

GP1A13R

OPIC Photointerrupter with Encoder Function

■ Features

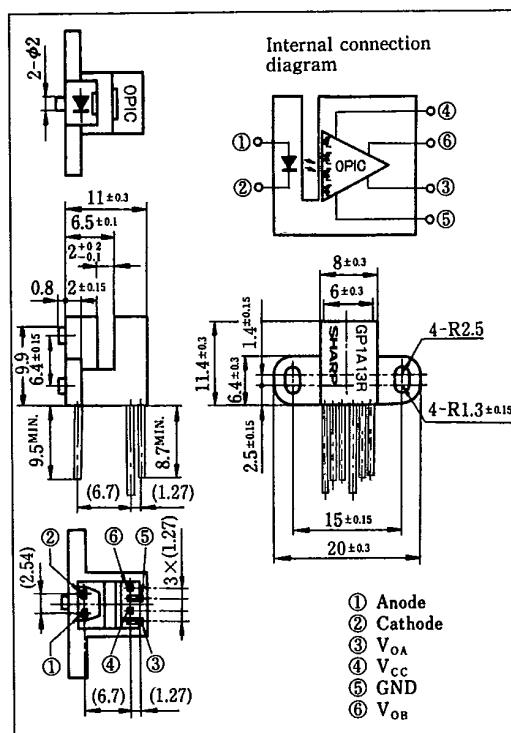
1. A, B 2-phase digital output
 2. Resolution : Slit pitch 1.6mm
 3. TTL compatible output
 4. Compact and light

■ Applications

1. Electronic printers
 2. Robots
 3. Numerical control machines

■ Outline Dimensions

(Unit : mm)



* OPIC is a registered trademark of Sharp and stands for Optical IC. It has a light detecting element and signal processing circuitry integrated onto a single chip.

Absolute Maximum Ratings

(Ta = 25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I _F	50	mA
	*1 Peak forward current	I _{FM}	1	A
	Reverse voltage	V _R	6	V
	Power dissipation	P	75	mW
Output	Supply voltage	V _{cc}	7	V
	Low level output current	I _{OL}	20	mA
	Power dissipation	P _O	250	mW
Operating temperature		T _{opr}	0 ~ +70	°C
Storage temperature		T _{stg}	-40 ~ +80	°C
*2 Soldering temperature		T _{sot}	260	°C

*1 Pulse width $\leq 100\mu s$. Duty ratio = 0.01

*2 For 5 seconds

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■ Electro-optical Characteristics

(Ta=0~+70°C unless specified)

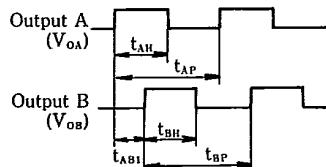
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V _F	Ta=25°C, I _F =20mA	—	1.2	1.4	V
	Reverse current	I _R	Ta=25°C, V _R =3V	—	—	10	μA
Output	Operating supply voltage	V _{CC}		4.5	5.0	5.5	V
	High level output voltage	V _{OL}	V _{CC} =5V, I _F =20mA, I _{OL} =8mA**	—	0.1	0.4	V
	Low level output voltage	V _{OH}	V _{CC} =5V, I _F =20mA**	2.4	4.9	—	V
Transfer characteristics	Supply current	I _{CC}	I _F =20mA, V _{CC} =5V*3,**	—	5	20	mA
	Duty ratio	* ^s D _A	V _{CC} =5V, I _F =20mA	0.25	0.50	0.75	—
		* ^s D _B	f=2.5kHz**	0.25	0.50	0.75	—
	Response frequency	f _{max.}	V _{CC} =5V, I _F =20mA**	—	—	10	kHz

*3 In the condition that output A and B are low level.

*4 Measured under the condition shown in Measurement Condition.

