GP1A30R

OPIC Photointerrupter with Encoder Function

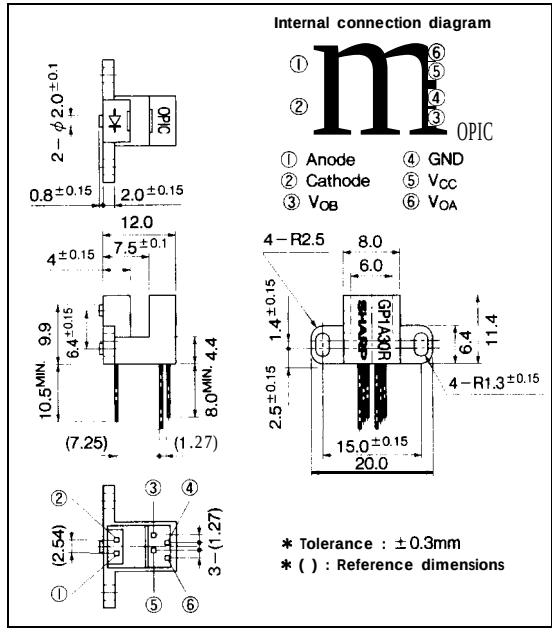
■ Features

1. 2-phase (A, B) digital output
2. Possible to use plastic disk
3. High sensing accuracy
   (Disk slit pitch: O.7mm)
4. TTL compatible output
5. Compact and light

■ Applications

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

■ Outline Dimensions (Unit : mm)



"OPIC" (Optical IC) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

■ Absolute Maximum Ratings (Ta = 25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	IF	65	mA
	*1 Peak forward current	IFM	1	A
	Reverse voltage	VR	6	v
	power dissipation	P	100	mW
output	Supply voltage	Vcc	7	v
	Low level output current	IOL	20	mA
	Power dissipation	Po	250	mW
Operating temperature		Topr	0 to +70	'c
Storage temperature		Tstg	-40 to +80	℃
*2 Soldering temperature		Tsol	260	℃

*1 Pulse width ≦ 100 μs, Duty ratio = 0.01 *2 For 5 seconds

■ Electro-optical Characteristics (Unless otherwise specified, Ta = O to + 70℃)

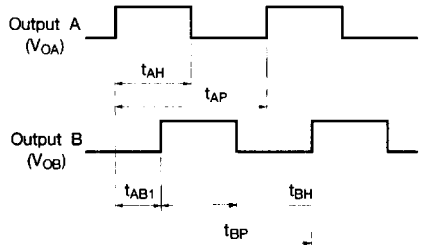
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	VF	Ta = 25℃, IF = 30mA	—	1.2	1.5	v
	Reverse current	IR	Ta = 25℃, VR = 3V	—	—	10	μA
output	Operating supply voltage	Vcc		4.5	5.0	5.5	v
	High level output voltage	VOH	*3 Vcc = 5V, IF = 30mA	2.4	4.9		v
	Low level output voltage	VOL	*3 IOL = 8mA, Vcc = 5V, IF = 30mA	—	0.1	0.4	v
	Supply current	Icc	*3*4 IF = 30mA, Vcc = 5V	—	5	20	mA
Transfer charac teristics	Duty ratio	*5 DA	Vcc = 5V, IF = 30mA, *3 f = 2.5kHz	20	50	80	%
		*5 DB		20	50	80	%
	Response frequency	fMAX	*3 Vcc = 5V, IF = 30mA	—	—	5	kHz

*3 Measured under the condition shown in Measurement Conditions. *5

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

$$D_A = \frac{t_{AH}}{t_{AP}} \times 100,\ D_B = \frac{t_{BH}}{t_{BP}} \times 100$$

