SPEC. No. ED-04U038
ISSUE September 28, 2004

SHARP

OPTO-ELECTRONIC DEVICES DIVISION
ELECTRONIC COMPONENTS GROUP
SHARP CORPORATION

SPECIFICATION

DEVICE SPECIFICATION FOR

Infrared Detecting unit for Remote Control

MODEL No.

GP1UM10XP00F series

Specified for

Enclosed please find copies of the Specifications which consists of 16 pages including cover.
After confirmation of the contents, please be sure to send back ☐ copies of the Specifications with approving signature on each.

CUSTOMER'S APPROVAL

DATE

BY

PRESENTED

DATE

BY

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

Product name : Infrared Detecting unit for Remote Control

Model No. : GP1UM10XP00F series

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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))

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.

NOTICE

1. Application

This specifications applies to the model marked "○" in the following models of infrared detecting unit for remote control.

The model list of GP1UM10XP00F series

Application	Model No.	B.P.F. center frequency (TYP)
	GP1UM10XP00F	40 kHz
	GP1UM100XP0F	36 kHz
	GP1UM101XP0F	38 kHz
	GP1UM102XP0F	36.7 kHz

Main application : Camcorder, Camera

2. Outline

Refer to the attached sheet, Page 7.

3. Ratings and characteristics

Refer to the attached sheet, Page 4 to 6.

4. Reliability

Refer to the attached sheet, Page 8.

5. Outgoing inspection

Refer to the attached sheet, Page 9.

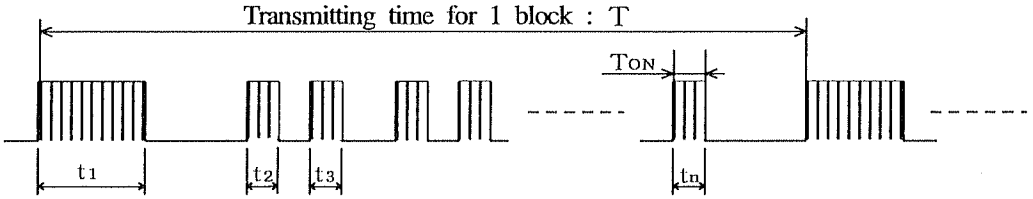
6. Supplement

1) This infrared detecting unit for remote control satisfies each performance requirements in para. 3.5, in the standard optical system in Fig.2.
2) This product is built-in photodiode.
3) Product mass : Approx. 0.5g
4) 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)
5) Brominated flame retardants
   Specific brominated flame retardants such as the $PBBO_S$ and PBB_S are not used in this device at all.
6) Taping : Refer to the attached sheet, page 11 to 13.
7) Taping moisture-proof package : Refer to the attached sheet, page 14.
8) Package specification : Refer to the attached sheet, Page 15.
9) Country of origin : Japan
10) This product doesn't use lead.

7. Notes

1) Transmitting code

When this infrared remote control detecting unit shall be adopted for wireless remote control, please use it with the signal format of transmitter, which total duty ratio Dt (Emitting time $\sum_{N=1}^{n} t_N$ / Transmitting time for 1 block T) is 40% or less. ON signal time T_{ON} (Pulse width of the presence of modulated IR) should be 250 μ s or more. In case that the signal format of total duty and ON signal time is out of above conditions, there is a case that reception distance is much reduced or output is not appeared.



$$D_t = \left(\sum_{N=1}^{n} t_N / T\right) \times 100 \ (\%)$$

PRELIMINARY

2) Transmitter

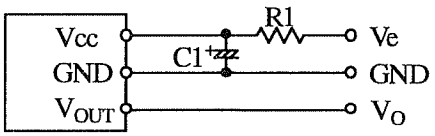
Please use a light emitting unit (remote control transmitter) taking into consideration such factors as the performances, characteristics and operating condition of the light emitting element and the characteristics of this light detecting unit.

3) Detector face and cleaning

If the surface of detector is smeared with dust or dirt, it may cause faulty operation. Caution shall be taken to avoid this.
And do not touch the detector surface. If the surface was smeared, wipe it clean with soft cloth.
If any solvent is needed, Methyl alcohol, Ethyl alcohol, or Isopropyl alcohol should be used.
Please don't carry out washing. Because, after washing the remainder in solvent or flux in this device cause malfunction.
Marking on this device is defaced by washing.

4) Mounting this product

- The shield case shall be grounded on the PCB pattern.
  (There are two cases that shield case and GND pin are connected in the shield case, or are not connected in it.)
- Unnecessary stress should not be applied to the terminal.
- Please don't push the detecting side (photodiode) from external.
- In order to prevent electrostatic discharge of integrated circuit, human body and soldering iron, etc. shall be grounded.
- The holes and the slits on the infrared detecting unit shall not be used as the other purpose to maintain its performance.
- When mounting, please mount the external circuit below. (CR filter)
  (External parts should be mounted as close as possible to the sensor.)



(Circuit Constant)
R1=47 Ω ±5%
C1=47 μF

The circuit constant is a example. It is difference from mounting equipment. Please select it by your mounting equipment.
This device has a transistor as protection element between Vcc and GND to improve anti-static electricity proof.
Please be carefully not to apply exceeding the absolute maximum ratings of applying voltage and continuous high voltage spike noise because there is cases that transistor will be short by secondary breakdown generally.
In order to do difficultly, Please add CR filter (47 Ω (1/10W), 10 μF or more) such as external circuit example above near Vcc.

