

GP1A038RxK0F Series

***OPIC Output,
Transmissive Photointerrupter
with Encoder function**



■ Description

GP1A038RxK0F Series is a transmissive photo-interrupter, with optical encoder function used for determining rotational/linear direction and speed. Must be used in conjunction with a linear scale or code wheel. The encoder is designed to output 2 pulses whose phase differs by 90°

Their contact pin has both of straight and right angle version.

■ Features

1. Transmissive with encoder function
2. Highlights :
 - High resolution model available
 - Rotary or Linear functionality
3. Key Parameters :
 - Resolution : 150LPI (**GP1A038RBKxF**),
180LPI (**GP1A038RCKxF**)
 - Type : Digital output
 - Frequency : 20 kHz (max.)
 - Gap Width : 1.7mm
 - Package : 20.2×11.85×12mm (**GP1A038RxK0F**)
20.2×13×11.9mm (**GP1A038RxKLF**)
4. Lead free and RoHS directive compliant

■ Agency approvals/Compliance

1. Compliant with RoHS directive

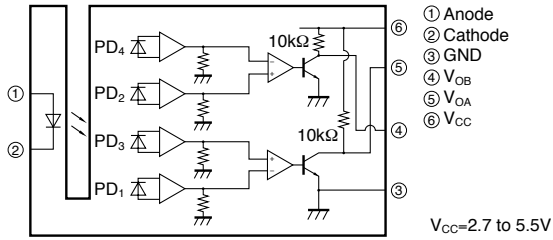
■ Applications

1. General purpose detection of motion either linear or rotary
2. Example : Printer paper feed roller or printer head

* "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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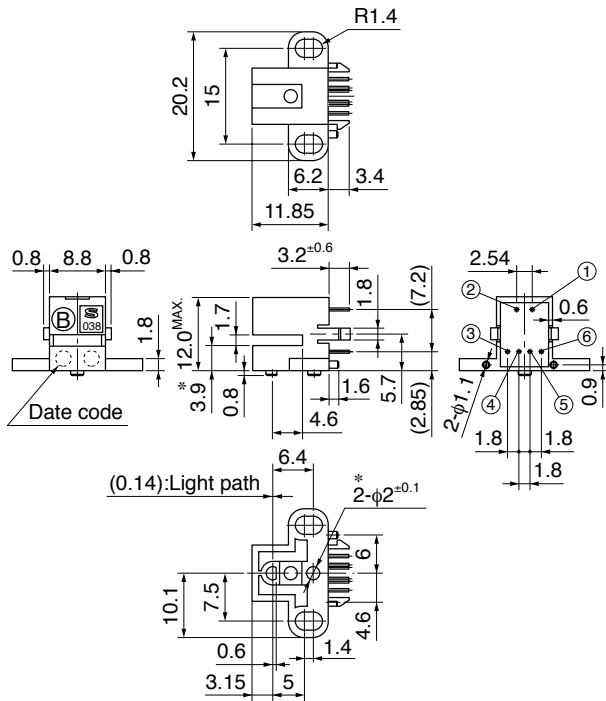
Internal Connection Diagram



Outline Dimensions

(Unit : mm)

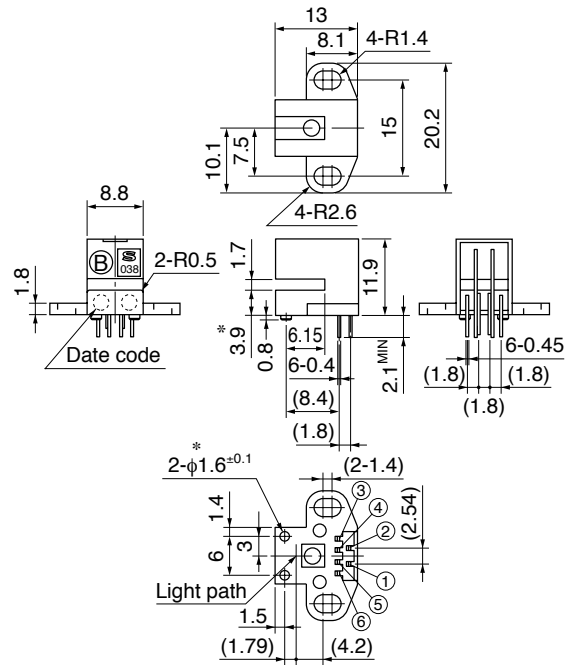
GP1A038RBK0F



- Unspecified tolerance : ±0.3mm.
- () : Reference dimensions.
- *The outline dimensions show the which affects electrical characteristics in out going inspection standard.