■ Output Waveforms



Rotational direction Counterclockwise when seen from OPIC light detector

Fig. 1 Forward Current vs. Ambient Temperature

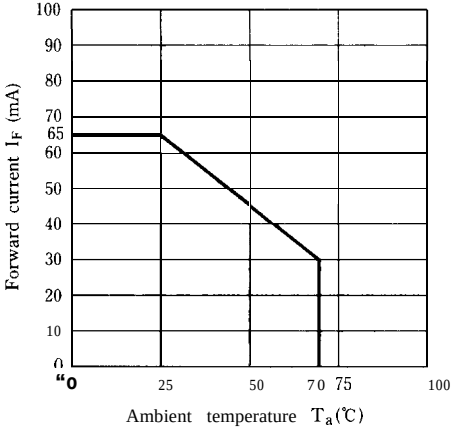


Fig. 2 Output Power Dissipation vs. Ambient Temperature

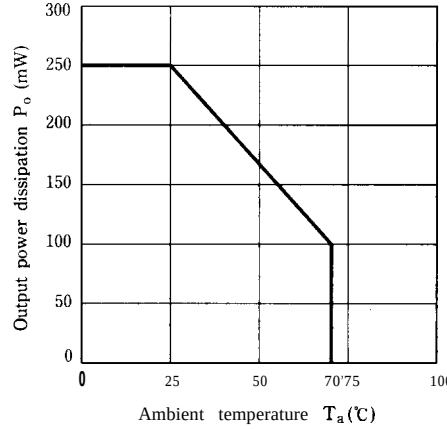


Fig. 3 Duty Ratio vs. Frequency

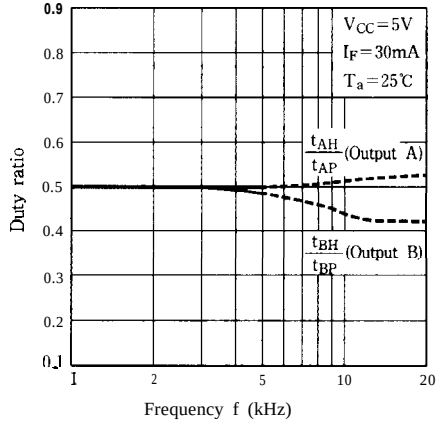


Fig. 4 Phase Difference vs. Frequency

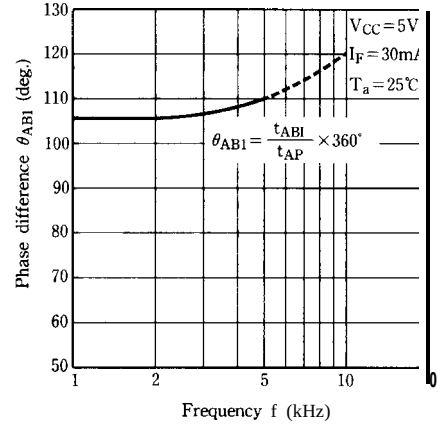


Fig. 5 Duty Ratio vs. Ambient Temperature

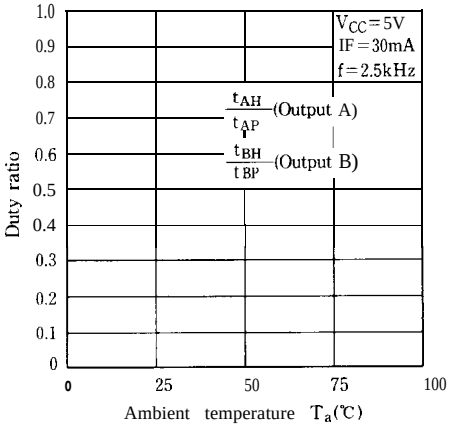


Fig. 6 Phase Difference vs. Ambient Temperature

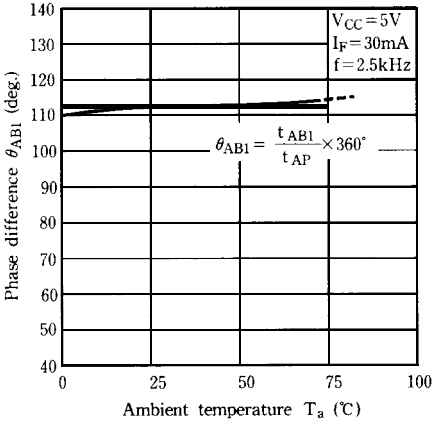


Fig. 7 Duty Ratio vs. Distance (X direction)

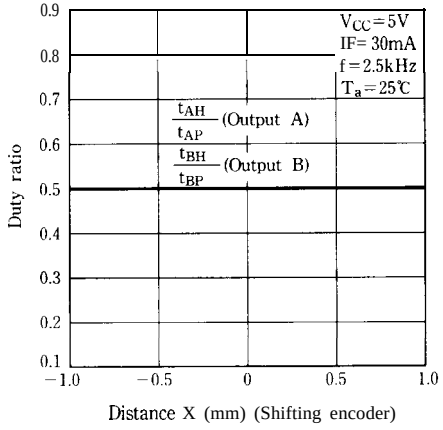


Fig. 8 Phase Difference vs. Distance (X direction)

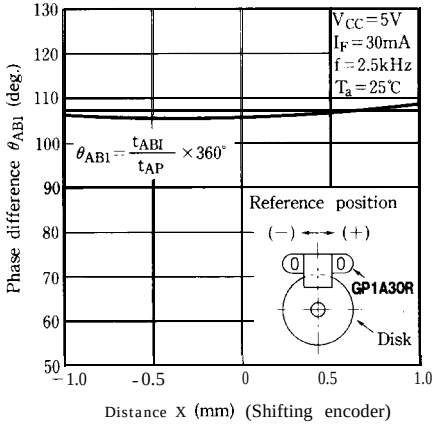


Fig. 9 Duty Ratio vs. Distance (Y direction)

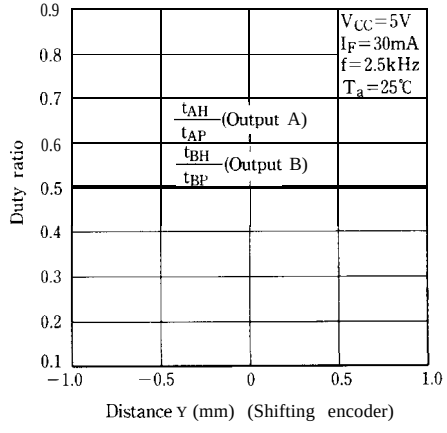


Fig.10 Phase Difference vs. Distance (Y direction)

