

GP1A046RBZLF

***OPIC Output,
Transmissive Photointerrupter
with Encoder function**



■ Description

GP1A046RBZLF is a transmissive photointerrupter, with optical encoder function used for determining rotational/linear direction and speed. Must be used in conjunction with a linear scale or code wheel. The encoder is designed to output 2 pulses whose phase differs by 90°

Mist proof function with new design lens.
Without attachment hole.

■ Features

1. Transmissive with encoder function
2. Highlights :
 - High resolution available
 - Rotary or Linear functionality
3. Key Parameters :
 - Resolution : 150LPI
 - Type : Digital
 - Frequency : 50kHz (max.)
 - Gap Width : 0.6mm
 - Package: 9×12.2×7.35mm
4. Lead free and RoHS directive compliant

■ Agency approvals/Compliance

1. Compliant with RoHS directive

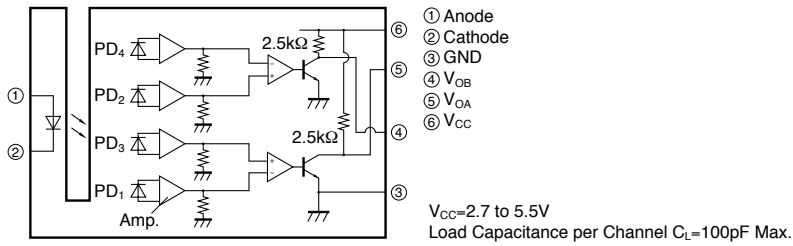
■ Applications

1. General purpose detection of motion either linear or rotary
2. Example : Printer paper feed roller or printer head

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

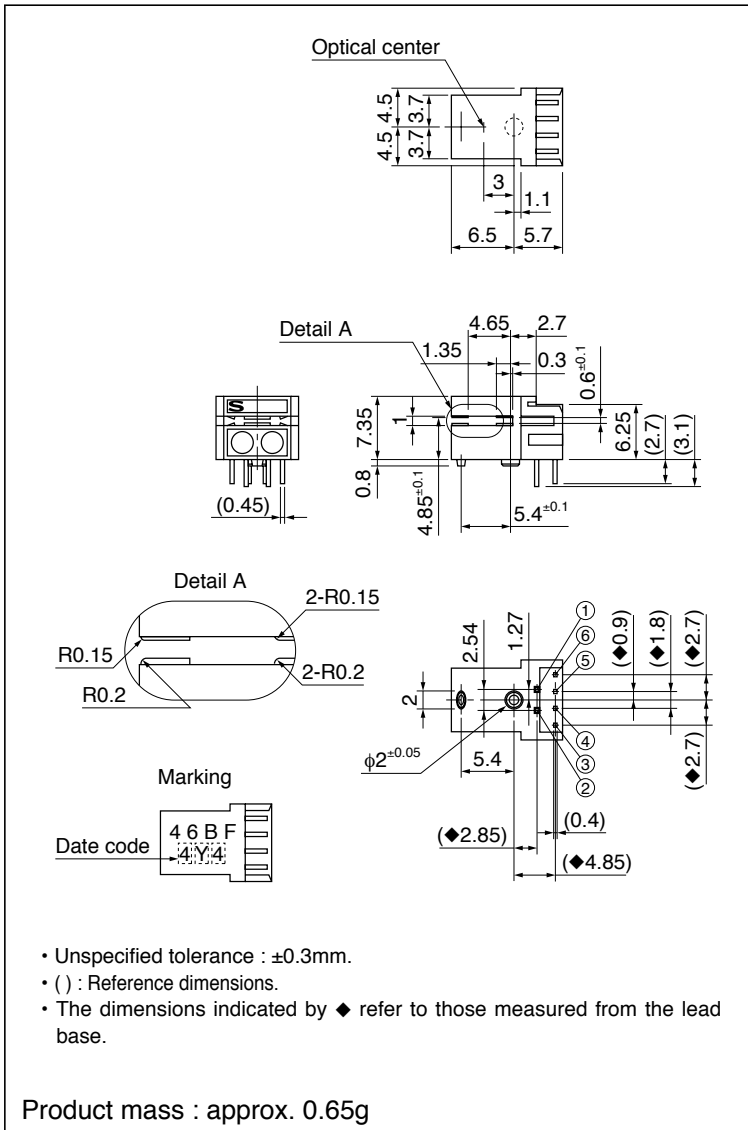
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Internal Connection Diagram



Outline Dimensions

(Unit : mm)



Plating material : Au-Pd-Ni-Cu

Date code (3 digit)