5) Characteristics of this product

- There is a possibility that noise on output may be caused by environmental condition etc.
  even if there is no input transmission signal.
- Please shall confirm operation or your actual machine. Because the output pulse width of this product is fluctuated by environmental conditions such as signal format, temperature, distance from transmitter, and so on.

6) Soldering

Precautions for Soldering Refer to the attachment-1.

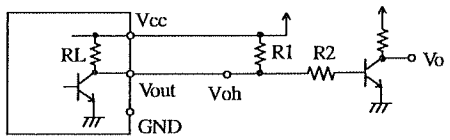
7) Use condition

Please use this device away from the dew drop.
Be aware that the dew drop rusts shield case and others, may affect the electric characteristics.

8) Output circuit

In case output of Vout (Voltage of Voh in the below chart) decreases due to influence from the external circuit, please adjust the circuit constants so that Voh is kept more than 2.8V.

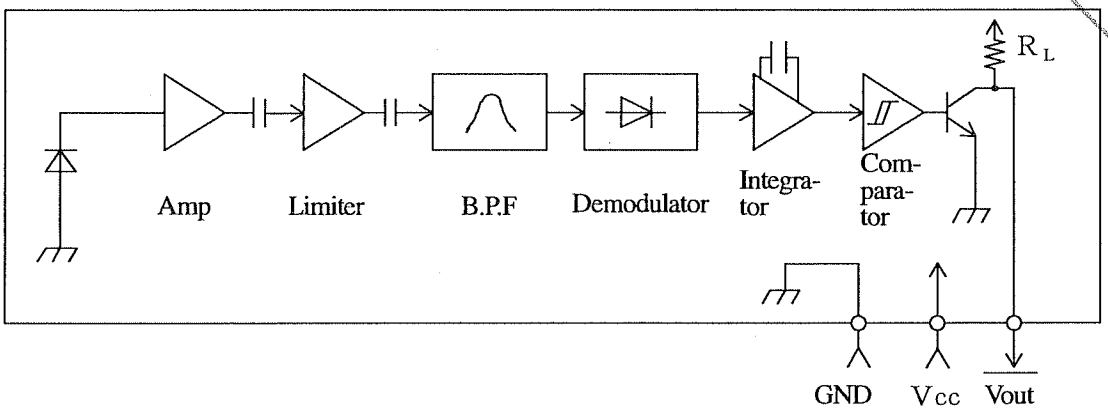
Ex.) When adding transistors to output circuit, they shall be added as R1, R2 shown on the right chart & their value shall be adjusted so that Voh becomes 2.8V or more. (RL=about 100k Ω)



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3. Ratings and characteristics

3.1 Schematic



3.2 Absolute maximum ratings

Parameter	Symbol	Ratings	Unit
Supply voltage	Vcc	0 to 6.0	V
Operating temperature	Topr	-10 to +70 ※1	℃
Storage temperature	Tstg	-20 to +70	℃
Soldering temperature	Tsol	240 (Soldering time : 5s)	℃

※1) No dew drop

3.3 Recommended operating conditions

Parameter	Symbol	Operating condition	Unit
Supply voltage	Vcc	4.5 to 5.5	V

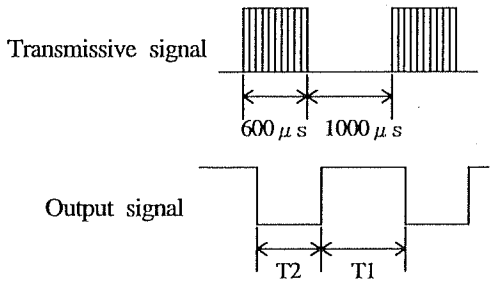
3.4 Electrical characteristics

(Unspecified Ta=25℃, Vcc=+3V)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remark
Current dissipation	Icc	-	0.95	1.5	mA	No input light
High level output voltage	V_{OH}	Vcc-0.5	-	-	V	※3
Low level output voltage	V_{OL}	-	-	0.45	V	※3 I_{OL}=1.6mA
High level pulse width	T_1	600	-	1200	μs	※3
Low level pulse width	T_2	400	-	1000	μs	※3
B.P.F. center frequency	f_0	-	※3	-	kHz	
Output pull-up resistance	R_L	70	100	130	kΩ	

※3) The burst wave as shown in the figure on the right shall be transmitted by the transmitter shown in Fig.1. However, the carrier frequency of transmitter is same as ※4 kHz. Measuring shall start just after starting of the transmission and do on until 50 pulse.

fo=※3 kHz Carrier Duty 50%



※4) B.P.F. center frequency : f_0 of each model is shown in the list below.

Model No.	B.P.F. center frequency (TYP)
GP1UM10XP00F	40 kHz
GP1UM100XP0F	36 kHz
GP1UM101XP0F	38 kHz
GP1UM102XP0F	36.7 kHz

3.5 Performance

The output signal of this infrared detecting unit shall satisfy the following requirements with the transmitter shown in Fig.1 used in the standard optical system in Fig.2.

3.5.1 Characteristics of linear reception distance

The output signal shall satisfy the electrical characteristic requirements in para. 3.4 at L=0.2 to 5.0m, (※5) Ev＜10lx, ϕ=0° in Fig.2.

