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GP1A70R/GP1A71R

OPIC Photointerrupter with Encoder Functions

■ Features

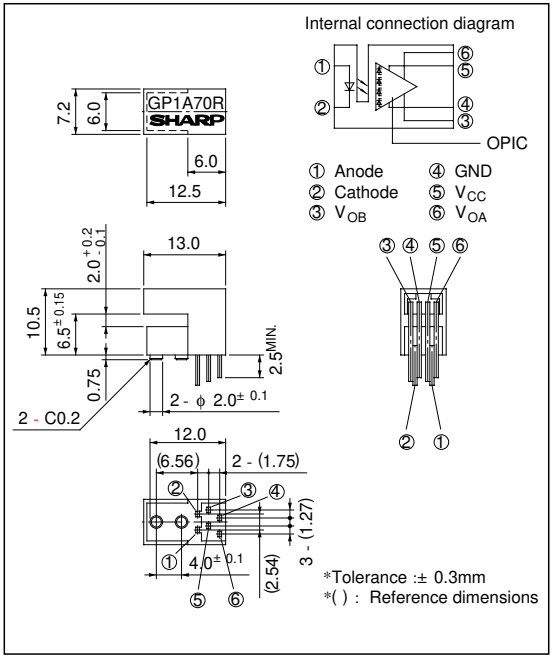
1. 2-phase (A, B) digital output
2. Sensing accuracy
   (**GP1A70R** Disk slit pitch : 1.14mm)
   (**GP1A71R** Disk slit pitch : 0.7mm)
3. PWB mounting type
   (Lead bending type)
4. TTL compatible output
5. Compact, lightweight

■ Applications

1. Printers
2. Copiers
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	I_F	50	mA
	*1Peak 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 to + 70	°C
Storage temperature		T_{stg}	- 40 to + 80	°C
*2 Soldering temperature		T_{sol}	260	°C

*1 Pulse width<=100μ s, Duty ratio 0.01
*2 For 5 seconds

■ Electro-optical Characteristics

(Ta = 25°C unless otherwise specified)

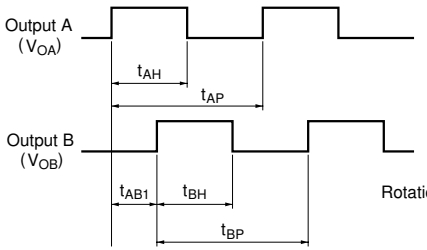
Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V_F	I_F = 20mA, Ta= 25°C	-	1.2	1.4	V
	Reverse current		I_R	V_R= 3V, Ta= 25°C	-	-	10	μA
Output	Operating supply voltage		V_{CC}		4.5	5.0	5.5	V
	High level output voltage		V_{OH}	*3 V_{CC}= 5V, I_F= 20mA	2.4	4.9	-	V
	Low level output voltage		V_{OL}	*3 I_{OL}= 8mA, V_{CC}= 5V, I_F= 20mA	-	0.1	0.4	V
	Supply current		I_{CC}	*4 V_{CC}= 5V, I_F= 20mA	-	5	20	mA
Transfer characteristics	Duty ratio	**GP1A70R**	*5 D_A, D_B	*3 V_{CC}= 5V, I_F= 20mA, f = 2.5kHz	25	50	75	%
		GP1A71R			25	50	75	%
	Response frequency		$f_{MAX.}$	*3 V_{CC}= 5V, I_F= 20mA	-	-	10	kHz

*3 Measured under the condition shown in Measurement Conditions.

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

*5 D_A: $\frac{t_{AH}}{t_{AP}}$ x 100, D_B : $\frac{t_{BH}}{t_{BP}}$ x 100, Duty ratio: Average disk rotation time per turn