1st digit		2nd digit		3rd digit	
Year of production		Month of production		Date of production	
A.D.	Mark	Month	Mark	Date	Mark
2000	0	1	1	1 to 8	1
2001	1	2	2		
2002	2	3	3		
2003	3	4	4	9 to 16	2
2004	4	5	5		
2005	5	6	6		
2006	6	7	7	17 to 24	3
2007	7	8	8		
2008	8	9	9		
2009	9	10	X	25 to 31	4
2010	0	11	Y		
:	:	12	Z		

repeats in a 10 year cycle

Country of origin

China

■ Absolute Maximum Ratings (T_a=25°C)

Parameter		Symbol	Rating	Unit
Input	*1 Forward current	I _F	30	mA
	Reverse voltage	V _R	5	V
Supply voltage		V _{CC}	6	V
Output	Low level output current	I _{OL}	10	mA
	*1 Power dissipation	P _O	150	mW
Operating temperature		T _{opr}	0 to +60	°C
Storage temperature		T _{stg}	-40 to +85	°C
*2 Soldering temperature		T _{sol}	260	°C

*1 Refer to Fig.2, Fig.3

*2 For MAX. 5s

■ Electro-optical Characteristics (T_a=25°C)

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit		
Input	Forward voltage	V _F	I _F =15mA	-	2.1	2.4	V		
	Reverse current	I _R	V _R =5V	-	-	100	μA		
Operating supply voltage range		V _{CC}	-	2.7	3.3	5.5	V		
Output	Low level output voltage	V _{OL}	V _{CC} =3.3V, I _F =15mA, I _{OL} =8mA	-	-	0.4	V		
	High level output voltage	V _{OH}	V _{CC} =3.3V, I _F =15mA	2.4	3.2	-	V		
	Supply current	I _{CC}	V _{CC} =3.3V, I _F =15mA Phase A and B both at low level	-	3.6	7	mA		
*3 Transfer characteristics	Duty	D _A	V _{CC} =3.3V, I _F =15mA, f=10kHz, *4 Z=0.15 to 0.65mm	36.1	50	63.9	%		
		D _B							
	Phase difference			θ _{AB1 to 4}	60	90	120	°	
	Response time	Rise time		t _r	V _{CC} =3.3V, I _F =15mA, f=10kHz	-	200	-	ns
		Fall time		t _f		-	50	-	ns
Response frequency		f _{max}	V _{CC} =3.3V, I _F =15mA	-	-	50	kHz		

*3 The test condition is according to Fig.4. Transfer characteristics value does not include any error of linear scale.

*4 Z stands for distance between scale surface (patterned surface) and detector holder surface.

