

# 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 ( $\pm 90^\circ$ ) by the position of rolling ball.
4. High reliability due to non-contact structure

### ■ Applications

1. Digital cameras
2. Camcoders

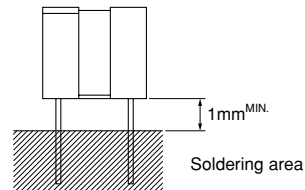
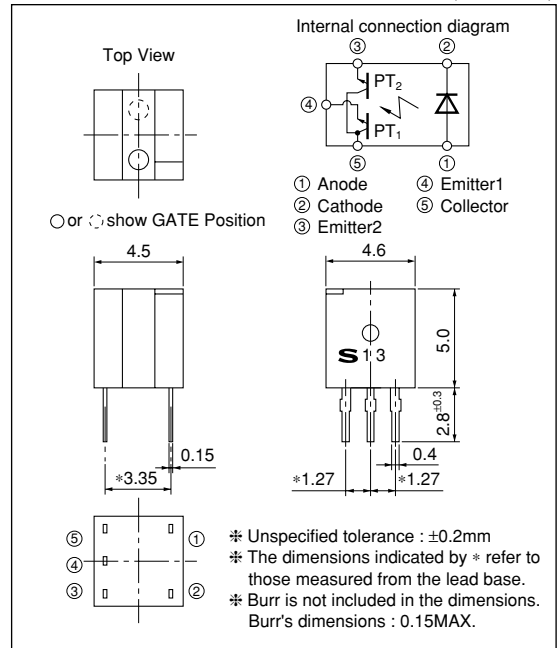
### ■ Absolute Maximum Ratings ( $T_a=25^\circ\text{C}$ )

	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	$V_{CE1O}$	35	V
		$V_{CE2O}$		
	Emitter-collector voltage	$V_{E1CO}$	6	V
		$V_{E2CO}$		
	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	$^\circ\text{C}$
Storage temperature		$T_{stg}$	-40 to +100	$^\circ\text{C}$
*1 Soldering temperature 1		$T_{sol}$	260	$^\circ\text{C}$

\*1 For MAX. 5s

### ■ Outline Dimensions

(Unit : mm)



**Electro-optical Characteristics**

(T<sub>a</sub>=25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Input	Forward voltage	V <sub>F</sub>	I <sub>F</sub> =20mA	—	1.2	1.4	V	
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =3V	—	—	10	μA	
*3 Output	Collector dark current	I <sub>CEO</sub>	V <sub>CE</sub> =20V	—	—	100	nA	
*3 Coupling Characteristics	Collector current	I <sub>C</sub>	V <sub>CE</sub> =5V, I <sub>F</sub> =5mA	55	—	300	μA	
	*4 Leak current	I <sub>LEAK</sub>	V <sub>CE</sub> =5V, I <sub>F</sub> =5mA	—	—	17	μA	
	Response time	Rise time	t <sub>r</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =100μA R <sub>L</sub> =1kΩ	—	50	150	μs
		Fall time	t <sub>f</sub>		—	50	150	μs
Collector-emitter saturation voltage		V <sub>CE(sat)</sub>	I <sub>F</sub> =10mA, I <sub>C</sub> =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<sub>C</sub>=OFF

**Detecting Angle Characteristics**

θ	0°	→	30°	→	60°	→	120°	→	150°	→	210°
I <sub>C1</sub>	OFF						*5		ON		
I <sub>C2</sub>	OFF	*5			ON			*5			

θ	→	240°	→	300°	→	330°	→	360°
I <sub>C1</sub>	ON	*5			OFF			
I <sub>C2</sub>	*5	OFF						

\* Conditions : I<sub>F</sub>=5mA, V<sub>CE</sub>=5V, φ=±5°

\*5 Indefinite

I<sub>C1</sub> : Output current of phototransistors PT<sub>1</sub>

I<sub>C2</sub> : Output current of phototransistors PT<sub>2</sub>

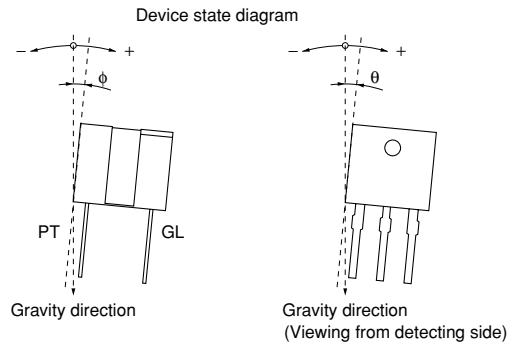
θ : Device condition : Refer to the figure

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



**Supplement**

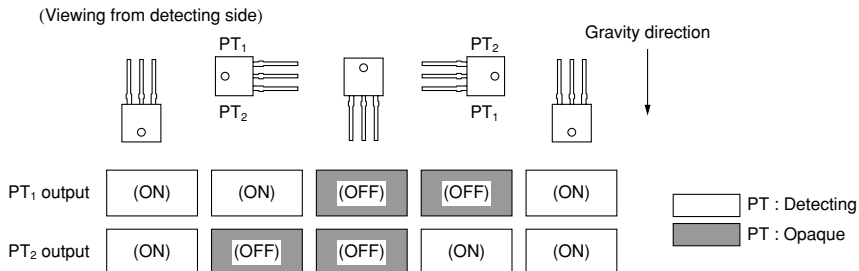


Fig.1 Forward Current vs. Ambient Temperature

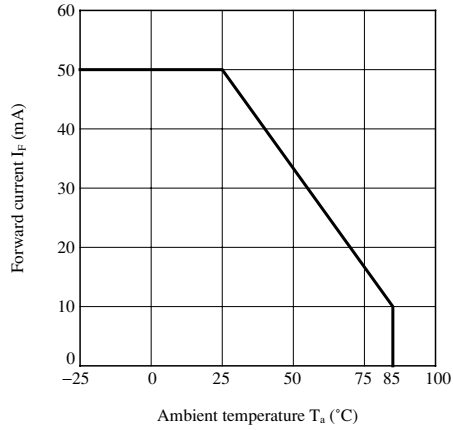
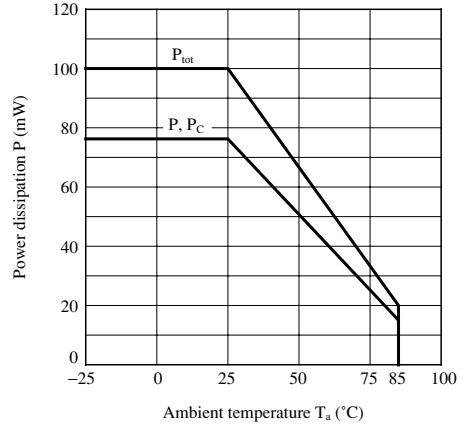


Fig.2 Power Dissipation vs. Ambient Temperature



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