Product mass : approx. 0.94g

GP1A038RBKLF

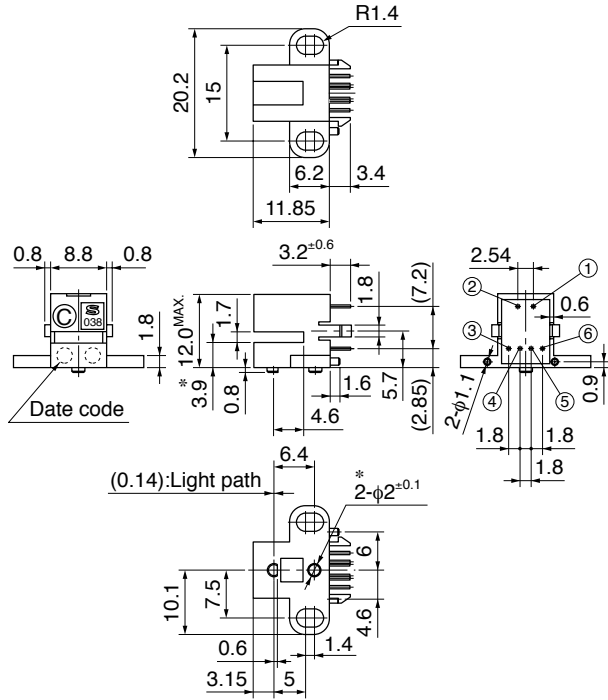


- Unspecified tolerance : ±0.3mm.
- () : Reference dimensions.
- *The outline dimensions show the which affects electrical characteristics in out going inspection standard.

Product mass : approx. 0.94g

Solder material : SnAgCu dipping

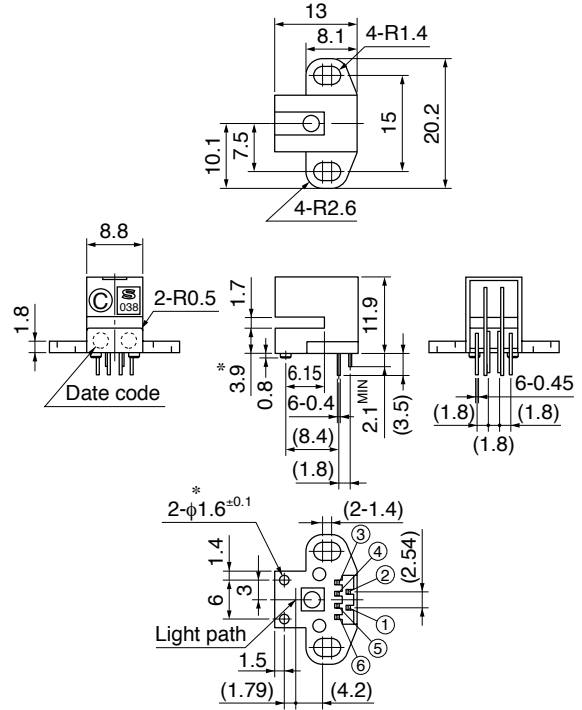
GP1A038RCK0F



- Unspecified tolerance : ±0.3mm.
- () : Reference dimensions.
- *The outline dimensions show the which affects electrical characteristics in out going inspection standard.

Product mass : approx. 0.94g

GP1A038RCKLF



- Unspecified tolerance : ±0.3mm.
- () : Reference dimensions.
- *The outline dimensions show the which affects electrical characteristics in out going inspection standard.

