GP2S28

Optimal Detecting Distance: 6mm Phototransistor Output, Case package Reflective Photointerrupter

■ Description

GP2S28 is a standard, phototransistor output, reflective photointerrupter with emitter and detector facing the same direction in a case that provides non-contact sensing, resulting in a through-hole design.

The case includes snap-mount positioning hooks and a position pin to prevent mis-alignment.

■ Features

1. Reflective with phototransistor Output
2. Highlights :
   - Snap-mount positioning hooks
   - Position pin to prevent mis-alignment.
3. Key Parameters :
   - Optimal Sensing Distance : 3 to 14mm
   - Package : 12.8×9.3×5.4mm
4. Lead free and RoHS directive compliant

■ Agency approvals/Compliance

1. Compliant with RoHS directive

■ Applications

1. General purpose detection of object presence or motion.
2. Example : Printer, FAX, Optical storage unit.

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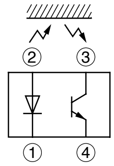
■ Internal Connection Diagram

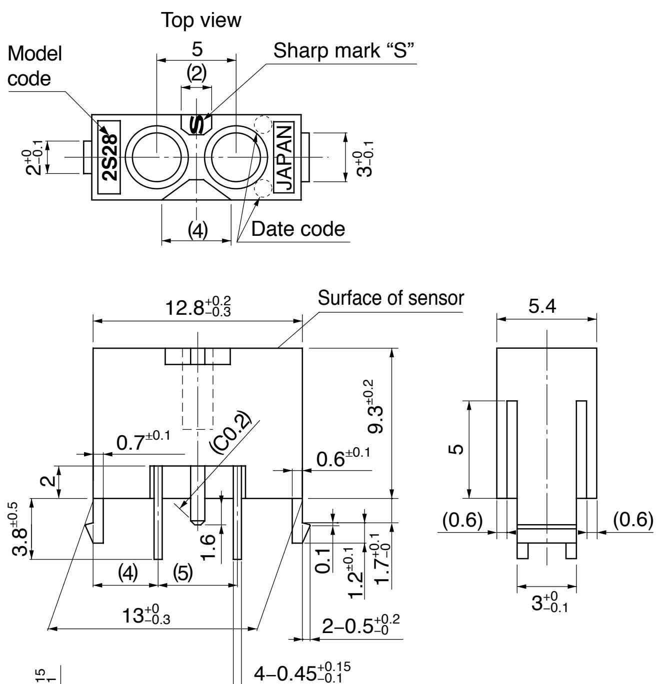
Top view

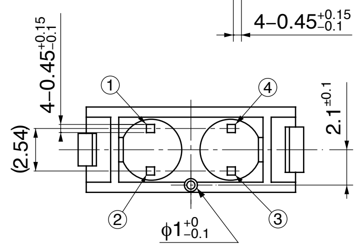


① Cathode
② Anode
③ Collector
④ Emitter

■ Outline Dimensions

(Unit : mm)





• Unspecified tolerance : ±0.2mm
• ( ) : Reference dimensions
• Thin burr is not included in tolerance.

Product mass : approx. 0.6g

Solder material : Sn−3Ag−0.5Cu dipping

Date code (2 digit)

1st digit		2nd digit	
Year of production		Month of production	
A.D.	Mark	Month	Mark
2000	0	1	1
2001	1	2	2
2002	2	3	3
2003	3	4	4
2004	4	5	5
2005	5	6	6
2006	6	7	7
2007	7	8	8
2008	8	9	9
2009	9	10	X
2010	0	11	Y
:	:	12	Z

repeats in a 10 year cycle

Country of origin

Japan

■ Absolute Maximum Ratings

(T_a=25˚C)

Parameter		Symbol	Rating	Unit
Input	*1 Forward current	I_F	60	mA
	*1, 2 Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P	150	mW
Output	Collector-emitter voltage	V_{CEO}	35	V
	Emitter-collector voltage	V_{ECO}	6	V
	Collector current	I_C	20	mA
	*1 Collector power dissipation	P_C	50	mW
Operating temperature		T_{opr}	–25 to +85	˚C
Storage temperature		T_{stg}	–40 to +85	˚C
*3 Soldering temperature		T_{sol}	260	˚C

*1 Refer to Fig.2, 3, 4
*2 Pulse width ≤ 100μs, Duty ratio=0.01
*3 For 5s or less

■ Electro-optical Characteristics

(T_a=25˚C)

