

SPEC. No. ED-03G042
ISSUE November 11, 2003

SHARP

OPTO-ELECTRONIC DEVICES DIVISION
ELECTRONIC COMPONENTS GROUP
SHARP CORPORATION

SPECIFICATION

DEVICE SPECIFICATION FOR

PHOTOINTERRUPTER

MODEL No.

GP1S73PS

Specified for

BDT

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 ☐ 1 copy of the Specifications
with approving signature on each.

CUSTOMER'S APPROVAL

DATE

BY

PRESENTED

DATE Nov. 12. 2003

BY

H. Ogura,
Department General Manager of
Engineering Dept., III
Opto-Electronic Devices Div.
ELECOM Group
SHARP CORPORATION

Product name : PHOTOINTERRUPTER

Model No. : GP1S73PS

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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) 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 (2) or (3), please be sure to observe the precautions given in those respective paragraphs.

- (2) 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 etc.)

- (3) Please 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 etc.)

- (4) Please contact and consult with a Sharp sales representative if there are any questions regarding interpretation of the above three paragraphs.

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

1. Application

This specification applies to the outline and characteristics of transmissive type photointerrupter with connector, Model No. GP1S73PS.

2. Outline

2.1 Outline : Refer to the attached drawing No. CY6972i02A.

2.2 Recommended Installation Hole drawing : Refer to the attached drawing No. CY6973i06.

3. Ratings and characteristics

Refer to the attached sheet, Page 5, 6.

4. Reliability

Refer to the attached sheet, Page 7.

5. Outgoing inspection

Refer to the attached sheet, Page 8.

6. Supplements

6.1 Package drawing : Refer to the attached sheet, Page 10.

6.2 Parts : Refer to the attached sheet, Page 9.

6.3 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)

6.4 Brominated flame retardants

Specific brominated flame retardants such as the PBBOs and PBBs are not used in this device at all.

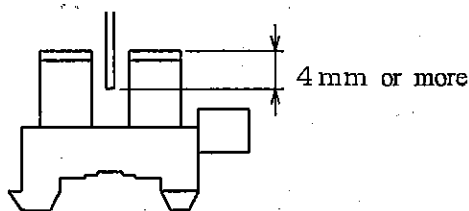
6.5 Product mass : 0.8g (TYP)

6.6 Production country : Japan, Philippine

7. Notes

- 1) In circuit designing, make allowance for the degradation of the light emitting diode output that results from long continuous operation. (50% degradation/5 years)
- 2) Opaque board shall be installed at place 4mm or more from the top of elements.

(Example)



- 3) Please don't carry out immersion cleaning or ultrasonic cleaning to avoid keeping solvent inside case of this device.
- 4) Dust and stain shall clean by air blow, or shall clean by soft cloth soaked in washing materials.
And washing material to clean shall be used the below materials only.
Ethyl alcohol, Methyl alcohol, Isopropyl alcohol

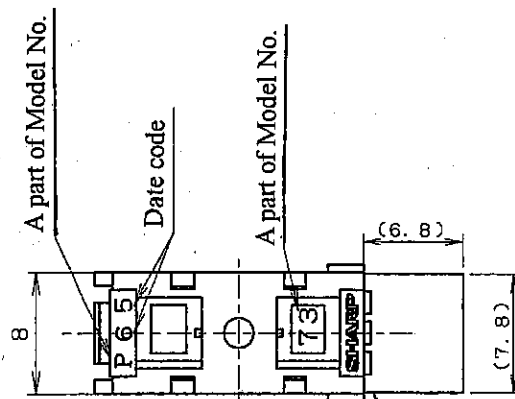
2. Outline (Drawing No. CY6972i02A)

