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SPEC. No. ED-15G001
ISSUE Feb. 6, 2015

SHARP

SYSTEM DEVICES UNIT
ELECTRONIC COMPONENTS AND DEVICES DEVISION
SHARP CORPORATION

SPECIFICATION

DEVICE SPECIFICATION FOR

DUST SENSOR

MODEL No.

GP2Y1014AU0F

Specified for

Enclosed please find copies of the Specifications which consists of 11 pages including cover.
After confirmation of the contents, please be sure to send back ☐ copies of the Specifications with approving signature on each.

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Product name : Dust sensor

Model No. : GP2Y1014AU0F

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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 Please do verify the validity of this part after assembling it in customer's products, when customer wants to make catalogue and instruction manual based on the specification sheet of this part.

② This product is designed for use in the following application areas ;

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

If the use of the product in the above application areas is for equipment listed in paragraphs ③ or ④, please be sure to observe the precautions given in those respective paragraphs.

③ 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

④Please 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
- Power generation and power transmission control system (Key system)

⑤Please contact and consult with a Sharp sales representative if there are any questions regarding interpretation of the above four paragraphs.

3. Please contact and consult with a Sharp sales representative for any questions about this product.

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1. Application

This tentative specification applies to the outline and characteristics of Model No. GP2Y1014AU0F (Dust sensor).

2. Outline

Refer to the attached drawing No. CY15282i02.

3. Ratings and characteristics

Refer to the attached sheet, Page 5 to 6.

4. Reliability

Refer to the attached sheet, Page 7.

5. Outgoing inspection

Refer to the attached sheet, Page 8.

6. Supplements

6-1 Output voltage vs Dust density characteristics[Example]:

Refer to the attached sheet, Page 9.

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 (Methylchloroform)

6-3 This product does not contain the chemical materials regulated by RoHS directive (except for the parts NOT regulated by RoHS directive) .

6-4 Product mass : Approx. 16g

6-5 Packaging specification : Refer to the attached sheet, Page 10

6-6 Country of origin : China or Indonesia

6-7 Compliance with each regulation

6.7.1 The RoHS directive(2011/65/EC)

This product complies with the RoHS directive(2011/65/EC) .

Object substances: mercury, lead, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

6.7.2 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).

Marking Styles for the Names and Contents of the Hazardous Substances

Category	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr^{6+})	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Dust sensor	×	○	○	○	○	○

This table is prepared in accordance with the provisions of SJ/T 11364.

○ : Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572

× : Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572

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7. Notes

7-1 Connection of case and GND

Case material use conductive resin as cover case (printed model No.) and metal (test terminal side) as bottom cover. The metal case connects with GND in sensor.

7-2 Cleaning

Please don't do cleaning, because there is a case that this device is not satisfied with its characteristics by cleaning.

7-3 Pulse input range

Please subject to recommendation written in the paragraph (3-4)as regard input condition for LED in order to keep reliability.

7-4 Dust Adhesion

There is a case that this product does not detect the dust density correctly, since the dust adhered to the inside of the dust through hole may project into the detecting space which consist of emitter and detector light axis. Please take the structure and mechanism of the equipment into consideration to avoid the influence of adhered dust. And when the dust is adhered, please consider the maintenance such as vacuuming or blowing off the dust by air.

In addition, please pay attention to structure and placing location of the application to avoid any adhesive particle like oil, etc. to gets into the device.

If it sticks to optical part, malfunction may occur.

7-5 Light output

In circuit designing, make allowance for the degradation of the light emitting diode output that results from long continuous operation.

(50% degradation/5years)

7-6 Sensitivity adjustment VR

VR for sensitivity adjustment is set up at shipping from Sharp.

Please do not touch the VR or Electro-optical characteristics specified on the specification will be invalid.

7-7 Resolution

Please do not disassemble the device such as removing a tapping screw and so on.

Even if the device is reassembled, it may not satisfy the specification.

7-8 Application to fire alarm

Please do not use this device for a fire alarm application. When using this device to application other than air purifying and equipment with air purifying function, please inform us before usage.

7-9 Noise influence

If the sensor is located close to noise source (ex. Electric dust collector, etc.),

The sensor output may be affected by leaded noise.

On top of that noise from power supply line also may affect the sensor output.

