



**THE DATASHEET OF  
GP1A058SCK0F**



# GP1A058SCK0F

Case Type  
With Encoder Function  
Digital 2 Output (A Phase / B Phase)  
Transmissive Photointerrupter



## ■Description

**GP1A058SCK0F** is a transmissive photointerrupter with digital 2 output (phase A/B) encoder function. Using this with a linear scale (or rotation disk) that forms a slit pattern, this product detects the movement (rotation) direction and the amount of movement (number of revolutions, rotation angle). This product has mounting holes for screwing to a substrate.

## ■Features

1. Transmissive Photointerrupter
2. Case type, with encoder function
3. Output signal : Digital 2 output (A Phase / B Phase)
4. Resolution : Linear scale slit pitch 0.14 [mm]  
(180LPI)

## ■Agency approvals/Compliance

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

## ■Applications

1. Detects direction of movement, the amount of movement, rotation angle of equipment and device that move horizontally or rotate.  
Example : printer, copier, robot, motor control, etc.

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Sheet No.: OP14031EN

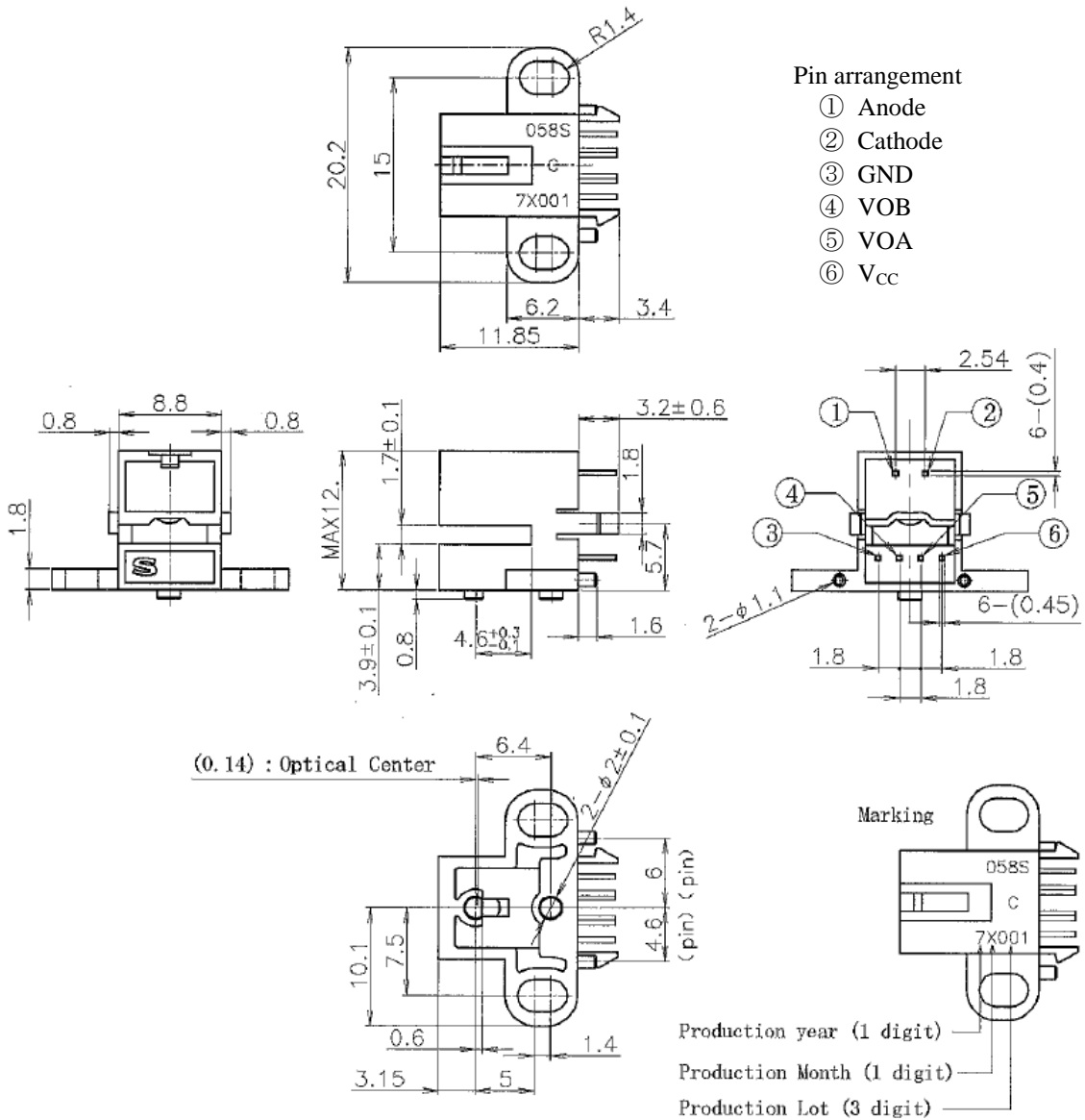
■ Outline

Drawing No. CY14075i02

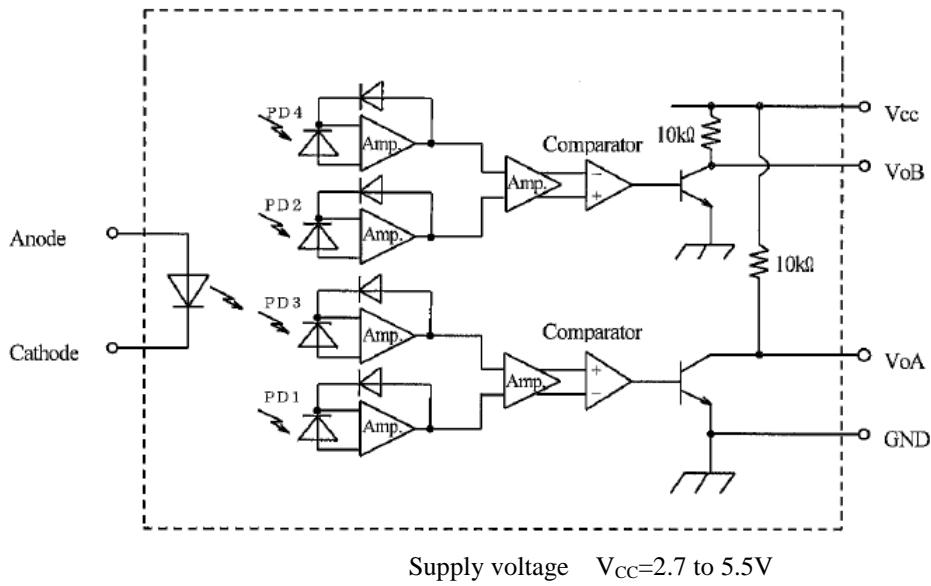
Unit : mm

Notes

- 1) Unspecified tolerances shall be  $\pm 0.3$ .
- 2) Dimensions in parenthesis are shown for reference.
- 3) The dimensions indicated by \* refer to the those measured from the lead base.
- 4) Datecode is 5 digit.  
 (Production year) The last number of the year.  
 (Production Month) From 1 to 9, it mean January to September.  
 X is October, Y is November and Z is December.  
 (Production Lot) 001 means Production Lot No. "001"



■Block diagram



■Absolute maximum ratings

$T_a=25^{\circ}C$

Parameter		Symbol	Rating	Unit
Input	Forward current *1	$I_F$	30	mA
	Reverse voltage	$V_R$	4	V
Output	Supply voltage	$V_{CC}$	6	V
	Low level output current	$I_{OL}$	8	mA
	Power dissipation *1	$P_o$	150	mW
Operating temperature		$T_{opr}$	-10 to +70	$^{\circ}C$
Storage temperature		$T_{stg}$	-40 to +80	$^{\circ}C$
Soldering temperature *2		$T_{sol}$	260	$^{\circ}C$

\*1 The derating factors of absolute maximum ratings due to ambient temperature are shown in Fig. 1, 2.