Fig.1 Output Waveform

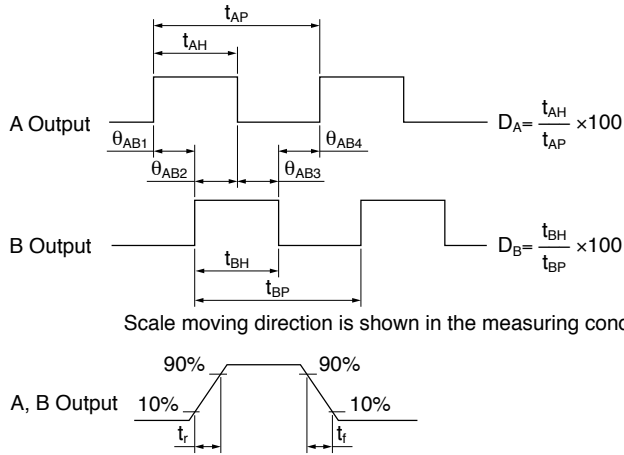


Fig.2 Forward Current vs. Ambient Temperature

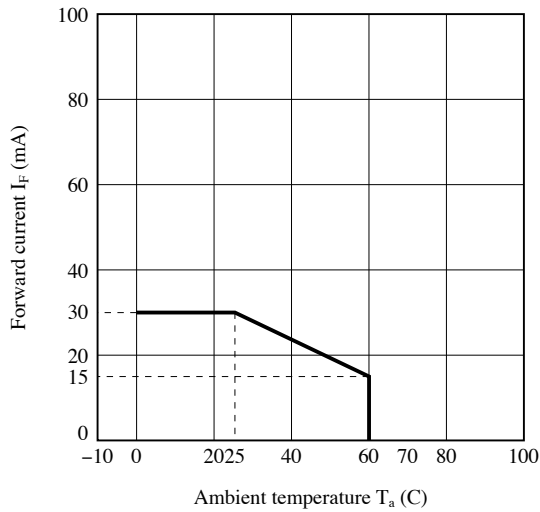


Fig.3 Output Power Dissipation vs. Ambient Temperature

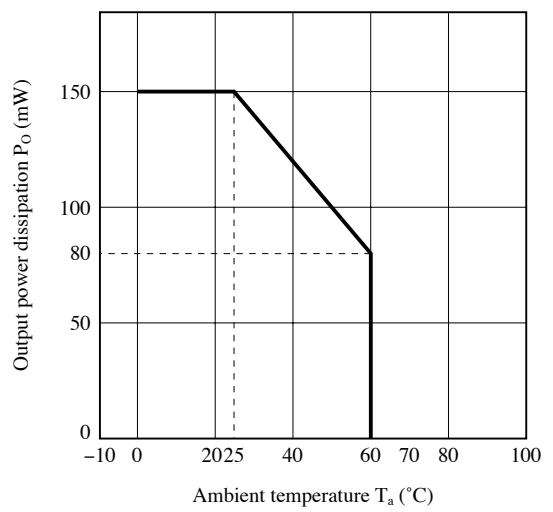
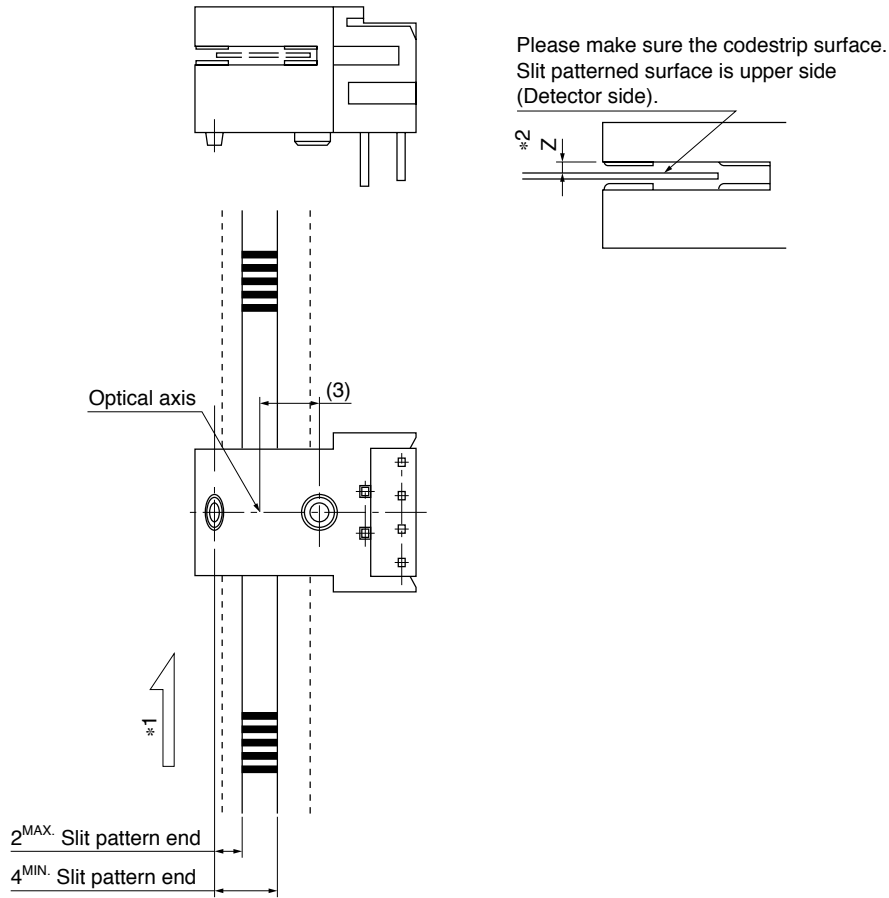


Fig.4 Measuring Condition



- *1 The moving direction of codestrip against output waveform (Refer to Fig.1).
- *2 Distance between codestrip surface (patterned surface) and detector holder surface.

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

■ **Design Considerations**

● **Design guide**

- 1) It is recommended that this product be used under the condition of typical $I_F=15\text{mA}$ for which it is designed.
- 2) In order to stabilize power supply line, connect a by-pass capacitor of more than $0.01\mu\text{F}$ between V_{CC} and GND near the device.
- 3) When using this product in combination with linear scale, please set them up so that the scale face should not touch this product.
- 4) OPIC chip due to micro design is easily affected by the Electro static discharge. At operating, in order to protect the destruction and the defect of characteristics by Electro static discharge, please take a general countermeasure of the Electro static discharge.

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)** [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	780	400 to 1 200	20

- **Photo emitter (qty. : 1)**

Category	Material	Maximum light emitting wavelength (nm)
Infrared emitting diode (non-coherent)	AlGaInP	652

- **Material**

Holder	Bottom cover	Lens holder	Lead frame plating
Black polycarbonate resin (GF 10% content)	Black polycarbonate resin	Transparent polycarbonate resin	Au-Pd-Ni-Cu

- **Others**

Laser generator is not used.

■ 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.

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 tooling and soldering conditions.

● Cleaning instructions

The lens part of this product is an optical component built with the resin.

Therefore, please never cleanse this product by the cleaning agent.

When necessary, dust and stain shall clean by air-blow.

● 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. 20 sleeves in one case.

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

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

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