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 (±90˚) by the position of rolling ball.
4. High reliability due to non-contact structure

■ Applications

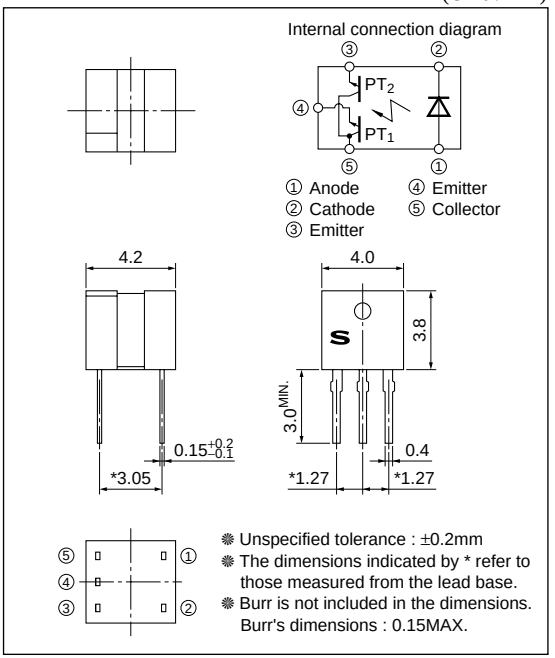
1. Digital cameras
2. Camcoders

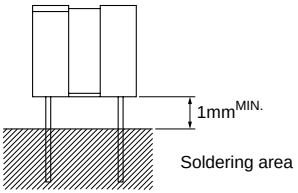
■ Absolute Maximum Ratings (Ta=25˚C)

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_{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
*2 Soldering temperature 2		T_{sol}	320	˚C

*1 For MAX. 5s
*2 For MAX. 2s at the position of 0.8mm from the bottomface 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_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	60	–	360	μA
	*4 Leak current		I_{LEAK}	V_{CE}=5V, I_F=5mA			15	μA
	Response time	Rise time	t_r	V_{CE}=5V, I_C=100μA	–	50	150	μs
		Fall time	t_f	R_L=1 000Ω	–	50	150	μs
	Collector-emitter saturation voltage		$V_{CE(sat)}$	I_F=10mA, I_C=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_C=OFF.

■ Detecting Angle Characteristics

θ	–90°	↔	–75°	↔	–15°	↔	+15°	↔	+75°	↔	+90°
I_{C1}	ON							*5	OFF		
I_{C2}	OFF			*5	ON						

✵ Conditions : I_F=5mA, V_{CC}=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

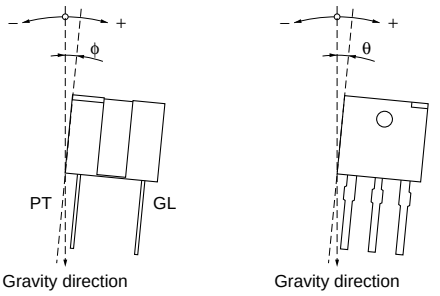
ϕ : Device condition : Refer to the figure

ON :Output current of phototransistors : 60μA or more

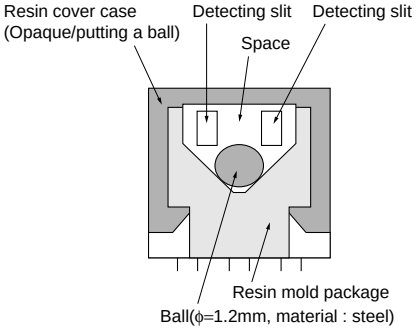
OFF : Output current of phototransistors : 15μA or less

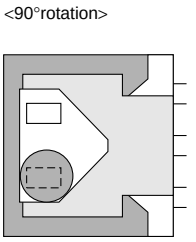
✵ Output current of ON/OFF is output when device is at a standstill

