

### GP1US30XP Series

SMD Type IR Detecting Unit  
for Remote Control

#### Features

1. Compact type.
2. Low dissipation current:MAX. 0.6mA(at  $V_{CC}=3V$ )
3. SMD type and applicable for reflow
4. Lead-free and RoHS directive compliant.

#### Applications

1. AV equipments
2. Home appliances

#### Absolute Maximum Ratings

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

Parameter	Symbol	Rating	Unit
Supply voltage	$V_{CC}$	0 to +6.0	V
*1 Operating temperature	$T_{opr}$	-30 to +85	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-40 to +90	$^\circ\text{C}$
*2 Soldering temperature	$T_{sol}$	MAX.255	$^\circ\text{C}$

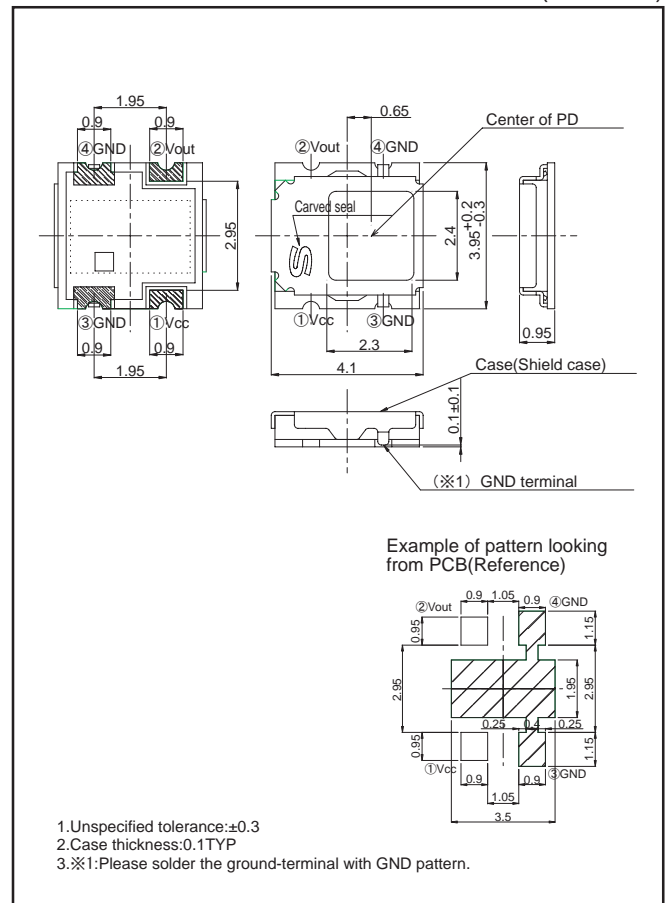
\*1 No dew condensation is allowed  
\*2 Soldering time by reflow : 10s

#### Recommended Operating Conditions

Parameter	Symbol	Operating conditions	Unit
Supply voltage	$V_{CC}$	2.4 to 5.5	V

#### Outline Dimensions

(Unit : mm)



Notice The content of data sheet is subject to change without prior notice.

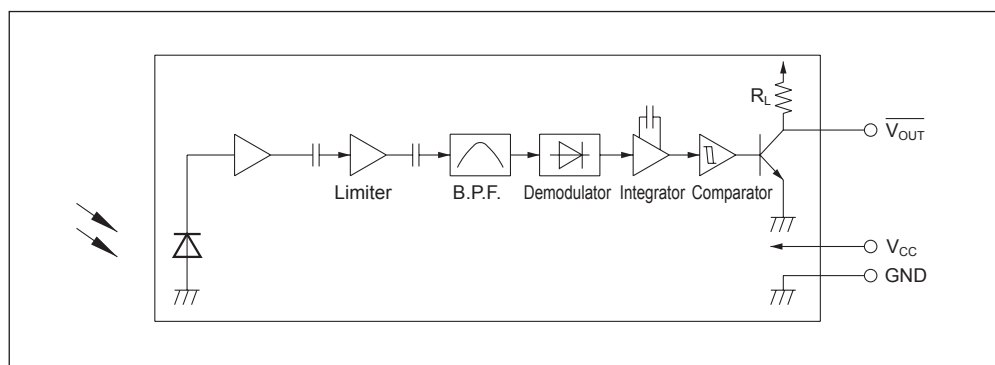
In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that may occur in equipment using any SHARP devices shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device.

### Model Line-up

Diversified models with a different B.P.F. frequency are also available.