When designing the system, please consider the effect from noise.

7-10 Vibration influence

The sensor may change its output value under mechanical oscillation.

Before usage, please make sure that the device works normally in the application.

7-11 Incident light influence

There is a case that the sensor output may be affected when outer-light comes through dust through hole on printed side.

In order to avoid any influence from outer-light, please locate the printed side of the sensor facing to inside of the application.

7-12 Dewing

When inside of the sensor is moisturized, this product does not keep its proper function.

Please design the application so that moisturization of the sensor does not happen.

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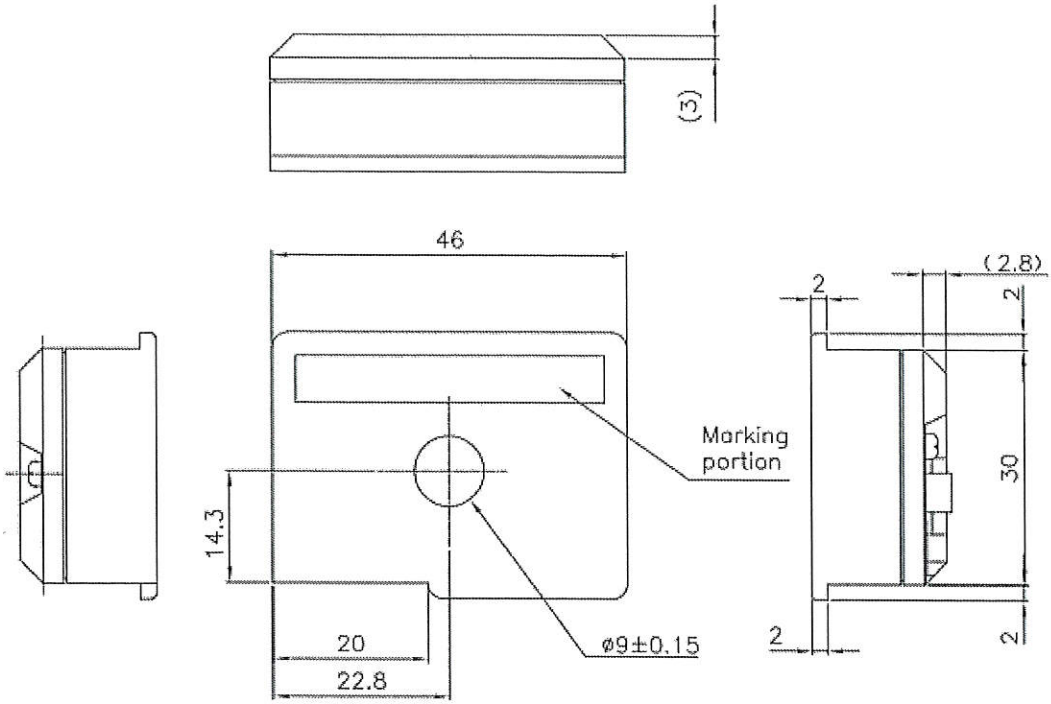
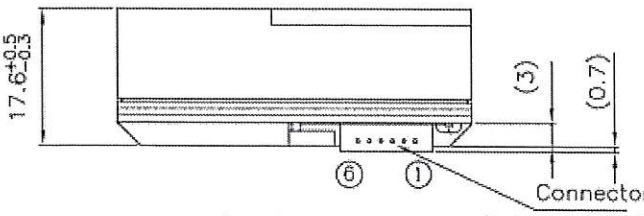
2. Outline