Scale : 2/1

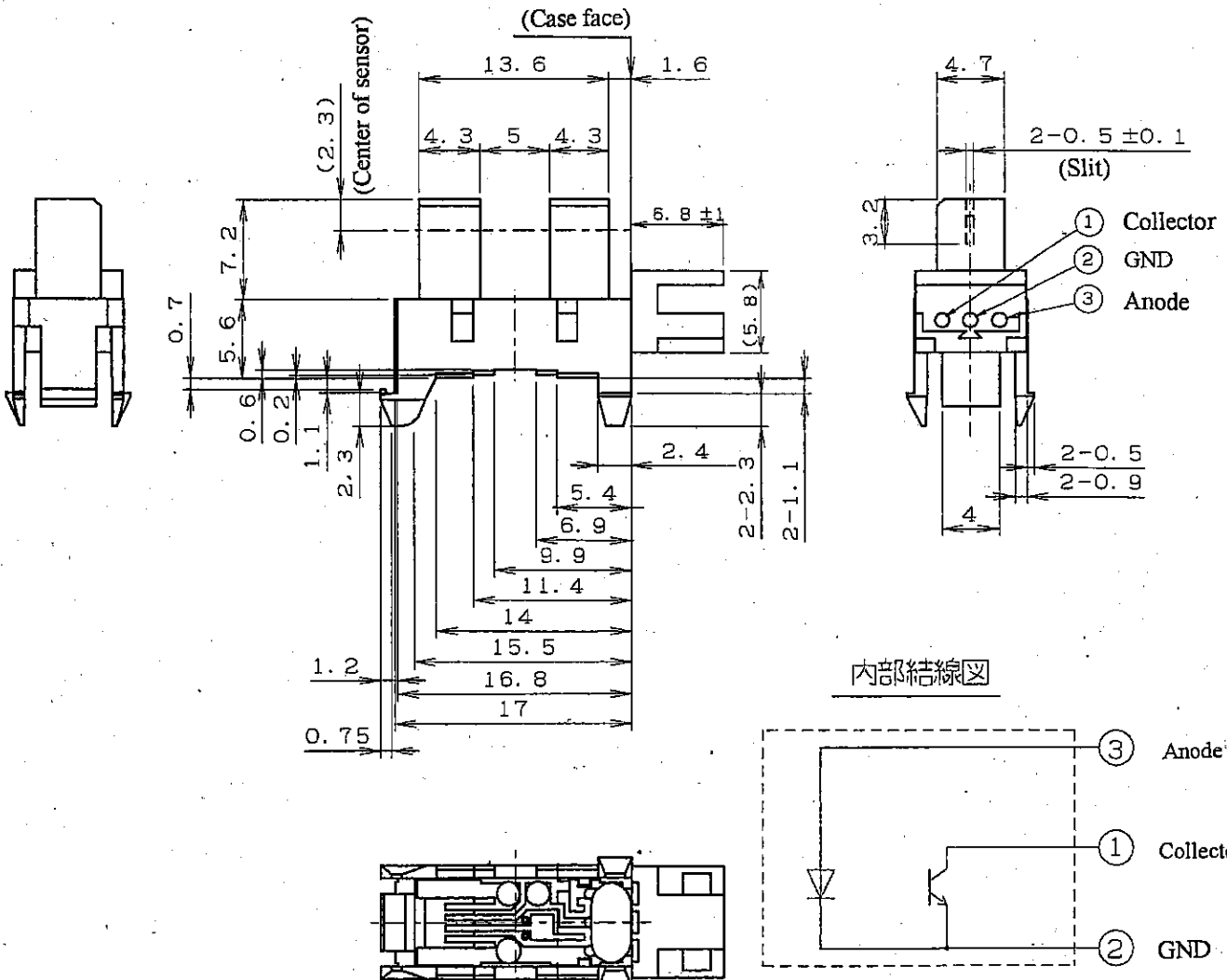
Unit :1/1mm

- Note) 1. Unspecified tolerance shall be followed the list below.
2. Dimensions in parenthesis are shown for reference.

Dimension	Tolerance
less than 5.0	± 0.15
5.0 or more less than 15.0	± 0.2
15.0 or more	± 0.3



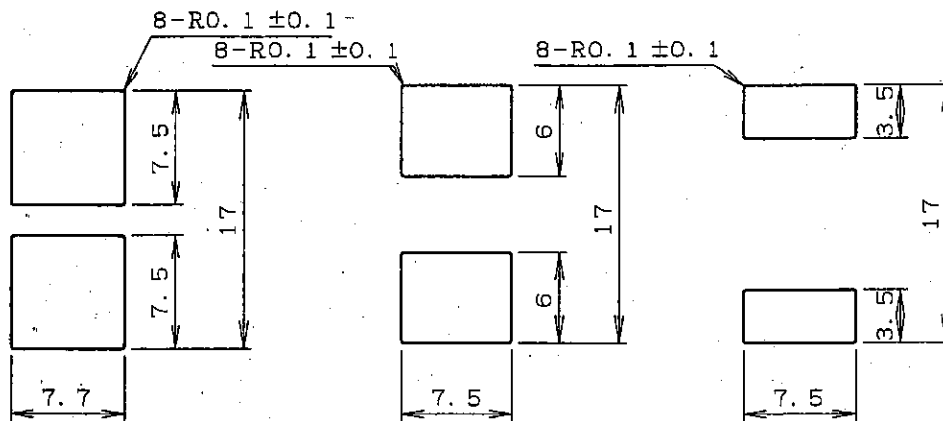
Connector : 175487-3 (Made by Tyco Electronics AMP k.k.)