Product mass : approx. 0.94g

Solder material : SnAgCu dipping

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

China

■ Absolute Maximum Ratings (T_a=25°C)

Parameter		Symbol	Rating	Unit
Input	*1 Forward current	I _F	50	mA
	Reverse voltage	V _R	4	V
Supply voltage		V _{CC}	7	V
Output	Low level output current	I _{OL}	8	mA
	*1 Power dissipation	P _O	150	mW
Operating temperature		T _{opr}	-10 to +70	°C
Storage temperature		T _{stg}	-40 to +80	°C
*2 Soldering temperature		T _{sol}	260	°C

*1 Refer to Fig.2, Fig.3

*2 For MAX. 5s

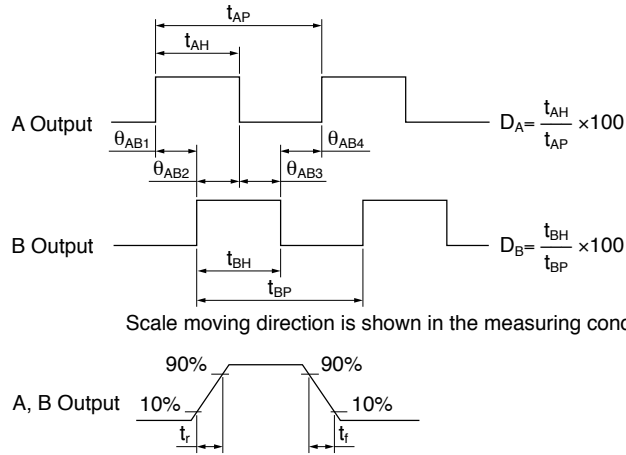
■ Electro-optical Characteristics (T_a=25°C)

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	
Input	Forward voltage	V _F	I _F =11mA	-	1.3	1.5	V	
	Reverse current	I _R	V _R =1V	-	-	100	μA	
Operating supply voltage range		V _{CC}	-	2.7	5	5.5	V	
Output	Low level output voltage	V _{OL}	V _{CC} =5V, I _F =11mA, I _{OL} =8mA	-	0.1	0.4	V	
	High level output voltage	V _{OH}	V _{CC} =5V, I _F =11mA	2.4	4.9	-	V	
	Supply current	I _{CC}	V _{CC} =5V, I _F =11mA Phase A and B both at low level	-	2	5	mA	
*3 Transfer characteristics	Duty		D _A /D _B	V _{CC} =5V, I _F =11mA, f=10kHz, *4 Z=0.1 to 1mm	35	50	65	%
	Phase difference		θ _{AB1 to 4}		45	90	135	°
	Response time	Rise time	t _r		-	1	2	μs
		Fall time	t _f		-	1	2	
	Response frequency		f _{max}		V _{CC} =5V, I _F =11mA, Z=0.1 to 1mm	-	-	20

*3 The test condition is according to Fig.4. Transfer characteristics value does not include any error of linear scale.

*4 Z stands for distance between scale surface (patterned surface) and detector holder surface.

Fig.1 Output Waveform



Scale moving direction is shown in the measuring condition (Refer to Fig.4).