\*2 Soldering time : 5s or less

**Electro-optical Characteristics**

Ta=25°C

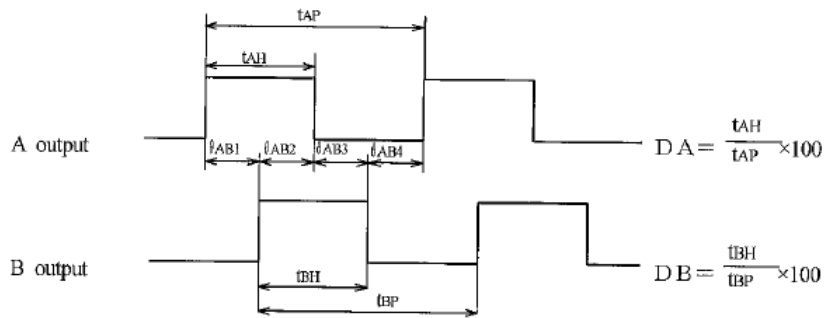
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V <sub>F</sub>	I <sub>F</sub> =20mA	-	2.1	2.6	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =1V	-	-	100	μA
Output	Operating supply voltage range	V <sub>CC</sub>	-	2.7	3.3	5.5	V
	Low level output voltage	V <sub>OL</sub>	V <sub>CC</sub> =3.3V, I <sub>F</sub> =20mA I <sub>OL</sub> =8mA	-	-	0.4	V
	High level output voltage	V <sub>OH</sub>	V <sub>CC</sub> =3.3V, I <sub>F</sub> =20mA	2.4	3.2	-	V
	Supply current	I <sub>CC</sub>	V <sub>CC</sub> =3.3V, I <sub>F</sub> =20mA Phases A and B both at low level	-	2.2	5.5	mA
Transfer characteristics *1	Duty	D <sub>A</sub>	V <sub>CC</sub> =3.3V I <sub>F</sub> =20mA f=10kHz 0.1mm<Z≤1.0mm *2	35	50	65	%
		D <sub>B</sub>					
	Phase difference	θ <sub>AB1to4</sub>		45	90	135	°
	Response	t <sub>r</sub>		-	1.0	2.0	μs
		t <sub>f</sub>					
Response frequency	f <sub>max</sub>	V <sub>CC</sub> =3.3V, I <sub>F</sub> =20mA 0.1mm<Z≤1.0mm *2	-	-	40	kHz	

\*1 The test condition is according to Fig.3 (CY14076i06)  
And transfer characteristics value does not include any error of code-wheel (Liner scale).  
The error of slit-pattern shall not be included.

\*2 Z stands for distance between code-wheel (Liner scale) surface (patterned surface) and detector holder surface,  
and patterned surface shall be arranged face to face with detector holder surface.  
The code-wheel (Liner scale) shall not contact with the holder surface.

Note: It is recommended that the GP1A058SCK0F be used under the condition of typical I<sub>F</sub>=20mA for which it is designed.

**Output waveform**



Refer to note 1 in Fig.3 (CY14076i06) for the moving direction of Liner scale (code-wheel).