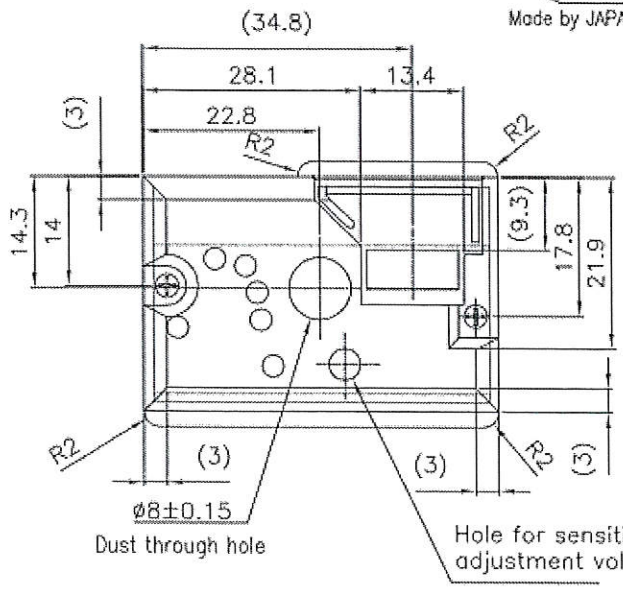


Connector arrangement

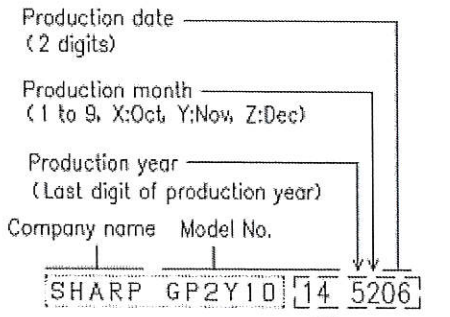
No.	Pin name
①	V-LED
②	LED-GND
③	LED
④	S-GND
⑤	Vo
⑥	Vcc



Made by JAPAN SOLDERLESS TERMINAL CO. S6B-ZR-SM4A



[Marking portion]



With underline : Product is made in China.
Without underline : Product is made in Indonesia.

Carved seal

Mark

1) Unspecified tolerance shall be ±0.3mm

( ) : Reference value

Unit :mm

Name	GP2Y1014AU0F outline dimensions
Drawing No.	CY15282i02A

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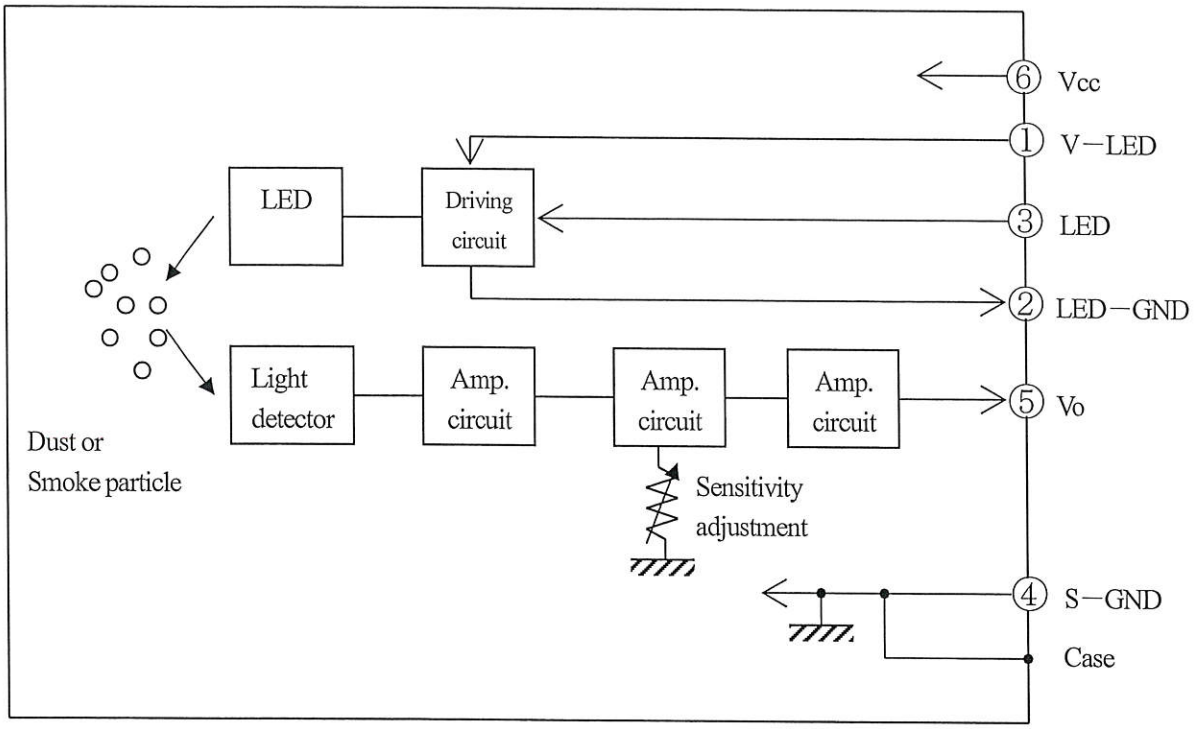
3. Ratings and characteristics