Fig.2 Forward Current vs. Ambient Temperature

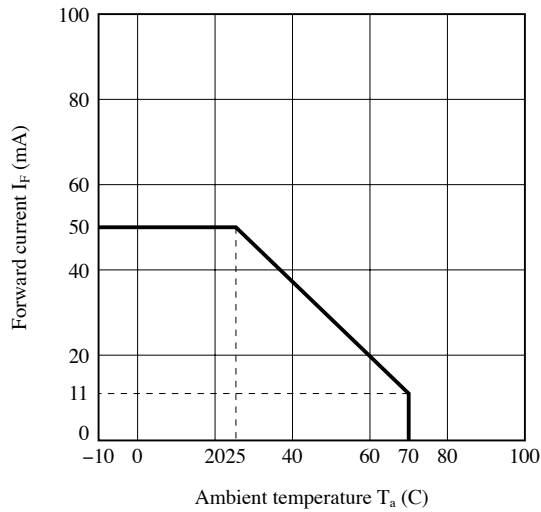


Fig.3 Output Power Dissipation vs. Ambient Temperature

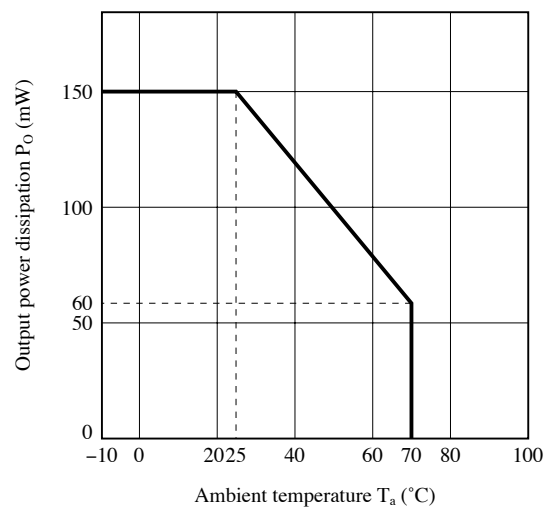
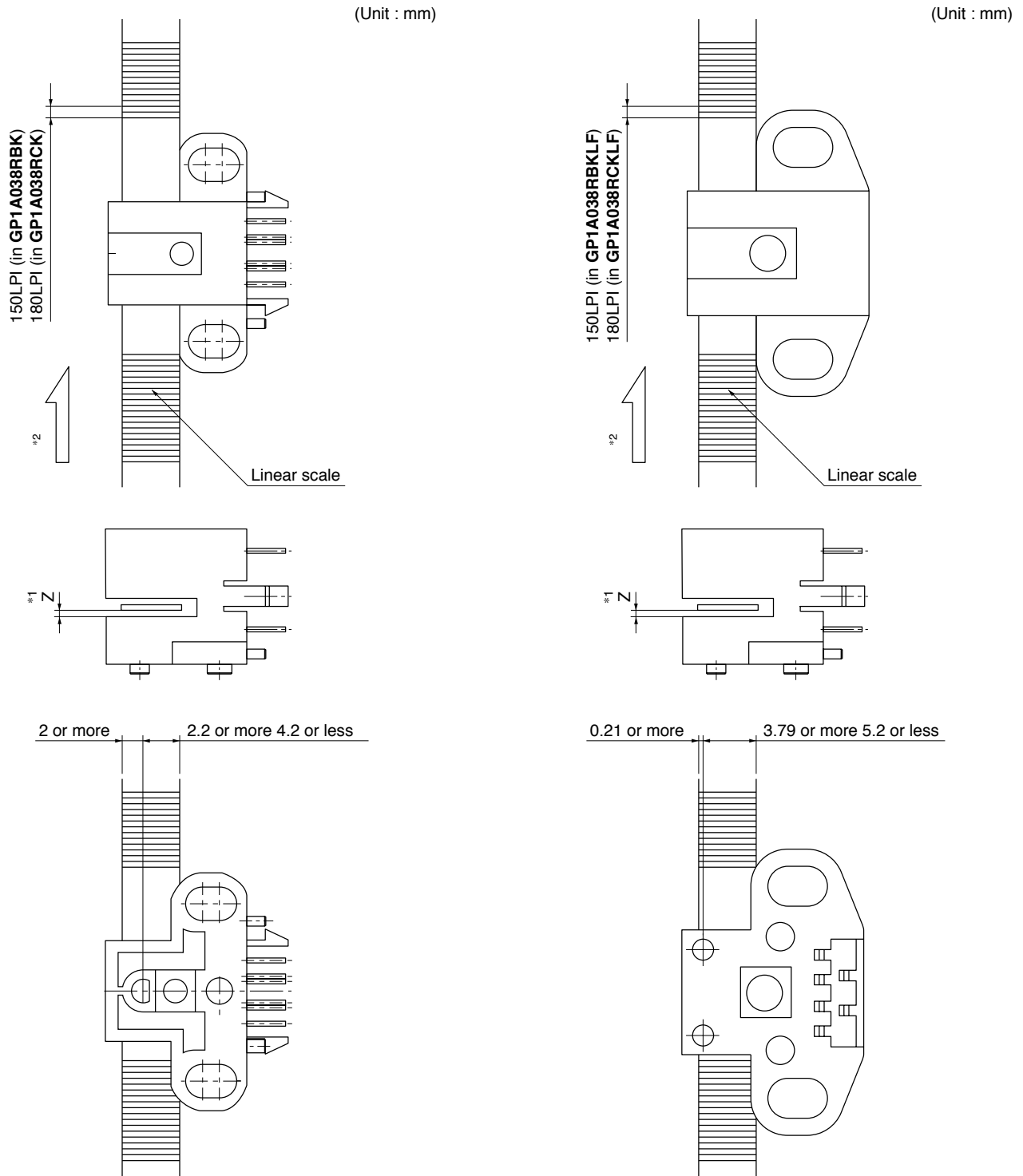


Fig.4 Measuring Condition



*1 Distance between scale face and holder on the detector side
 *2 Scale moving direction

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

■ Design Considerations

● Design guide

- 1) It is recommended that this product be used under the condition of typical $I_F=11\text{mA}$ for which it is designed.
- 2) In order to stabilize power supply line, connect a by-pass capacitor of more than $0.01\mu\text{F}$ between V_{CC} and GND near the device.
- 3) When using this product in combination with linear scale, please set them up so that the scale face should not touch this product.
- 4) OPIC chip due to micro design is easily affected by the Electro static discharge. At operating, in order to protect the destruction and the defect of characteristics by Electro static discharge, please take a general countermeasure of the Electro static discharge.

