

GP2A28AJ000F GP2A28CJ000F

Flat detecting portion
 Detecting Distance :
 1 to 9mm
 *OPIC Output,
 Reflective Photointerrupter with
 Connector



■ Description

GP2A28AJ000F/GP2A28CJ000F are OPIC output, reflective photointerrupters with emitter and detector facing the same direction in a molding that provides non-contact sensing. This family of devices uses light modulation to reduce the affects of disturbing light, and the sensor is optimized to work in the selected focal distance. A 3-pin connector is included to allow remote-mount or off-board designs.

■ Features

1. Reflective with OPIC Light Modulated Output
2. Highlights :
 - Snap-mount positioning hooks (**GP2A28AJ000F**)
 - Includes additional screw fixing holes (**GP2A28CJ000F**)
 - Position pin to prevent mis-alignment (**GP2A28CJ000F**)
 - Short focal distance
3. Key Parameters :
 - Detecting distance : 1 to 9mm (White paper)
3 to 7mm (Black paper)
 - Undetecting distance : over 27mm (White paper)
 - Connector : Tyco Electronics AMP K.K.
(PN : 292133-3)
4. RoHS directive compliant

■ Agency approvals/Compliance

1. Compliant with RoHS directive

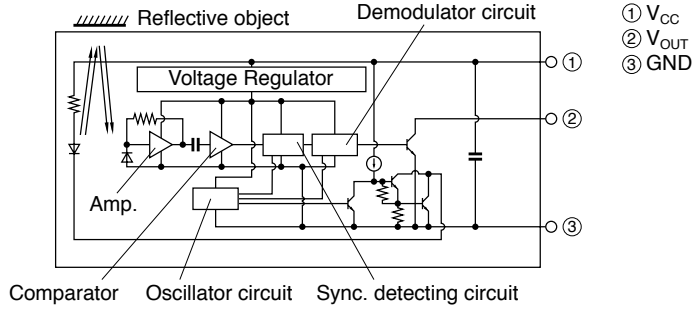
■ Applications

1. General purpose detection of paper 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



Outline Dimensions

(Unit : mm)

GP2A28AJ000F

Connector : 292133-3
(Tyco Electronics AMP K.K.)

① V_{CC}
② V_{OUT}
③ GND

• Unspecified tolerance shall be as follows ;

| Dimensions | Tolerance |
|------------------------|-----------|
| less than 6 | ±0.2 |
| 6 or more less than 14 | ±0.3 |
| 14 or more | ±0.4 |

• () : Reference dimensions.

Product mass : approx. 1.85g

GP2A28CJ000F

Connector : 292133-3
(Tyco Electronics AMP K.K.)

① V_{CC}
② V_{OUT}
③ GND

• Unspecified tolerance shall be as follows ;

| Dimensions | Tolerance |
|------------------------|-----------|
| less than 6 | ±0.2 |
| 6 or more less than 14 | ±0.3 |
| 14 or more | ±0.4 |

• () : Reference dimensions.

Product mass : approx. 2.3g

Connector terminal plating material : Sn

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

| Parameter | Symbol | Rating | Unit |
|-------------------------------------|-----------|------------|------------------|
| Supply voltage | V_{CC} | -0.5 to +7 | V |
| Output voltage | V_O | 30 | V |
| ^{*1} Output current | I_{OL} | 50 | mA |
| ^{*2} Operating temperature | T_{opr} | -10 to +60 | $^\circ\text{C}$ |
| ^{*2} Storage temperature | T_{stg} | -20 to +80 | $^\circ\text{C}$ |

^{*1} Sink current refer to Fig.5.

^{*2} The connector should be plugged in/out at normal temperature.

■ Electro-optical Characteristics ($T_a=25^\circ\text{C}$)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|--|-----------|--|-------|------|------|------|
| Supply voltage | V_{CC} | - | 4.75 | - | 5.25 | V |
| Current dissipation (I) | I_{CC} | Smoothing value $V_{CC}=5\text{V}$, $R_L=\infty$ | - | - | 30 | mA |
| ^{*3} Current dissipation (II) | I_{CCP} | Pulse peak value $V_{CC}=5\text{V}$ | - | - | 150 | mA |
| Low level output voltage | V_{OL} | $V_{CC}=5\text{V}$, $I_{CL}=16\text{mA}$, at detecting time | - | - | 0.4 | V |
| High level output voltage | V_{OH} | $V_{CC}=5\text{V}$, $R_L=1\text{k}\Omega$, at non detecting time | 4.5 | - | - | V |
| ^{*4} Non detection distance | L_{LHL} | KODAK Gray Cards, $V_{CC}=5\text{V}$ | - | - | 27 | mm |
| ^{*4} Detection distance | L_{HLS} | KODAK Gray Cards, $V_{CC}=5\text{V}$ | - | - | 1 | mm |
| | | Black paper, $V_{CC}=5\text{V}$ | - | - | 3 | |
| | L_{HLL} | KODAK Gray Cards, $V_{CC}=5\text{V}$ | 9 | - | - | mm |
| | | Black paper, $V_{CC}=5\text{V}$ | 7 | - | - | |
| ^{*5} Response time | t_{PLH} | $V_{CC}=5\text{V}$ | - | - | 1 | ms |
| | t_{PHL} | | - | - | 1 | ms |
| ^{*6} Acceptable illuminance | Ev1 | - | 3 000 | - | - | lx |
| | Ev2 | | 1 500 | - | - | lx |