3-1 Constitution diagram



3-2 Absolute maximum ratings

(Ta=25℃)

Parameter	Symbol	Rating	Unit	Remark
Supply voltage	Vcc	-0.3 to +7	V	—
Input terminal voltage	V-LED	-0.3 to Vcc	V	Open Drain drive input
Operating temperature	Topr	-10 to +65	℃	—
Storage temperature	Tstg	-20 to +80	℃	—

·Operating Supply Voltage

Symbol	Rating	Unit	Remark
Vcc	5±0.5	V	—

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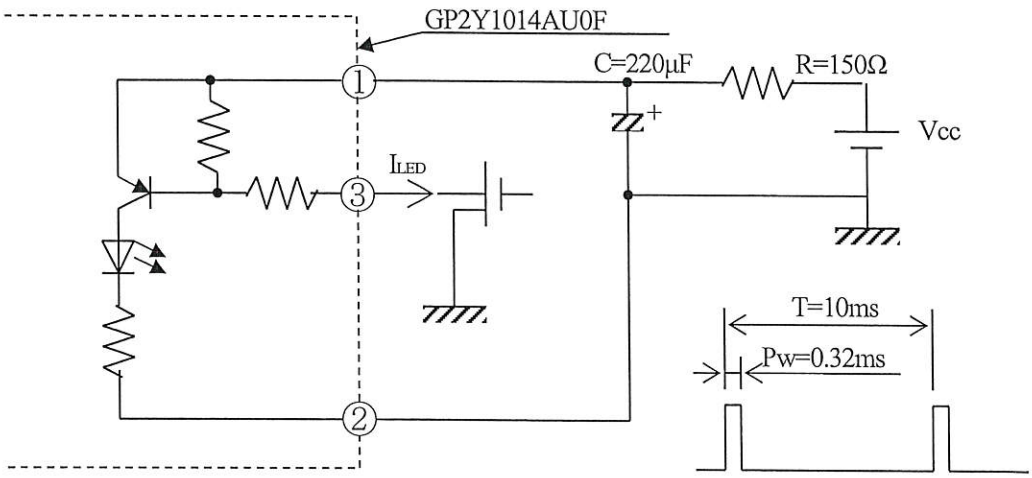
3-3 Electro-optical Characteristics (Ta=25°C, Vcc=5V)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Sensitivity	K	(*1)(*2)(*3)(*4)	0.425	0.5	0.575	V/ (100 μ g/m³)
Output voltage at no dust	Voc	(*2)(*3)(*4)	0.1	0.6	1.1	V
Output voltage range	VOH	RL=4.7kΩ (*2)(*3)(*4)	3.4	-	-	V
LED terminal current	ILED	LED terminal=0V (*2)(*3)	-	10	20	mA
Supply current	ICC	RL=∞ (*2)(*3)	-	11	20	mA

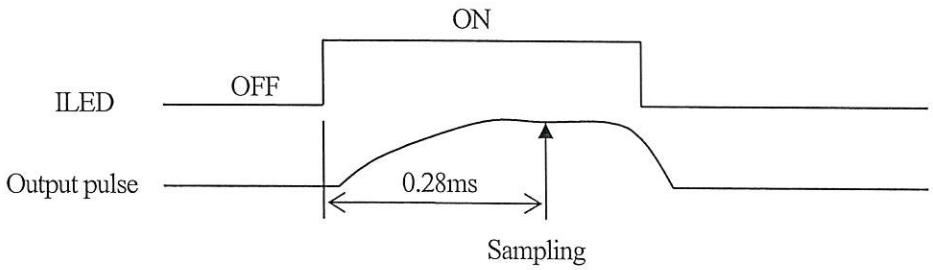
(*1) - Dust density shall be measured the density of Mevius by using a digital dust indicator.
(P-5L2 made by SIBATA SCIENTIFIC TECHNOLOGY LTD.)
- Sensitivity : K shall be specified about output voltage change when dust density is changed 100 μ g/m³.

