

GP2S24J0000F Series

Detecting Distance: 0.7mm Phototransistor Output, Compact Reflective Photointerrupter



■ Description

GP2S24J0000F Series is a compact-package, phototransistor output, reflective photointerrupter, with emitter and detector facing the same direction in a molding that provides non-contact sensing. The compact package series is a result of unique technology, combing transfer and injection molding, that also blocks visible light to minimize false detection.

■Features

- 1. Reflective with Phototransistor Output
- 2. Highlights:
 - Compact Size
- 3. Key Parameters:
 - · Optimal Sensing Distance: 0.7mm
 - Package: 4×3×1.7mm
 - · Visible light cut resin package
- 4. Lead free and RoHS directive compliant

■Agency approvals/Compliance

1. Compliant with RoHS directive

■ Applications

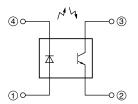
- 1. Detection of object presence or motion.
- 2. Example: printer, optical storage

Notice The content of data sheet is subject to change without prior notice.

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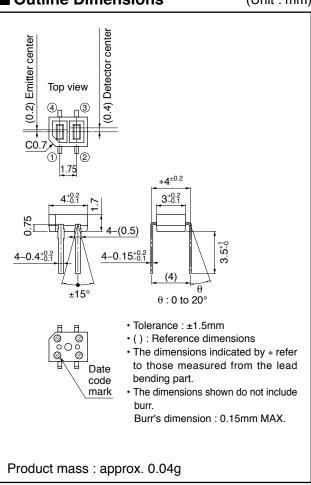


■ Internal Connection Diagram



- ① Anode
- 2 Emitter
- 3 Collector
- 4 Cathode

■ Outline Dimensions (Unit:mm)



Plating material: SnCu (Cu: TYP. 2%)



Date code (Symbol)

January



July



February



August



March



September



April



October



May



November



June



December



Rank mark

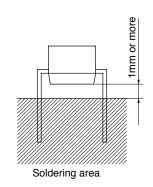
There is no rank indicator.

Country of origin

Japan



■ Absolute Maximum Ratings $(T_a=25^\circ$				
	Parameter	Symbol	Rating	Unit
	Forward current		50	mA
Input	Reverse voltage	V_R	6	V
	Power dissipation	P	75	mW
	Collector-emitter voltage	V_{CEO}	35	V
Outmut	Emitter-collector voltage	V _{ECO}	6	V
Output	Collector current	I_{C}	20	mA
	Collector power dissipation	P _C	75	mW
Total power dissipation		P _{tot}	100	mW
Operating temperature		Topr	-25 to +85	°C
Storage temperature		T _{stg}	-40 to +100	°C
*1Soldering temperature		T _{sol}	260	°C



■ Electro-optical Characteristics

 $(T_a=25^{\circ}C)$

	Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit
Innut	Forward voltage		V_{F}	I _F =20mA	-	1.2	1.4	V
Input	Reverse current		I_R	$V_R=6V$	_	_	10	μΑ
Output	Collector dark curren	nt	I_{CEO}	$V_{CE}=20V$	_	1	100	nA
Transfer	*2 Collector Current		I_{C}	$I_F=4mA, V_{CE}=2V$	20	45	120	μΑ
charac-	Dagmanaa tima	Rise time	t _r	$V_{CE}=2V, I_{C}=100\mu A,$	_	20	100	
teristics	Response time Fall	Fall time	$t_{\rm f}$	$R_L=1k\Omega$, $d=1mm$	_	20	100	μs
teristics	*3 Leak current		I_{LEAK}	$I_F=4mA$, $V_{CE}=2V$	-	-	100	nA

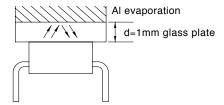
^{*2} The condition and arrangement of the reflective object are shown below.

The rank splitting of collector current (I_C) shall be executed according to the table below.

Rank	Collector current, I_C [μA] (I_F =4 mA , V_{CE} =2 V)	Package sleeve color
A	20 to 42	Yellow
В	34 to 71	Transparent
C	58 to 120	Green

^{*3} Without reflective object.

◆ Test Conditon and Arrangement for Collector Current



^{*1} For 5s or less



■ Model Line-up

Model No.	Rank	Collector current I _C [μA]	
Middel No.		$(I_F=4mA, V_{CE}=2V, T_a=25^{\circ}C)$	
GP2S24J0000F	A, B or C	20 to 120	
GP2S24BJ000F	В	34 to 71	
GP2S24CJ000F	С	58 to 120	
GP2S24ABJ00F	A or B	20 to 71	
GP2S24BCJ00F	B or C	34 to 120	

^{*} The ratio of each rank can not be guaranteed.

Please contact a local SHARP sales representative to inquire about production status.