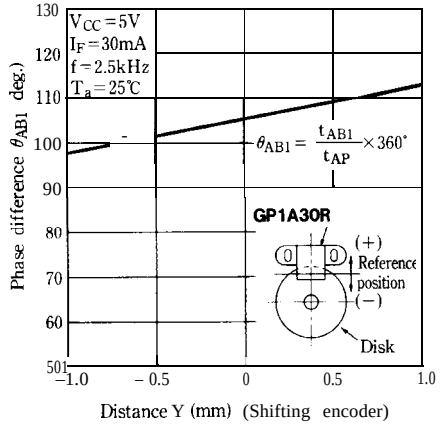


Fig.11 Duty Ratio vs. Distance (z direction)

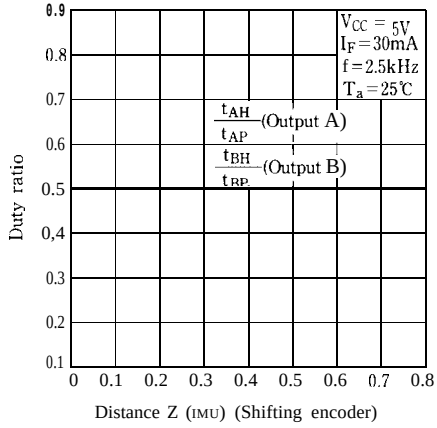
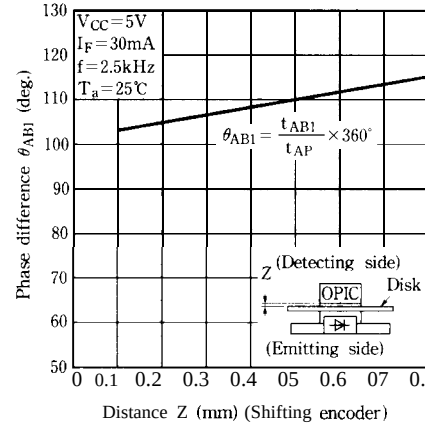
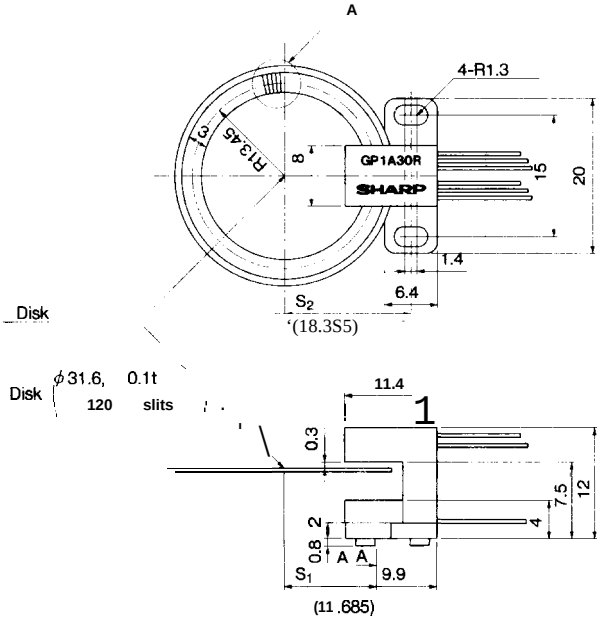


Fig.12 Phase Difference vs. Distance (Z direction)



■ Measurement Conditions



〈Basic Design〉

R_O (distance between the disk center and half point of a slit), p (slit pitch), S_1 and S_2 (installing position of photointerrupter) will be provided by the following equations.

Slit pitch : P (slit center)

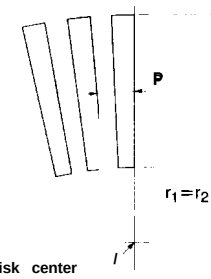
$R_O = \frac{N}{120} \times 13.45$ (mm) N : number of slits

$P = \frac{2 \times \pi \times R_O}{N}$ (mm)

$S_1 = R_O - 1.765$(mm), $S_2 = S_1 + 6.7$(mm)

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

Enlarged drawing of A portion
Slit pitch : P



(Ex.) In the case of N = 200P/R

$R_O = \frac{200}{120} \times 13.45$ (mm)

= 22.42rnm

$P = \frac{2x \pi \times 22.42}{200}$ (mm)

= 0.704mm

$S_1 = 22.42 - 1.765$

= 20.655mm

$S_2 = 20.655 + 6.7$

= 27.355mm

■ Precautions for Use

(1) This module is designed to be operated at I_F = 30mA TYP.

(2) Fixing torque : MAX. 6kg • cm

(3) In order to stabilize power supply line, connect a by-pass capacitor of more than 0.01 μF between Vcc and GND near the device.

(4) As for other general cautions, refer to the chapter "Precautions for Use" (Page 78 to 93).