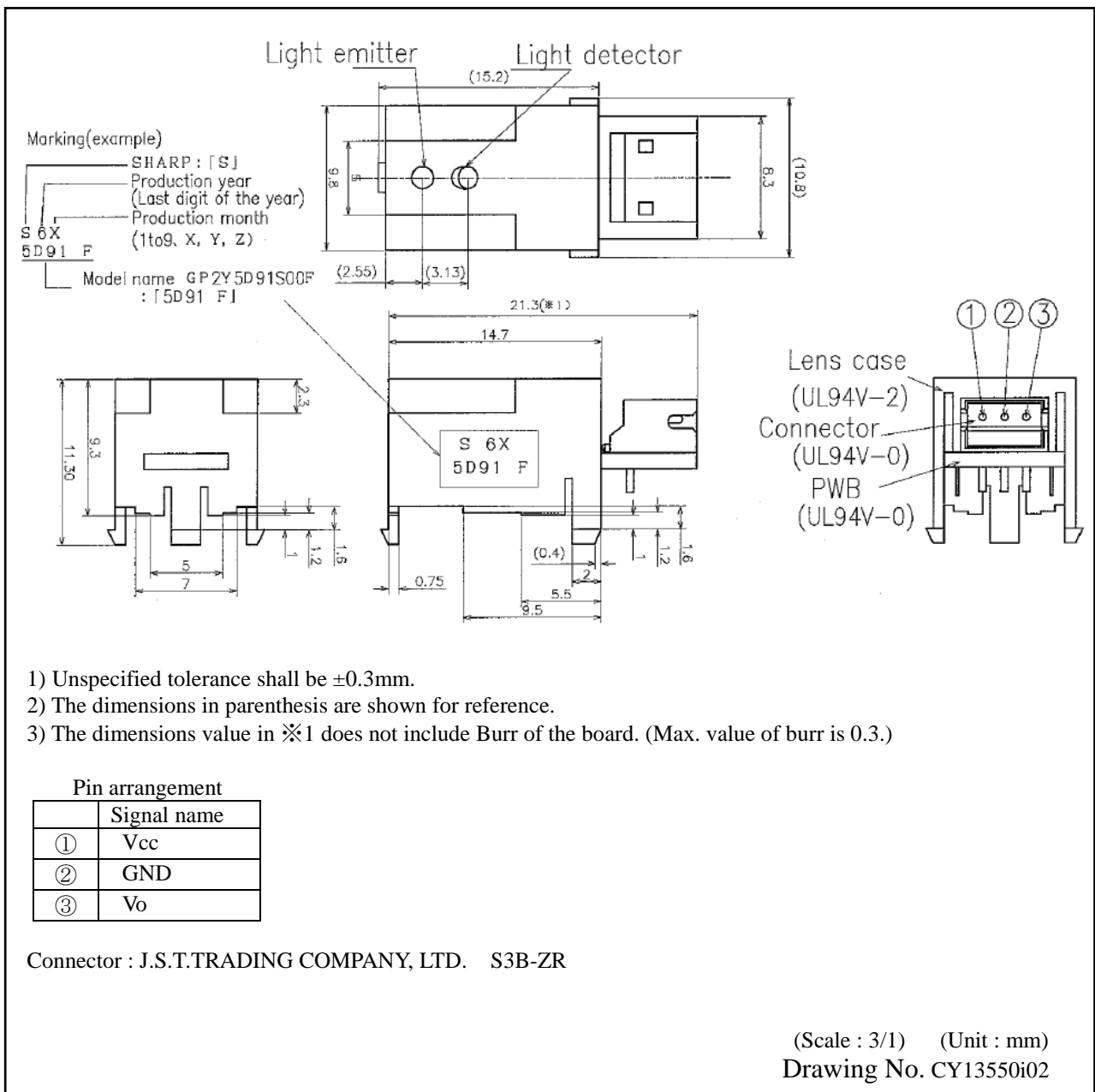
■Schematic
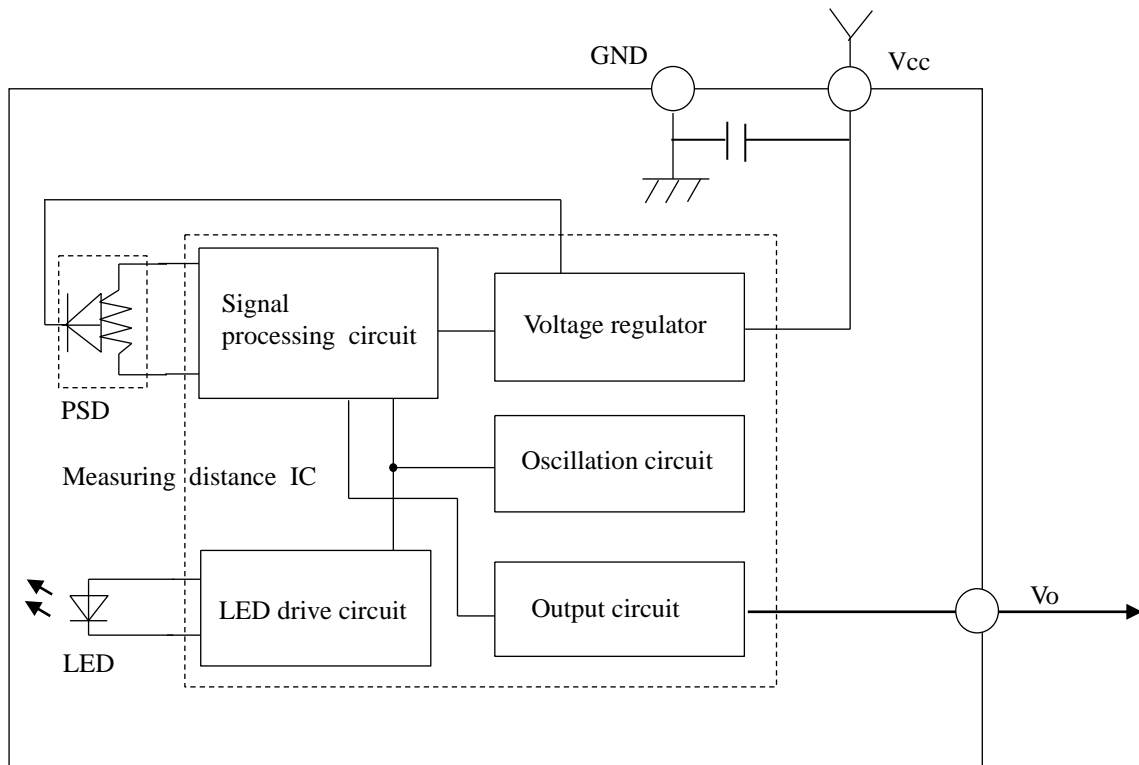
LED pulse current : Typ.100mA

