

# GP2A231LRSF GP2A230LRS0F GP2A230LRSF

**Snap-in type**

**Detecting Distance : 1 to 9mm**

**\*OPIC Output,  
Reflective Photointerrupter with  
Connector**



## ■ Description

**GP2A230LRS0F Series** are standard, OPIC output, reflective photointerrupters with emitter and detector facing the same direction in a molding that provides non-contact sensing. This family of devices uses light modulation to reduce the affects of disturbing light, and the sensor is optimized to work in the selected focal distance. A 3-pin connector is included to allow remote-mount or off-board designs.

## ■ Features

1. Reflective with OPIC Light Modulated Output
2. Highlights :
  - Position pin to prevent mis-alignment.
  - Snap-mount positioning hooks  
(**GP2A230LRSF**, **GP2A231LRSF**)
  - Includes additional screw fixing holes  
(**GP2A230LRS0F**)
  - Short focal distance
3. Key Parameters :
  - Detecting distance : 1 to 9mm (White paper)  
3 to 7mm (Black paper)
  - Undetecting distance : over 27mm (White paper)
  - Connector : **GP2A230LRSF** ; Tyco Electronics Japan G.K.  
(PN : 292133-3)  
**GP2A230LRS0F** ; Tyco Electronics Japan G.K.  
(PN : 292133-3)  
**GP2A231LRSF** ; Japan Molex K.K.  
(PN : 53401-0335)
4. RoHS directive compliant

## ■ Agency approvals/Compliance

1. Compliant with RoHS directive

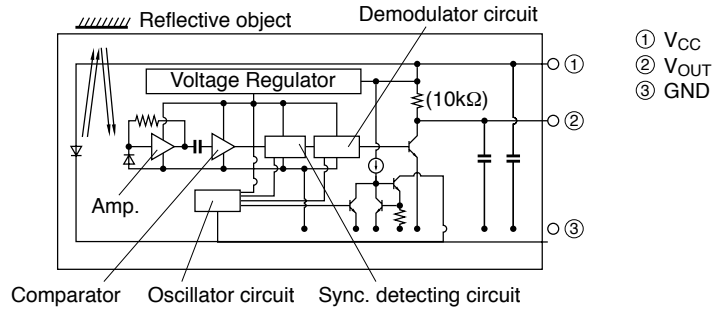
## ■ Applications

1. General purpose detection of paper presence or motion.
2. Example : PPC, FAX, Printer

\* "OPIC"(Optical IC) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and a signal-processing

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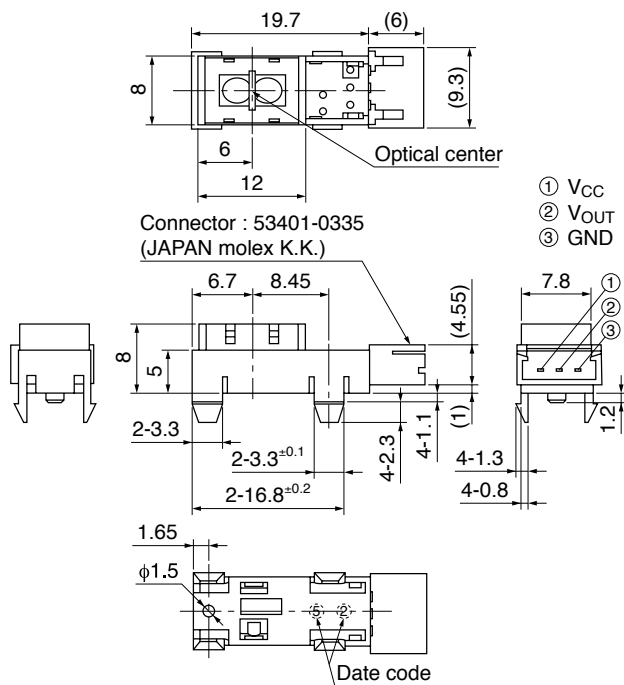
## Internal Connection Diagram



## Outline Dimensions

(Unit : mm)