Unit : 1/1mm

- *1 We recommend to fix GP1S73PS at punching side on the fixing plate (metal plate).
- *2 Please decide the final dimensions at your side after confirmation by the actual applications, Because mounting efficiency and mounted stabilization are dependent on mounting plate corner-R and punched state.
- *3 Tolerance shall be $\pm 0.1\text{mm}$

Normal mounting type

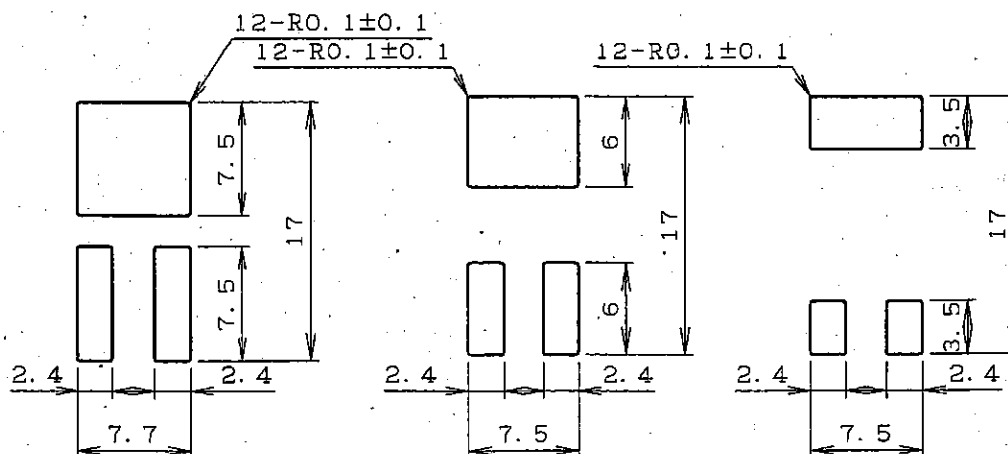


Thickness of plate for 1.6mm

Thickness of plate for 1.2mm

Thickness of plate for 1.0mm

Irregular mounting protection type



Thickness of plate for 1.6mm

Thickness of plate for 1.2mm

Thickness of plate for 1.0mm

3. Ratings and characteristics

3.1 Absolute maximum ratings

$T_a=25^{\circ}\text{C}$

Parameter		Symbol	Rating	Unit
Input	*1 Forward current	I_F	50	mA
	*1, 2 Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P	75	mW
Output	Collector-emitter voltage	V_{CEO}	35	V
	Emitter-collector voltage	V_{ECO}	6	V
	Collector current	I_c	20	mA
	*1 Collector power dissipation	P_c	75	mW
*3 Operating temperature		T_{opr}	-25 to +85	$^{\circ}\text{C}$
Storage temperature		T_{stg}	-40 to +85	$^{\circ}\text{C}$

*1 The derating factors of absolute maximum ratings due to ambient temperature are shown in Fig. 1, 2, 3.

*2 Pulse width $\leq 100 \mu\text{s}$, Duty ratio : 0.01

*3 Connector attachment and release shall be done at normal temperature.

3.2 Electro-optical characteristics

$T_a=25^{\circ}\text{C}$

			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V_F	$I_F=20\text{mA}$	-	1.2	1.4	V
	Peak forward voltage		V_{FM}	$I_{FM}=0.5\text{A}$	-	3	4	V
	Reverse current		I_R	$V_R=3\text{V}$	-	-	10	μA
Output	Dark current		I_{CEO}	$V_{CE}=20\text{V}$	-	1	100	nA
Transfer characteristics	Collector current		I_c	$V_{CE}=5\text{V}, I_F=20\text{mA}$	0.5	-	15	mA
	Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_F=40\text{mA}, I_c=0.5\text{mA}$	-	-	0.4	V
	Response time	(Rise)	t_r	$V_{CE}=2\text{V}, I_c=2\text{mA}$ $R_L=100\Omega$	-	3	15	μs
		(Fall)	t_f		-	4	20	μs