3.5.2 Characteristics of sensitivity angle reception distance

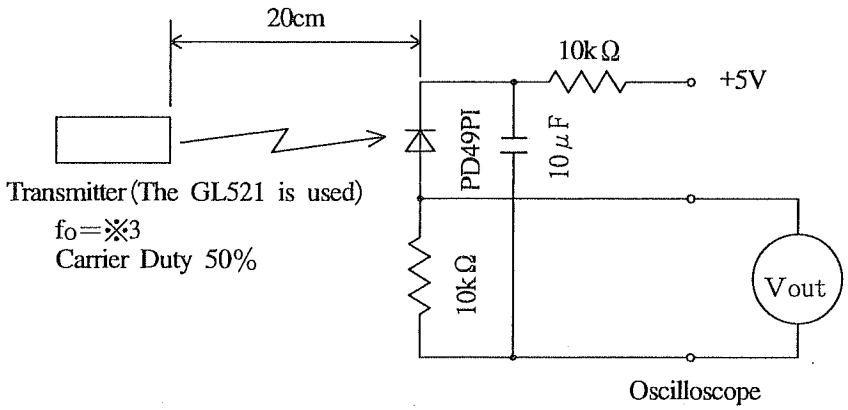
The output signal shall satisfy the electrical characteristic requirements in para. 3.4 at L=0.2 to 4.0m, (※5) Ev＜10lx, $\phi \leqq 30°$ in Fig.2.

3.5.3 Characteristics of anti-outer peripheral light reception distance

The output signal shall satisfy the electrical characteristic requirements in para. 3.4 at L=0.2 to 2.5m, (※5, ※6) Ev≦300lx, ϕ=0° in Fig.2.

※4) It refers to detector face illuminance.

※5) Outer peripheral light source: CIE standard light source A shall be used and placed at 45° from the perpendicular axis at the detector face center.



In the figure above, the transmitter shall be set as the output Vout(p-p) will be 40mV.
Note that the PD49PI in this application is the one with short-circuit current
Isc=2.6 μA measured at Ev=100lx. (Ev is the illuminance by CIE standard light source A (tungsten lamp)).

