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GP1A05AJ000F Series

Gap : 5mm, Slit : 0.5mm
 *OPIC Output
 Transmissive Photointerrupter
 with Connector



■ Description

GP1A05AJ000F Series are standard, OPIC output, transmissive photointerrupters with opposing emitter and detector in a case, providing non-contact sensing. For this family of devices, the emitter and detector are inserted in a case, and a 3-pin connector is included to allow remote-mount or off-board designs.

■ Features

1. Transmissive with OPIC output
2. Highlights :
 - Includes additional screw fixing holes
 - Positioning Pin to prevent misalignment
3. Key Parameters:
 - Gap Width : 5mm
 - Slit Width (detector side) : 0.5mm
 - Package : 34×18×11mm (without connector and positioning pin)
 - Connector : **GP1A05AJ000F** ; Tyco Electronics AMP K.K. (PN : 171825-3)
GP1A05A2J00F ; J.S.T. Mfg Co., Ltd. (PN : B3P-SHF-IAA (LF))
GP1A05A5J00F ; Molex-Japan Co., Ltd. (PN : 5267-03A)
 - Output Type : High when the object is present with Pullup Resistor
4. Lead free and RoHS directive compliant

■ Agency approvals/Compliance

1. Compliant with RoHS directive

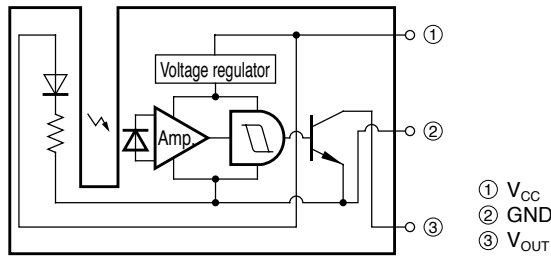
■ Applications

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

* "OPIC"(Optical IC) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and a signal-processing

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Internal Connection Diagram



Truth table (In case of external addition pull-up resistance to V_{OUT} terminal)

| Condition | Output |
|--------------------------|--------|
| Light beam interrupted | High |
| Light beam uninterrupted | Low |

Outline Dimensions

(Unit : mm)

GP1A05AJ000F

Connector : 171825-3 (Tyco Electronics AMP K.K.)

Connector : B3P-SHF-1AA (LF) (J.S.T. MFG. CO., LTD.)

• Unspecified tolerance shall be as follows ;

| Dimensions(d) | Tolerance |
|------------------------|-----------|
| less than 4 | ± 0.2 |
| 4 or more less than 16 | ± 0.3 |
| 16 or more | ± 0.5 |

Product mass : approx. 3.0g

GP1A05A2J00F

Connector : B3P-SHF-1AA (LF) (J.S.T. MFG. CO., LTD.)

• Unspecified tolerance shall be as follows ;

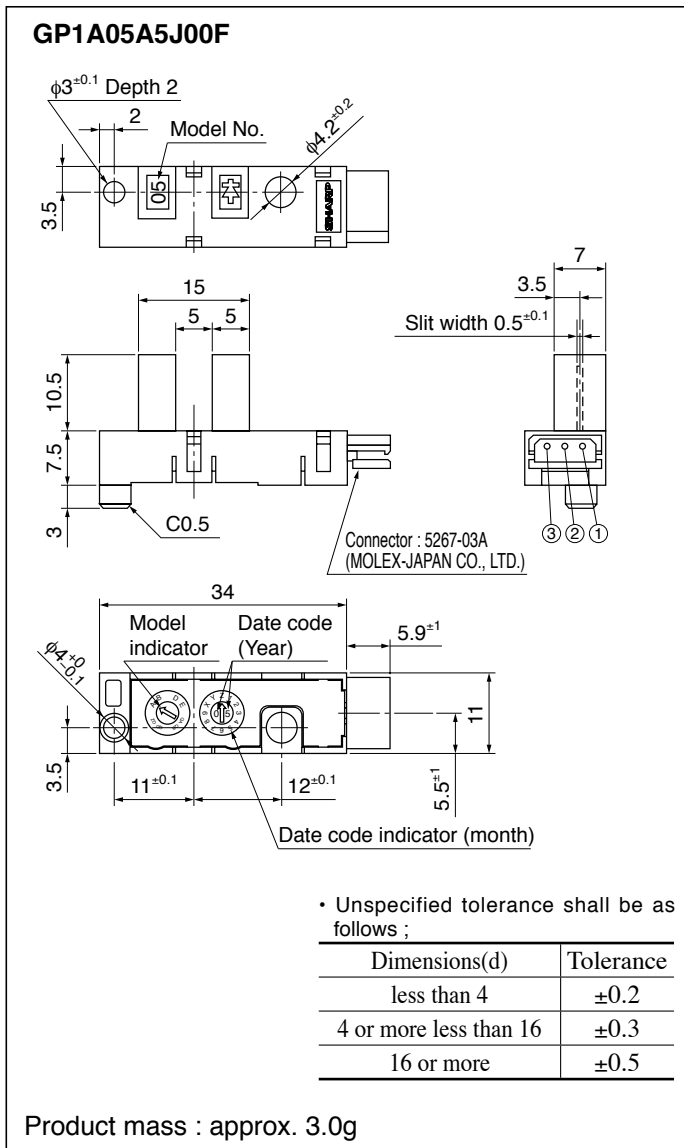
| Dimensions(d) | Tolerance |
|------------------------|-----------|
| less than 4 | ± 0.2 |
| 4 or more less than 16 | ± 0.3 |
| 16 or more | ± 0.5 |