(Test circuit for response time)

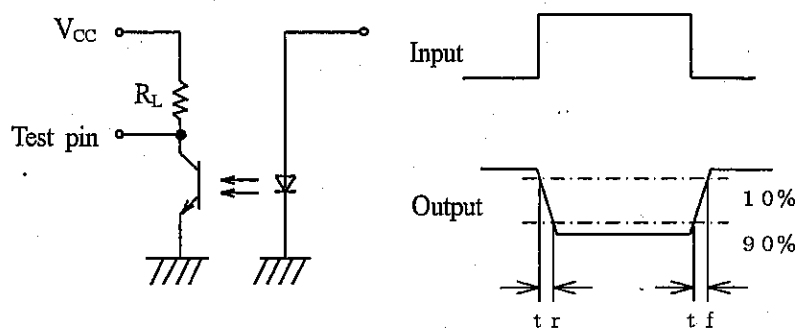


Fig.1 Forward current vs. ambient temperature

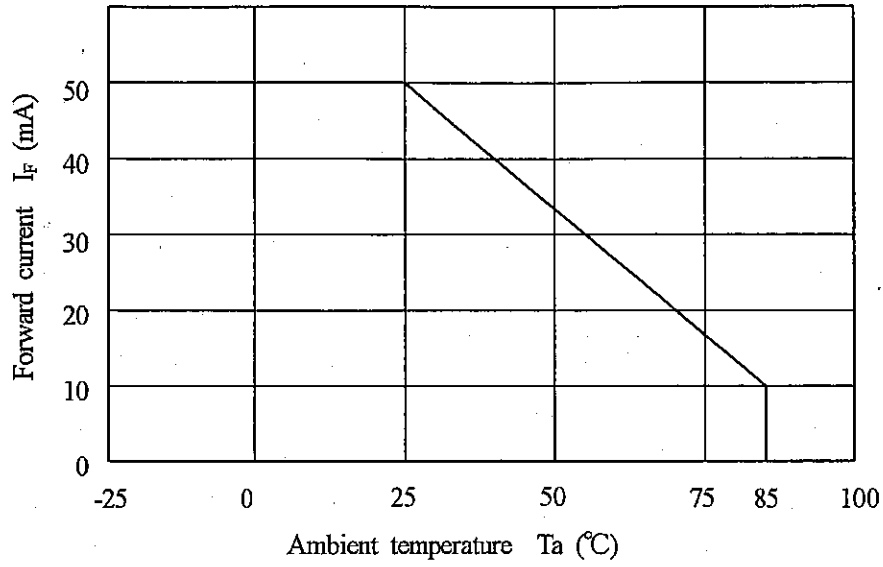


Fig.2 Collector power dissipation vs. ambient temperature

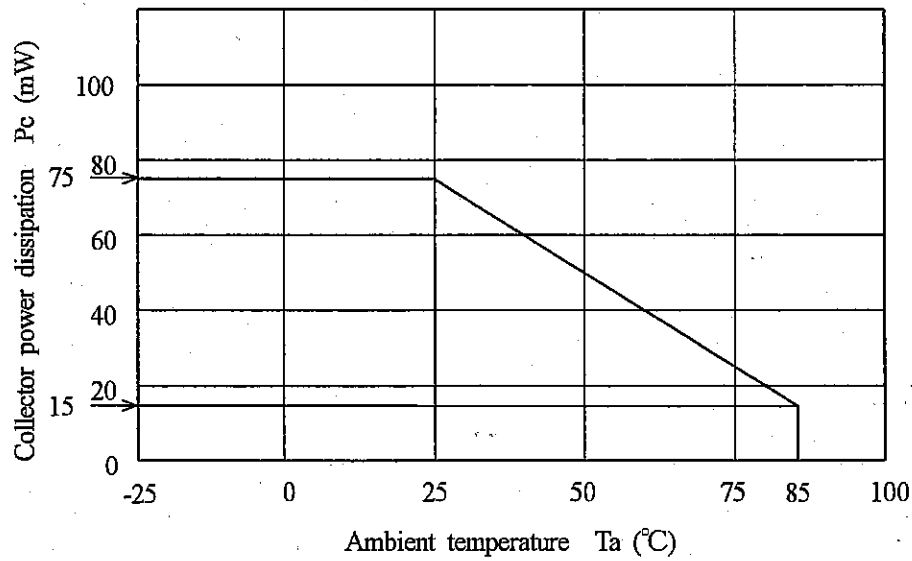
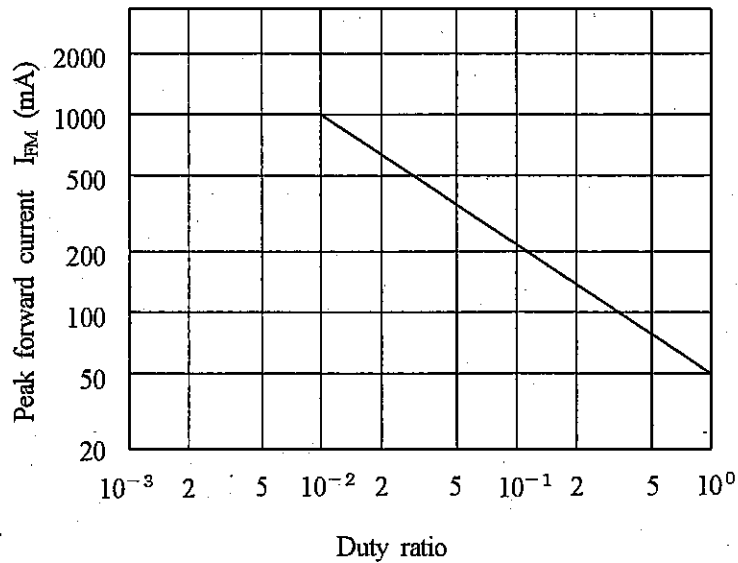