■Absolute maximum ratings

(Ta=25°C)

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	-30 to +105	°C	-
Storage temperature	Tstg	-35 to +105	°C	-

Operating supply voltage

Symbol	Rating	Unit	Remark
Vcc	2.7 to 6.2	V	-

■Electro-optical Characteristics

(Ta=25°C, Vcc=5V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output terminal voltage	VoH	Output voltage at high level	Vcc-0.6	-	-	V
	VoL	Output voltage at low level	-	-	0.6	V
Detecting distance	Vo1	(*1) (*2)	12.5	15	-	mm
Non-detecting distance	Vo2	(*1) (*3)	-	-	20	mm
Average supply current	Icc 1	Vcc=5V (*4) (at shortest operation time)	-	7	12	mA
Average supply current	Icc 2	Vcc=5V (*4) (at longest operation time)	-	13	20	mA

※ L :　Distance to reflective object

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

(*2)　GP2Y5D91S00F has hysteresis width of output voltage when changing output ("H"→"L").
　　　The definition of V01 such as detecting distance characteristic is defined as the distance when output voltage changing from non-detecting condition (output"H") to detecting condition (output"L").

(*3)　GP2Y5D91S00F has hysteresis width of output voltage when changing output ("L"→"H").
　　　The definition of V02 such as non-detecting distance characteristic is defined as the distance when output voltage changing from detecting condition (output"L") to detecting condition (output"H").

(*4)　GP2Y5D91S00F has LED emitting control which has 15times-LED emitting (4times-obtaining data per 1time-LED emitting) and stop the LED-emitting and the output "L"or"H" when either of detecting condition ("L") or non-detection ("H") comes up to 30times during 15times-LED emitting period.
　　　It means that average consumption current will be 2 conditions as shortest operation time is 8times –LED emitting and longest operation time is 15times-LED emitting.