(*2) Input condition for LED input terminal (Pulse driving condition)

(*3) Connect C and R of value shown in below drawing.



(*4) Sampling timing of output pulse



3-4 Recommended input condition for LED input terminal

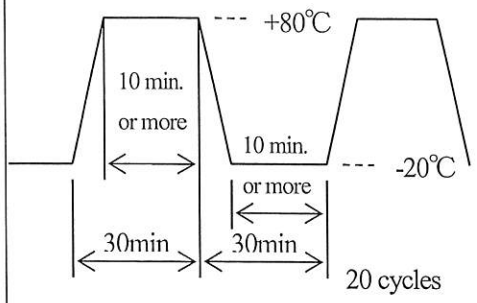
Parameter	Symbol	Recommendation	Unit
Pulse cycle	T	10±1	ms
Pulse width	Pw	0.32±0.02	ms

NEW CHANGE

4. Reliability

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

Confidence level : 90%
LTPD : 20 or 30

No.	Test Items	Test Conditions	Failure Judgment Criteria	Samples (n) / Defective(C)
1	Temperature cycling		L×0.8>K K>U×1.2 Voc>U×1.2 U : Upper specification limit L : Lower specification limit	n=11, c=0
2	High temp. and high humidity storage	+60℃, 90%RH, 500h		n=11, c=0
3	High temp. and high humidity operation	+60℃, 90%RH, Vcc=5V, 500h		n=11, c=0
4	High temp. storage	+80℃, 500h		n=11, c=0
5	High temp. operation	+65℃, Vcc=5V, 500h		n=11, c=0
6	Low temp. storage	-20℃, 500h		n=11, c=0
7	Low temp. operation	-10℃, Vcc=5V, 500h		n=11, c=0
8	Mechanical shock	1000m/s^2, 6.0ms 3 times /±X, ±Y, ±Z direction		n=8, c=0
9	Variable frequency Vibration	5 to 55 to 5Hz/1min. overall amplitude : 1.5mm 2h/X, Y, Z direction		n=8, c=0

*1 Test conditions are according to 3-3 Electro-optical characteristics.

*2 After test, measurement shall be done after leaving under the normal temperature and the normal humidity for 2h. And there should be no dew.

*3 LED terminal input conditions for operating test (No.3.5.7) apply according to electro-optical characteristics(3-3).

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5. Outgoing 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 ISO 2859 shall be adopted.

Defect	Inspection item	AQL (%)
Major defect	Electro-optical characteristics defect (In para. 3-3)	0.4
Minor defect	Defect on appearance and dimension (*) Split, chip, scratch, stain	1.0

(*) Split, chip, scratch, stain

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

(*) Rust shall not be defect.