Fig. 1 Transmitter

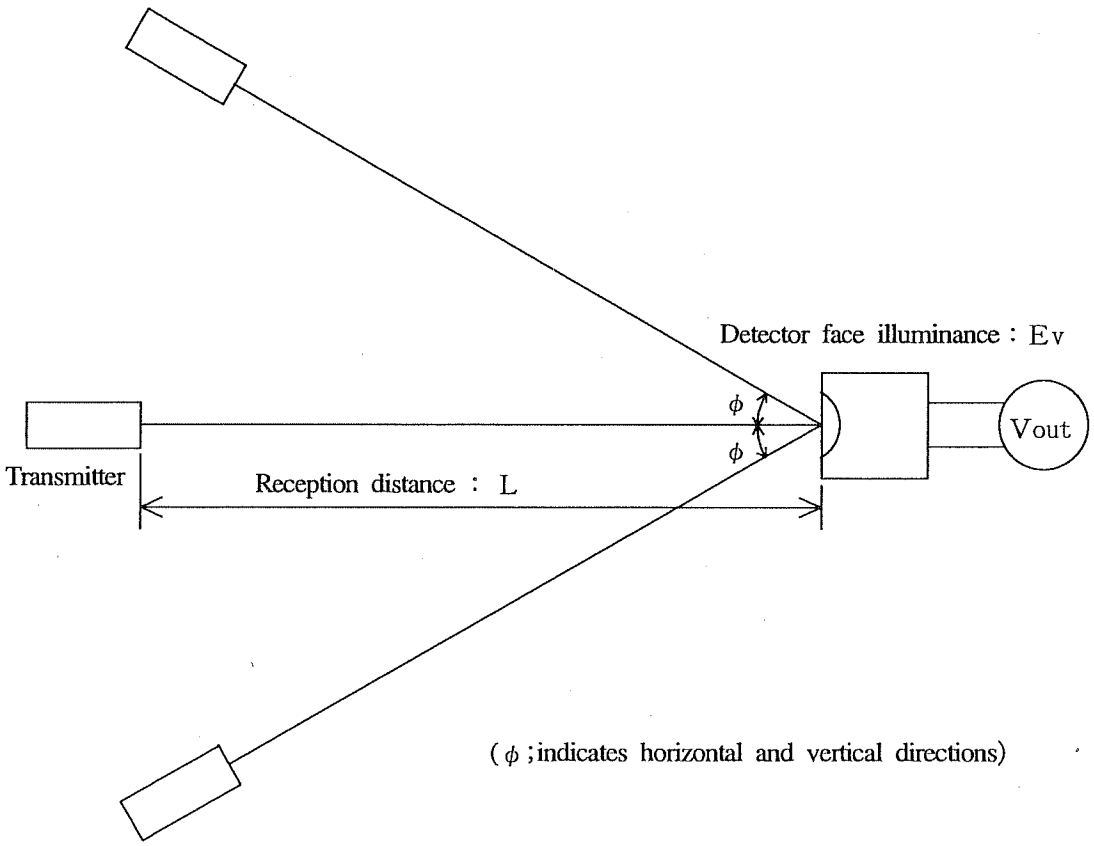


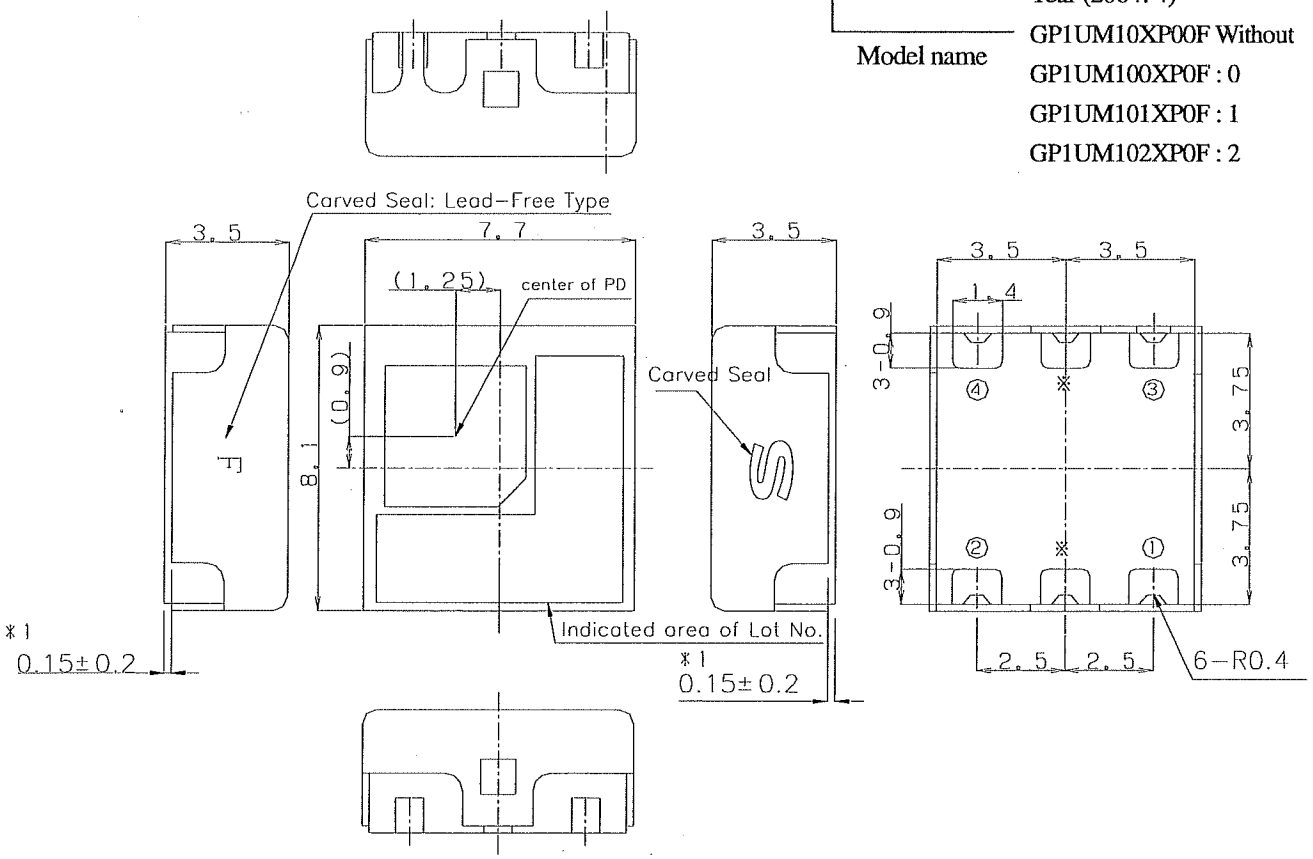
Fig.2 Standard optical system

SAMPLE

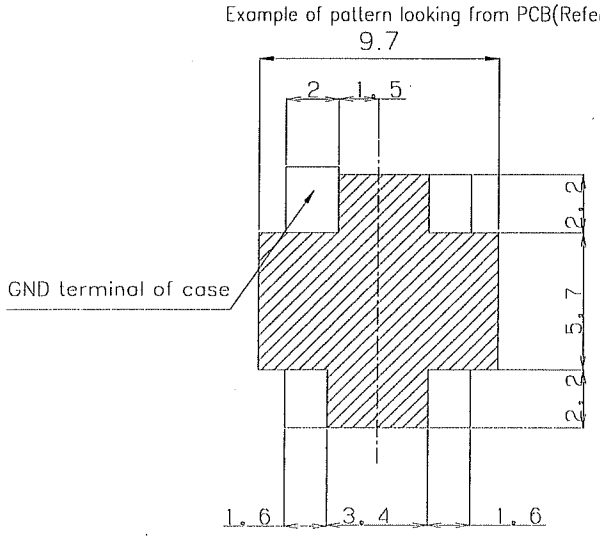
Lot No. (Stamp : Black)

M
1 4 3 4
- Model name
- Week (1 to 6)
- Month (1 to 9, X,Y,Z)
- Year (2004: 4)
- GP1UM10XP00F Without
- GP1UM100XP0F : 0
- GP1UM101XP0F : 1
- GP1UM102XP0F : 2

Model name



Example of pattern looking from PCB(Reference)



Portion of ▨ shall not make pattern.