Fig.1 Forward Current vs. Ambient Temperature

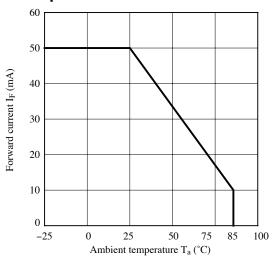


Fig.3 Forward Current vs. Forward Voltage

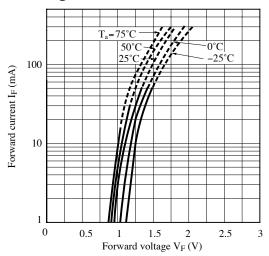


Fig.5 Collector Current vs.
Collector-Emitter Voltage

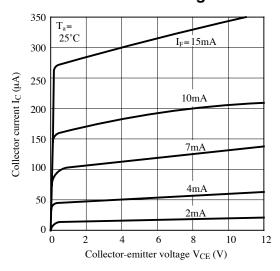


Fig.2 Power Dissipation vs.
Ambient Temperature

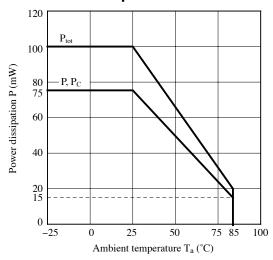


Fig.4 Collector Current vs. Forward Current

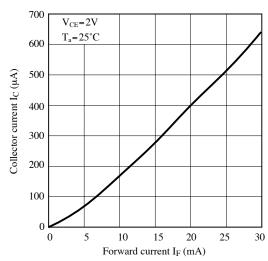


Fig.6 Relative Collector Current vs.
Ambient Temperature

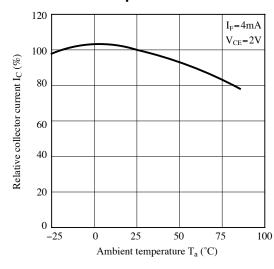




Fig.7 Collector Dark Current vs.
Ambient Temperature

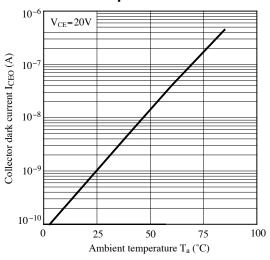


Fig.9 Test Circuit for Response Time

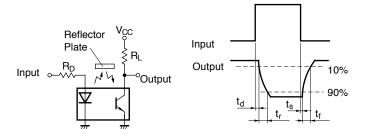


Fig.8 Response Time vs. Load Resistance

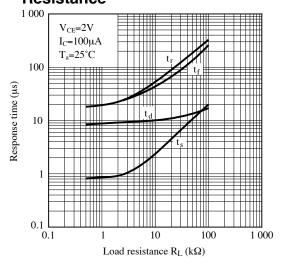


Fig.10 Relative Collector Current vs.
Distance (Reference value)

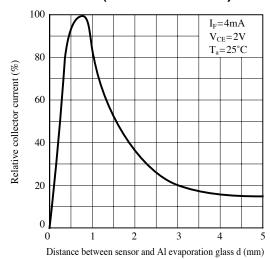


Fig.11 Detecting Position Characteristics (1)

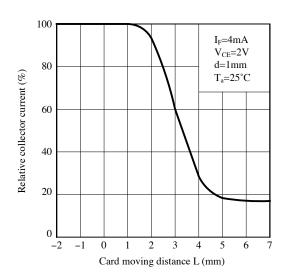


Fig.12 Detecting Position Characteristics (2)

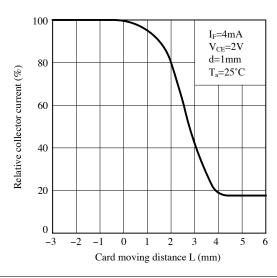




Fig.13 Test Condition for Distance & Detecting Position Characteristics

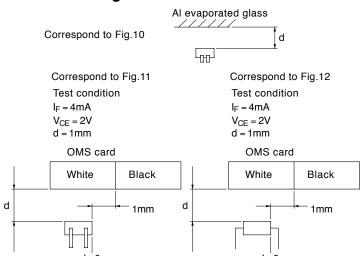


Fig.14 Freauency Response

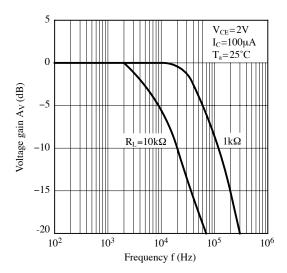
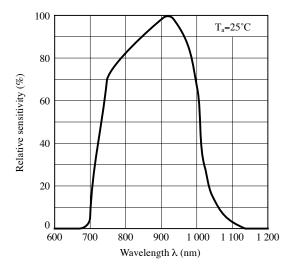


Fig.15 Spectral Sensitivity (Detecting Side)



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 characteristic

Please refer to Fig.10 (Relative collector current vs. Distance) to set the distance of the photointerrupter and the object.

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

Degradation

In general, the emission of the IRED used in photointerrupter 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	gory Material Maximum Sensitivity wavelength (nm)		Sensitivity wavelength (nm)	Response time (µs)
Phototransister	Silicon (Si)	930	700 to 1 200	20

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	Lead frame plating
Black polyphernylene	42Alloy	SnCu plating



■ Manufacturing Guidelines

Soldering Method

Flow Soldering:

Soldering should be completed below 260°C and within 5 s.

Soldering area is 1mm or more away from the bottom of housing.

Please take care not to let any external force exert on lead pins.

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.

Cleaning instructions

Solvent cleaning:

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

Ultrasonic cleaning:

Do not execute 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

Sleeve package

Package materials

Sleeve : Polystyrene

Stopper: Styrene-Butadiene

Package method

MAX. 50 pcs. of products shall be packaged in a sleeve. Both ends shall be closed by tabbed and tabless stoppers.

MAX. 40 sleeves in one case.

Color of sleeve

Rank classification is distinguished by the color of the sleeve as shown in the table below. But the ratio of each rank can not be guaranteed.

Rank	Color of sleeve
A	Yellow
В	Transparent
С	Green



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 - --- Telecommunication equipment [terminal]
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