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	SPECIFICATION	PAGE 9 Pages
		REPRESENTATIVE DIVISION: OPTO-ELECTRONIC DEVICES DIV.

DEVICE SPECIFICATION FOR

Infrared Light Detecting unit for Remote Control

MODEL No.

GP1U28R series

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2. Please obey the instructions mentioned below for actual use of this device.
SHARP takes no responsibility for damage caused by improper use of the devices.

(1) This device is designed for general electronic equipment.
Main uses of this device are as follows;

[.OA equipment .AV equipment
. Home appliance, • Telecommunication equipment (Terminal), etc.]

(2) Please take proper steps in order to maintain reliability and safety, in case this device is used for the uses mentioned below which require high reliability.

[• Unit concerning control and safety of a vehicle (air plane, train, automobile etc.)
• Gas leak detection breaker • Traffic signal, Fire box and burglar alarm box
* Other safety equipment, etc.]

(3) Please do not use for the uses mentioned below which require extremely high reliability.

[.Space equipment • Telecommunication equipment (Trunk)
• Nuclear control equipment • Medical equipment etc.]

Contact a SHARP representative of sales omce trr advance when you intend to use SHARP devices for any applications other than those applications for general electronic equipment recommend by SHARP at(1).

CUSTOMER'S APPROVAL

DATE

BY

DATE PRESENTED BY K. Ekiya

for. T. Matsumura,
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ELECOM Group
SHARP CORPORATION

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1. Application

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

The model list of GP1U28R series

Application	Model No.	B.P.F. center frequency (TYP)
	GP1U28R	40 kHz
	GP1U280R	36 kHz
	GP1U281R	38 kHz
	GP1U282R	36.7 kHz
	GP1U283R	32.75 kHz
	GP1U287R	56,8 kHz

Main application: TV set, VCR, Radio cassette recorder, Stereo

2. Outline

Refer tome attached sheet, Page 7.

3. Ratings and characteristics

Refer to the attached sheet, Page 3 to 6.

4. Reliability

Refer to the attached sheet, Page 8.

5. Incoming inspection

Refer to the attached sheet, Page 9..

6. Supplement

1) This infrared light detecting unit for remote control satisfies each performance requirements in para. 3.6, in the standard optical system In Fig.2.

2) This product is built-in photodiode.

7. Notes

1) If GP1U28R series is used in wireless remote controllers, please use in accordance wtth the transmission scheme and the signal format recommended in "Guidance to prevent home appliances with infrared remote control from malfunctions" Issued by Japan Association of Electrical Home Appliances (AEHA) in July 1987.
There is a possibility that malfunction may be caused under some conditions, if the different transmission scheme and signal format from the AEHA's is used. (Ex. signal format without leader signal, or bit structure of smaller duty ratio ($T_H/(T_H+T_L)$), etc.)

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

3) 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 1s needed, Methyl alcohol, Ethyl alcohol, or Isopropyl alcohol should be used. PIease 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) The shield case shall be grounded on the PWB pattern.
(There are two cases that shield case and GND pin continue in the shield case, or doesn't continue in it.)

5) It shall not be applied the terminal and case with ***unnecessary stress.***

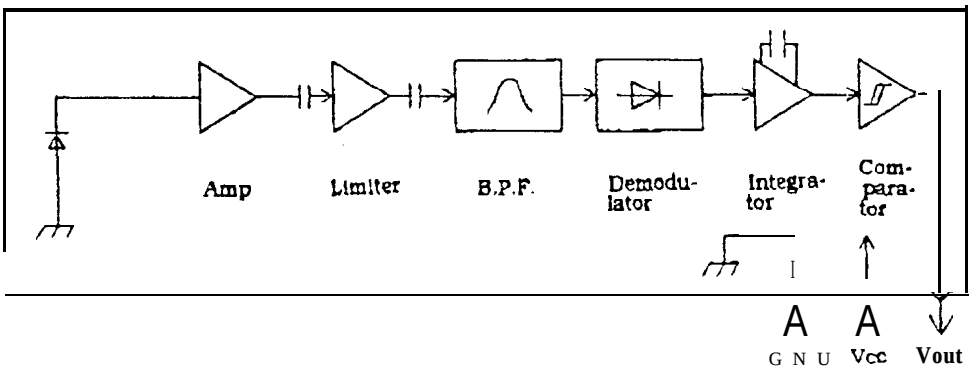
6) Please don't push the detecting side (photodiode) from external,

7) In order to prevent static destruction of integrated circuit, human body and soldering iron, etc. shall be grounded.

8) The holes and the slits on the light detecting unit shall not be used as the other purpose to maintain its performance.

