SHARP

GP1S036HEZ

Photointerrupter for Detecting Tilt Direction

■ Features

1. Subminiature

   (with built-in super compact ball for detecting tilt direction)

2. 2-phase output type (4

3. Able to detect the tilt direction of both side (±90˚) by the position of rolling ball.

4. High reliability due to non-contact structure
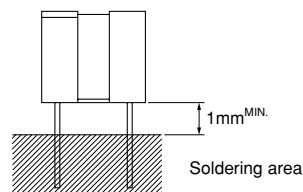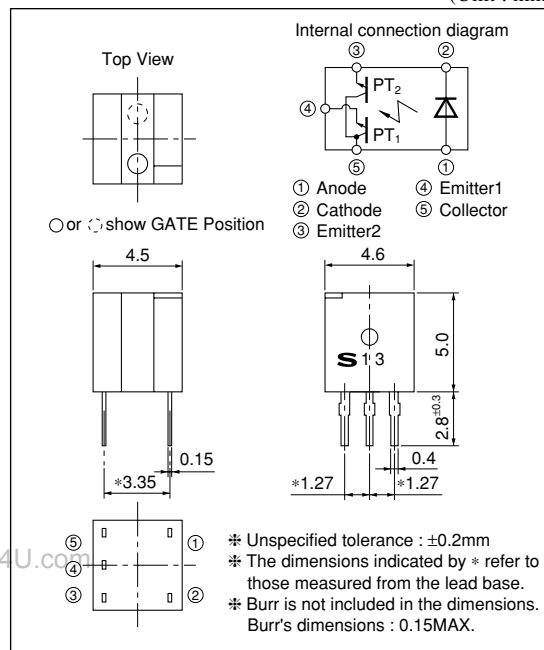
■ Applications

1. Digital cameras

2. Camcoders

■ Absolute Maximum Ratings   (T$_a$=25˚C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I$_F$	50	mA
	Reverse voltage	V$_R$	6	V
	Power dissipation	P	75	mW
Output	Collector-emitter voltage	V$_{CE_1O}$	35	V
		V$_{CE_2O}$		
	Emitter-collector voltage	V$_{E_1CO}$	6	V
		V$_{E_2CO}$		
	Collector current	I$_C$	20	mA
	Collector Power dissipation	P$_C$	75	mW
	Total power dissipation	P$_{tot}$	100	mW
	Operating temperature	T$_{opr}$	−25 to +85	˚C
	Storage temperature	T$_{stg}$	−40 to +100	˚C
[*1] Soldering temperature 1		T$_{sol}$	260	˚C

*1 For MAX. 5s

■ Outline Dimensions   (Unit : mm)

Top View

Internal connection diagram

① Anode ④ Emitter1
② Cathode ⑤ Collector
③ Emitter2

○ or ⟨⟩ show GATE Position

4.5

4.6

5.0

2.8$^{±0.3}$

0.15

0.4

*3.35

*1.27 *1.27

⑤ ①
④
③ ②

❈ Unspecified tolerance : ±0.2mm
❈ The dimensions indicated by * refer to those measured from the lead base.
❈ Burr is not included in the dimensions. Burr's dimensions : 0.15MAX.

1mm$^{MIN.}$

Soldering area

■ Electro-optical Characteristics

(T$_a$=25°C)

	Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V$_F$	I$_F$=20mA	–	1.2	1.4	V
	Reverse current		I$_R$	V$_R$=3V	–	–	10	μA
*3 Output	Collector dark current		I$_{CEO}$	V$_{CE}$=20V	–	–	100	nA
*3 Coupling Characteristics	Collector current		I$_C$	V$_{CE}$=5V, I$_F$=5mA	55	–	300	μA
	*4 Leak current		I$_{LEAK}$	V$_{CE}$=5V, I$_F$=5mA			17	μA
	Response time	Rise time	t$_r$	V$_{CE}$=5V, I$_C$=100μA	–	50	150	μs
		Fall time	t$_f$	R$_L$=1kΩ	–	50	150	μs
	Collector-emitter saturation voltage		V$_{CE(sat)}$	I$_F$=10mA, I$_C$=55μA	–	–	0.4	V

*3 Output and coupling characteristics are common to the both phototransistors
*4 Characteristics except leak current is measured at θ=180°, ϕ=0°
    Leak current is the output current of transistor when θ=±90°, ϕ=0° and I$_C$=OFF