■Timing chart
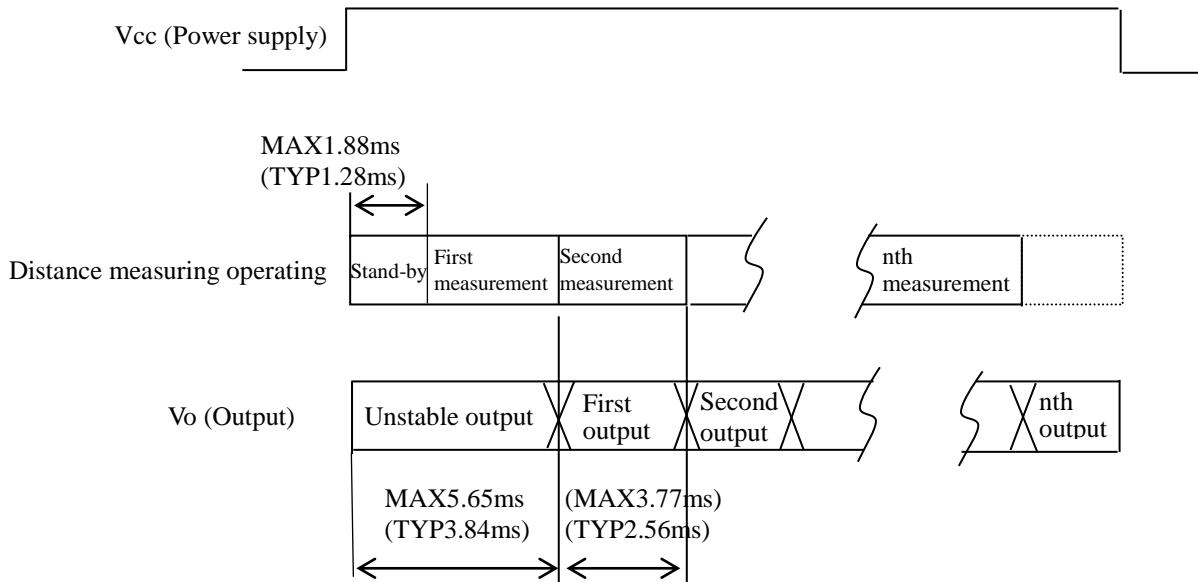
■Supplements

●GP2Y5D91S00F Example of Output distance characteristics
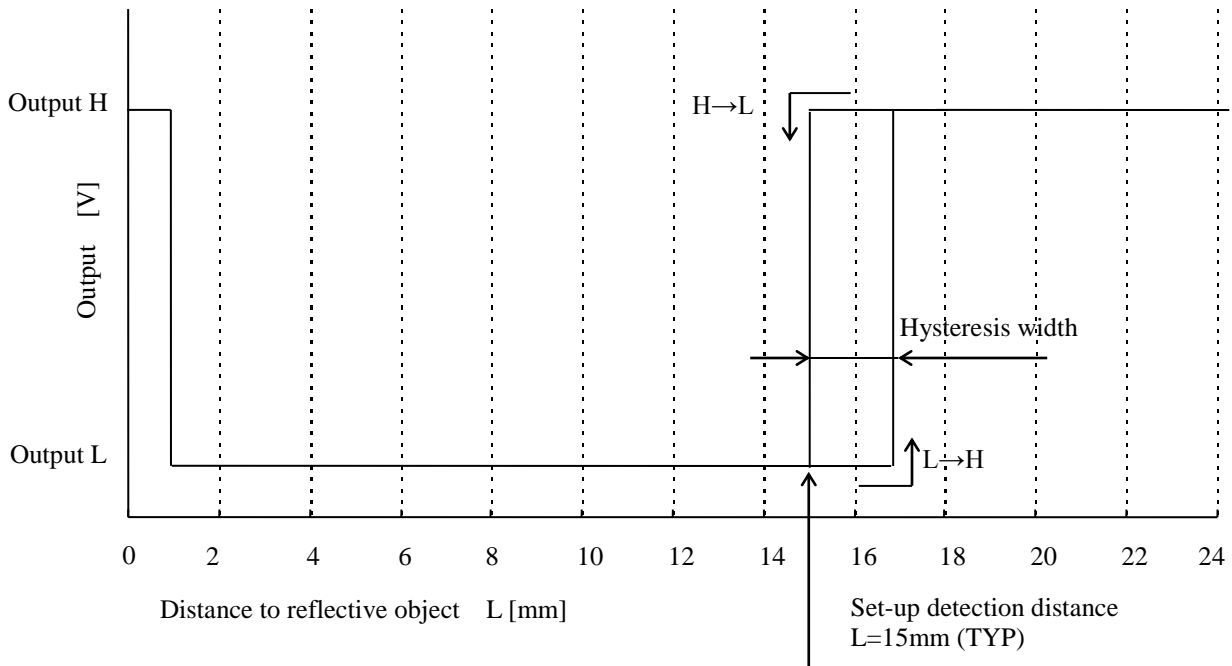
●This product shall not contain the following materials.
Also, the following materials shall not be used in the production process for this product.
Materials for ODS :   CFCs, Halon, Carbon tetrachloride 1.1.1-Trichloroethane (Methyl chloroform)