### GP2A231LRSF



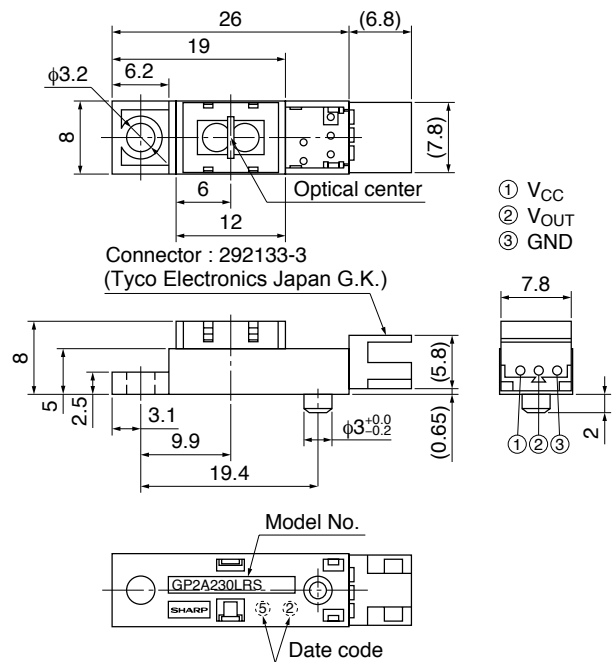
• Unspecified tolerance shall be as follows ;

| Dimensions             | Tolerance |
|------------------------|-----------|
| less than 6            | ±0.2      |
| 6 or more less than 14 | ±0.3      |
| 14 or more             | ±0.4      |

• ( ) : Reference dimensions.

Product mass : approx. 1.4g

### GP2A230LRS0F



• Unspecified tolerance shall be as follows ;

| Dimensions             | Tolerance |
|------------------------|-----------|
| less than 6            | ±0.2      |
| 6 or more less than 14 | ±0.3      |
| 14 or more             | ±0.4      |

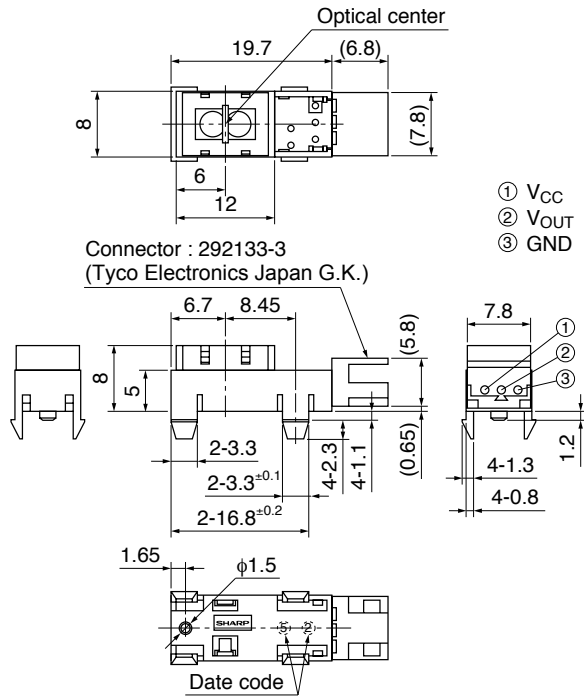
• ( ) : Reference dimensions.

Product mass : approx. 1.42g

Connector terminal plating material : Sn

(Unit : mm)

## GP2A230LRSF



• Unspecified tolerance shall be as follows ;

| Dimensions             | Tolerance |
|------------------------|-----------|
| less than 6            | ±0.2      |
| 6 or more less than 14 | ±0.3      |
| 14 or more             | ±0.4      |

• ( ) : Reference dimensions.

Product mass : approx. 1.42g

Connector terminal plating material : Sn

**Date code (2 digit)**

| 1st digit          |      | 2nd digit           |      |
|--------------------|------|---------------------|------|
| Year of production |      | Month of production |      |
| A.D.               | Mark | Month               | Mark |
| 2000               | 0    | 1                   | 1    |
| 2001               | 1    | 2                   | 2    |
| 2002               | 2    | 3                   | 3    |
| 2003               | 3    | 4                   | 4    |
| 2004               | 4    | 5                   | 5    |
| 2005               | 5    | 6                   | 6    |
| 2006               | 6    | 7                   | 7    |
| 2007               | 7    | 8                   | 8    |
| 2008               | 8    | 9                   | 9    |
| 2009               | 9    | 10                  | X    |
| 2010               | 0    | 11                  | Y    |
| :                  | :    | 12                  | Z    |

repeats in a 10 year cycle

**Country of origin**

Japan or China

(Indicated on the packing case)