Parameter			Symbol	Condition	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V_F	I_F=20mA	–	1.3	1.5	V
	Peak forward voltage		V_{FM}	I_{FM}=0.5A		2.2	3.5	V
	Reverse current		I_R	V_R=3V	–	–	10	μA
Output	Collector dark current		I_{CEO}	V_{CE}=20V	–	1	100	nA
Transfer charac-teristics	*4 Collector current		I_C	V_{CE}=5V, I_F=20mA	0.04	–	0.9	mA
	Collector-emitter saturation voltage		$V_{CE(sat)}$	I_F=40mA, I_C=0.04mA	–	–	0.4	V
	Response time	Rise time	t_r	V_{CE}=2V, I_C=0.1mA, R_L=100Ω	–	–	20	μs
		Fall time	t_f		–	–	30	

*4 The conditions and arrangement of the reflective object are shown below.

● Measuring Configulation of Collector Current

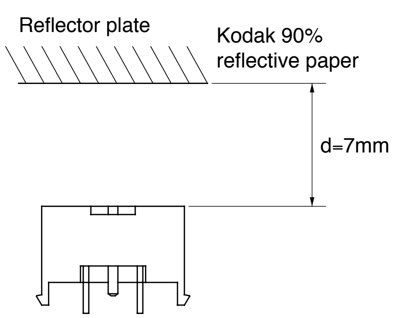


Fig.1 Test Circuit for Response Time

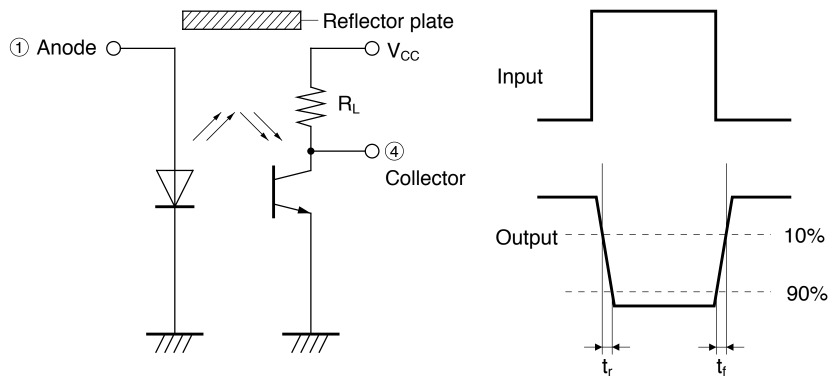


Fig.2 Forward Current vs. Ambient Temperature

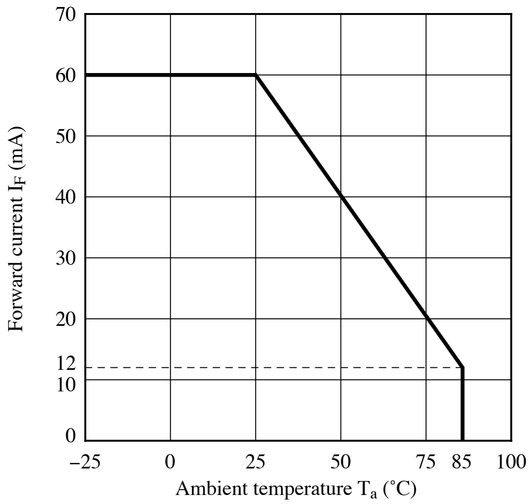


Fig.3 Collector Power Dissipation vs. Ambient Temperature

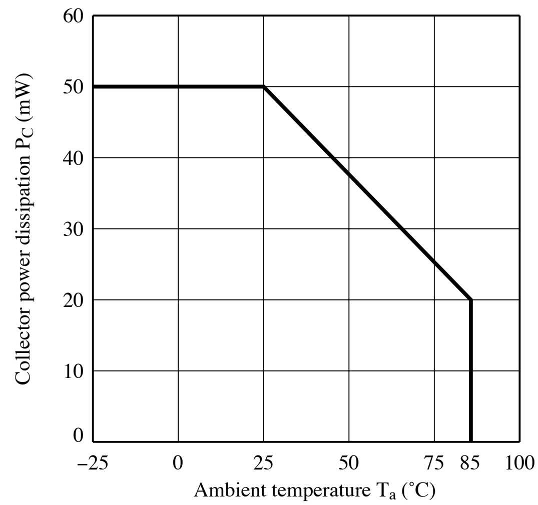


Fig.4 Peak Forward Current vs. Duty Ratio

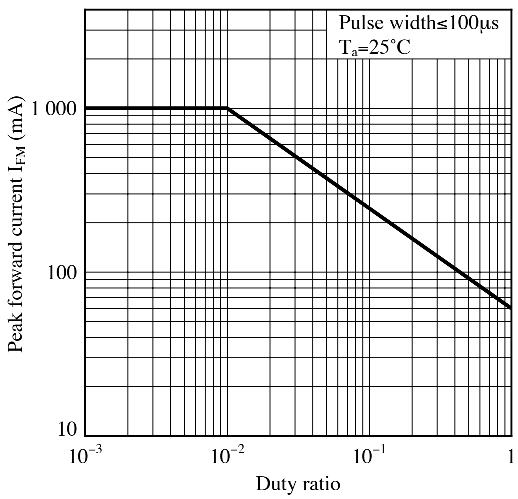


Fig.5 Forward Current vs. Forward Voltage

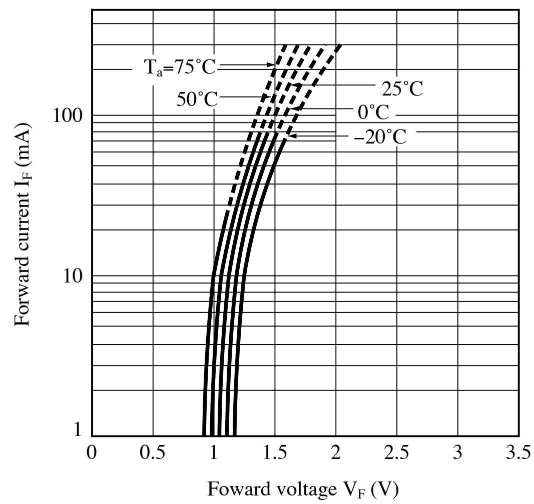


Fig.6 Collector Current vs. Forward Current

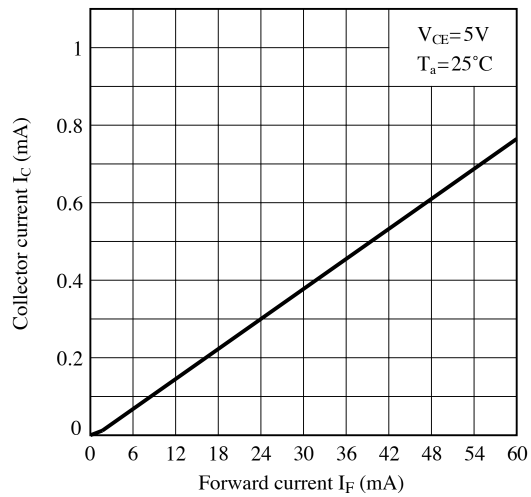


Fig.7 Collector Current vs. Collector-emitter Voltage

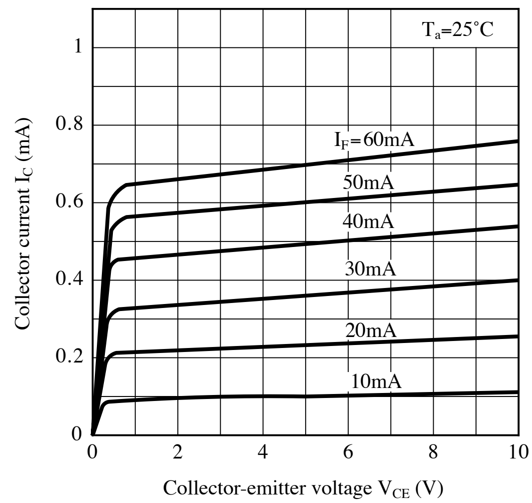