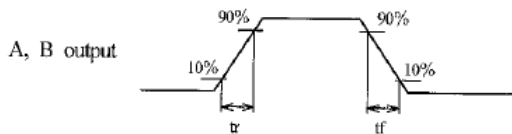


Fig.1 Forward current vs. ambient temperature

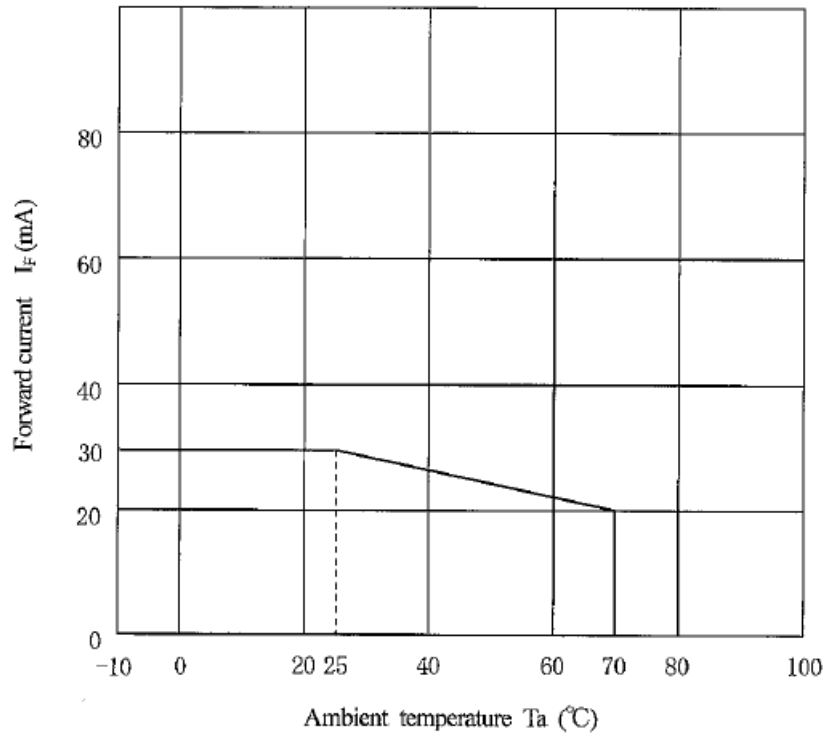


Fig.2 Output power dissipation vs. ambient temperature

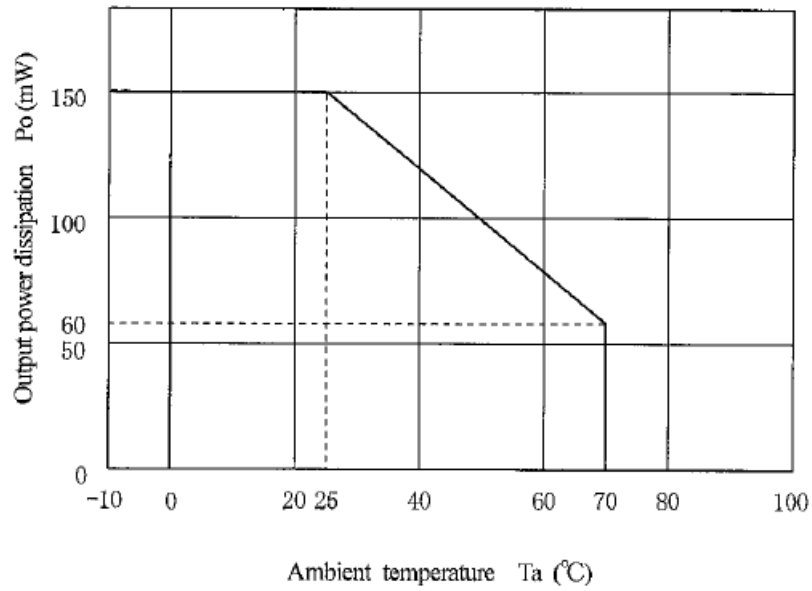
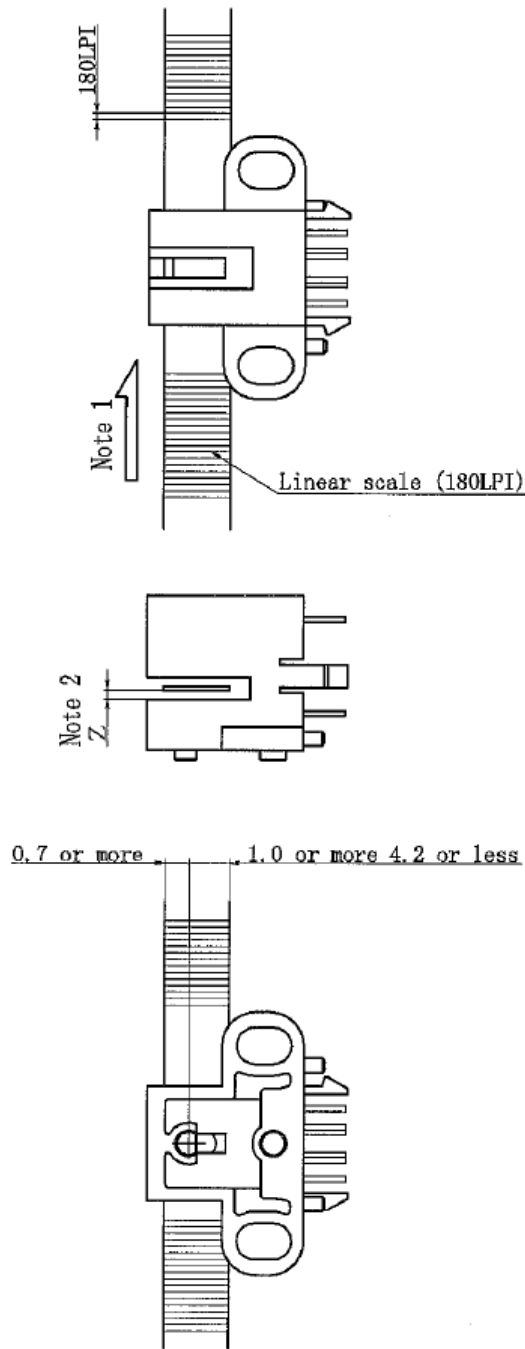