**■ Absolute Maximum Ratings** (T<sub>a</sub>=25°C)

| Parameter                | Symbol           | Rating     | Unit |
|--------------------------|------------------|------------|------|
| Supply voltage           | V <sub>CC</sub>  | -0.5 to +7 | V    |
| Output voltage           | V <sub>O</sub>   | 7          | V    |
| *1 Output current        | I <sub>OL</sub>  | 50         | mA   |
| *2 Operating temperature | T <sub>opr</sub> | -10 to +70 | °C   |
| *2 Storage temperature   | T <sub>stg</sub> | -20 to +80 | °C   |

\*1 Sink current refer to Fig.5.

\*2 The connector should be plugged in/out at normal temperature.

## ■ Electro-optical Characteristics (T<sub>a</sub>=25°C)

| Parameter                   | Symbol           | Condhitions                                                     | MIN.  | TYP. | MAX. | Unit |
|-----------------------------|------------------|-----------------------------------------------------------------|-------|------|------|------|
| Supply voltage              | V <sub>CC</sub>  | –                                                               | 4.75  | –    | 5.25 | V    |
| Current dissipation (I)     | I <sub>CC</sub>  | Smoothing value V <sub>CC</sub> =5V, R <sub>L</sub> =∞          | –     | –    | 20   | mA   |
| *3 Current dissipation (II) | I <sub>CCP</sub> | Pulse peak value V <sub>CC</sub> =5V                            | –     | –    | 100  | mA   |
| Low level output voltage    | V <sub>OL</sub>  | V <sub>CC</sub> =5V, I <sub>OL</sub> =16mA, at detecting time   | –     | –    | 0.4  | V    |
| High level output voltage   | V <sub>OH</sub>  | V <sub>CC</sub> =5V, R <sub>L</sub> =1kΩ, at non detecting time | 4.5   | –    | –    | V    |
| *4 Non detection distance   | L <sub>LHL</sub> | KODAK Gray Cards, V <sub>CC</sub> =5V                           | –     | –    | 27   | mm   |
| *4 Detection distance       | L <sub>HLS</sub> | KODAK Gray Cards, V <sub>CC</sub> =5V                           | –     | –    | 1    | mm   |
|                             |                  | Black paper, V <sub>CC</sub> =5V                                | –     | –    | 3    |      |
|                             | L <sub>HLL</sub> | KODAK Gray Cards, V <sub>CC</sub> =5V                           | 9     | –    | –    | mm   |
|                             |                  | Black paper, V <sub>CC</sub> =5V                                | 7     | –    | –    |      |
| *5 Response time            | t <sub>PLH</sub> | V <sub>CC</sub> =5V                                             | –     | –    | 1    | ms   |
|                             | t <sub>PHL</sub> |                                                                 | –     | –    | 1    | ms   |
| *6 Acceptable illuminance   | Ev1              | –                                                               | 3 000 | –    | –    | lx   |
|                             | Ev2              |                                                                 | 1 500 | –    | –    | lx   |

\*3 Refer to Fig.1.

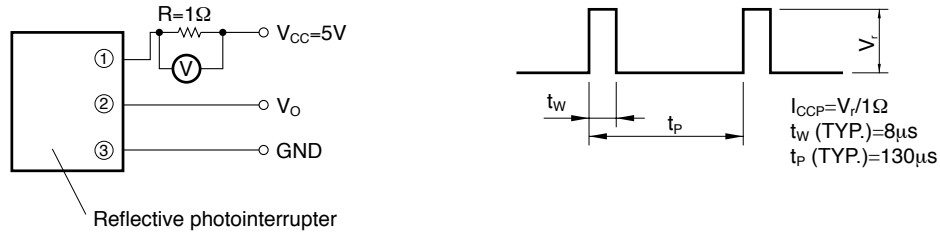
\*4 Refer to Fig.2.

\*5 Refer to Fig.3.

