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GP1US30XP Series

SMD Type IR Detecting Unit
for Remote Control

Features

1. Compact type.
2. Low dissipation current:MAX. 0.6mA(at Vcc=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

(Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	0 to +6.0	V
*1 Operating temperature	T _{opr}	-30 to +85	°C
Storage temperature	T _{stg}	-40 to +90	°C
*2 Soldering temperature	T _{sol}	MAX.255	°C

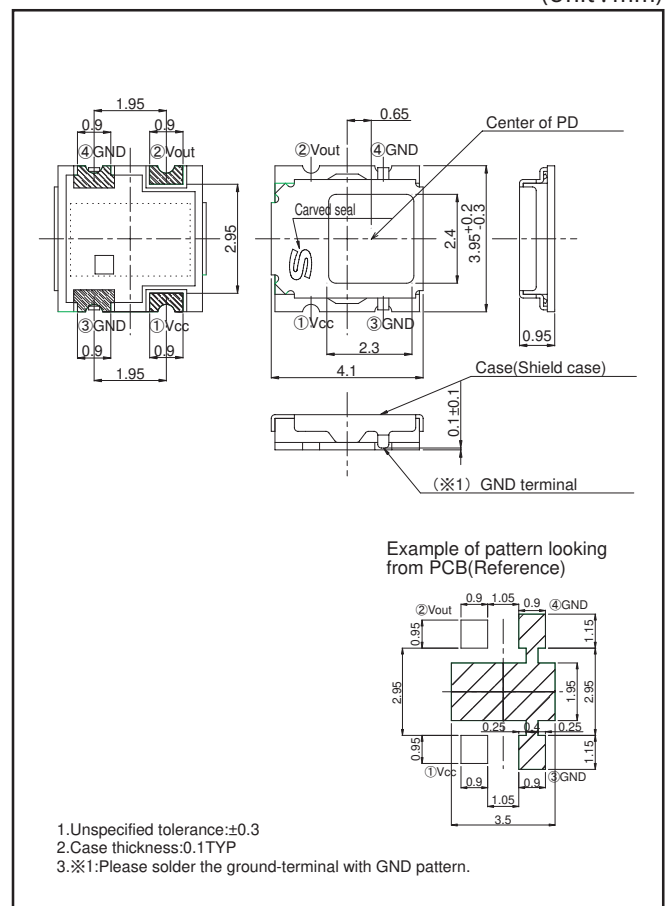
*1 No dew condensation is allowed
*2 Soldering time by reflow : 10s

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.

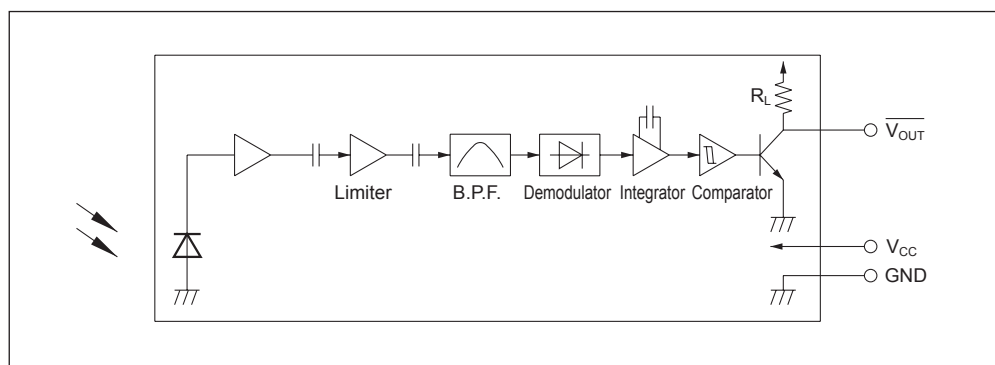
In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that may occur in equipment using any SHARP devices shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device.

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

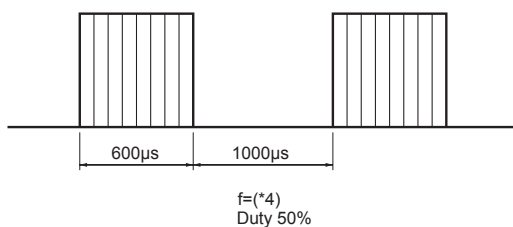
($T_a=25^\circ\text{C}$, $V_{CC}=3\text{V}$)

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	μs
Low level pulse width	T_2	^{*3}	400	-	1000	μs
B.P.F. center frequency	f_0	-	-	^{*4}	-	kHz
Output pull-up resistance	R_L	-	-	100	-	k Ω

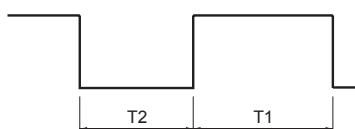
^{*3} The burst wave as shown in the following figure shall be transmitted by the transmitter shown in Fig. 1. The carrier frequency of the transmitter, however, shall be same as ^{*4}, and measurement shall be from just after starting the transmission until 10 pulse

^{*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 5.0m , ${}^5E_v < 10\text{ lx}$ 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 4.0m , ${}^5E_v < 10\text{ lx}$ and $\phi \leq 30^\circ$ in Fig.2, the output signal shall meet the electrical characteristics in the attached list.