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

● 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	780	400 to 1 200	50

- Photo emitter (qty. : 1)

Category	Material	Maximum light emitting wavelength (nm)
Infrared emitting diode (non-coherent)	GaAlAs	870

- Material

Holder	Slit	Lens holder	Lead frame plating
Black polycarbonate resin	Black polycarbonate resin	Transparent polycarbonate resin	SnAgCu dipping

- Others

Laser generator is not used.

■ Manufacturing Guidelines**● Soldering Method**

Flow Soldering:

Soldering should be completed below 260°C and within 5 s.

Please solder within one time.

Please take care not to let any external force exert on lead pins.

Please don't do soldering with preheating, and please don't do soldering by reflow.

Other notice

Please test the soldering method in actual condition and make sure the soldering works fine, since the impact on the junction between the device and PCB varies depending on the tooling and soldering conditions.

● Cleaning instructions

The lens part of this product is an optical component built with the resin.

Therefore, please never cleanse this product by the cleaning agent.

When necessary, dust and stain shall clean by air-blow.

● 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**GP1A038RBK0F/GP1A038RCK0F****Package materials**

Tray : Polystyrene

Pad : Polyethylene

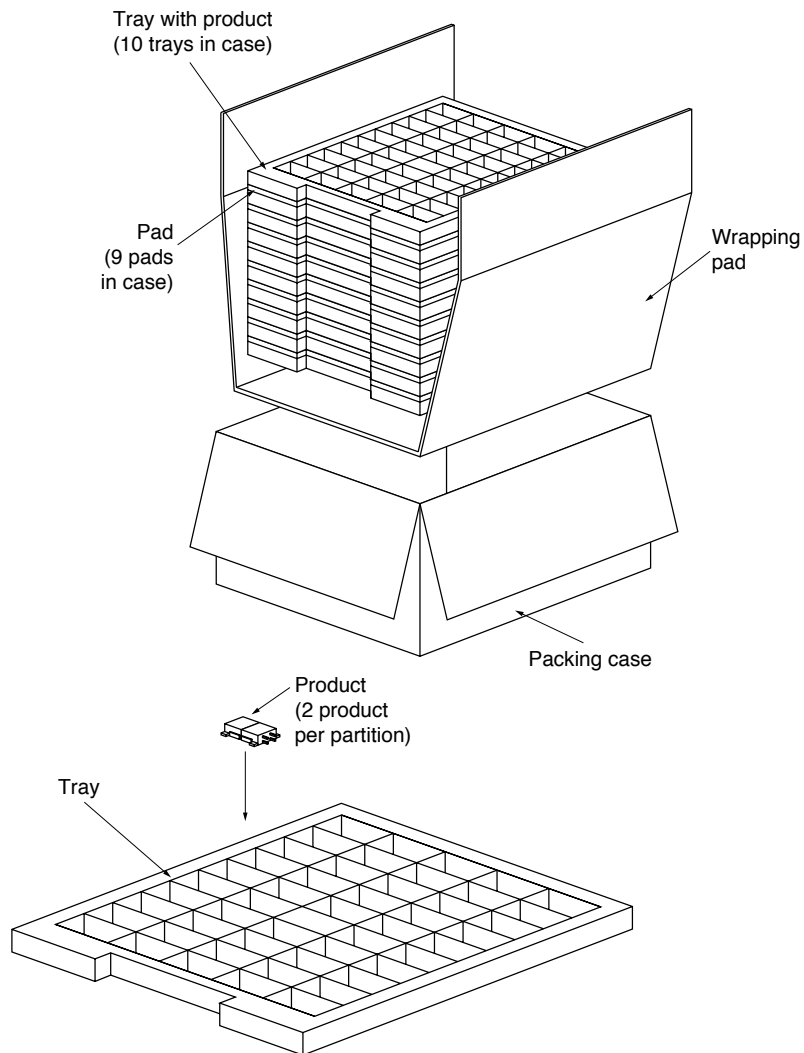
Wrapping pad : Polyethylene

Packing case : Corrugated fiberboard

Package method

100 pcs of products shall be packaged in a tray. (The storage method is shown in below figure.) The 10 trays are heaped up, and the 9 pads are put between each tray.