Fig.8 Collector Current vs. Ambient Temperature

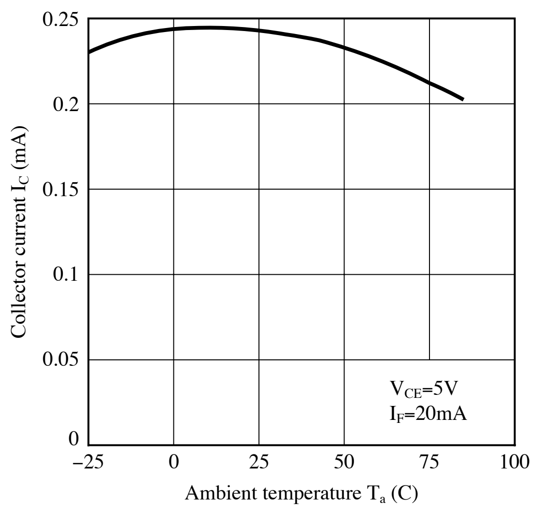


Fig.9 Collector Dark Current vs. Ambient Temperature

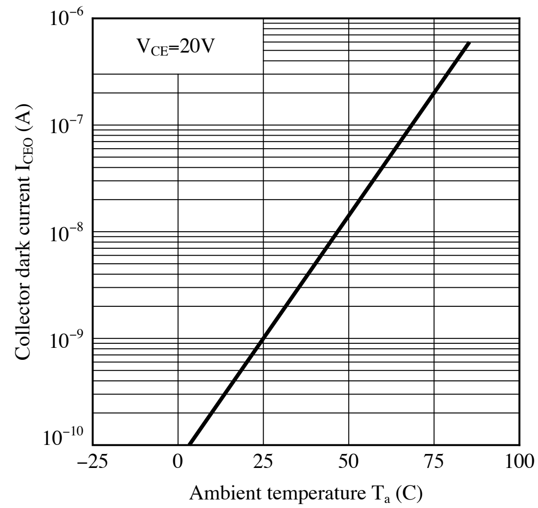
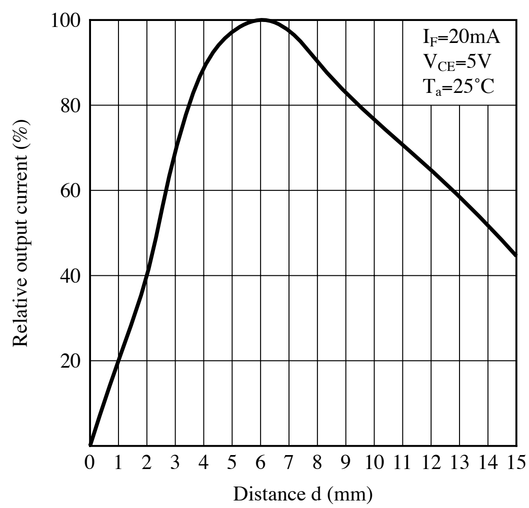
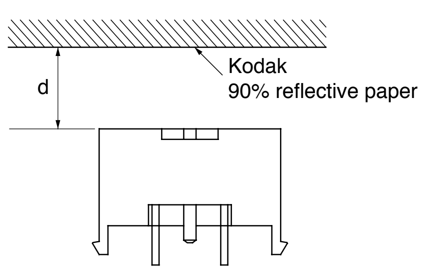


Fig.10 Relative colletor current vs. Distance



(Test arrangement)



Remarks : Please be aware that all data in the graph are just for reference and not for guarantee.

Design Considerations

Design guide

1) Prevention of detection error

To prevent photointerrupter from faulty operation caused by external light, do not set the detecting face to the external light.

2) Distance characteristics

The distance beteen the photointerrupter and the object to be detected shall be determined by referencing Fig.10 "Relative collector current vs. distance".

This product is not designed against irradiation and incorporates non-coherent IRED.

Degradation

In general, the emission of the IRED used in photocouplers will degrade over time.
In the case of long term operation, please take the general IRED degradation (50% degradation over 5 years) into the design consideration.

Parts

This product is assembled using the below parts.

• Photodetector (qty. : 1)

Category	Material	Maximum Sensitivity wavelength (nm)	Sensitivity wavelength (nm)	Response time (μs)
Phototransistor	Silicon (Si)	800	700 to 1 200	3.5

• Photo emitter (qty. : 1)

Category	Material	Maximum light emitting wavelength (nm)	I/O Frequency (MHz)
Infrared emitting diode (non-coherent)	Gallium arsenide (GaAs)	950	0.3

• Material

Case	Lead frame plating
Black Polycarbonate resin (UL94 HB)	Solder dip. (Sn–3Ag–0.5Cu)

■ Manufacturing Guidelines

● Soldering Method

Soldering:

To solder onto lead pins, soldering at 260˚C for 5 s or less.
Please take care not to let any external force on lead pins when soldering on just after soldering.
Please don't do soldering with preheating, and please don't do soldering by reflow.

Other notice

Please test the soldering method in actual condition and make sure the soldering works fine, since the impact on the junction between the device and PCB varies depending on the cooling and soldering conditions.

Flux

Some flux, which is used in soldering, may crack the package due to synergistic effect of alcohol in flux and the rise in temperature by heat in soldering. Therefore, in using flux, please make sure that it does not have any influence on appearance and reliability of the photointerrupter.

● Cleaning instructions

Solvent cleaning :

Solvent temperature should be 45˚C or below. Immersion time should be 3 minutes or less.