Device state diagram



■ Supplement





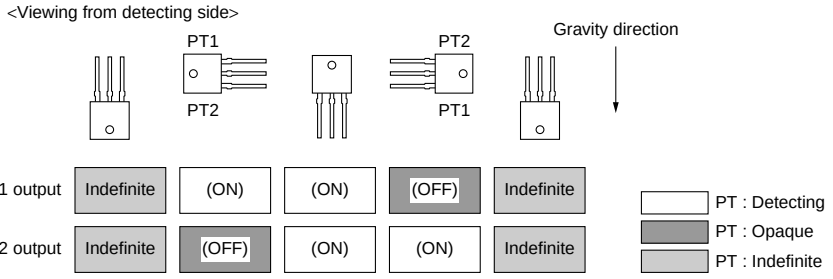


Fig.1 Forward Current vs. Ambient Temperature

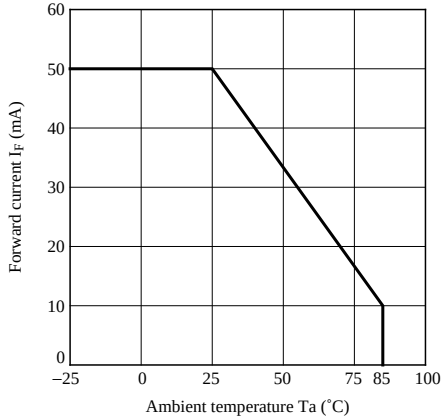


Fig.2 Power Dissipation vs. Ambient Temperature

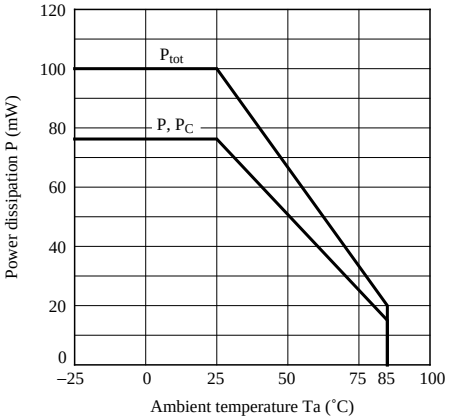


Fig.3 Forward Current vs. Forward Voltage

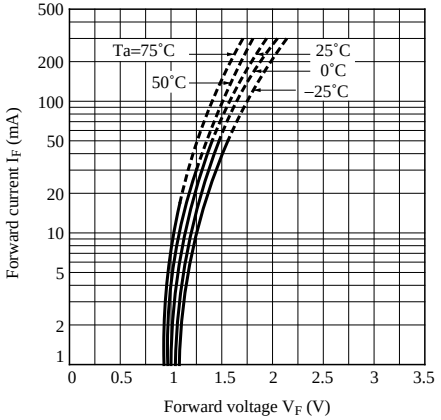


Fig.4 Collector Current vs. Forward Current

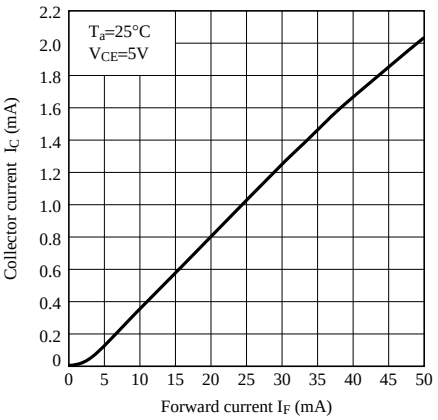


Fig.5 Collector Current vs. Collector-emitter Voltage

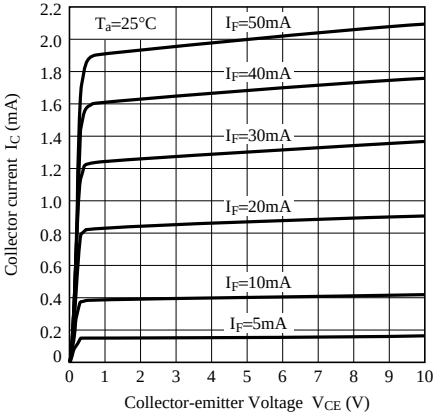


Fig.6 Relative Collector Current vs. Ambient Temperature

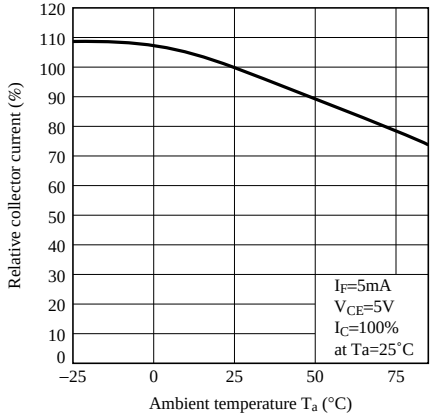


Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature

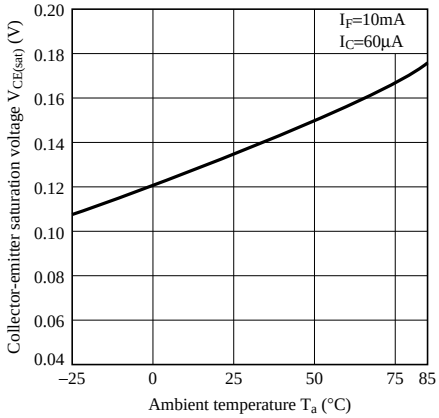


Fig.8 Response Time vs. Load Resistance

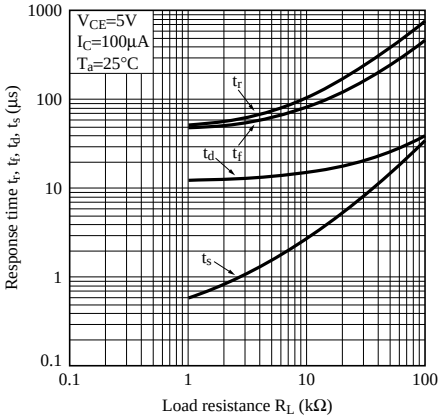


Fig.9 Collector Dark Current vs. Ambient Temperature

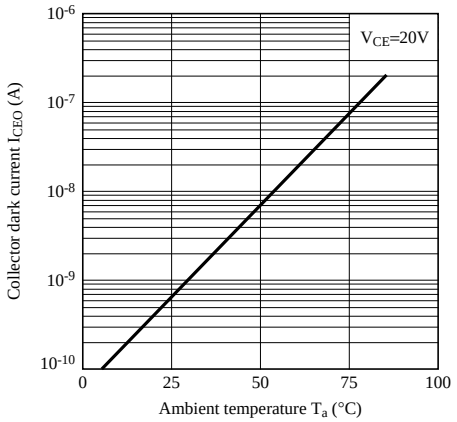
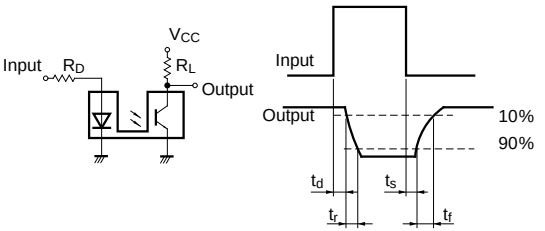


Fig.10 Test Circuit for Response Time



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