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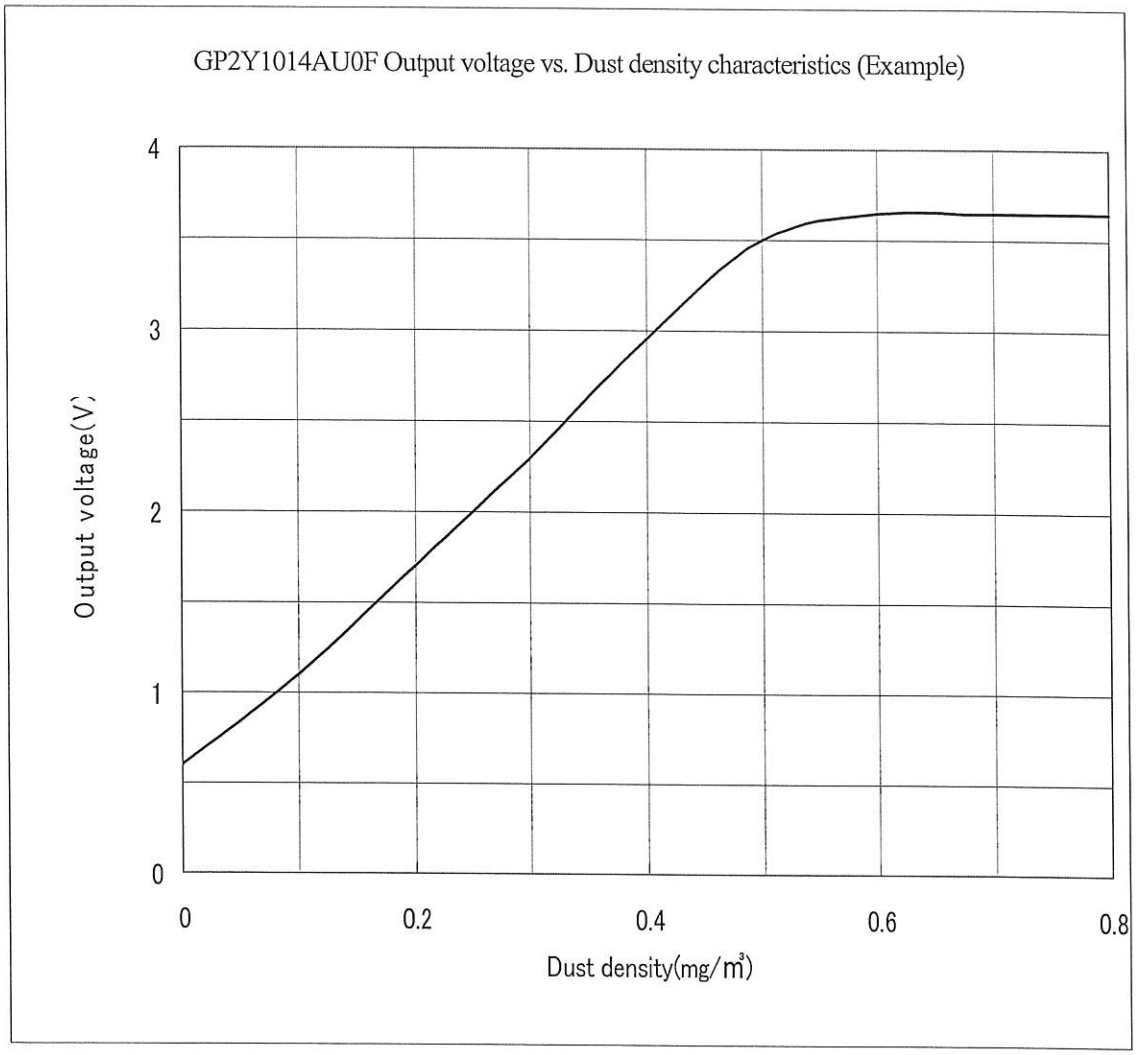
6-1 Test conditions are according to 3-3 Electro-optical characteristics.



