

# GP1S36

## Photointerrupter for Detecting Tilt Direction

### Features

1. Subminiature (4.0×4.2×3.8mm)  
(with built-in super compact ball for detecting tilt direction)
2. 2-phase output type
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 (Ta=25°C)

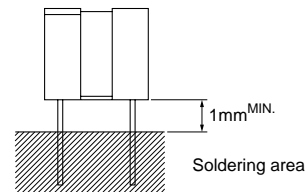
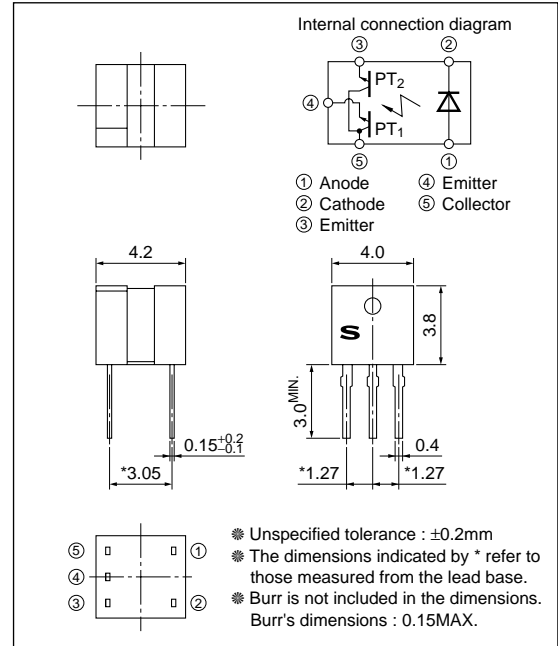
	Parameter	Symbol	Rating	Unit
Input	Forward current	$I_F$	50	mA
	Reverse voltage	$V_R$	6	V
	Power dissipation	$P$	75	mW
Output	Collector-emitter voltage	$V_{CE1O}$	35	V
		$V_{CE2O}$		
	Emitter-collector voltage	$V_{E1CO}$	6	V
		$V_{E2CO}$		
	Collector current	$I_C$	20	mA
Collector Power dissipation	$P_C$	75	mW	
Total power dissipation	$P_{tot}$	100	mW	
Operating temperature	$T_{opr}$	-25 to +85	°C	
Storage temperature	$T_{stg}$	-40 to +100	°C	
*1 Soldering temperature 1	$T_{sol}$	260	°C	
*2 Soldering temperature 2	$T_{sol}$	320	°C	

\*1 For MAX. 5s

\*2 For MAX. 2s at the position of 0.8mm from the bottom face of resin package by hand soldering.

### Outline Dimensions

(Unit : mm)



■ Electro-optical Characteristics

(Ta=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	60	-	360	μA	
	*4 Leak current	I <sub>LEAK</sub>	V <sub>CE</sub> =5V, I <sub>F</sub> =5mA			15	μA	
	Response time	Rise time	t <sub>r</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =100μA	-	50	150	μs
		Fall time	t <sub>f</sub>	R <sub>L</sub> =1 000Ω	-	50	150	μs
Collector-emitter saturation voltage		V <sub>CE(sat)</sub>	I <sub>F</sub> =10mA, I <sub>C</sub> =60μA	-	-	0.4	V	

\*3 Output and coupling characteristics are common to the both phototransistors.

\*4 Characteristics except leak current is measured at θ=0°, 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	-90° ↔	-75° ↔	-15° ↔	+15° ↔	+75° ↔	+90°
I <sub>C1</sub>	ON			*5	OFF	
I <sub>C2</sub>	OFF	*5	ON			

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

\*5 Indefinite

I<sub>C1</sub> : Output current of phototransistors PT1

I<sub>C2</sub> : Output current of phototransistors PT2

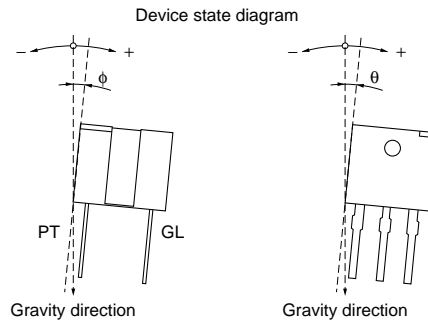
θ : Device condition : Refer to the figure