3. Ratings and characteristics

3.1 Schematic



3.2 Absolute maximum ratings

Parameter	symbol	Ratings	unit
Supply voltage	Vcc	0 to 6.3	V
Operating temperature	Topr	-iota +70 ※1	℃
Storage temperature	Tstg	-20 to +70	℃
Soldering temperature	Tsol	260 (Soldering time : 5s)	℃

※ 1) No dew formation

3,3 Recommended operating conditions

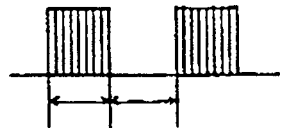
Parameter	Symbol	Operating condition	Unit
Supply voltage	Vcc	4.7 to 5.3	v

3.4 Electrical characteristics

(Unspecified Ta=25℃, Vcc=+5V)

Parameter	Symbol	MIN.	TYP.	MAX.	unit	Remark
Current dissipation	Icc		-	5.0	mA	No input light
High level output voltage	V_{OH}	Vcc-0.5	-	-	V	※2
Low level output voltage	V_{OL}	-	-	0.45	V	※2
High level pulse width	T_1	400	-	800	μs	※2
Low level pulse width	T_2	400	-	800	μs	※2
B.P.F. center frequency	f_0	-	※3	-	kHz	

※2) 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 ※3. Measuring shall be 100pulse or later after starting the transmission.



600 μs 600 μs

f_0=※3 kHz Duty 50%

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

Model No.	B.P.F. center frequency (kHz)
GP1U28R	40
GP1U280R	36
GP1U281R	38
GP1U282R	36.7
GP1U283R	32.75
GP1U287R	56.8

3.5 Performance

The output signal of this light 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 6.5m, (※4) Ee < 10 ℓx, ϕ = 0° in Fig.2.

3.5.2 Characteristics of sensitivity angle reception distance

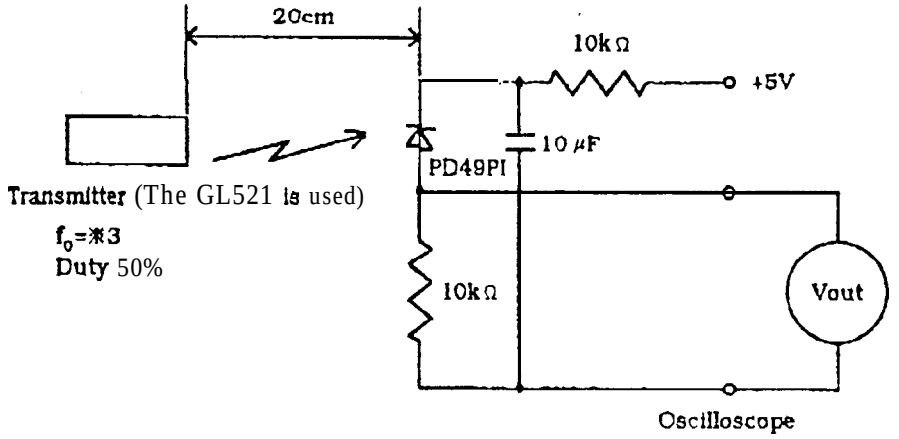
The output signal shall satisfy the electrical characteristic requirements in para. 3.4 at L=0.2 to 4.5m, (※4) Ee < 10 ℓx, $\phi \leqq 30°$ in Fig.2.

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 3m, (※5) Ee ≦ 300 ℓx, 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 will be 40mVpp. Note that the PD49PI in this application is The one with short-circuit current Isc=2.6 μA measured at Ev= 100 ℓx. (Ev is the illuminance by CIE standard light source A (tungsten lamp)).

