GP1S95J0000F

Gap : 1.6mm Slit : 0.3mm Phototransistor Output, Compact Transmissive Photointerrupter

■ Description

GP1S95J0000F is a compact-package, phototransistor output, transmissive photointerrupter, with opposing emitter and detector in a molding that provides non-contact sensing. The compact package series is a result of unique technology combing transfer and injection molding.

This device has a thin emitter and detector molding.

■ Features

1. Transmissive with phototransistor output
2. Highlights :
   - Compact Size
   - Deep Gap (Gap depth : 3.3mm)
   - Thin emitter and detector molding
3. Key Parameters :
   - Gap Width : 1.6mm
   - Slit Width (detector side): 0.3mm
   - Package : 3.6×3.4×4.7mm
4. Lead free and RoHS directive compliant

■ Agency approvals/Compliance

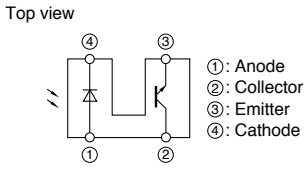
1. Compliant with RoHS directive

■ Applications

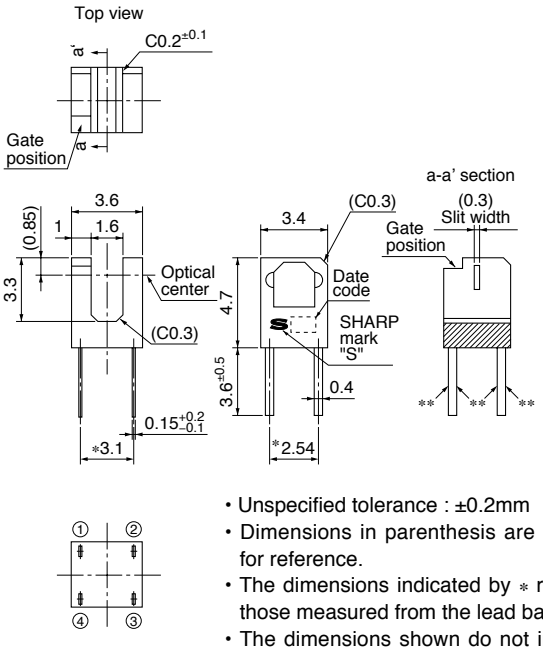
1. General purpose detection of object presence or motion.
2. Example : printer, lens control for camera

Sheet No.: D3-A00701EN
Date Jun. 30. 2005

■ Internal Connection Diagram



■ Outline Dimensions (Unit : mm)



- Unspecified tolerance : ±0.2mm
- Dimensions in parenthesis are shown for reference.
- The dimensions indicated by * refer to those measured from the lead base.
- The dimensions shown do not include burr.
  Burr's dimension : 0.15mm MAX.
  Residual gate shall be lower than the top of package.
- The lead may be exposed at the shaded portion.

Product mass : approx. 0.08g

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

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

Rank mark

There is no rank indicator.

Country of origin

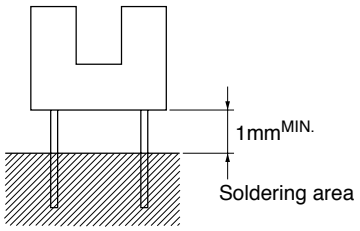
Japan

■ Absolute Maximum Ratings

(T_a=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_{CEO}	35	V
	Emitter-collector voltage	V_{ECO}	6	V
	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
*1Soldering temperature		T_{sol}	260	°C

*1 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	–	1.2	1.4	V
	Reverse current		I_R	V_R=3V	–	–	10	μA
Output	Collector dark current		I_{CEO}	V_{CE}=20V	–	–	100	nA
Transfer characteristics	Collector current		I_C	V_{CE}=5V, I_F=5mA	50	–	300	μA
	Collector-emitter saturation voltage		$V_{CE(sat)}$	I_F=10mA, I_C=50μA	–	–	0.4	V
	Response time	Rise time	t_r	V_{CE}=5V, I_C=100μA, R_L=1kΩ	–	35	100	μs
		Fall time	t_f		–	35	100	μs