B.P.F. center frequency	Model No.	Unit
40	GP1US30XP	kHz
36	GP1US300XP	
38	GP1US301XP	
36.7	GP1US302XP	

### Internal Block Diagram



### Electro-optical Characteristics

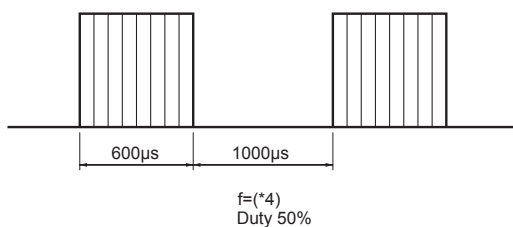
( $T_a=25^\circ\text{C}$ ,  $V_{CC}=3\text{V}$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Dissipation current	$I_{CC}$	No input light	-	0.4	0.6	mA
High level output voltage	$V_{OH}$	*3	$V_{CC}-0.5$	-	-	V
Low level output voltage	$V_{OL}$	*3 $I_{OL}=1.6\text{mA}$	-	-	0.45	V
High level pulse width	$T_1$	*3	600	-	1200	$\mu\text{s}$
Low level pulse width	$T_2$	*3	400	-	1000	$\mu\text{s}$
B.P.F. center frequency	$f_0$	-	-	*4	-	kHz
Output pull-up resistance	$R_L$	-	-	100	-	k $\Omega$

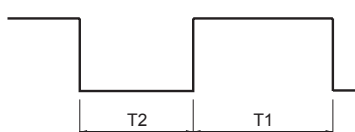
\*3 The burst wave as shown in the following figure shall be transmitted by the transmitter shown in Fig. 1  
The carrier frequency of the transmitter, however, shall be same as \*4, and measurement shall be from just after starting the transmission until 10 pulse

\*4 The B.P.F. center frequency  $f_0$  varies with model, as shown in Model Line-up

Burst wave



Output signal



■ Performance

Using the transmitter shown in Fig. 1, the output signal of the light detecting unit is good enough to meet the following items in the standard optical system in Fig. 2.

1. Linear reception distance characteristics

When  $L=0.2$  to  $5.0\text{m}$ ,  ${}^5E_v < 10\text{ lx}$  and  $\phi = 0^\circ$  in Fig.2, the output signal shall meet the electrical characteristics in the attached list.

2. Sensitivity angle reception distance characteristics

When  $L=0.2$  to  $4.0\text{m}$ ,  ${}^5E_v < 10\text{ lx}$  and  $\phi \leq 30^\circ$  in Fig.2, the output signal shall meet the electrical characteristics in the attached list.

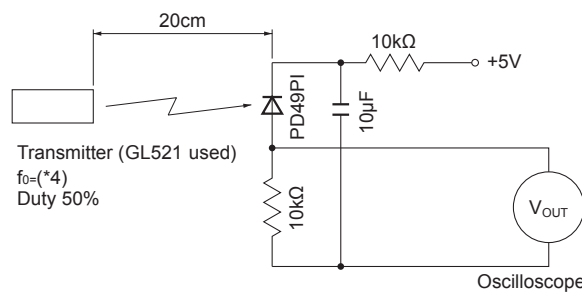
3. Anti outer peripheral light reception distance characteristics

When  $L=0.2$  to  $2.5\text{m}$ ,  ${}^6E_v \leq 300\text{ lx}$  and  $\phi = 0^\circ$  in Fig.2, the output signal shall meet the electrical characteristics in the attached list.

\*5 It refers to detector face illuminance

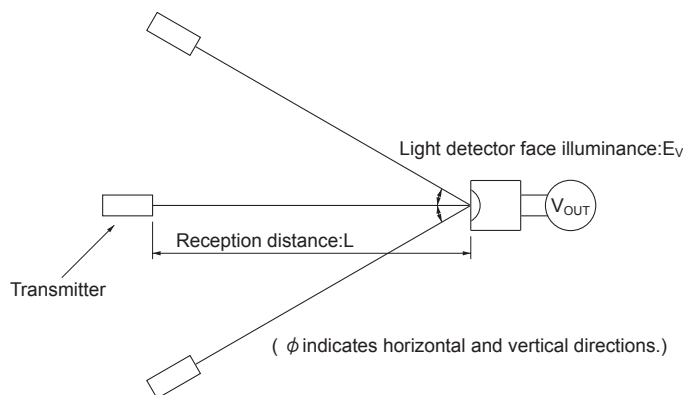
\*6 Outer peripheral light source: CIE standard light source A shall be used and placed at  $45^\circ$  from perpendicular axis at the detector face center

Fig.1 Transmitter



In the above figure, the transmitter should be set so that the output  $V_{OUT (P-P)}$  can be  $40\text{mV}$ . However, the PD49PI to be used here should be of the short-circuit current  $I_{SC}=2.6\mu\text{A}$  at  $E_v = 100\text{ lx}$ . ( $E_v$  is an illuminance by CIE standard light source A (tungsten lamp).)