^{*3} Refer to Fig.1.

^{*4} Refer to Fig.2.

^{*5} Refer to Fig.3.

^{*6} Refer to Fig.4.

Reflective object Black paper (black) : Standard reflective object (provided by SHARP Corporation)
 KODAK Gray Cards (use the white side reflects about 90%)
 PPC paper : Standard reflective object (provided by SHARP Corporation)
 PPC paper : Standard reflective object (provided by SHARP Corporation)

Fig.1 Test Condition for Peak Pulse Value I_{CCP}

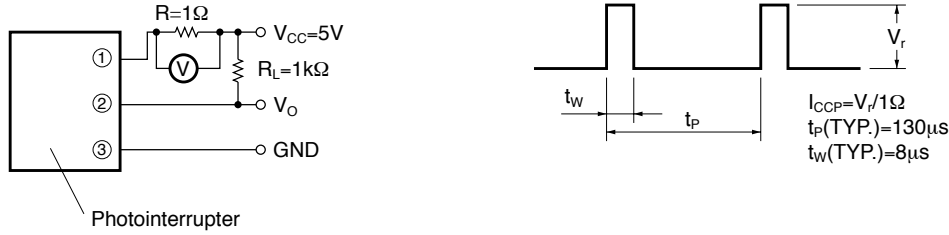


Fig.2 Test Condition for Detecting Distance Characteristics