Fig.3 GP1A058SCK0F Test Condition (Drawing No. CY14076i06)

Unit : mm



Notes

- 1) The moving direction of Liner scale (code-wheel) against output waveform (Page 4).
- 2) Z : Distance between Liner scale (code-wheel) surface (patterned surface) and detector holder surface.  
 ※  $0.1\text{mm} < Z \leq 1.0\text{mm}$   
 The Liner scale (code-wheel) shall not contact with the holder surface.

■ **Supplements**

● ODS materials

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)

● 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, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

2) Content of six substances specified in Management Method 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 <sup>6+</sup> )	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Photointerrupter	✓	✓	✓	✓	✓	✓

✓ : 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.

● Product mass : Approximately 0.85g

● Country of origin : Japan, China, Indonesia

## ■Notes

- The recommendation conditions of forward current:  
This product is designed in consideration of using this product under the condition of typical  $I_F=20\text{mA}$  as a standard.
- In order to stabilize power supply line, it is recommended to have a by-pass capacitor of  $0.1\mu\text{F}$  or more between  $V_{CC}$  and GND near the device.
- Lens is made from resin, as to cleaning, this photointerrupter should not be cleaned by cleaning materials absolutely. (Dust and stain shall be cleaned by air blow.)
- Soldering  
To solder onto lead pins, please solder at  $260^\circ\text{C}$  for 5s or less with longer distance than 1.6mm from the bottom surface of the package.  
Please take care not to let any external force exert on lead pins when soldering or just after soldering.  
Please don't do soldering by reflow.
- OPIC chip due to micro design is easily affected by the Electro static discharge.  
At operating, in order to prevent the destruction and the defect of characteristics by Electro static discharge, please take a general countermeasure of the Electro static discharge.
- Prevention of malfunction  
For this product, the transparent material is used as the case material.  
Before using this product, please confirm the following items with the actual equipment.  
1) The product does not malfunction by the ambient light illuminating the photo-detector surface.  
2) Other equipment is not affected by the light leaking from the light-emitting device.
- Storage and usage environment  
Polycarbonate is used as the case material of this product.  
If polycarbonate contacts with the hot liquid and the alkaline solution (alkaline atmosphere), polycarbonate is hydrolyzed. Therefore, please do not store and use this product in such an environment.
- When tightening this product with the screw, please use the M2.6 machine screw.  
The recommended tightening torque with M2.6 machine screw is 0.25 to 0.35 N · m.  
However, this recommended tightening torque is the reference value because the tightening torque varies according to the screw and the bolted joint.  
Before tightening the screw, please certainly confirm the tightening strength of this product and the object on which this product is mounted. Also, when tightening the screw with the tools such as the screw-driver, if the pushing force by the screw-driver is too strong, the damage of the product performances such as the break of the holder's mounting hole may be caused by the application of the external force.  
Therefore, please be careful not to apply such a force to this product.

**■Parts**

This product uses the below parts.

- Light detector (Quantity : 1)  
(Using a silicon photodiode as light detecting portion, and a bipolar IC as signal processing circuit.)