*5 D_A : $\frac{t_{AH}}{t_{AP}}$, D_B : $\frac{t_{BH}}{t_{BP}}$

■ Output Waveforms



Rotational direction : Counterclockwise when seen from OPIC light detector



Fig. 1 Forward Current vs. Ambient Temperature

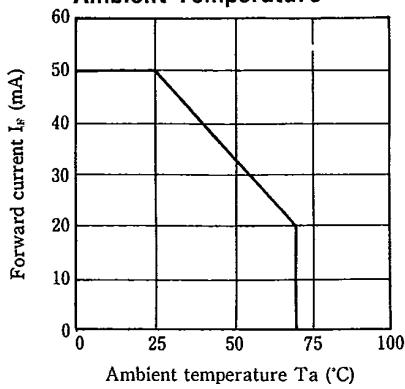


Fig. 2 Output Power Dissipation vs. Ambient Temperature

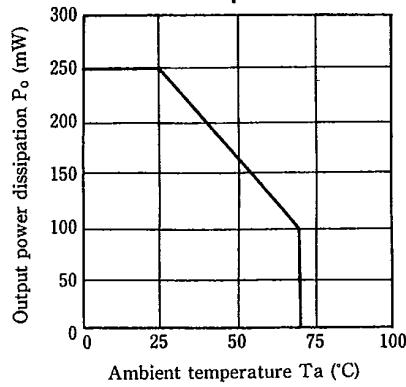


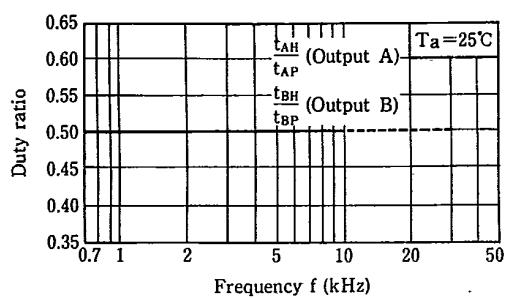
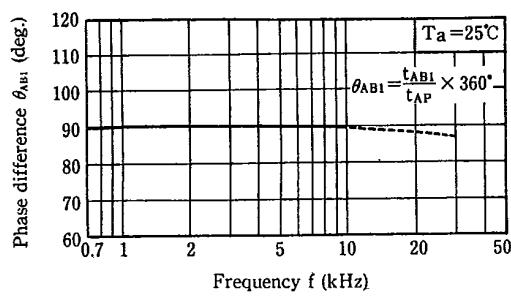
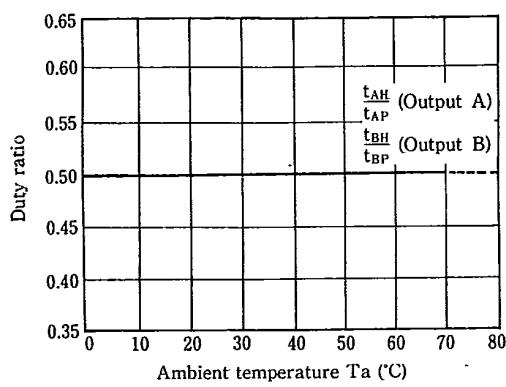
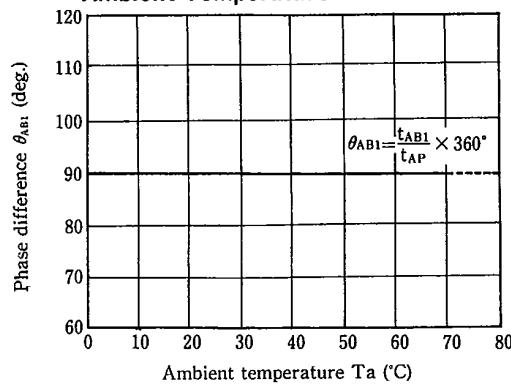
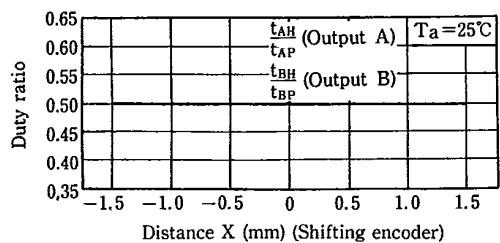
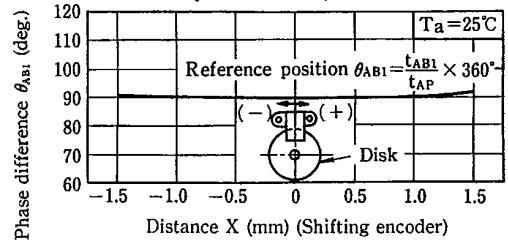
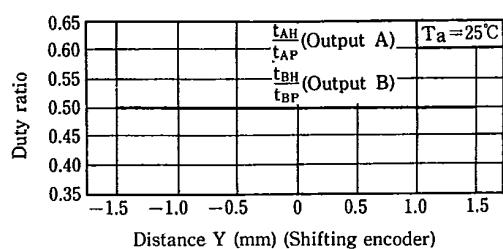
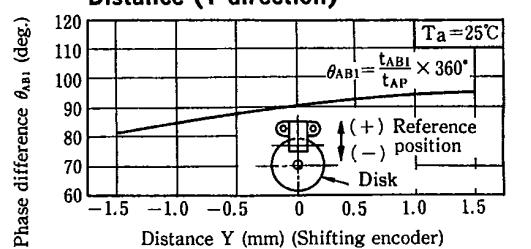
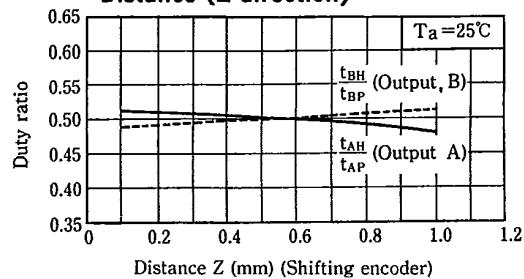
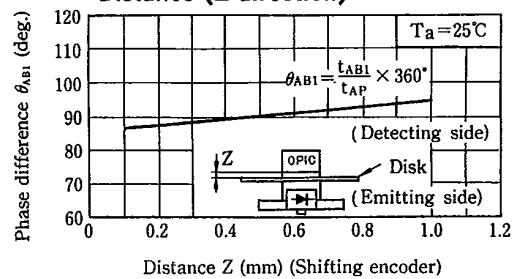
Fig. 3 Duty Ratio vs. Frequency**Fig. 4 Phase Difference vs. Frequency****Fig. 5 Duty Ratio vs. Ambient Temperature****Fig. 6 Phase Difference vs. Ambient Temperature****Fig. 7 Duty Ratio vs. Distance (X direction)****Fig. 8 Phase Difference vs. Distance (X direction)**