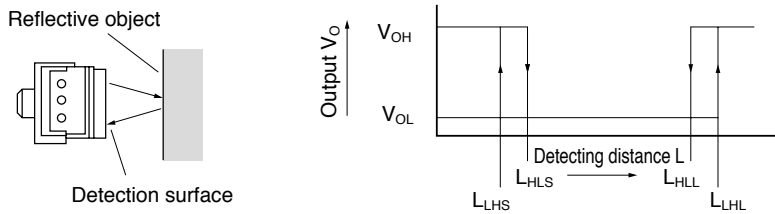


Fig.3 Test Circuit for Response Time

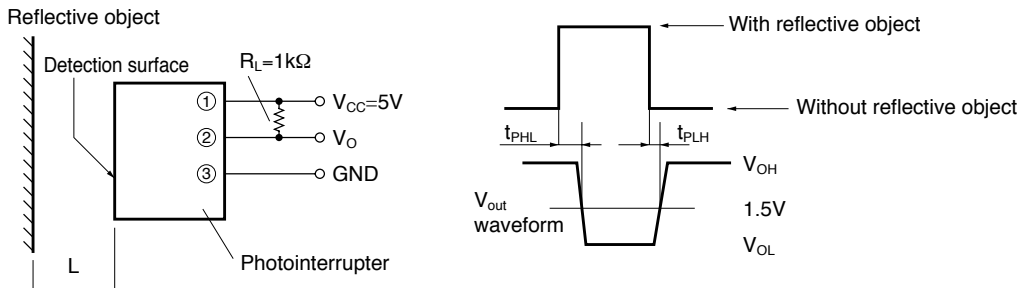


Fig.4 Test Condition for External Disturbing Light Illuminance

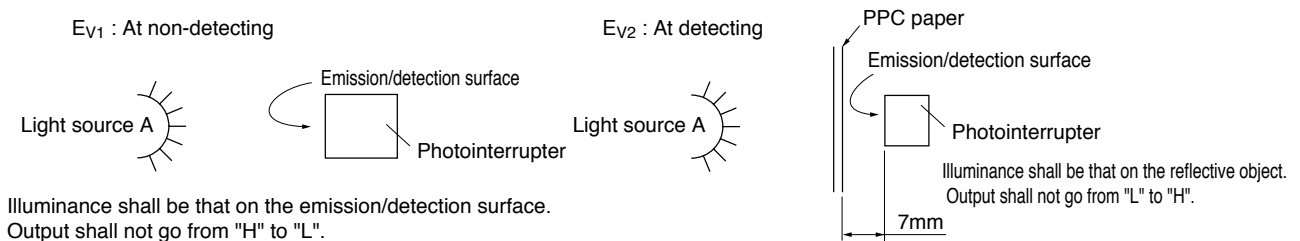


Fig.5 Low Level Output Current vs. Ambient Temperature

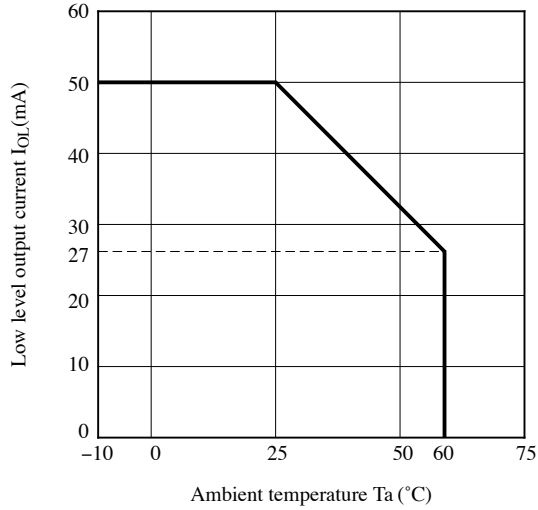


Fig.6 Low Level Output Voltage vs. Ambient Temperature

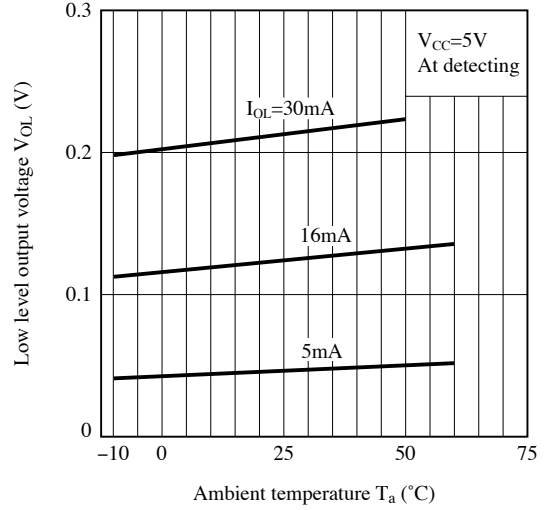


Fig.7 Low Level Output Voltage vs. Low Level Output Current

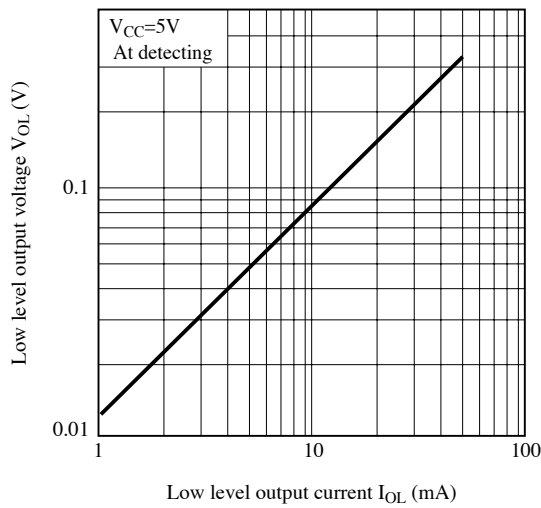
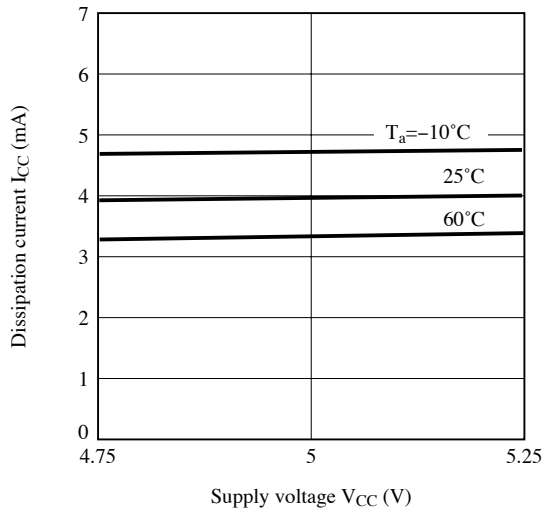