Fig.3 Peak forward current vs. duty ratio



(Pulse width $\leq 100 \mu s$ $T_a = 25^\circ C$)

4. Reliability

The reliability of products shall satisfy items listed below.

Confidence level : 90%

LTPD : 10 or 20

Test item	Test conditions	Failure Judgement Criteria	Samples (n)
			Defective(C)
Temperature cycling	1 cycle -40°C to +85°C (20min) (20min) 5 cycles test	$V_F \geq U \times 1.2$	n=22, C=0
High temp. and high humidity storage	+40°C, 90%RH, 240h	$I_R \geq U \times 2$	n=22, C=0
High temp. storage	+85°C, 240h, Without connector	$I_{CEO} \geq U \times 2$	n=22, C=0
Low temp. storage	-40°C, 240h	$I_C \leq L \times 0.8$	n=22, C=0
Operation life	Ta=25°C, I _F =20mA, 1000h		n=22, C=0
Mechanical shock	1km/s ² , 3times/ X, Y, Z direction		n=11, C=0
Variable vibration frequency	Overall amplitude ; 1.5mm Frequency range 10 to 55 to 10 Hz/1 min 2h/ X, Y, Z direction	U : Upper specification limit L : Lower specification limit	n=11, C=0
Connector strength I	Pull connector housing horizontally to connector terminal pin direction by 20N weight for 5 s (1 time)	Abnormal electrical characteristics	n=11, C=0
Connector strength II	Push connector housing perpendicular to connect- or terminal pin direction by 10N weight for 5 s (1 time)		n=11, C=0

5. Outgoing inspection

5.1 Inspection items

(1) Electrical characteristics

V_F , V_{FM} , I_R , BV_{CEO} , BV_{ECO} , I_{CEO} , I_C , $V_{CE(sat)}$

(2) Appearance

5.2 Sampling method and Inspection level

A single sampling plan, normal inspection level II based on ISO 2859 is applied.

The AQL according to the inspection items are shown below.

Defect	Inspection item	AQL (%)
Major defect	Characteristics defect Unreadable marking	0.4
Minor defect	Appearance defect except the above mentioned.	1.0

6. Supplements

6.2 Parts

This product uses the following parts.

6.2.1 Light detector (Q'ty : 1)

Type	Material	Maximum sensitivity wavelength (nm)	Sensitivity wavelength (nm)	Response time (μ s)
Phototransistor	Silicon (Si)	930	400 to 1200	3

6.2.2 Light emitter (Q'ty : 1)

Type	Material	Maximum light emitting wavelength (nm)	I/O Frequency (MHz)
Infrared light emitting diode (non-coherent)	GaAs	950	0.3