■ Output Waveforms



Rotational direction: Counterclockwise when seen from OPIC light detector

Fig. 1 Forward Current vs. Ambient Temperature

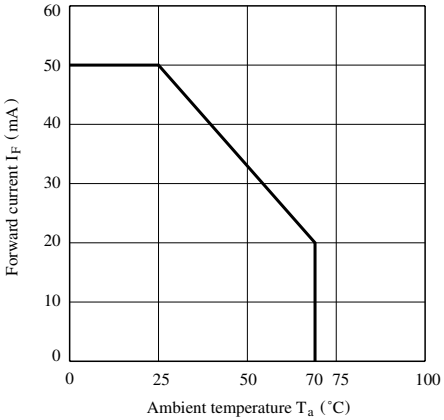


Fig. 2 Output Power Dissipation vs. Ambient Temperature

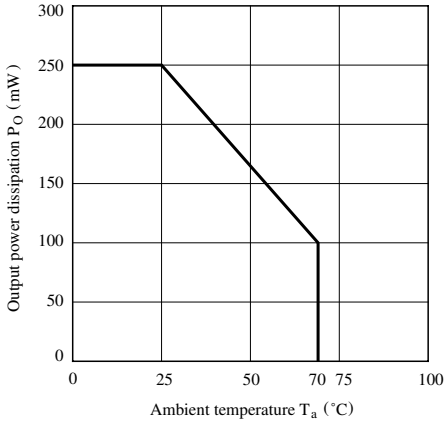


Fig. 3-a Duty Ratio vs. Frequency (GP1A70R)

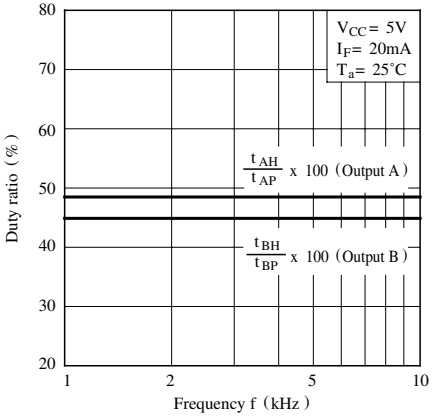


Fig. 3-b Duty Ratio vs. Frequency (GP1A71R)

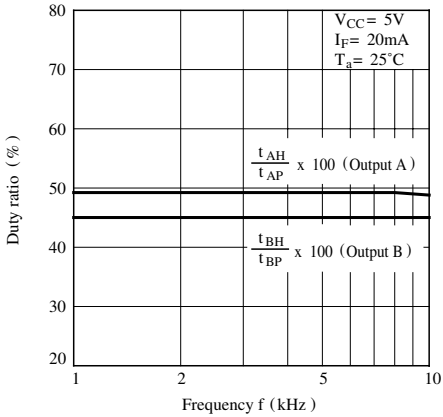


Fig. 4-a Phase Difference vs. Frequency (GP1A70R)

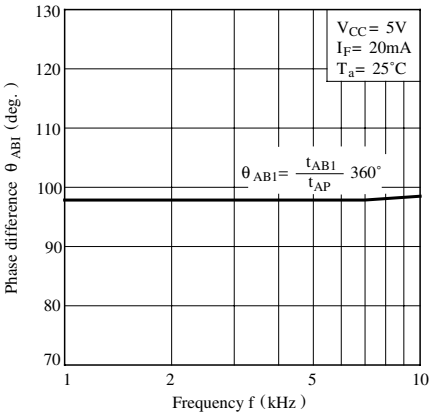


Fig. 4-b Phase Difference vs. Freauency (GP1A71R)

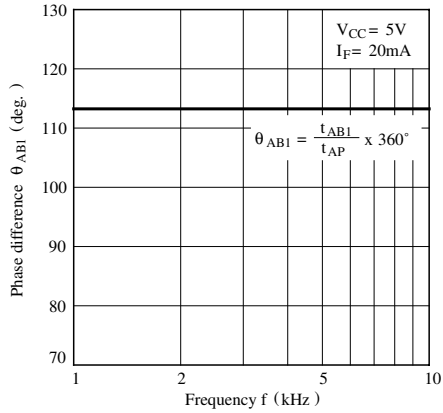


Fig. 5-a Duty Ratio vs. Ambient Temperature (GP1A70R)

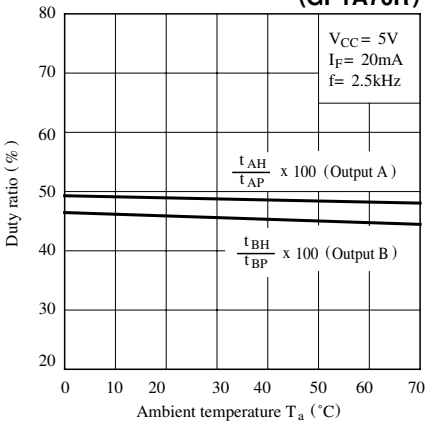


Fig. 5-b Duty Ratio vs. Ambient Temperature (GP1A71R)