Fig.8 Dissipation Current(Smoothing Value) vs. Ambient Temperature

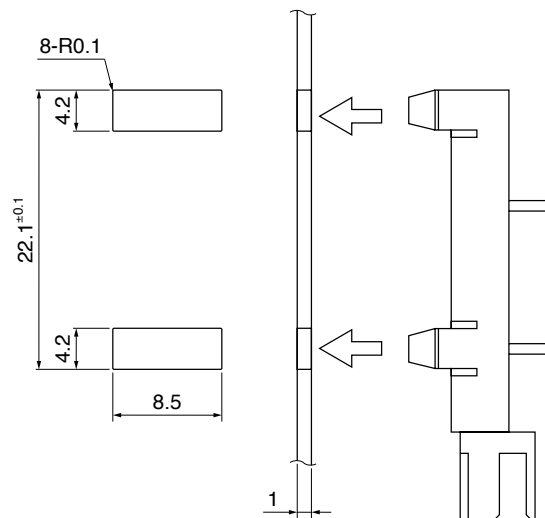


Remarks : Please be aware that all data in the graph are just for reference and not for guarantee.

■ Design Considerations**● Design guide**

- 1) This product operates the light emitter by pulse drive. Please supply the stable supply voltage in order to prevent error operation by pulse current.
Please use this device after connecting a capacitor between V_O and GND for prevention of line noise.
- 2) Prevention of detection error
Please be careful that you need to keep the direct inverter light away from the photo detecting surface since the device will not operate correctly in such case.
In addition, we recommend to make sure the operation test in the actual application.
- 3) Plugging in/out
The connector should be plugged in/out at normal temperature.

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

● Recommended Installation Hole drawing

● **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 (μs) |
|------------|-------------------------------------|-----------------------------|--------------------|
| Photodiode | 900 | 700 to 1 200 | 400 |

- **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 | Lens | Bottom cover |
|---|-----------------------|--|
| Black polyphernylene Sulfide resin (UL94 V-0) | Acryl resin (UL94 HB) | Polycarbonate resin (Black) (UL94 V-2) |

- **Others**

Laser generator is not used.

■ Manufacturing Guidelines**● Cleaning instructions**

Polycarbonate resin is used as the material of the lens surface. So this product shall not be cleaned by cleaning solvent absolutely. Dust and stain shall clean by air blow, or shall clean by soft cloth.

● 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

Anti-static plastic bag : Polyethylene

Moltopren : Urethane

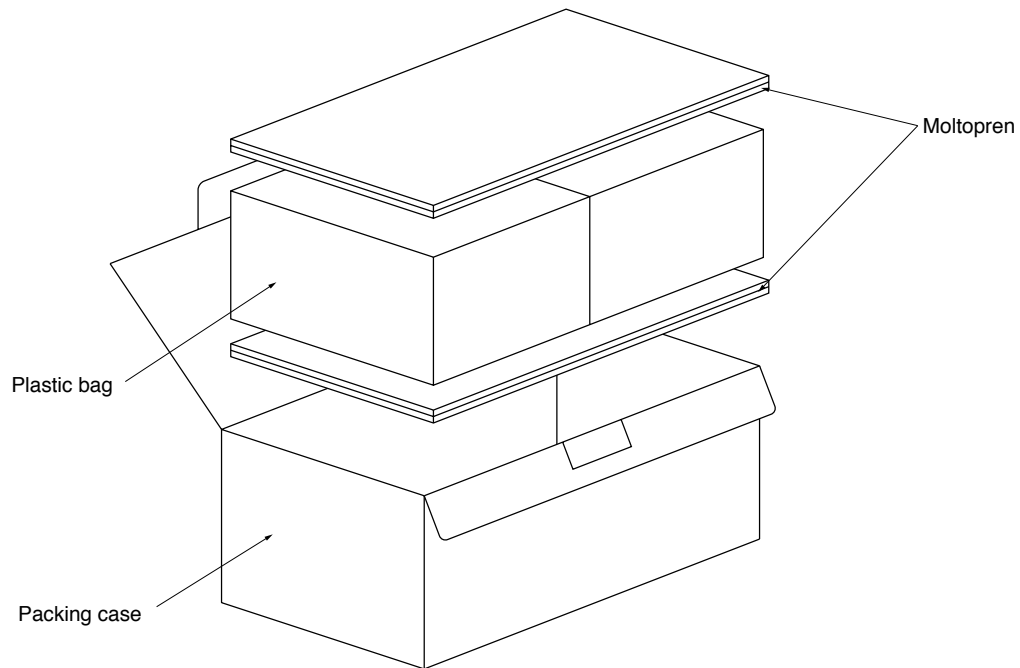
Packing case : Corrugated fiberboard

Package method

100 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 2 plastic bags shall be put into the packing case.

Moltopren should be located after all product are settled (1 packing contains 200 pcs).

Packing composition



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- 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

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- Traffic signals
- Gas leakage sensor breakers
- Alarm equipment
- Various safety devices, etc.

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- Telecommunication equipment [trunk lines]
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