GP1A70R/GP1A71R

OPIC Photointerrupter with Encoder Functions

■ Features

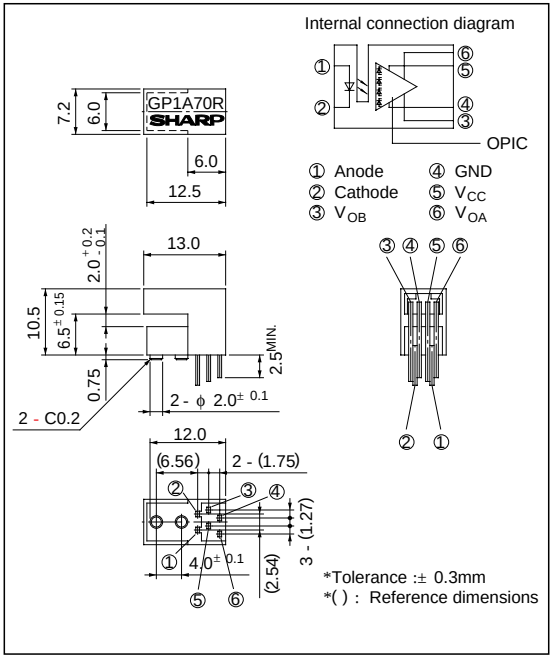
1. 2-phase (A, B) digital output
2. Sensing accuracy
   (**GP1A70R** Disk slit pitch : 1.14mm)
   (**GP1A71R** Disk slit pitch : 0.7mm)
3. PWB mounting type
   (Lead bending type)
4. TTL compatible output
5. Compact, lightweight

■ 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

" In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that occur in equipment using any of SHARP's devices, shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest version of the device specification sheets before using any SHARP's device."

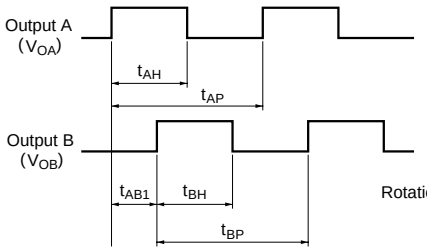
■ Electro-optical Characteristics

(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

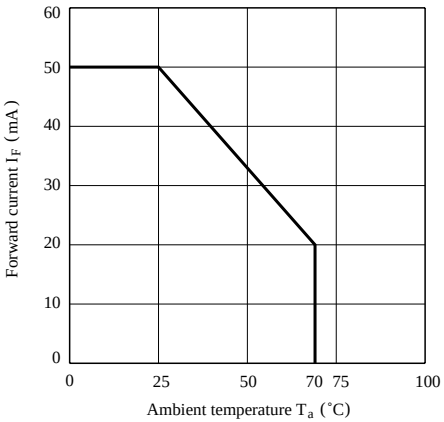


Fig. 2 Output Power Dissipation vs. Ambient Temperature

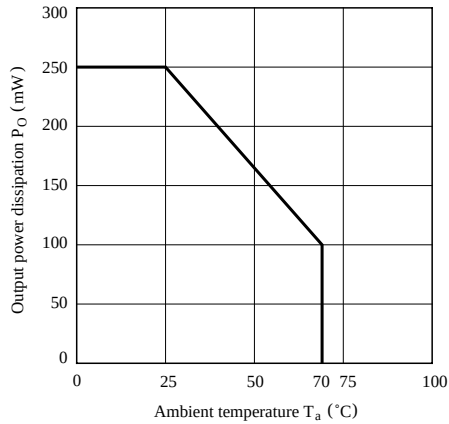


Fig. 3-a Duty Ratio vs. Frequency (GP1A70R)

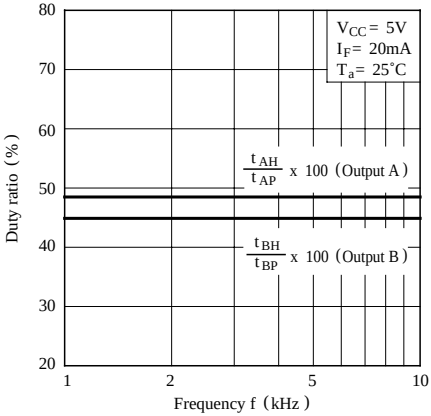


Fig. 3-b Duty Ratio vs. Frequency (GP1A71R)

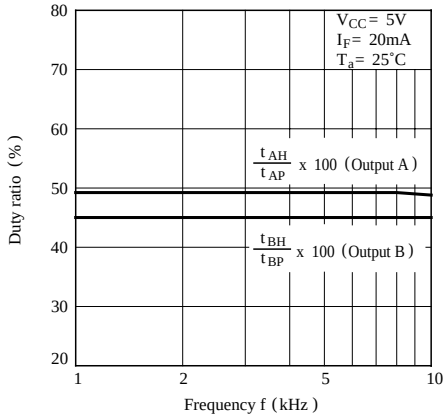


Fig. 4-a Phase Difference vs. Frequency (GP1A70R)