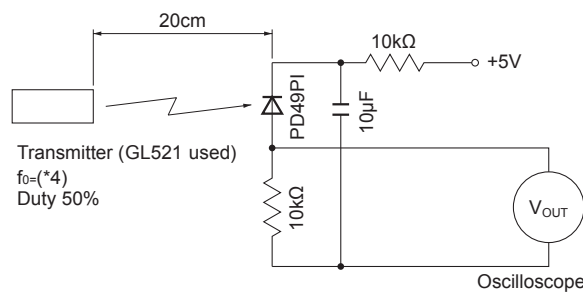
3. Anti outer peripheral light reception distance characteristics

When $L=0.2$ to 2.5m , ${}^6E_v \leq 300\text{ lx}$ 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

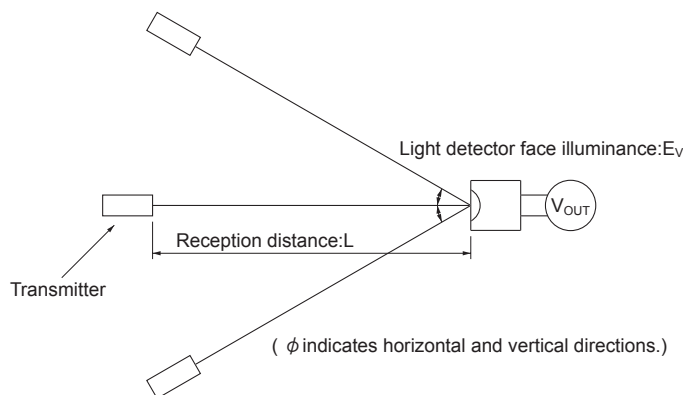
*6 Outer peripheral light source: CIE standard light source A shall be used and placed at 45° from perpendicular axis at the detector face center

Fig.1 Transmitter



In the above figure, the transmitter should be set so that the output $V_{OUT (P-P)}$ can be 40mV . 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).)

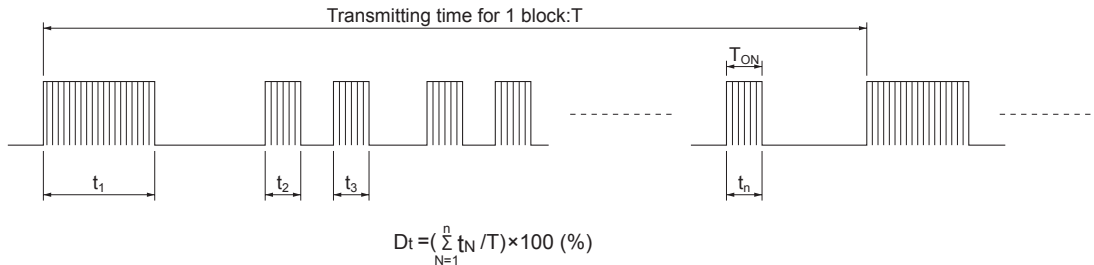
Fig.2 Standard Optical System



■ 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.)

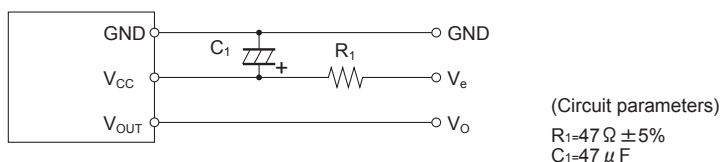
- Total duty ratio D_t (Emitting time $\sum_{N=1}^n t_N$ / Transmitting time for 1 block T) : 40% or less(Operation voltage : 2.4 to 3.6V)
25% or less(Operation voltage : 4.5 to 5.5V)
- ON signal time T_{ON} : 250 μ s or more.



Oeration voltage	Total duty ratio:Dt(%)	ON signal time:T _{ON} (μ 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 to avoid this. And do not touch the detector surface. IF the surface was smeared, wipe it clean 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 surface and the external 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 temporarily. When handling the product (including mounting), please be careful not to force the product.
6. Please don't push the detecting side (photodiode) from external side.
7. In order to prevent electrostatic discharge of integrated circuit, human body and soldering 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 an example. It is different from mounting equipment. Please select it by your mounting equipment. This device has a transistor as a protection element between V_{CC} and GND to improve anti-static electricity proof. Please be careful not to apply exceeding the absolute maximum ratings of applying voltage and continuous high voltage spike noise because there are cases that the transistor will be shorted by secondary breakdown generally. In order to do this difficultly, please add a CR filter (47 Ω (1/10W), 10 μ F or more) such as the 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.