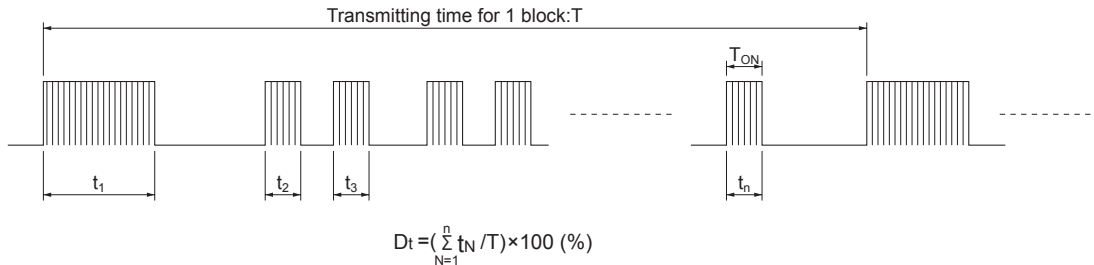
Fig.2 Standard Optical System



**■ Precautions for Operation**

1. When this infrared remote control detecting unit shall be adopted for wireless remote control, please use the following signal format . (NEC code,RC-6code etc.)

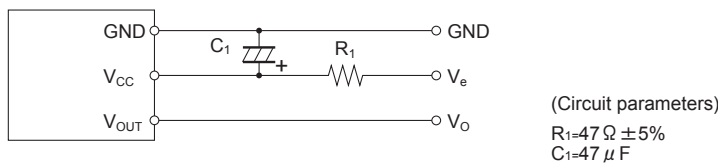
- Total duty ratio  $D_t$  (Emitting time  $\sum_{N=1}^n t_N$  / Transmitting time for 1 block  $T$ ) : 40% or less(Operation voltage : 2.4 to 3.6V)  
25% or less(Operation voltage : 4.5 to 5.5V)
- ON signal time  $T_{ON}$  : 250 $\mu$ s or more.



Oeration voltage	Total duty ratio:Dt(%)	ON signal time:T <sub>ON</sub> ( $\mu$ s)
2.4 to 3.6V	MAX.40	MIN.250
4.5 to 5.5V	MAX.25	MIN.250

In case the signal format of total duty and/or ON/OFF signal time dosen't meet the conditions noted above, there is a case that reception distance much reduces or output dose not appear.

2. Use the light emitting unit (remote control transmitter), in consideration of performance, characteristics, operating conditions of light emitting device and the characteristics of the light detecting unit.
3. If the surface of detector is smeared with dust or dirt,it may cause faulty operation.Caution shall be taken t avoid this.  
And do not touch the detector surface. IF the surface was smeared,wipe it clesan with soft cloth.  
If cleaning the product is needed after the soldering,the cleaning with alcohol is recommended.  
When cleaning the product,please extremely check the acceptance surfase and the extrenal appearance
4. The shield case shall be grounded on the PCB pattern.  
(that shield case and GND pin are not connected.)
5. The shield case is fixed temporarith When handring the product(including mounting),please be careful not to forse the product.
6. Please don't push the detecting side(photodiode)from external side.
7. In order to prevent electrostatic discharge of integrand circuit,human body and solding iron,etc.shall be grounded.
8. External Circuit Examples (Mount the outer parts as near the unit as possible).



In setting  $R_1$  and  $C_1$ , use suitable values after considering under the real condition  
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  $V_{CC}$  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 $\Omega$ (1/10W), 10 $\mu$ F or more)such as external circuit example above near  $V_{CC}$ .

9. There is a possibility that noise on output may be caused by environmental condition (Disturbing light noise, Electromagnetic noise, Power supply line noise, etc.) even if there is no input transmission signal.
10. 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.
11. 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.
12. Please be extremely careful about the product's moisture absorbent.  
If reflow soldering is applied when the GP1US30XPseries is having humidity conditions, there is possibility that resin peeling or wire breakdown may occur.  
When you carry out the reflow, please carry out it on the condition of describing to specifications.