Pin arrangement

① Vcc
② Vout
③ Case GND
④ GND
※ Dummy pattern (GND potential)

1. Unspecified tolerance : ±0.3
2. Case material : Fe
3. Case finish : Solder plating
   (Sn-Cu or Sn-Ni-Zn)
4. Case thickness : 0.2TYP.
5. Product mass : Approx. 0.5g
6. *1 Except for dimension variance by clearance between shield case and internal device.

Scale	Name	GP1UM10XP00F series Outline dimensions
Unit		
1=1/1mm	Drawing No.	RUD4608

4. Reliability

The reliability of products shall satisfy items listed below.

Confidence level : 90%
LTPD : 10 or 20

Test Items	Test Conditions	Failure Judgement Criteria	Samples (n) / Defective(C)
Shock	Acceleration: 1000m/s^2, 6ms 3 directions/3 times	Performance given in para. 3.5 should not be satisfied.	n=11, C=0
Variable frequency vibration	Frequency range: 10 to 55Hz/sweep 1min Overall amplitude: 1.5mm X, Y, Z/2h each		n=11, C=0
* High temp. and high humidity storage	Ta=40℃, 90%RH, t=240h		n=22, C=0
* High temp. storage	Ta=70℃, t=240h		n=22, C=0
* Low temp. storage	Ta=-20℃, t=240h		n=22, C=0
* Temperature cycling	1cycle -20℃ to +70℃ (30min) (30min) 5 cycles test		n=22, C=0
* Operation life (High temperature)	Ta=70℃, Vcc=5V, t=240h		n=22, C=0
Solder heat	240℃, 5s Temperature profile : Refer to the attached sheet, page 10.		n=11, C=0

In the test *mark above, the sample to be tested shall be left at normal temperature and humidity for 2hours after it is taken out of the chamber. (No dew drop)

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 applied.

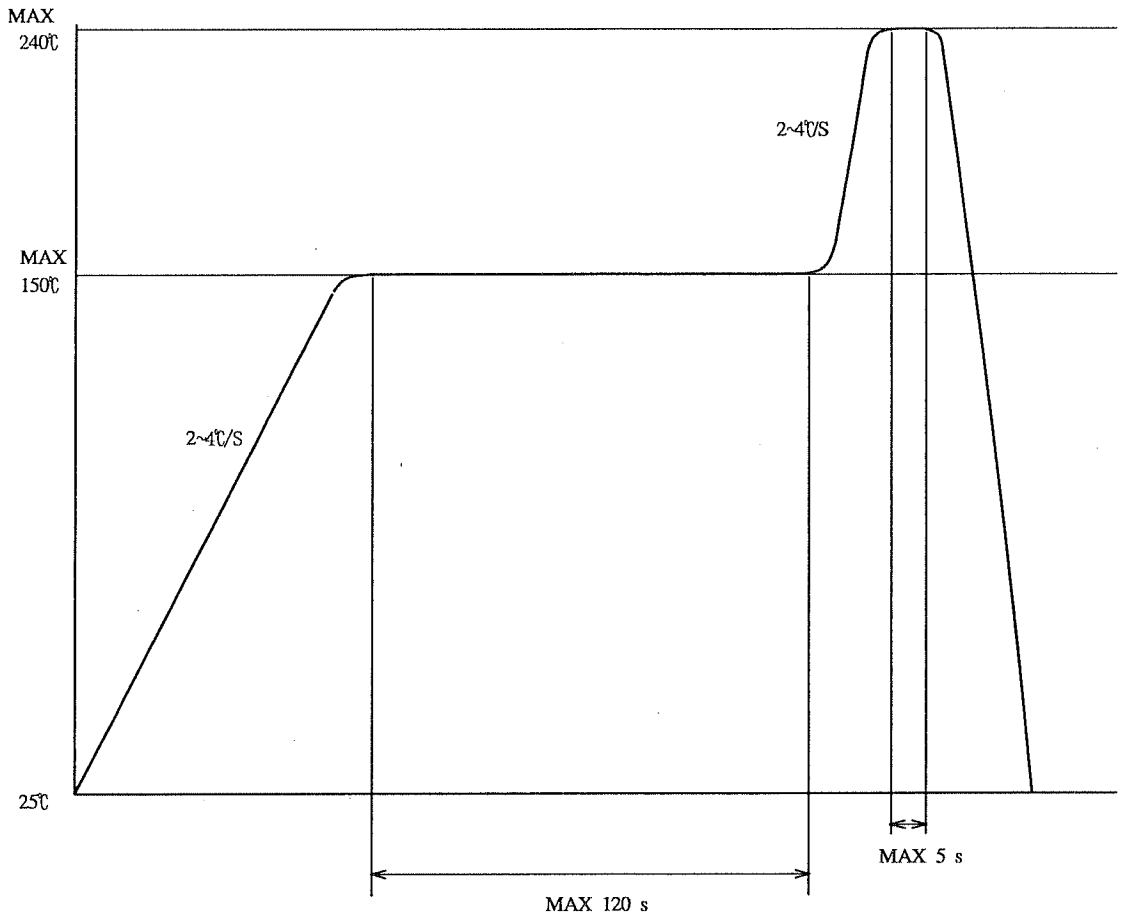
Classification of Defects		Inspection Items	AQL (%)
Major defect	1	Electrical characteristic defect of V_{OH}, V_{OL}, T_1 and T_2 in para. 3.4.	0.4
	2	It should have no remarkable stains and cracks that give any influence of electrical characteristic on light detecting face.	
Minor defect	1	Deformation of shield case (Satisfying outline dimensions of item 2)	1.5
	2	Stamp, Carved seal (It should be possible to read stamp and carved seal of item 2. Stamp and carved seal should be indicated at fixed position.)	