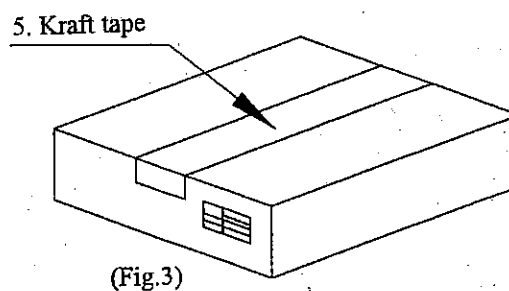
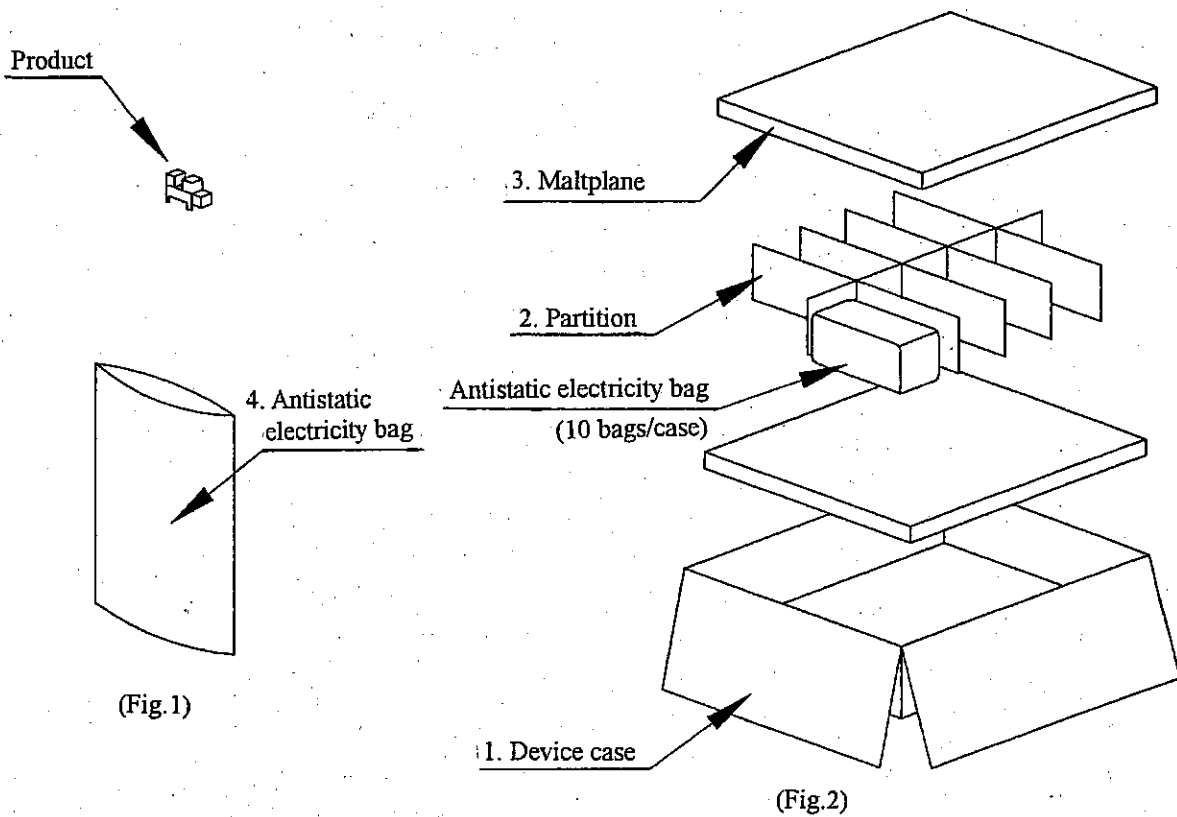
6.2.3 Material

Case
Black polycarbonate resin (UL 94V-2)

6.2.4 Others

This product shall not be proof against radiation flux.

Package drawing



Packaging method

No.	Name	Material	Quantity
1	Device case	Corrugated cardboard	1/1000
2	Partition	Corrugated cardboard	1/1000
3	Maltplane	Urethane	2/1000
4	Antistatic electricity bags	Polyethylene	1/100
5	Kraft tape	-	-

- Put 100 devices into antistatic electricity bag, and seal. (Fig.1)
- Put a maltplane and partition into a device case. Put a bag into a partitioned box. (10 bags per case) and put a maltplane. (Fig. 2)
- Seal device case with kraft tape, and stamp model No., quantity, inspection date. (Fig.3)
(1000pcs./a packing box)
(Approximately 1.16kg/a packaging mass)