●Product mass :   Approx. 3.6g (TYP)

●This product does not contain the chemical materials regulated by RoHS directive.
(Except for the NOT regulated by RoHS directive.)

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

●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[1] and glass of electronic components), cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)
    [1] : i.e. tin-lead solder alloys containing more than 85% lead
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(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Voltage regulator	＊	✓	✓	✓	✓	✓

✓ : 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.

＊ : indicates that the content of the toxic and hazardous substance in at least one homogeneous material of the part exceeds the concentration limit requirement as described in SJ/T 11363-2006 standard.

Lead in high melting temperature type solders (i.e. tin-lead solder alloys containing more than 85% lead) and glass of electronic components (designated by "＊" in the above table) are exempt from the RoHS directive (2002/95/EC), because there is no effective way to eliminate or substitute them by present scientific technology.
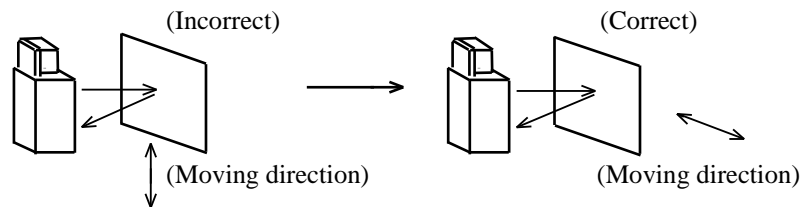
■Notes

●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 it at 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 whether 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 the distance can not be measured exactly. Please consider the design that the detector does not receive direct light from such light source.
- ・Distance between sensor and mirror reflector can not measure 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)
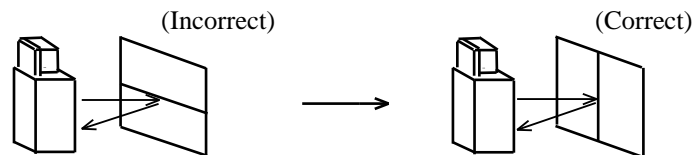
- ・In order to decrease measuring error due to moving direction of object, we recommend that the sensor be mounted like the drawing below.

(Incorrect)   (Correct)