SHARP

Precautions for Soldering infrared detecting unit for remote control

1. In case of solder reflow

Please do only one soldering at the temperature and the time within the temperature profile as shown in the figure.



2. Other precautions

An infrared lamp used to heat up for soldering may cause a localized temperature rise in the resin. Also avoid immersing the resin part in the soldering. Even if within the temperature profile above, there is the possibility that the gold wire in package is broken in case that the deformation of PCB gives the affection to lead pins. Please use after confirmation the conditions fully actual solder reflow machine.

3. Hand soldering

- Soldering iron shall be less than 25W,and temperature of point soldering iron shall use at less than 260℃.
- Soldering time shall be within 5s.
- Soldered product shall treat at normal temperature.
- Solder : 6/4 solder or included Ag solder.

Taping specifications

(ϕ 330mm reel)

1. Application

This packing specification sheets specify the taping specifications for GP1UM10XP00F series.

2. Taping method

2-1.Tape structure and Dimensions(Refer to the attached Sheet, page 12.)

The tape shall have a structure in which a cover tape is sealed pressed on the carrier tape of conductive PET.

2-2.Reel structure and Dimensions(Refer to the attached Sheet, page 13.)

The taping reel shall be conductive plastic with its dimensions as shown in the attached drawing.

2-3.Direction of product insertion(Refer to the attached Sheet, page 13.)

Product direction in carrier tape shall be that electrode side or product places on the cover tape side and lens side of product places on the hold side of the tape.

2-4.The way to repair taped failure devices

The way to repair taped failure devices cut a bottom of carrier tape with a cutter, and after replacing to good devices, the cutting portion shall be sealed with adhesive tape.

3. Adhesiveness of cover tape

The exfoliation force between carrier tape cover tape shall be 0.2N to 1N for the angle from 160° to 180° .

4. Rolling method and quantity

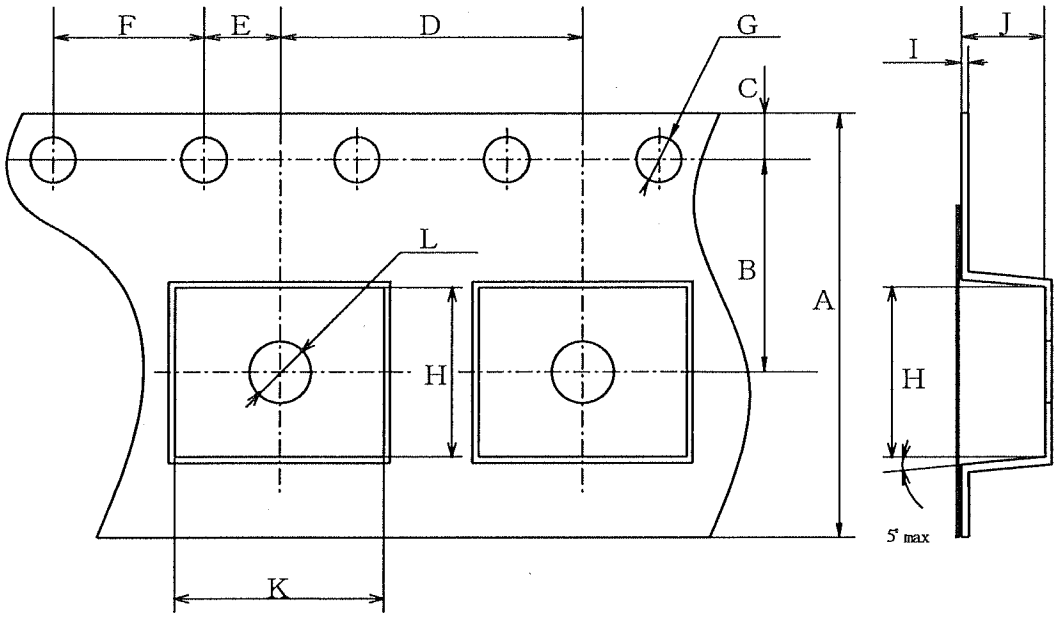
Wind the tape back on the reel so that the cover tape will be outside the tape.
Attach more than 20cm of blank tape to the trailer and leader and fix the both ends with adhesive tape.
One reel shall contain 1500pcs.

5. Safety protection during shipping

There shall be no deformation of component or degradation of electrical characteristics due to shipping.