■ Detecting Angle Characteristics

θ	0°	→	30°	→	60°	→	120°	→	150°	→	210°
I$_{C1}$	OFF						*5			ON	
I$_{C2}$	OFF		*5				ON				*5

θ	→	240°	→	300°	→	330°	→	360°
I$_{C1}$		ON			*5		OFF	
I$_{C2}$		*5		OFF				

✳ Conditions : I$_F$=5mA, V$_{CE}$=5V, ϕ=±5°
*5 Indefinite

I$_{C1}$: Output current of phototransistors PT$_1$
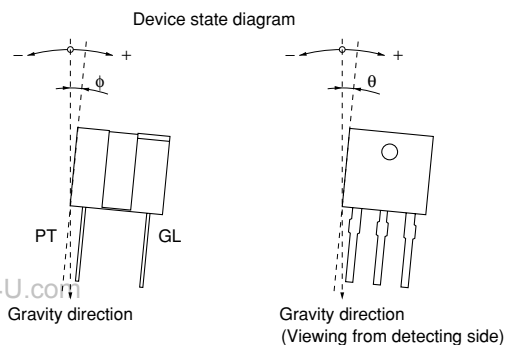
I$_{C2}$: Output current of phototransistors PT$_2$

θ : Device condition : Refer to the figure
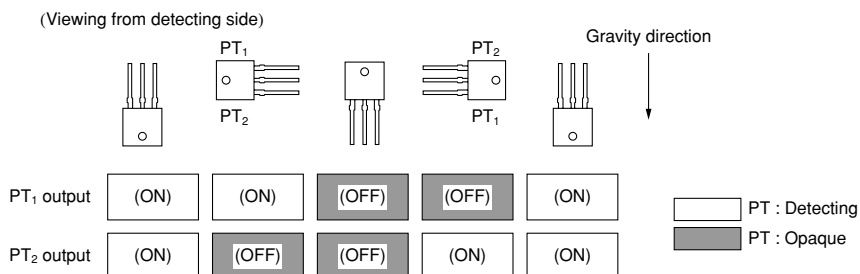
ϕ : Device condition : Refer to the figure

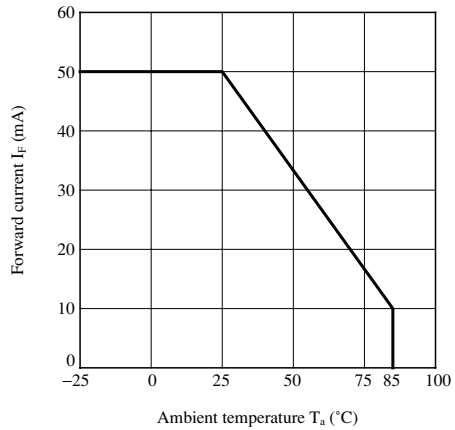ON :Output current of phototransistors : 55μA or more

OFF : Output current of phototransistors : 17μA or less
✳ Output current of ON/OFF is output when device is at a standstill

Device state diagram

PT   GL

Gravity direction

Gravity direction
(Viewing from detecting side)

■ Supplement

(Viewing from detecting side)

PT$_1$

PT$_2$

PT$_2$

PT$_1$

Gravity direction

PT$_1$ output	(ON)	(ON)	(OFF)	(OFF)	(ON)
PT$_2$ output	(ON)	(OFF)	(OFF)	(ON)	(ON)

☐ PT : Detecting

▨ PT : Opaque

Fig.1 Forward Current vs. Ambient Temperature

Fig.2 Power Dissipation vs. Ambient Temperature
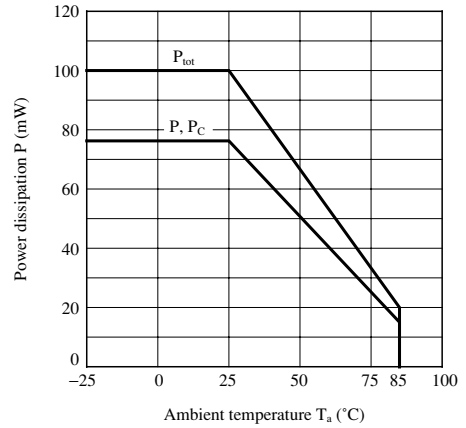
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    --- Alarm equipment
    --- Various safety devices, etc.

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