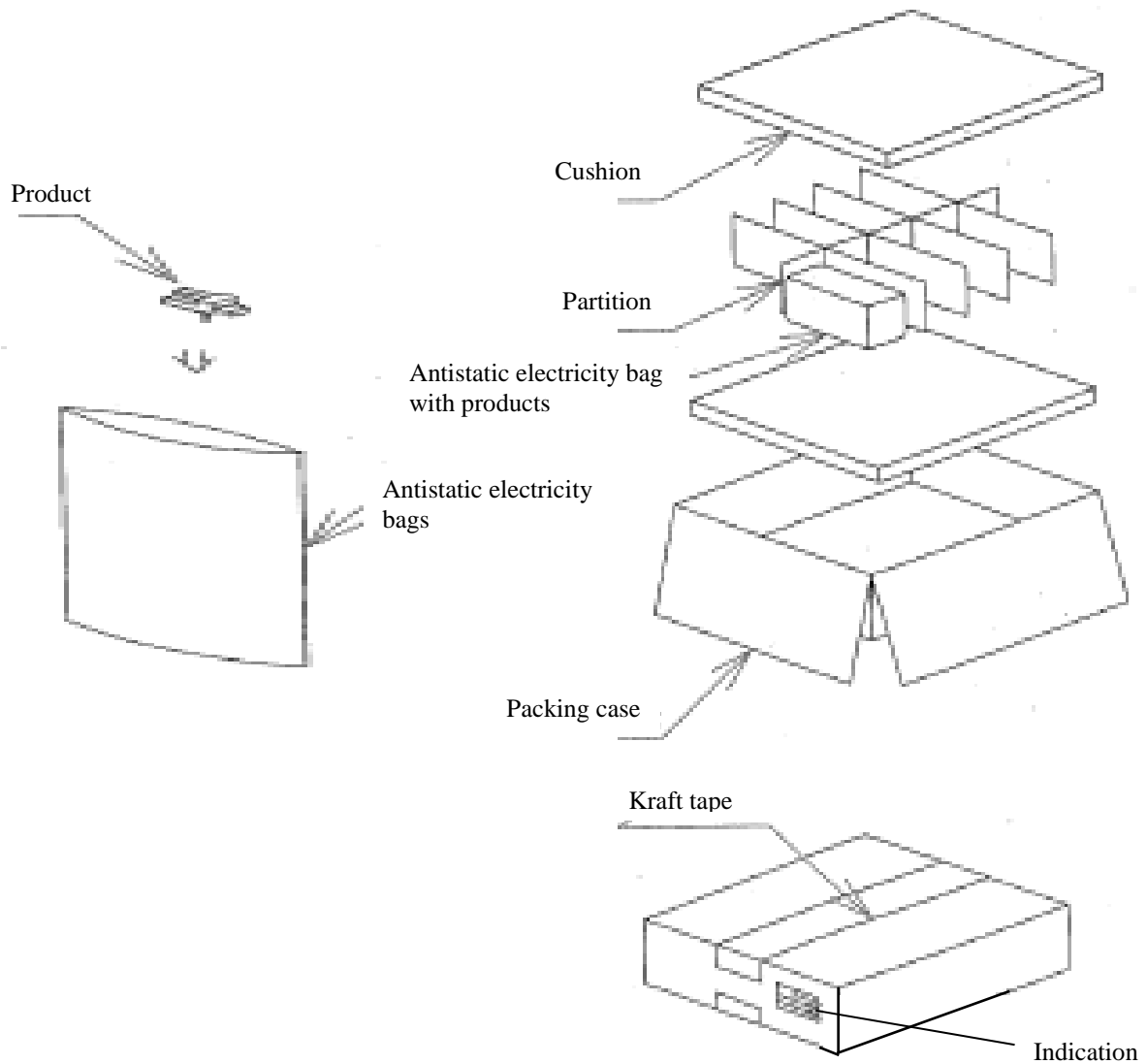(Moving direction)   (Moving direction)

- ・GP2Y5D91S00F has 0.1uF capacitor between Vcc to GND, However we recommend to add bigger than 47uF capacitor between Vcc to GND in order to have steady operation in case of noise source around GP2Y5D91S00F.

●Notes on handling
- ・Please don't do washing. There is fair chance to change the optical-characteristic and not to operate correctly due to the cleaning. GP2Y5D91S00F doesn't have chemical resistance consideration. So please treat such and decide the proper treatment under customer's circumstance.
- ・Please don't add too much stress especially soldering point of GP2Y5D91S00F when plugging in and off the connector with harness to connector of GP2Y5D91S00F. And please treat carefully the wiring harness and not to have too much stress to the GP2Y5D91S00F.
- ・GP2Y5D91S00F has components on board by soldering and they are exposed to the circumstance of it uses. So please design to consider the possibility of soldering clack under the circumstance of temperature variation in long term even within a specification of storage temperature.

■Packing specification

Product

Cushion

Partition

Antistatic electricity bag
with products

Antistatic electricity
bags

Packing case

Kraft tape

Indication

1. Packing numbers
   MAX. 50 pieces per bag
   MAX. 500 pieces per case

2. Put cushions between partitions.
   Close the lid of case and seals with craft tape.

3. Indication items
   The contents of the carton indication conform 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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--- Telecommunication equipment [terminal]
--- Test and measurement equipment
--- Industrial control
--- Audio visual equipment
--- Consumer electronics
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--- Traffic signals
--- Gas leakage sensor breakers
--- Alarm equipment
--- Various safety devices, etc.
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