Type	Maximum sensitivity wavelength (nm)	Sensitivity wavelength (nm)	Response time (μs)
Photodiode	780	400 to 1200	25

- Light emitter (Quantity : 1)

Type	Material	Maximum light emitting wavelength (nm)
Light emitting diode (Non-coherent)	AlGaInP /GaAs	652

- Material

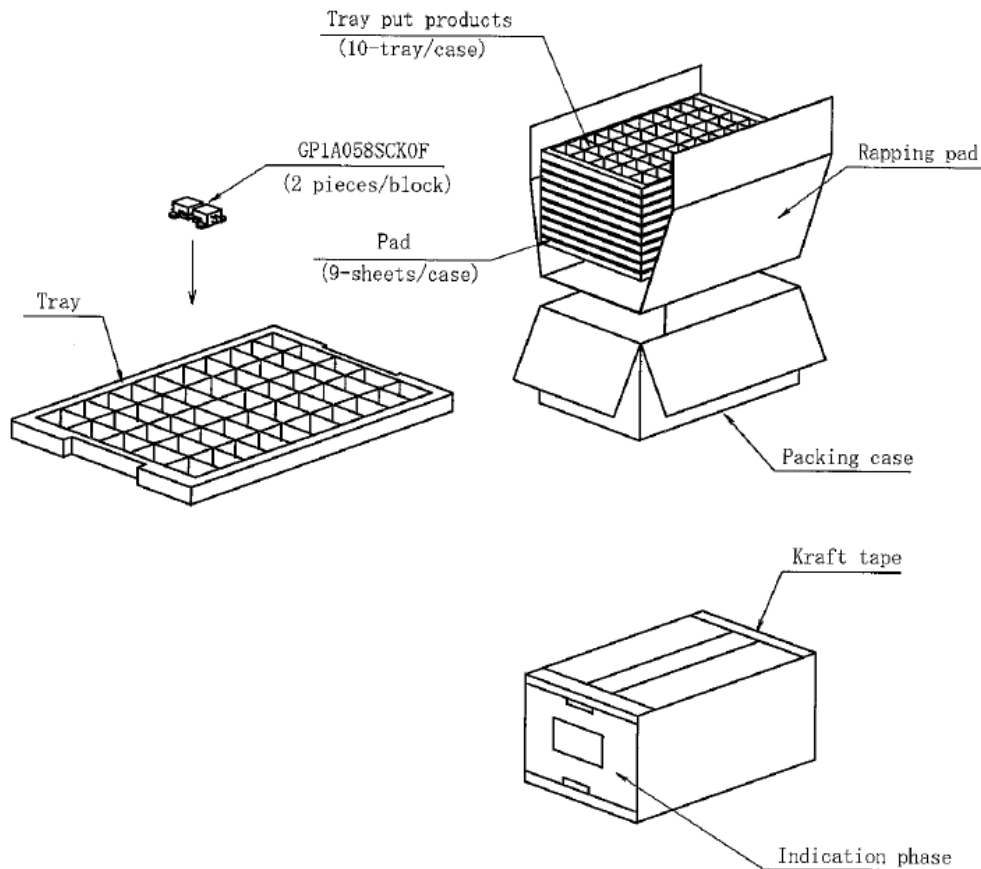
Holder integrated with Lens	Lead flame finish
Transparent polycarbonate resin	Solder dip (Sn-Ag-Cu)

- Others

This product shall not be radiation flux proof.  
Laser generator is not used.

## ■Packing

Drawing No. : CY14077i09



### 1) Package materials

- Outer package : Outer case (Paper corrugated cardboard)
- Inner package : Pad (Polyethylene)  
Rapping pad (Polyethylene)  
Tray (Polysthylene)

### 2) Packaging number

- Max. 100 pieces per tray
- Max. 1000 pieces per case

### 3) Package specifications

- Put them (10 tray) in the packing box.
- Put pads on their top and bottom, between them.
- Seal the packing box with kraft tape.

### 4) 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.

### 5) Regular packing mass

- (Excluding fractions, however above packing material, packing count, packing style)
- Approximately 2.3kg

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- Telecommunication equipment [terminal]
- Test and measurement equipment
- Industrial control
- Audio visual equipment
- Consumer electronics

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- Gas leakage sensor breakers
- Alarm equipment
- Various safety devices, etc.

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