Fig.1 Forward Current vs. Ambient Temperature

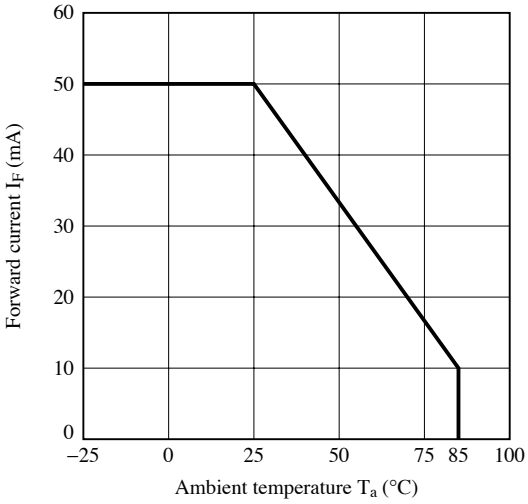


Fig.2 Power Dissipation vs. Ambient Temperature

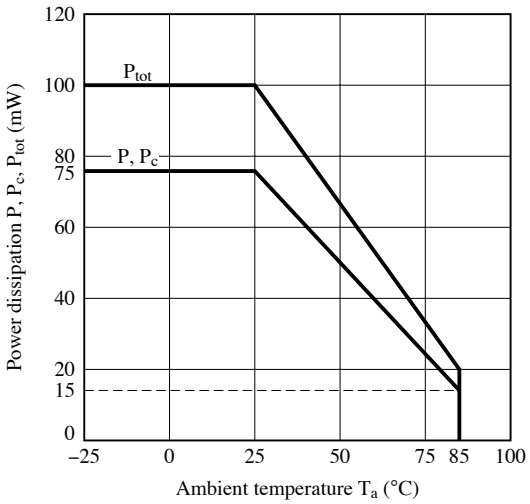


Fig.3 Forward Current vs. Forward Voltage

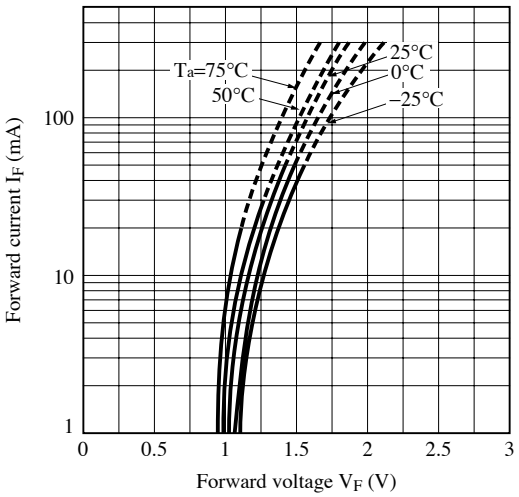


Fig.4 Collector Current vs. Forward Current

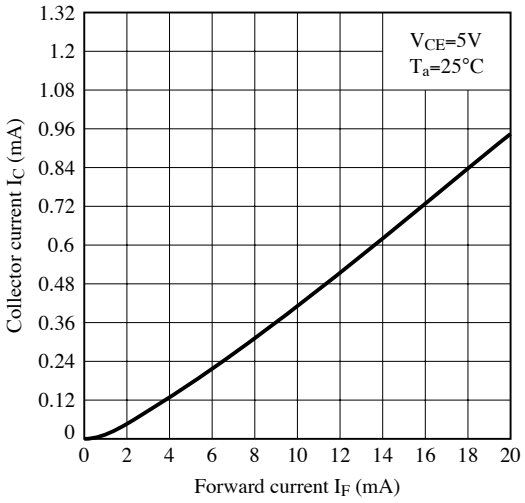


Fig.5 Collector Current vs. Collector-emitter Voltage

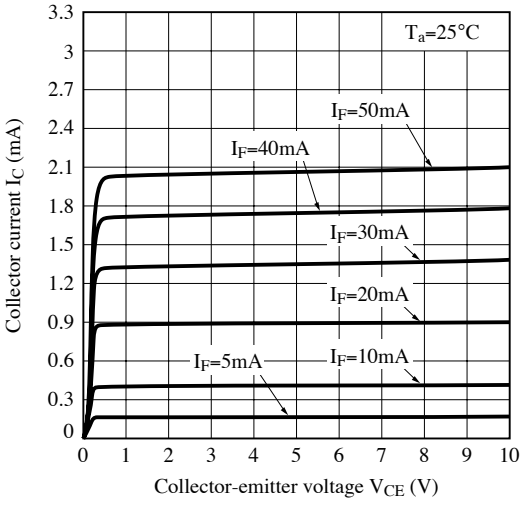


Fig.6 Relative Collector Current vs. Ambient Temperature