Product mass : approx. 3.0g

Connector terminal plating material : Sn

Connector terminal plating material : Sn

(Unit : mm)



Connector terminal plating material : Sn

Date code

| Year of production | Month of production | |
|---------------------------------------|---------------------|------|
| | Month | Mark |
| Last two digits of Christian year. | 1 | 1 |
| | 2 | 2 |
| | 3 | 3 |
| | 4 | 4 |
| | 5 | 5 |
| | 6 | 6 |
| | 7 | 7 |
| | 8 | 8 |
| | 9 | 9 |
| | 10 | X |
| | 11 | Y |
| | 12 | Z |

Country of origin

Japan or Philippines

(Indicated on the packing case)

■ Absolute Maximum Ratings

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

| Parameter | | Symbol | Rating | Unit |
|-----------------------------|-----------------------------|-----------|-------------|------------------|
| Supply voltage | GP1A05AJ000F | V_{CC} | -0.5 to +10 | V |
| | GP1A05A2J000F/GP1A05A5J000F | | -0.5 to +8 | |
| *1 Output voltage | | V_{OUT} | -0.5 to +28 | V |
| *2 Low level output current | | I_{OL} | 50 | mA |
| *3 Operating temperature | | T_{opr} | -20 to +75 | $^\circ\text{C}$ |
| *3 Storage temperature | | T_{stg} | -40 to +85 | $^\circ\text{C}$ |

*1 Collector-emitter voltage of output transistor.

*2 Collector current of output transistor, refer to Fig.1.

*3 The connector should be plugged in/out at normal temperature.

■ Electro-optical Characteristics

($V_{CC}=5\text{V}$, $T_a=25^\circ\text{C}$)

| Parameter | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---------------------------|-----------|-----------|--|--------------------|------|-------|---------------|
| Low level supply current | | I_{CCL} | Light beam uninterrupted | - | - | 30 | mA |
| Low level output voltage | | V_{OL} | Light beam uninterrupted, $I_{OL}=16\text{mA}$ | - | - | 0.35 | V |
| High level supply current | | I_{CCH} | Light beam interrupted | - | - | 30 | mA |
| High level output voltage | | V_{OH} | Light beam interrupted, $R_L=47\text{k}\Omega$ | $V_{CC}\times 0.9$ | - | - | V |
| *4 Response frequency | | f | $R_L=47\text{k}\Omega$ | - | - | 3 000 | Hz |
| Operating supply voltage | | V_{CC} | - | 4.5 | - | 5.5 | V |
| *5 Response time | Rise time | t_r | $R_L=280\Omega$ | - | 0.1 | 0.5 | μs |
| | Fall time | t_f | | - | 0.05 | 0.5 | μs |

*4 Response frequency is measured with the disk shown below being rotated.

*5 Refer to Fig.7.