PRELIMINARY

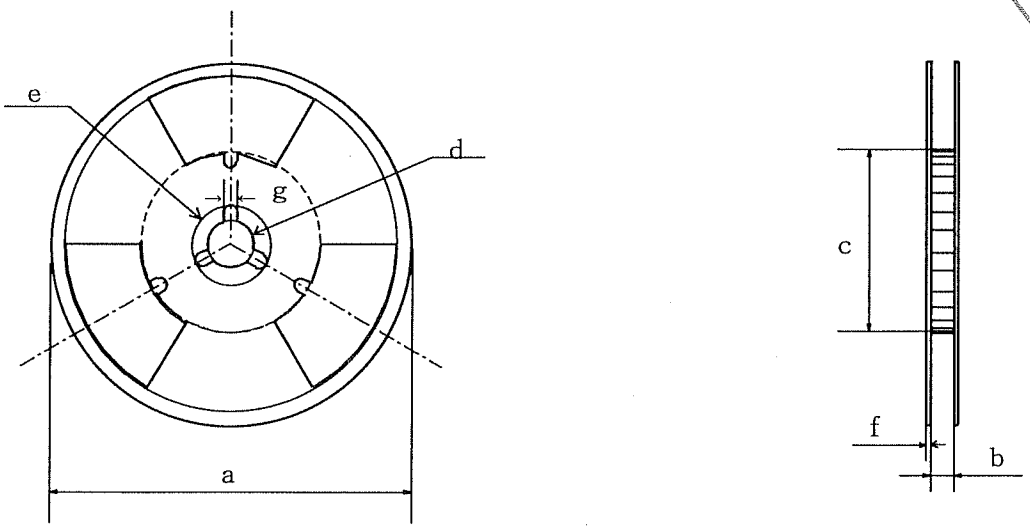
2-1. Tape structure and Dimensions



Symbol / Unit	A	B	C	D	E	F
mm	$16.0^{\pm 0.3}$	$7.5^{\pm 0.1}$	$1.75^{\pm 0.1}$	$12.0^{\pm 0.1}$	$2.0^{\pm 0.1}$	$4.0^{\pm 0.1}$

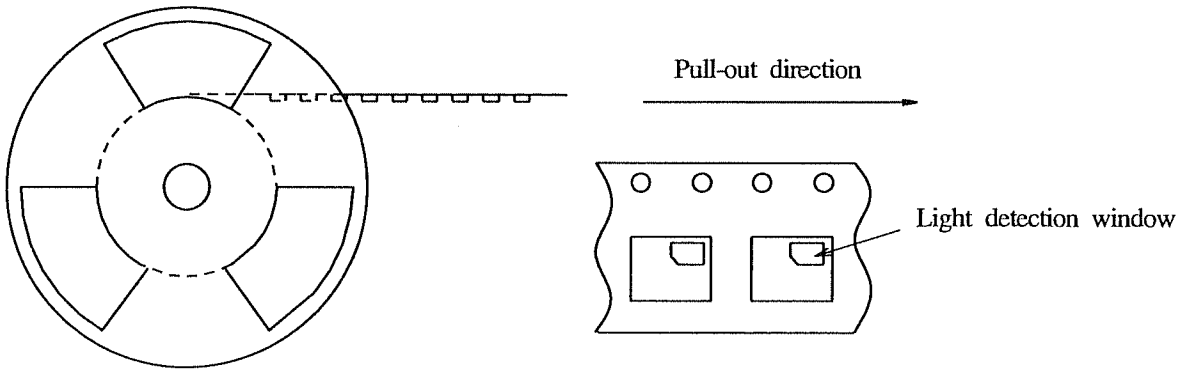
Symbol / Unit	G	H	I	J	K	L
mm	$\phi 1.5^{+0.1}_{-0.0}$	$8.4^{\pm 0.1}$	$0.4^{\pm 0.05}$	$3.9^{\pm 0.1}$	$8.8^{\pm 0.1}$	$\phi 2.0^{+0.1}_{-0.0}$

2-2. Reel structure and Dimensions



Symbol / Unit	Check word						
	a	b	c	D	e	f	g
mm	330±2	16.4^{+2}_{-0}	80±1	13±0.5	21±1	2.0±1	2.0±0.5

2-3. Direction of product insertion



PRELIMINARY

Taping moisture-proof packing
(ϕ 330mm reel)

1. Application

These specification sheets apply to the moist-proof packing specifications for the GP1UM10XP00F series to be delivered by Sharp Corp. to your company.

2. Packaging specifications

2.1 Packaging material

Name	Material	Q`ty
Aluminum laminate bag	Aluminum polyethylene	Refer to 2.2
Label	Paper(-made)	-
Silica gel	-	-
Outer case	Paper(-made)	-
Pads	Paper(-made)	-

2.2 Packaging method

(1) Seal the aluminum laminated bag that contains tape reel (contains 1500 devices per reel) and siccative.
(2) Fill necessary information to the label and paste it on the aluminum laminate bag.
(3) Pack 4 aluminum laminated bags (contains 1 reel each) into the designated packing case, where paper pads are placed on the bottom and top of the outer case, as well as each layer of the aluminum laminated bags.

Package quantity

Package shape	Product	Q`ty	Moisture-proof sack Q`ty
Tape reel (ϕ 330mm)	1 model	1,500 pcs./reel	1reel / laminated bag

Minimum order / shipment Q`ty should be 1 laminated bag.

(4) The outer case would be then sealed with the craft tape, with indication of model name, quantity, and outgoing inspection date on the case.
(total of 6000 pcs. per carton)

3. Storage and Treatment after Unsealed

3.1 Storage conditions

The delivered product should be stored with the conditions shown below :
Storage temperature : 10 to 30℃
Humidity : below 60%RH

3.2 Treatment after open

(1) After unsealed, devices should be mounted under the temperature condition of 10 to 30℃, at the humidity condition of below 60%RH, within 2 days.