φ : Device condition : Refer to the figure

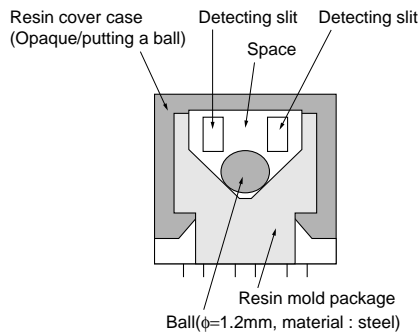
ON : Output current of phototransistors : 60μA or more

OFF : Output current of phototransistors : 15μA or less

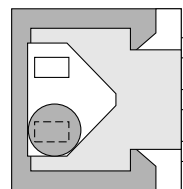
\* Output current of ON/OFF is output when device is at a standstill



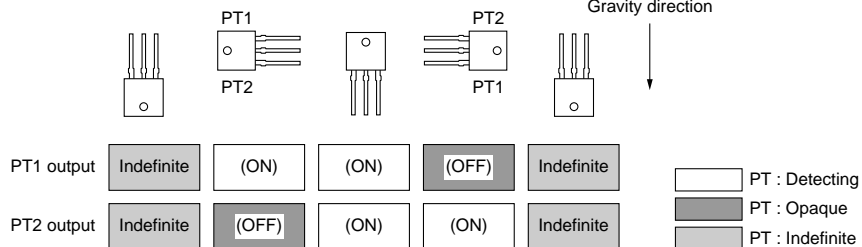
■ Supplement



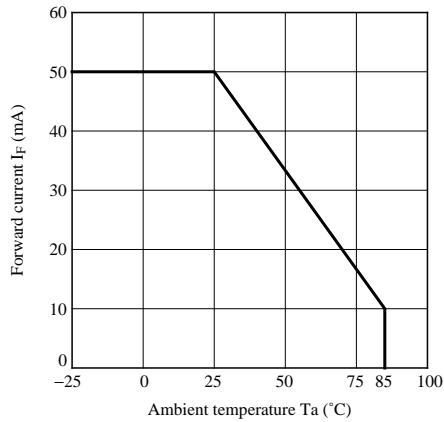
<90°rotation>



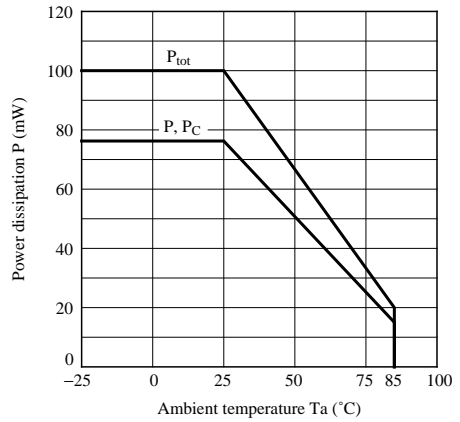
<Viewing from detecting side>



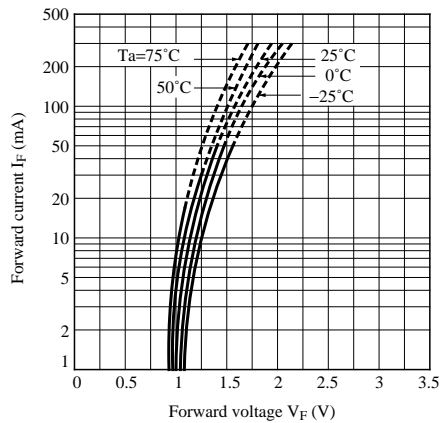
**Fig.1 Forward Current vs. Ambient Temperature**



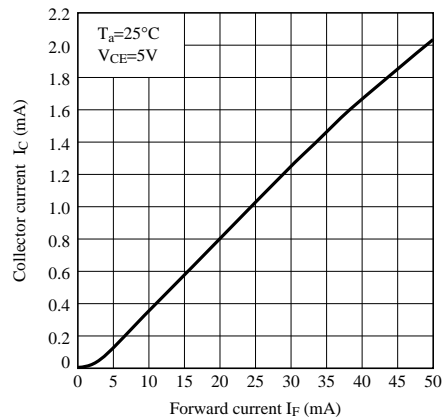
**Fig.2 Power Dissipation vs. Ambient Temperature**