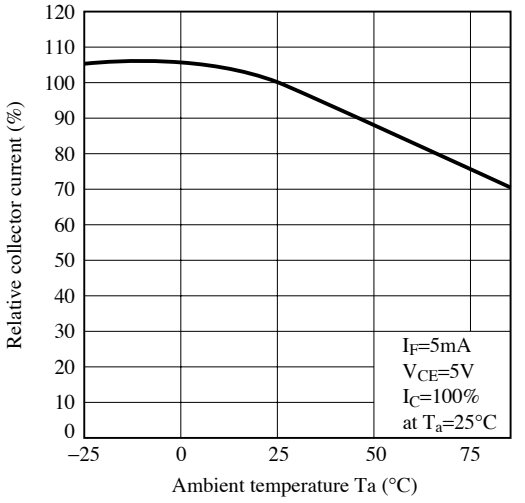


Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature

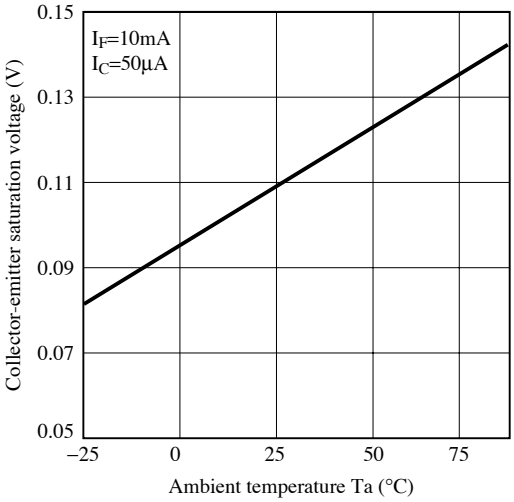


Fig.8 Collector Dark Current vs. Ambient Temperature

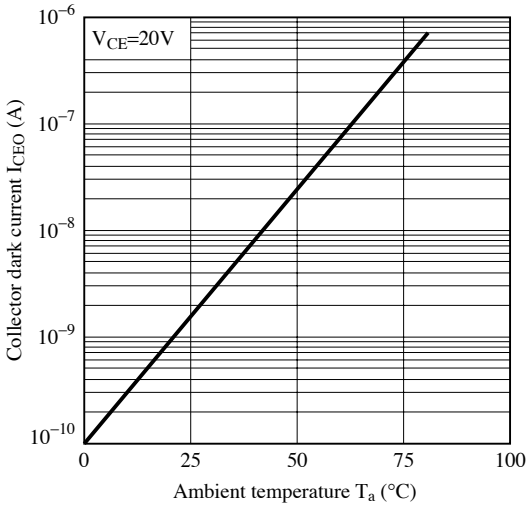


Fig.9 Response Time vs. Load Resistance

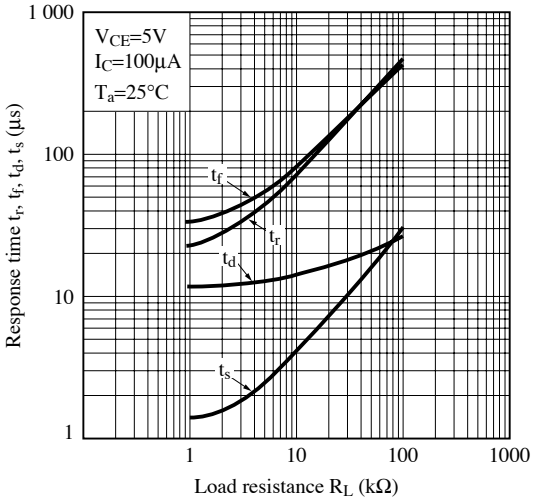


Fig.10 Test Circuit for Response Time

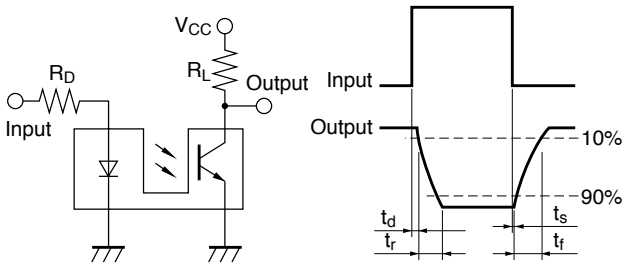


Fig.11 Detecting Position Characteristics (1)