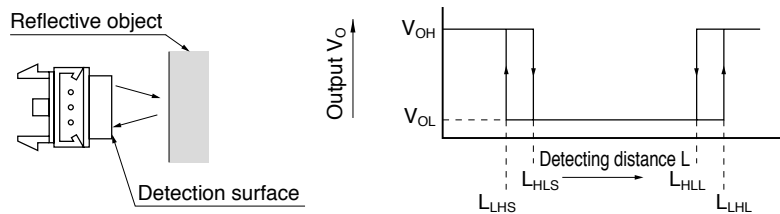
\*6 Refer to Fig.4.

|                   |                                                          |                                                              |
|-------------------|----------------------------------------------------------|--------------------------------------------------------------|
| Reflective object | Black paper (black)                                      | : Standard reflective object (provided by SHARP Corporation) |
|                   | KODAK Gray Cards (use the white side reflects about 90%) |                                                              |
|                   |                                                          | : Standard reflective object (provided by SHARP Corporation) |
|                   | PPC paper                                                | : Standard reflective object (provided by SHARP Corporation) |

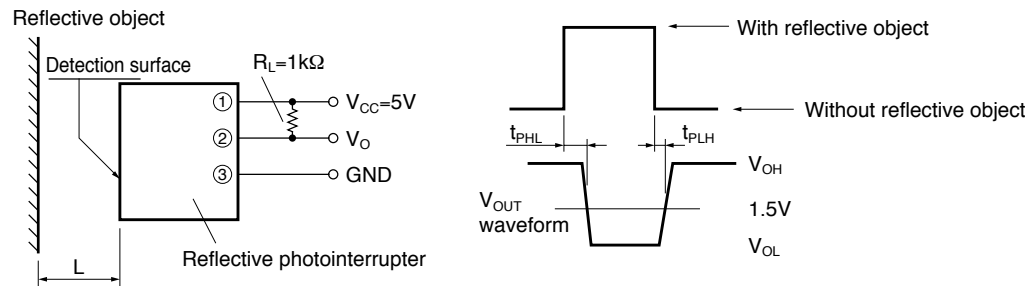
**Fig.1 Test Condition for Peak Pulse Value  $I_{CCP}$**



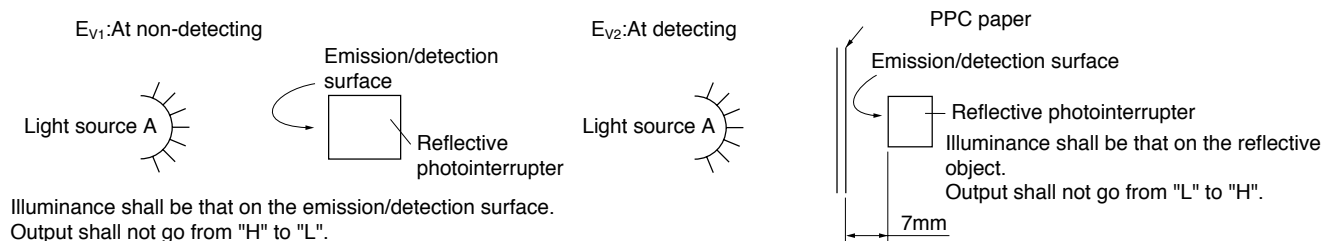
**Fig.2 Test Condition for Detecting Distance Characteristics**



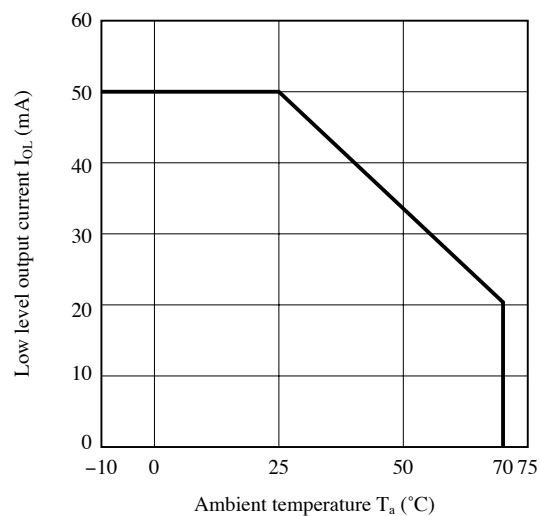
**Fig.3 Test Circuit for Response Time**



**Fig.4 Test Condition for External Disturbing Light Illuminance**



**Fig.5 Low Level Output Current vs. Ambient Temperature**



Remarks : Please be aware that all data in the graph are just for reference and not for guarantee.