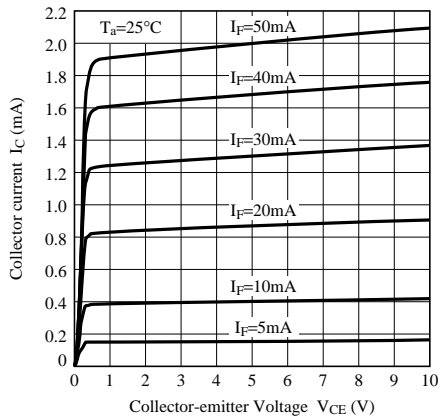
**Fig.3 Forward Current vs. Forward Voltage**



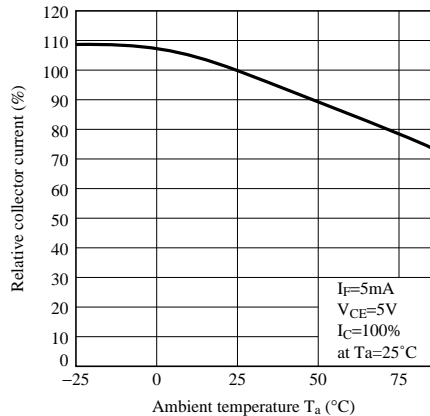
**Fig.4 Collector Current vs. Forward Current**



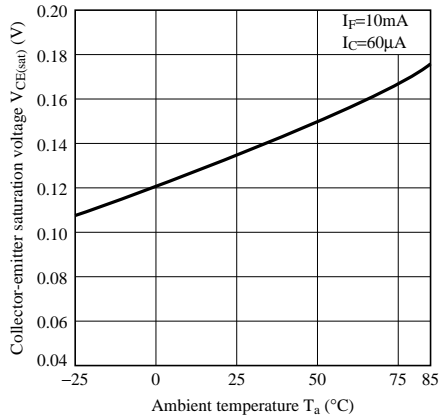
**Fig.5 Collector Current vs. Collector-emitter Voltage**



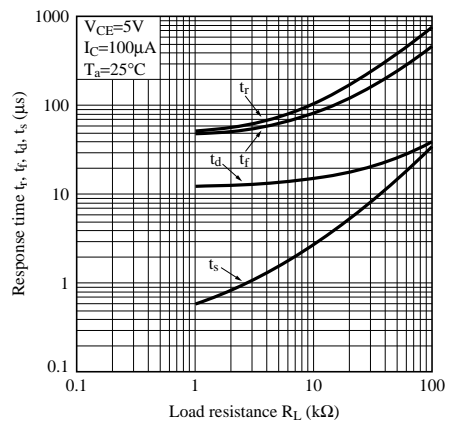
**Fig.6 Relative Collector Current vs. Ambient Temperature**



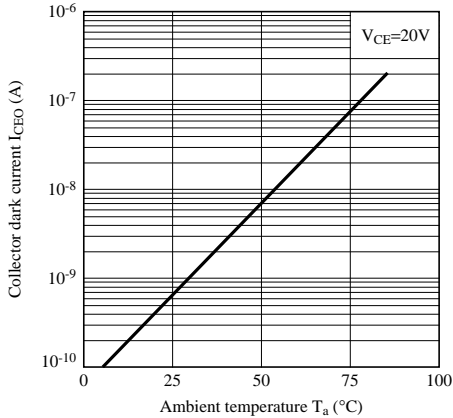
**Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature**



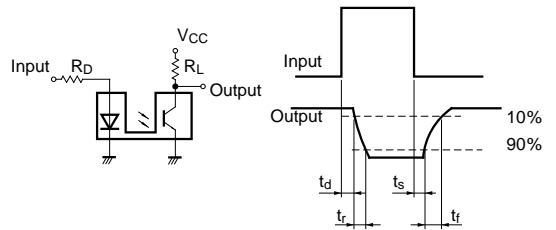
**Fig.8 Response Time vs. Load Resistance**



**Fig.9 Collector Dark Current vs. Ambient Temperature**



**Fig.10 Test Circuit for Response Time**



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