(2) In case that log term storage is needed, devices should either be stored in dry box, or re-sealed to moist-proof bag with siccative and leave them in the environment where the temperature is 10 to 30℃, at the humidity condition of below 60%RH. Devices must be mounted within 2 weeks.

3.3 Baking before mounting

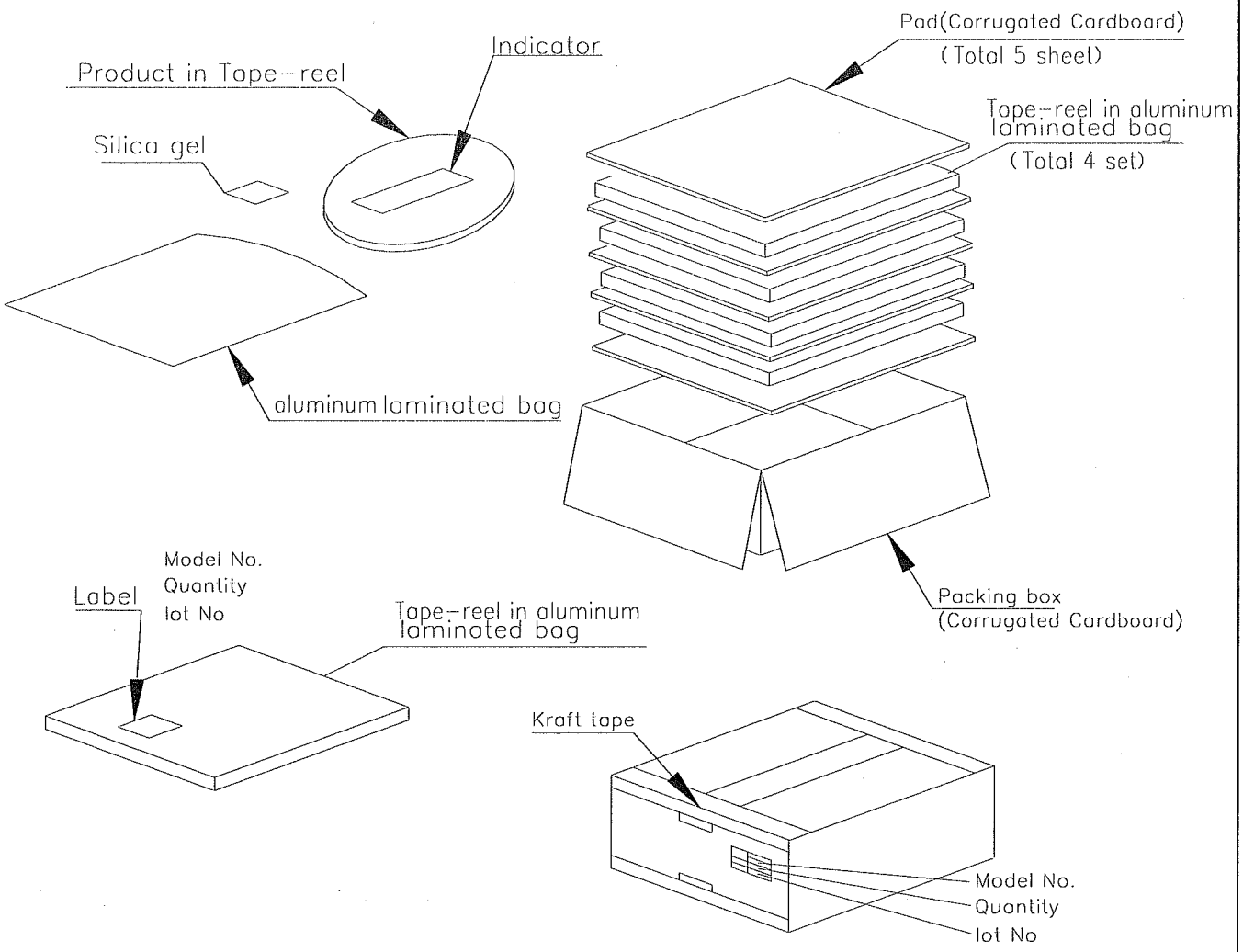
In case that the devices are not maintained in the conditions above, the enclosed indicator already turned its color to pink when the packaging is opened, baking must be applied before devices are to be mounted.
Please also note that baking should only be applied once.
After 1st time reflow, if mounting can not be completed at the conditions of 10 to 30℃ and humidity 60%RH within 2 days, baking must be applied. Please also note that baking should only be applied once.

Device recommended conditions: 100℃, 12 to 14H

* Baking will not properly done in packing condition. To complete the baking properly devices should either be Temporary mounted to PCB with adhesive,or placed to the metal tray.

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Package drawings



Package method

(1) Seal the aluminum laminated bag included the tape reel with 1,500pcs. and siccative. <Fig.1>
Fill up the model name, quantity etc. in the blank of label and paste on the bag.

(3) Put the four moisture-poof laminated bag in the ruled case <Fig.2>
Put the pad between the bags, and top and bottom.

(4) The packing case seals with craft tape, and indicate model name and quantity. <Fig.3>
(6,000pcs. / package)

Total packaged mass : Approximately 5.8kg

Scale	Name	GP1UM10XP00F series Package specification
/		
Unit	Drawing No.	RUD4609
1= / mm		