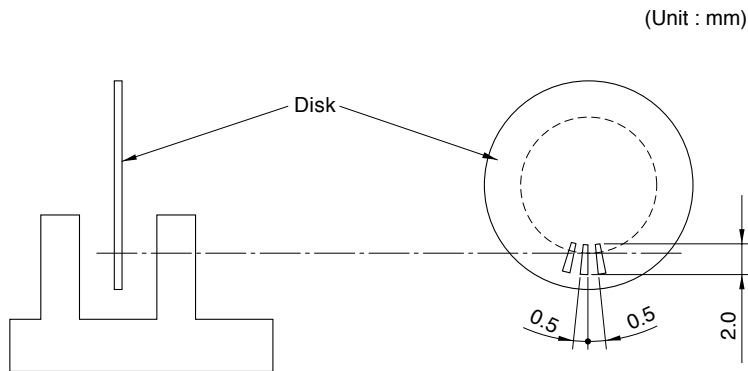


Fig.1 Low Level Output Current vs. Ambient Temperature

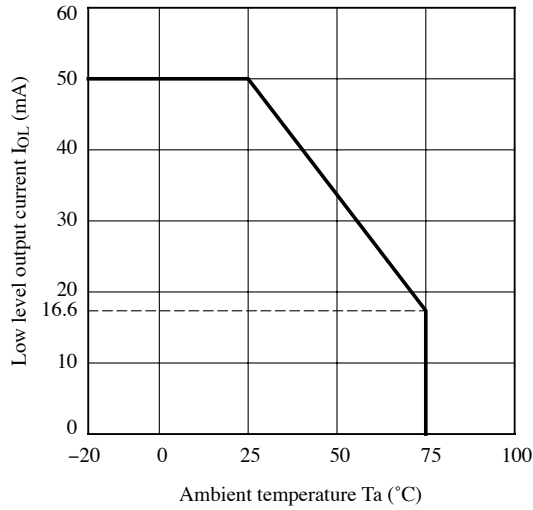


Fig.2 Low Level Output Voltage vs. Low Level Output Current

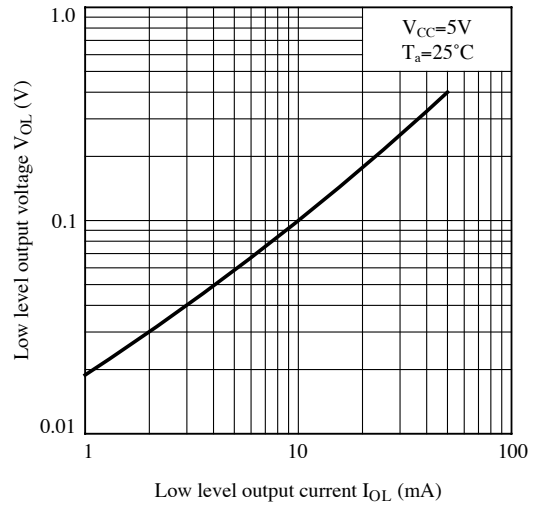


Fig.3 Low Level Output Voltage vs. Ambient Temperature

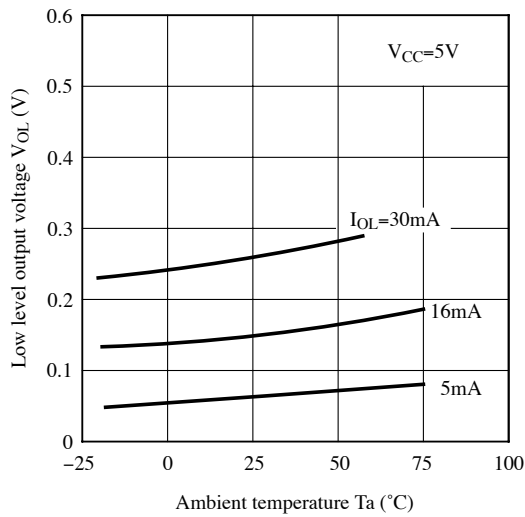


Fig.4 Supply Current vs. Supply Voltage

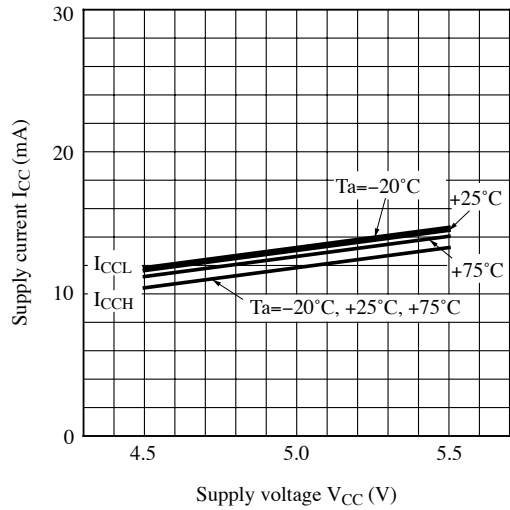


Fig.5 Detecting Position Characteristics (1)

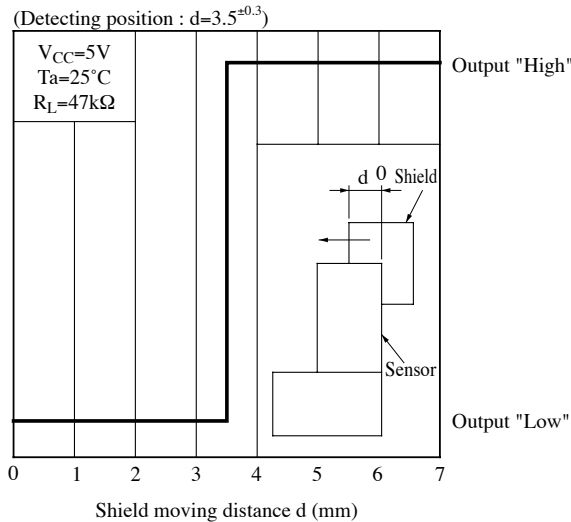


Fig.6 Detecting Position Characteristics (2)

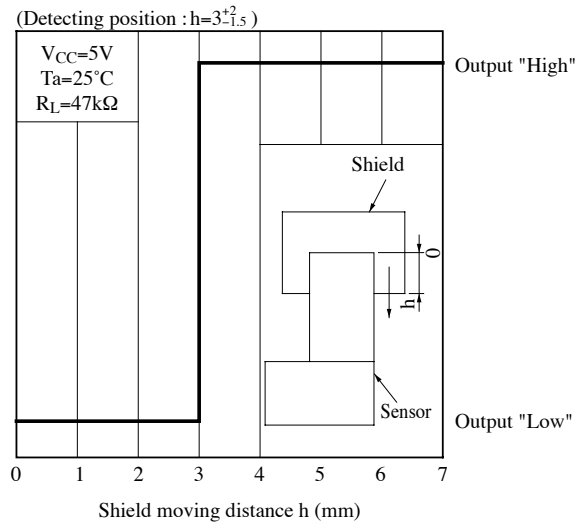
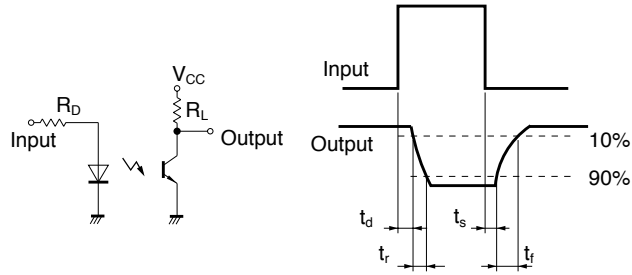


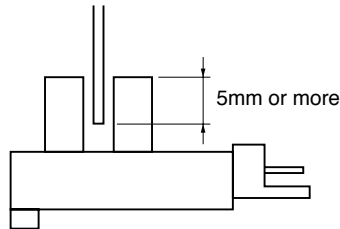
Fig.7 Test Circuit for Response Time

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) In order to stabilize power supply line, connect a by-pass capacitor of more than 0.01 μ F between V_{CC} and GND near the device.
- 3) When the sensor is connected with long wire, noise might be on the signal from the sensor while it is going through the wire. To avoid this problem, please evaluate the sensor under actual usage condition to make sure that the system works fine.
- 4) Position of opaque board
Opaque board shall be installed at place 5mm or more from the top of elements.
(Example)



- 5) Screw tightening torque
The tightening torque for screwing should be 0.6N·m or less.

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

● **Parts**

This product is assembled using the below parts.