Fig. 1 Transmitter

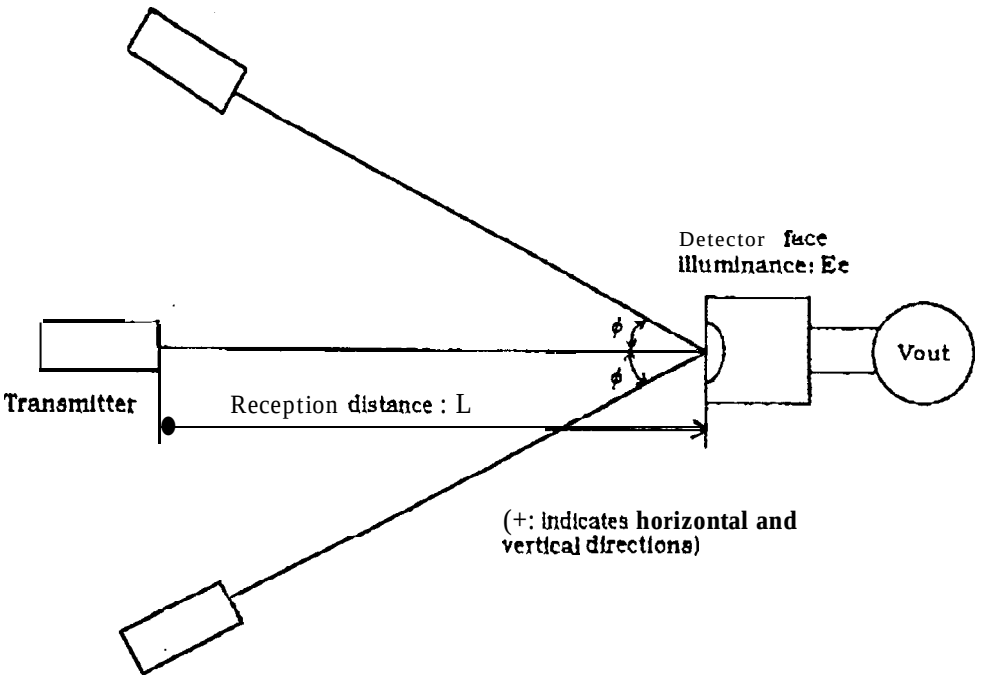


Fig.2 Standard optical system

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• stamp

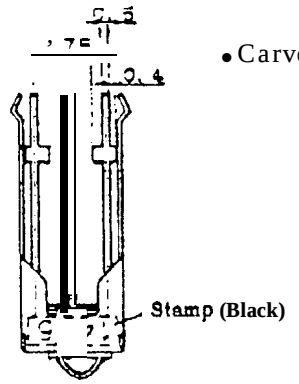
Model name
1495
Week (1 to 5)
Month (1 to Z)
Year (1994:4)

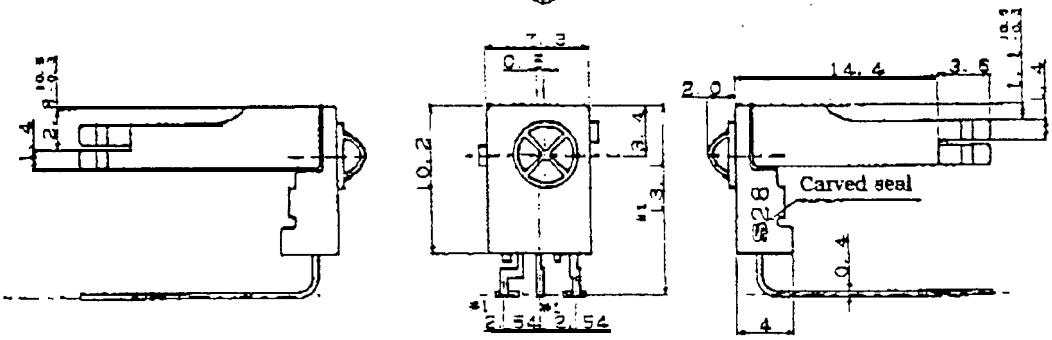
stamp list

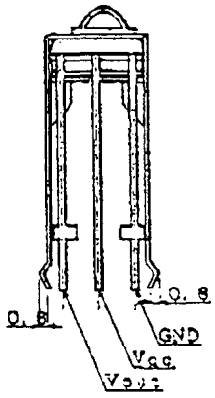
Model No.	Stamp
GP1U28R	Without
GP1U281R	1
GP1U282R	2
GP1U283R	3
GP1U287R	7
GP1 U280R	O

• Carved seal

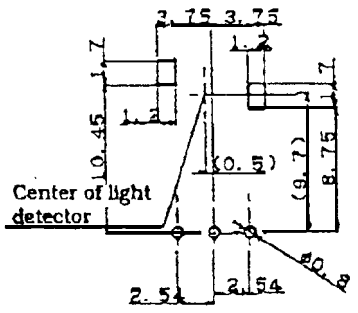
S28
Model name GP1U28R series
Sharp mark







Recommended mounting drawing from solder side



1. •1 indicates root dimensions of connector.
2. Unspecified tolerance: ±0.3
3. Case thickness : 0.3TYP.
4. Case material : Fe
5. Case finish : Solder plating (Pb 10%).
6. Lead material: Fe
7. Lead finish : Solder plating or solder dip
8. Mold resin : Epoxy resin
9. Weight: Approx. 1.Og
10. Dimensions in parenthesis are shown for reference.

Scale	Name	GP1U28R series Outline Dimensions
2/1		
Unit	Drawing No.	SOD02104
1=1/1mm		

4. Reliability

The reliability of products shall be satisfied with items listed below.

Confidence level: 90%
LTPD : 10% /20%

Test Items	Test Conditions	Failure Judgement Criteria	Samples (n) Defective(C)
Terminal strength (Tension)	Weight : 5N 30s/each terminal	Performance test requirements and criteria given in para. 3.5 should be satisfied.	n=11, C=0
Terminal strength (Bending)	Weight : 2.5N o" -90' -o' 2 times/each terminal		n=11, C=0
Shock	Acceleration: 1000m/s^2, 6ms 3directions / 3times		n=11, C=0
Variable frequency vibration	Frequency range: 10 to 55 Hz/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	1 cycle -20℃ to +70℃ (30min.)(30min.) 20cycles test		n=22, C=0
* Operation life (High temperature)	Ta=70℃, VCC=5V, t=240h		n=22, C=0
Solder heat	260 ±5℃, 5s		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 point)

5. Incoming inspection

(1) Inspection lot

Inspection shall be carried out per each delivery lot.

(2) Inspection method

A single sampling plan, normal inspection level 11 based on MIL-STD-105D 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	Distance between signal terminal and shield case (0.2mm or more) (Except for GND terminal)	
	3	It should have no remarkable stains and cracks that give any influence of electrical characteristic on light detecting face.	
Minor defect	1	Transformation 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.)	