## ■ Design Considerations

### ● Design guide

- 1) This product operates the light emitter by pulse drive. Please supply the stable supply voltage in order to prevent error operation by pulse current.  
Please use this device after connecting a capacitor between  $V_O$  and GND for prevention of line noise.
- 2) Prevention of detection error  
Please be careful that you need to keep the direct inverter light away from the photo detecting surface since the device will not operate correctly in such case.  
In addition, we recommend to make sure the operation test in the actual application.
- 3) Plugging in/out  
The connector should be plugged in/out at normal temperature.

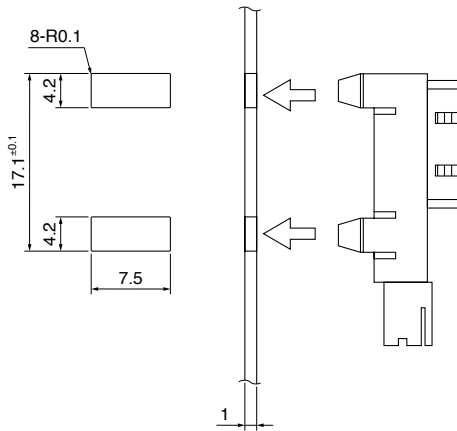
This product is not designed against irradiation and incorporates non-coherent IRED.

### ● Recommended Installation Hole drawing

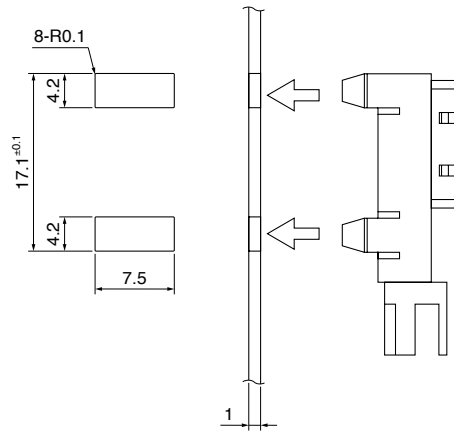
- 1) We recommend to fix the product at punching side on the fixing plate (metal plate).
- 2) Please decide the final dimensions at your side after confirmation by the actual applications, Because mounting efficiency and mounted stabilization are dependent on mounting hole corner curve and punched state.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

Normal type (Thickness of plate : 1mm)

**GP2A231LRSF**

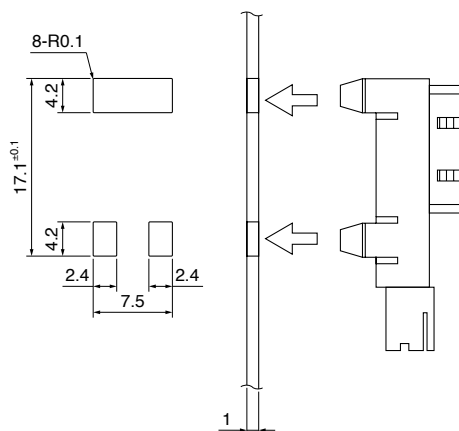


**GP2A230LRSF**

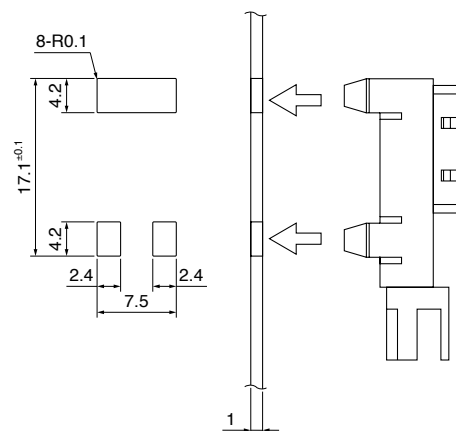


Reverse-insertion prevention type (Thickness of plate : 1mm)

## GP2A231LRSF



## GP2A230LRSF



## ● Parts

This product is assembled using the below parts.