- **Photodetector (qty. : 1)** [Using a silicon photodiode as light detecting portion, and a bipolar IC as signal processing circuit]

| Category | Maximum Sensitivity wavelength (nm) | Sensitivity wavelength (nm) | Response time (μ s) |
|------------|-------------------------------------|-----------------------------|--------------------------|
| Photodiode | 900 | 400 to 1 200 | 3 |

- **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 | Connector terminal finish |
|--|---------------------------|
| Black Polycarbonate resin (UL94 HB) | Sn plating |

- Others

Laser generator is not used.

■ Manufacturing Guidelines**● Notes of cleaning**

Please carry out neither the immersion cleaning nor the ultrasonic cleaning to avoid the solvent residue inside the case.

When necessary, dust and stain shall clean by air-blow or wipe off by soft cloth soaked in cleaning agent. The cleaning agent used to wipe off must use only the following kind. Ethyl alcohol, Methyl alcohol and Iso-propyl 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 : Polyethylene

Moltopren : Urethane

Partition : Corrugated fiberboard

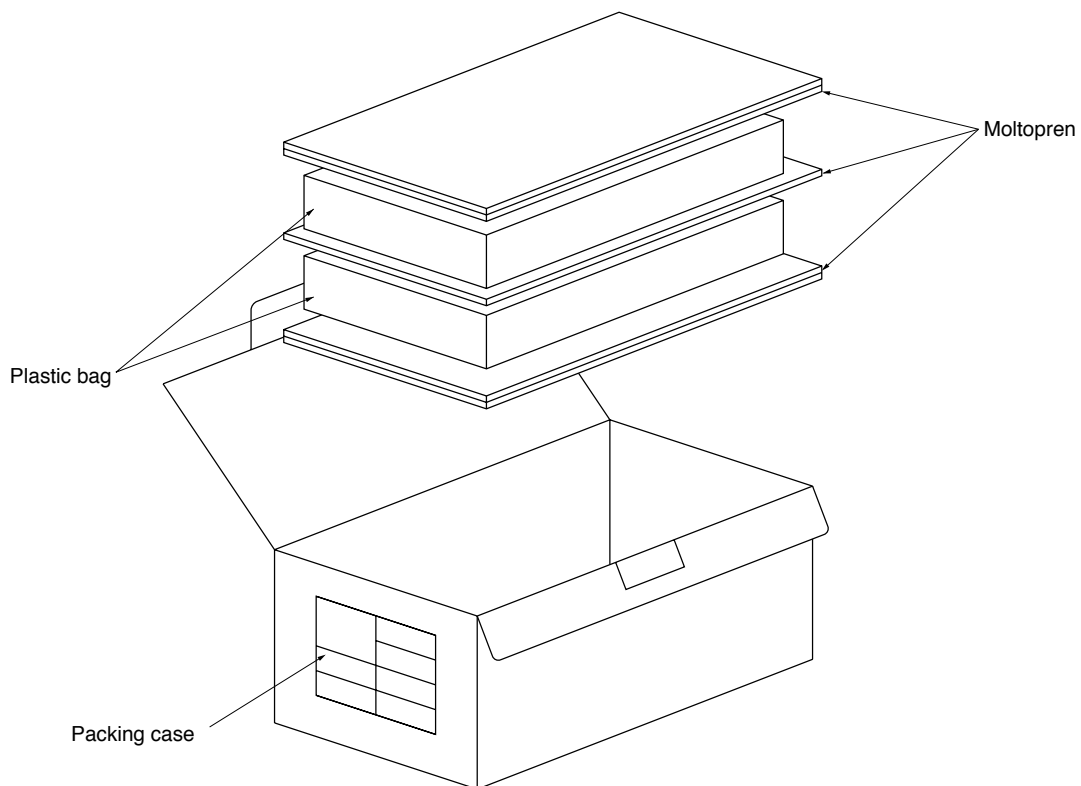
Packing case : Corrugated fiberboard

Package method

75 pcs of products shall be packaged in a plastic bag, Ends shall be sealed by stapler. The bottom of the packing case is covered with moltopren, and the partition is set in the packing case. Each partition should have 1 plastic bag.

Moltopren should be located after all product are settled (1 packing conteains 150 pcs).

Packing composition



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- 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:

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

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