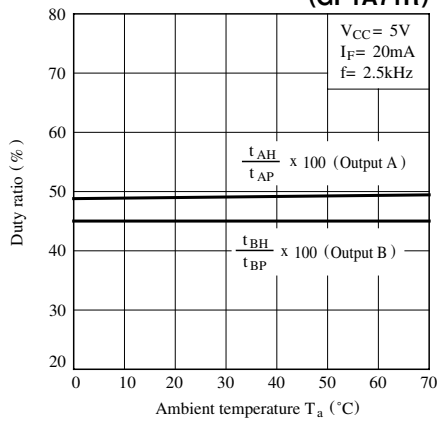


Fig. 6-a Phase Difference vs. Ambient Temperature

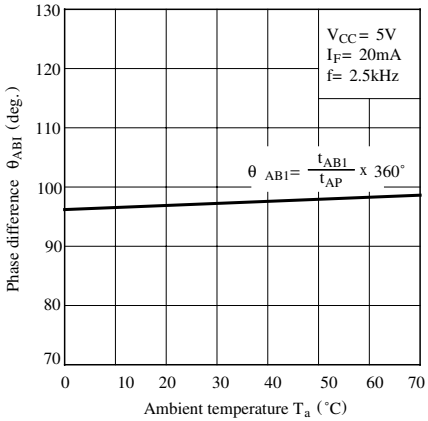


Fig. 6-b Phase Difference vs. Ambient Temperature

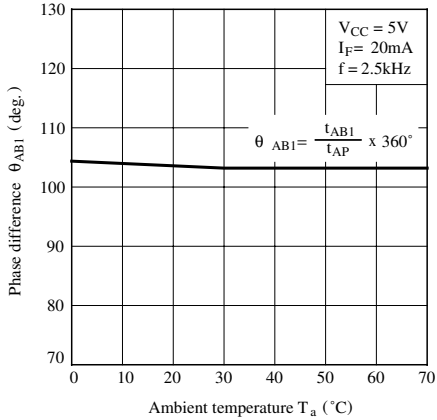


Fig. 7-a Duty Ratio vs. Distance (Xdirection) (GP1A70R)

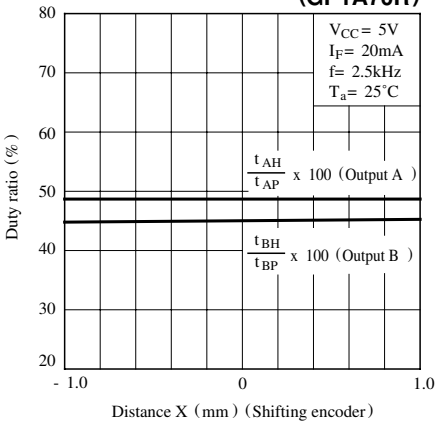


Fig. 7-b Duty Ratio vs. Distance (X direction) (GP1A71R)

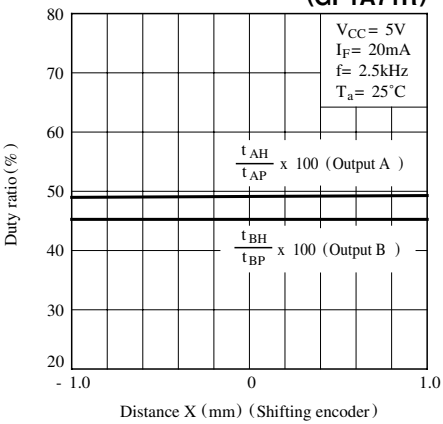


Fig. 8-a Phase Difference vs. Distance (X direction) (GP1A70R)

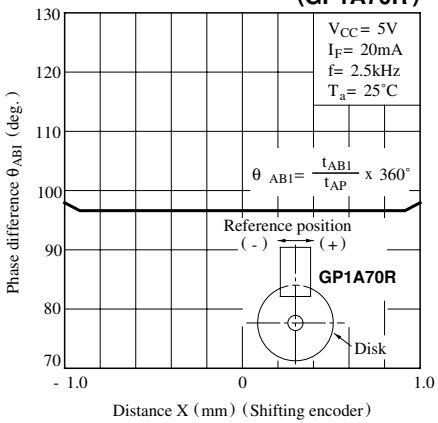


Fig. 8-b Phase Difference vs. Distance (X direction) (GP1A71R)

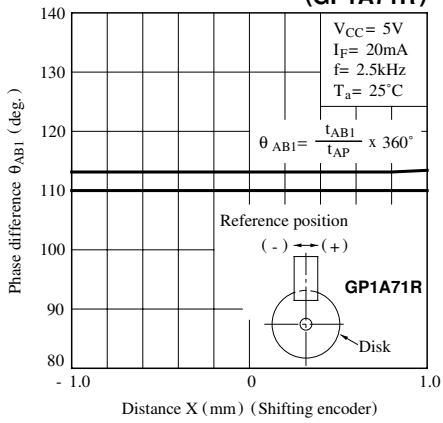


Fig. 9-a Duty Ratio vs. Distance (Ydirection) (GP1A70R)