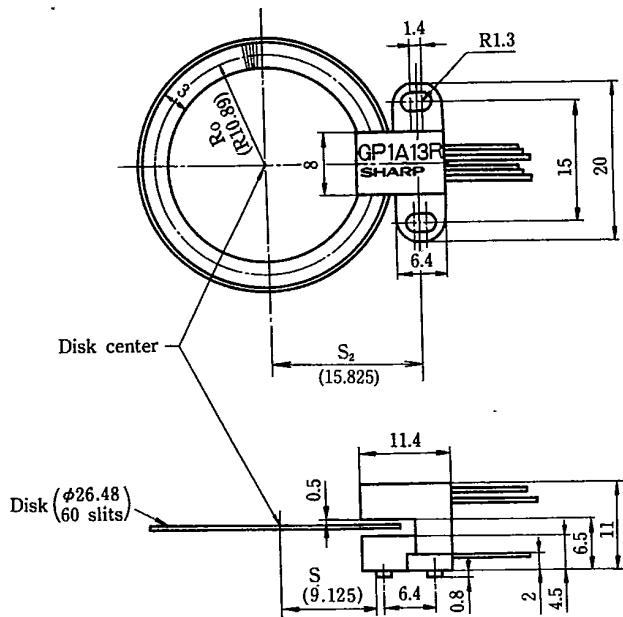
Fig. 9 Duty Ratio vs. Distance (Y direction)**Fig.10 Phase Difference vs. Distance (Y direction)**

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Fig. 11 Duty Ratio vs. Distance (Z direction)**Fig. 12 Phase Difference vs. Distance (Z direction)**

T-41-73

<Measuring Condition>

**Basic Design**

R_o (distance between the disk center and half point of a slit) and S (fixing position of photointerrupter) will be provided by the following equations.

$$R_o = \frac{N}{60} \times 10.89 \text{ (mm)} \quad N : \text{number of slits}$$

$$S_1 = R_o - 1.765 \text{ (mm)} \quad S_2 = S_1 + 6.7 \text{ (mm)}$$

Note) When the number of slits is changed, values in parenthesis are also changed according to the number.

(Precautions for Use)

- 1) In order to stabilize power supply line, connect a by-pass capacitor of more than $0.01\mu F$ between V_{cc} and GND near the device.
- 2) This module is designed to be operated at $I_f = 20mA$ TYP.

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