After these trays are wrapped into one by wrapping pad, they shall be put in the packing case. (1 packing contains 1 000 pcs).

Packing composition

GP1A038RBKLF/GP1A038RCKLF**Package materials**

Tray : Polystyrene

Pad : Polyethylene

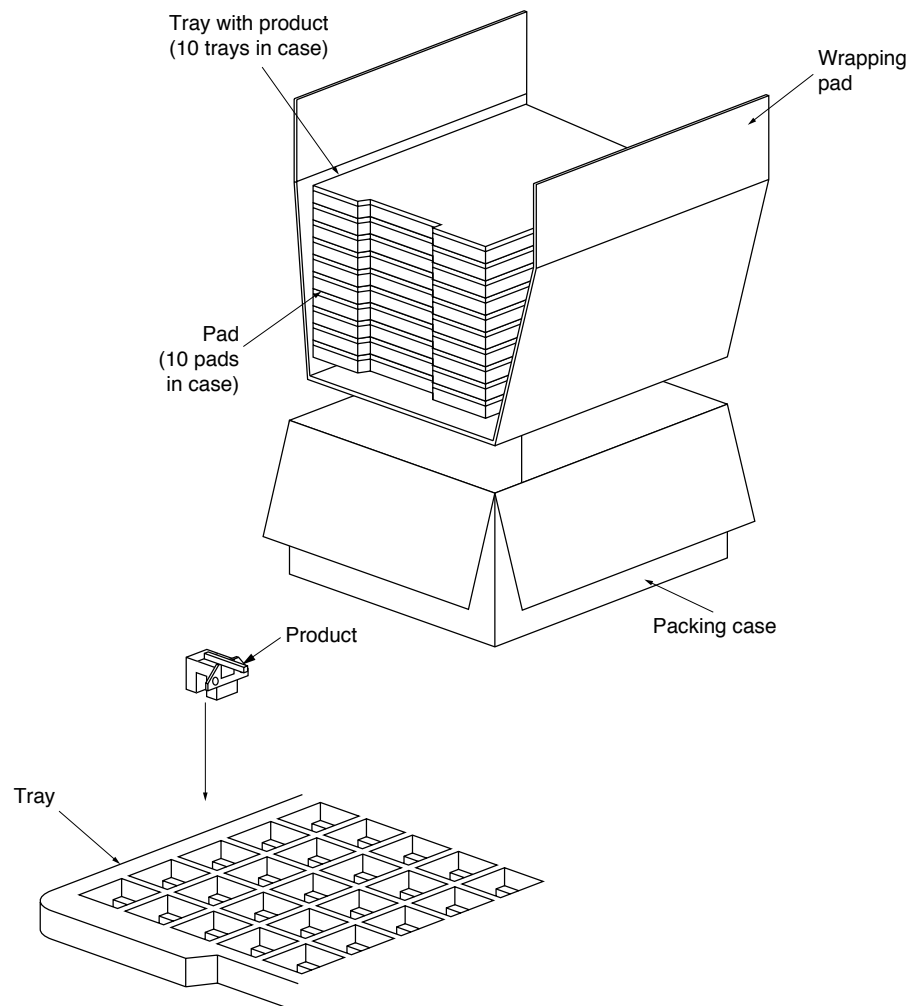
Wrapping pad : Corrugated fiberboard

Packing case : Corrugated fiberboard

Package method

100 pcs of products shall be packaged in a tray. (The storage method is shown in below figure.) The pad is put on top of tray, and these 10 trays are heaped up.

After these trays are wrapped into one by wrapping pad, they shall be put in the packing case. (1 packing contains 1 000 pcs).

Packing composition

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- 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

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- Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
- Traffic signals
- Gas leakage sensor breakers
- Alarm equipment
- Various safety devices, etc.

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- Telecommunication equipment [trunk lines]
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