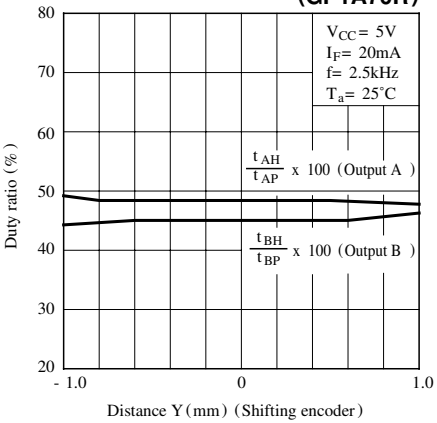


Fig. 9-b Duty Ratio vs. Distance (Y direction) (GP1A71R)

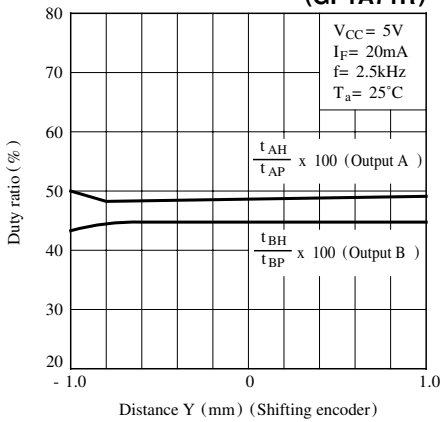


Fig.10-a Phase Difference vs. Distance (Y direction) (GP1A70R)

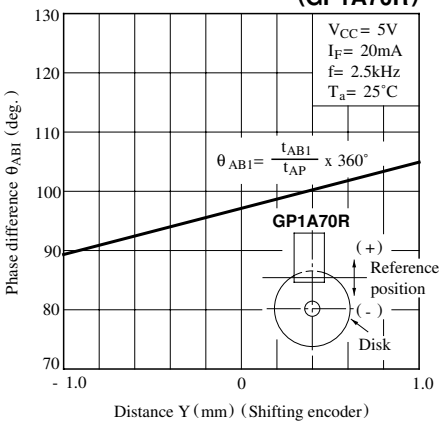


Fig.10-b Phase Difference vs. Distance (Y direction) (GP1A71R)

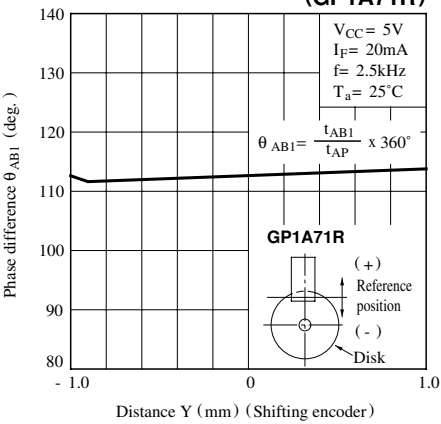


Fig.11-a Duty Ratio vs. Distance (Z direction) (GP1A70R)

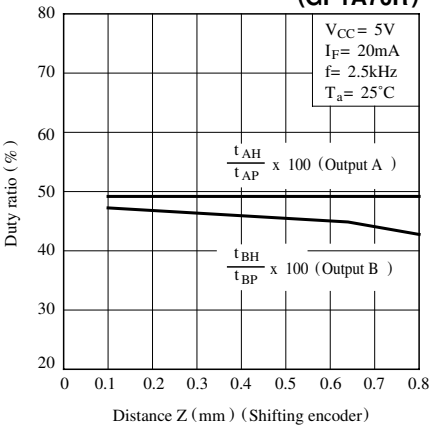


Fig.11-b Duty Ratio vs. Distance (Z direction) (GP1A71R)

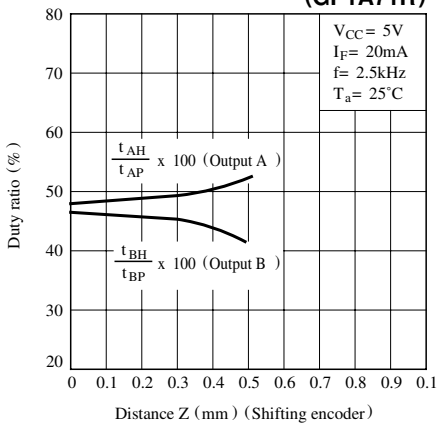


Fig.12-a Phase Difference vs. Distance (Z direction)