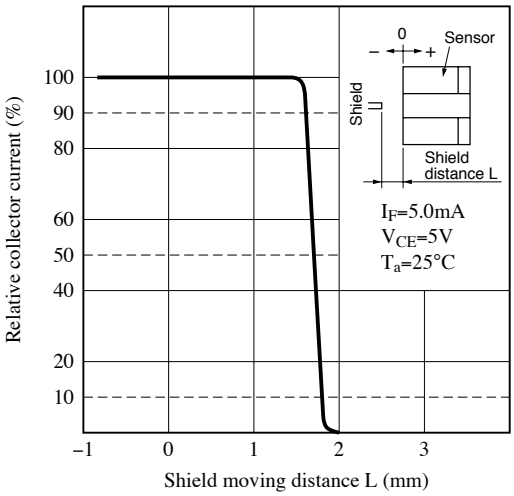
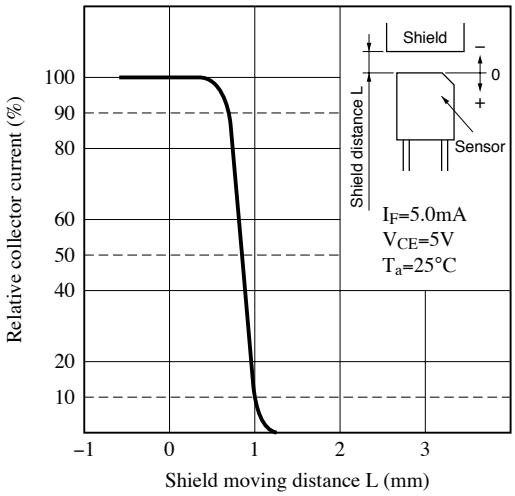


Fig.12 Detecting Position Characteristics (2)



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

■ Design Considerations

● Design guide

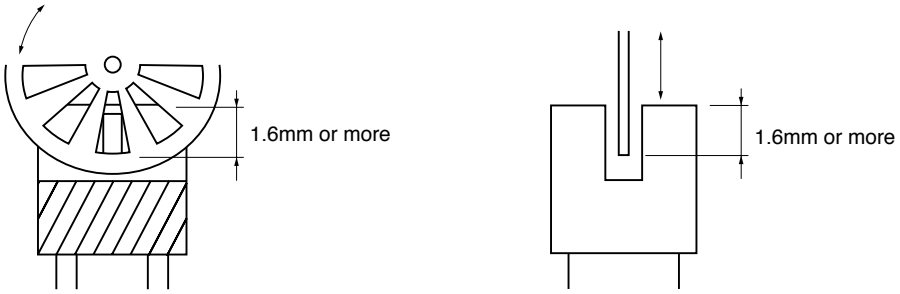
1) Prevention of detection error

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

2) Position of opaque board

Opaque board shall be installed at place 1.6mm or more from the top of elements.

(Example)



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	Material	Maximum Sensitivity wavelength (nm)	Sensitivity wavelength (nm)	Response time (μs)
Phototransistor	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 sulfide resin (UL94 V-0)	42Alloy	SnCu plating

■ Manufacturing Guidelines

● Soldering Method

Flow Soldering:

Soldering should be completed below 260˚C and within 5 s.
Please solder within one time.
Soldering area is 1.6mm 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.

Hand soldering

Hand soldering should be completed within 3 s when the point of solder iron is below 350˚C.
Please solder within one time.
Please don't touch the terminals directly by soldering iron.
Soldered product shall treat at normal temperature.

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-Elastomer

Package method

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

■ Important Notices

· The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.

· Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device. SHARP reserves the right to make changes in the specifications, characteristics, data, materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.

· Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:

(i) The devices in this publication are designed for use in general electronic equipment designs such as:

--- Personal computers
--- Office automation equipment
--- Telecommunication equipment [terminal]
--- Test and measurement equipment
--- Industrial control
--- Audio visual equipment
--- Consumer electronics

(ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:

--- Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
--- Traffic signals
--- Gas leakage sensor breakers
--- Alarm equipment
--- Various safety devices, etc.

(iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:

--- Space applications
--- Telecommunication equipment [trunk lines]
--- Nuclear power control equipment
--- Medical and other life support equipment (e.g., scuba).

· If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Law of Japan, it is necessary to obtain approval to export such SHARP devices.

· This publication is the proprietary product of SHARP and is copyrighted, with all rights reserved. Under the copyright laws, no part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, in whole or in part, without the express written permission of SHARP. Express written permission is also required before any use of this publication may be made by a third party.

· Contact and consult with a SHARP representative if there are any questions about the contents of this publication.