- Photodetector (qty. : 1) [Using a silicon photodiode as light detecting portion, and a bipolar IC as signal processing circuit]

| Category   | Maximum Sensitivity wavelength (nm) | Sensitivity wavelength (nm) | Response time (μs) |
|------------|-------------------------------------|-----------------------------|--------------------|
| Photodiode | 900                                 | 700 to 1 200                | 400                |

Using a silicon photodiode as light detecting portion, and a bipolar IC as signal processing circuit.

- Photo emitter (qty. : 1)

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

- Material

| Case                                         | Lens                           | Bottom cover                           |
|----------------------------------------------|--------------------------------|----------------------------------------|
| Black polyphenylene Sulfide resin (UL94 V-0) | Polycarbonate resin (UL94 V-2) | Polycarbonate resin (Black) (UL94 V-2) |

- Others

Laser generator is not used.

**■ Manufacturing Guidelines****● Cleaning instructions**

Polycarbonate resin is used as the material of the lens surface. So this product shall not be cleaned by cleaning solvent absolutely. Dust and stain shall clean by air blow, or shall clean by soft cloth.

**● Presence of ODC**

This product shall not contain the following materials.

And they are not used in the production process for this product.

Regulation substances : CFCs, Halon, Carbon tetrachloride, 1.1.1-Trichloroethane (Methylchloroform)

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

This product shall not contain the following materials banned in the RoHS Directive (2002/95/EC).

- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE).

**■ Package specification****● Sleeve package****Package materials**

Anti-static plastic bag : Polyethylene

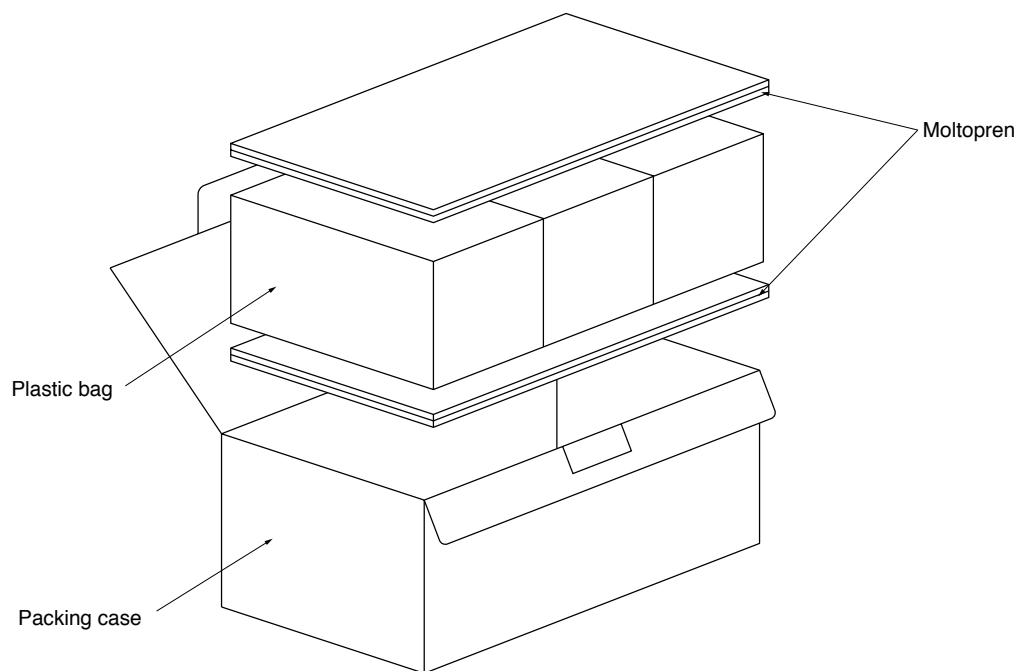
Moltopren : Urethane

Packing case : Corrugated fiberboard

**Package method**

100 pcs of products shall be packaged in a plastic bag, Ends shall be sealed by stapler. The bottom of the packing case is covered with moltopren, and 3 plastic bags shall be put into the packing case.

Moltopren should be located after all product are settled (1 packing contains 300 pcs).

**Packing composition**

## ■ Important Notices

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- Personal computers
- 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

with equipment that requires higher reliability such as:

- 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:

- Space applications
- Telecommunication equipment [trunk lines]
- Nuclear power control equipment
- Medical and other life support equipment (e.g., scuba).

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