(GP1A70R)

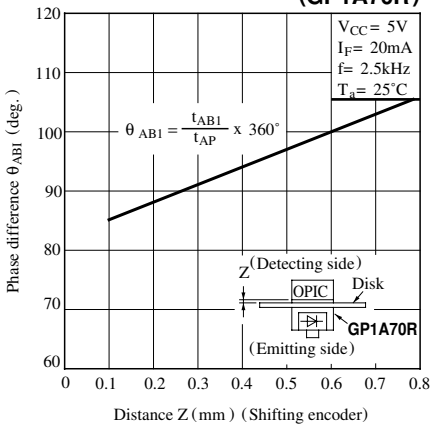
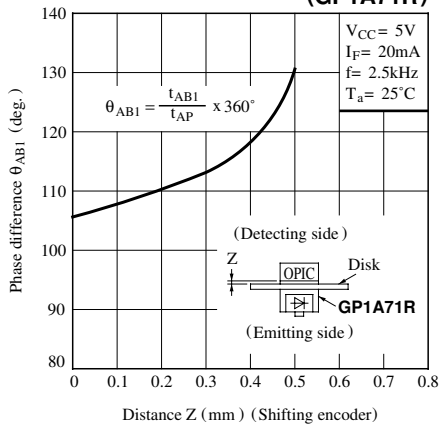
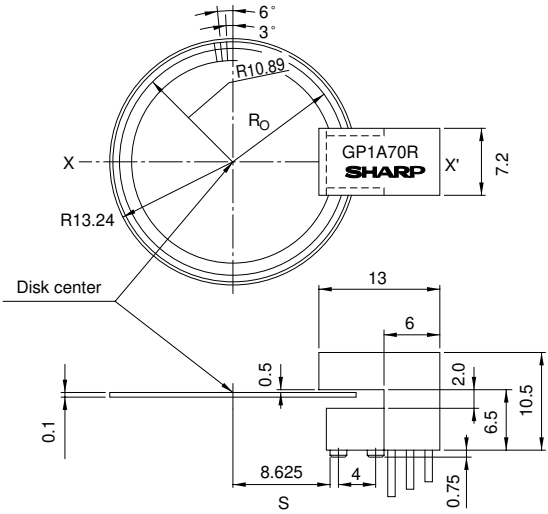


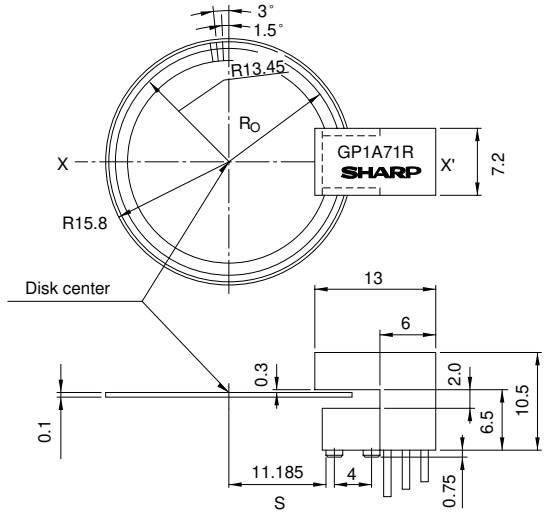
Fig.12-b Phase Difference vs. Distance (Z direction)

(GP1A71R)



<Measurement Conditions> (Unit : mm)





<GP1A70R Basic Design>

R_O (distance between the disk center and half point of a slit) and S (installing position of **GP1A70R**) will be provided by the following equations.

R_O=N/60 x 10.89 (mm) N : number of slits
S= R_O- 2.265 (mm)

<GP1A71R Basic Design>

R_O (distance between the disk center and half point of a slit) and S (installing position of **GP1A71R**) will be provided by the following equations.

R_O= N/120 x 13.45 (mm) N: number of slits
S= R_O- 2.265 (mm)

■ Precautions for Use

(1) This device is designed to be used under the condition of I_F = 20mA

(2) It is recommended that a by-pass capacitor of more than 0.01μF be added between V_{CC} and GND near the device in order to stabilize power supply line.

(3) As for other general cautions, refer to the chapter "Precautions for Use".

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- Industrial control
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- Consumer electronics

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

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