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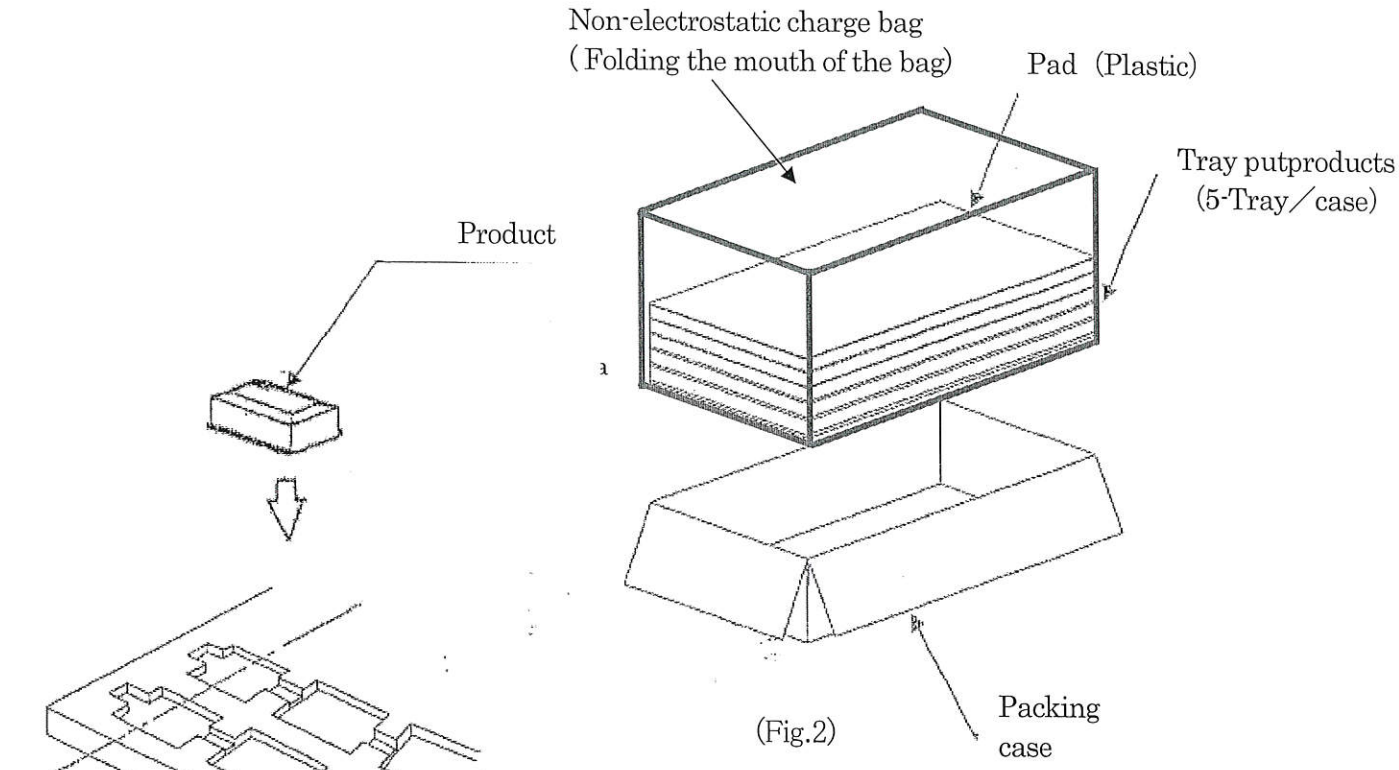
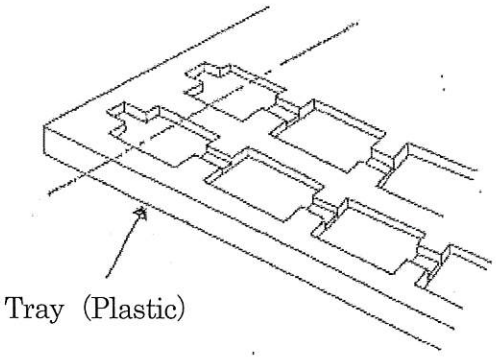
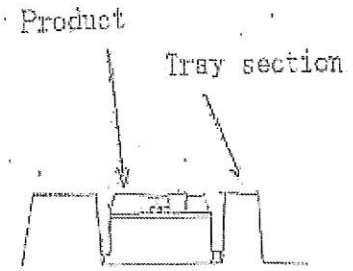
6-4 Packing specification

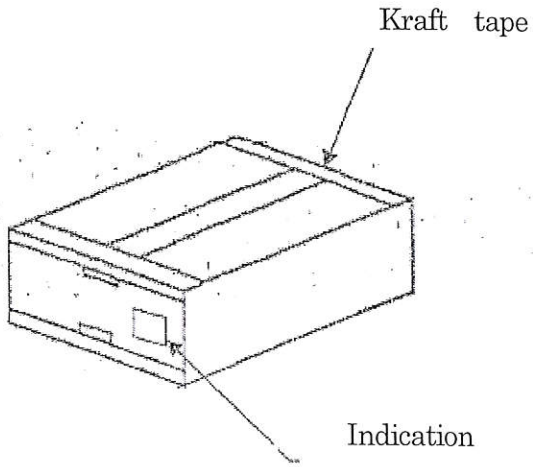


(Fig.2)





(Fig. 1)



(Fig3)

Packaging method

1.Put products in a non-electrostatic charge bag (turning down a non-electrostatic charge bag)of 50pcs in tray. Packing method is showed in the above fig. (Fig.1)

2.Put them (5-tray) with product on a non-electrostatic charge bag and put in the packing box. Put pad on their top. (Fig.2)

3.Seal the packing box with kraft tape.(Folding the mouth of the bag)

4.The mouth of the bag shall put it on top of one another
Print the model No., quantity, inspection date. (250pcs/a packing box) (Fig.3)

5. Indication items
The contents of the carton 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

(Formal packed mass : Approximately 5.6kg)