Ultrasonic cleaning :

The affect to device by ultrasonic cleaning is different by cleaning bath size, ultrasonic power output, cleaning time, PCB size or device mounting condition etc.
Please test it in actual using condition and confirm that doesn't occur any defect before starting the ultrasonic cleaning.

Recommended solvent materials :

Ethyl alcohol, Methyl alcohol and Isopropyl alcohol.

● Presence of ODC

This product shall not contain the following materials.
And they are not used in the production process for this product.
Regulation substances : CFCs, Halon, Carbon tetrachloride, 1.1.1-Trichloroethane (Methylchloroform)

Specific brominated flame retardants such as the PBBOs and PBBs are not used in this product at all.

This product shall not contain the following materials banned in the RoHS Directive (2002/95/EC).

- •Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE).

■ Package specification

● Case package

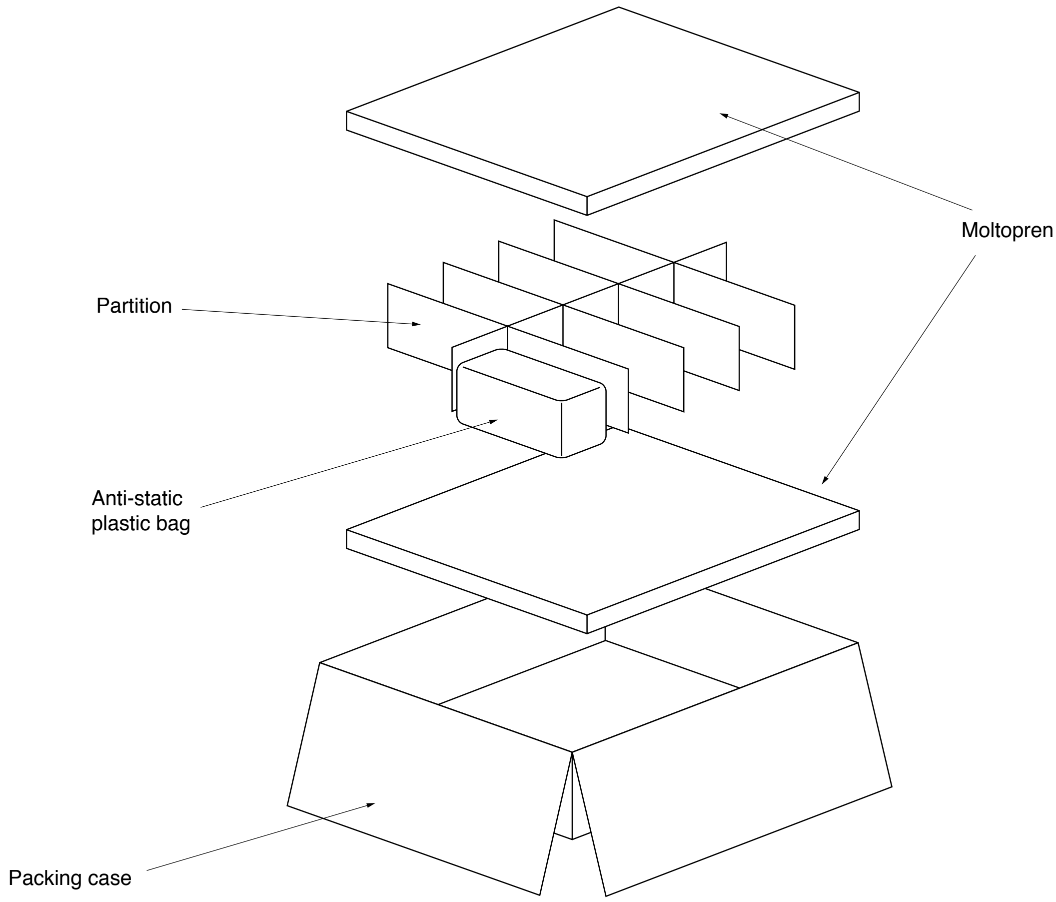
Package materials

Anti-static plastic bag : Polyethtylene
Moltopren : Urethane
Partition : Corrugated fiberboard
Packing case : Corrugated fiberboard

Package method

100 pcs of products shall be packaged in a plastic bag. Ends shall be fixed by stoppers. The bottom ot the packing case is covered with moltopren, and the partition is set in the packing case. Each partition should have 1 plastic bag.
The 10 plastic bags containing a product are put in the packing case.
Moltopren should be located after all product are settled (1 packing conteains 1 000 pcs).

Packing composition



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