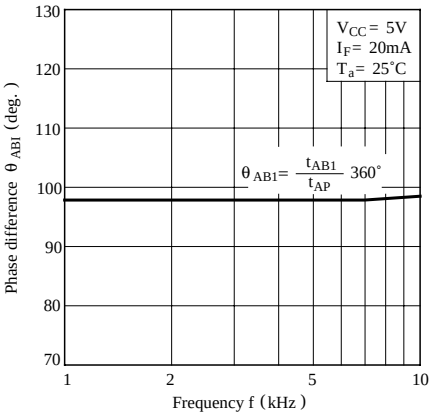


Fig. 4-b Phase Difference vs. Freauency (GP1A71R)

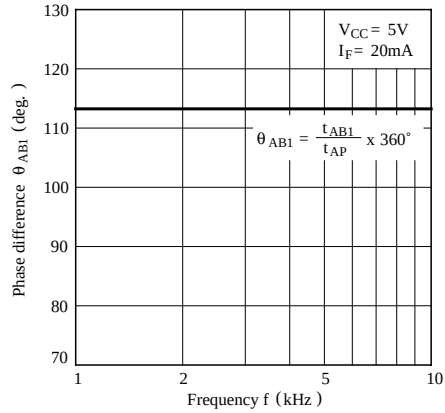


Fig. 5-a Duty Ratio vs. Ambient Temperature (GP1A70R)

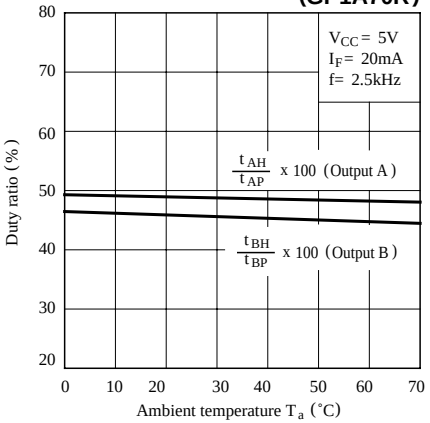


Fig. 5-b Duty Ratio vs. Ambient Temperature (GP1A71R)

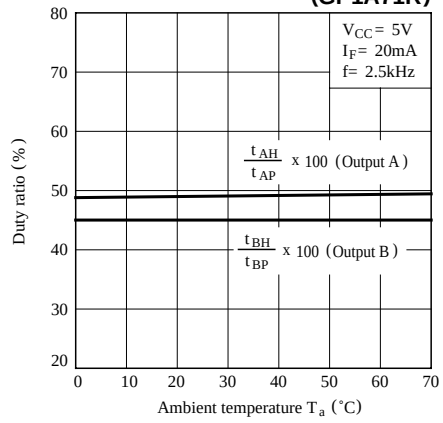


Fig. 6-a Phase Difference vs. Ambient Temperature

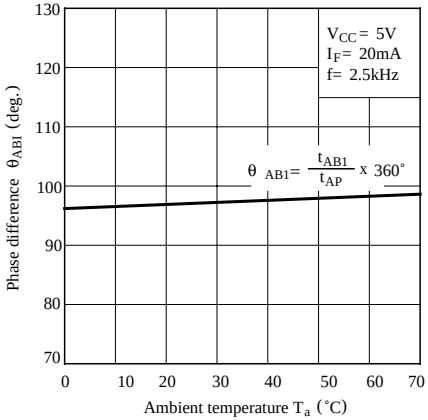


Fig. 6-b Phase Difference vs. Ambient Temperature

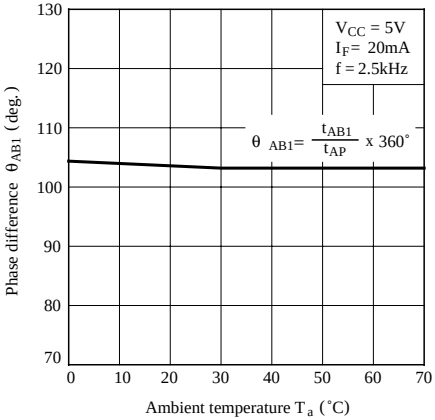


Fig. 7-a Duty Ratio vs. Distance (Xdirection) (GP1A70R)

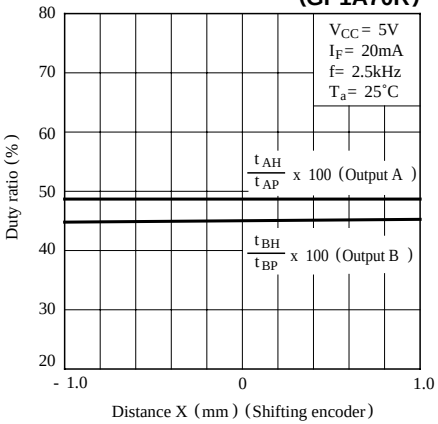


Fig. 7-b Duty Ratio vs. Distance (X direction) (GP1A71R)

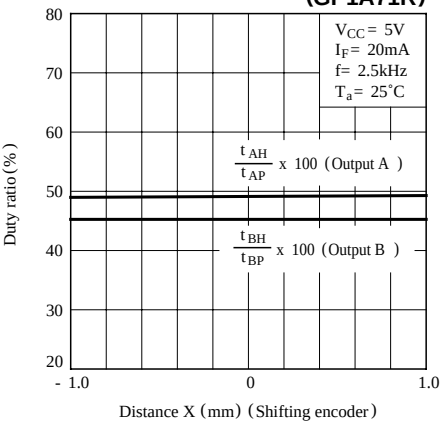


Fig. 8-a Phase Difference vs. Distance (X direction) (GP1A70R)

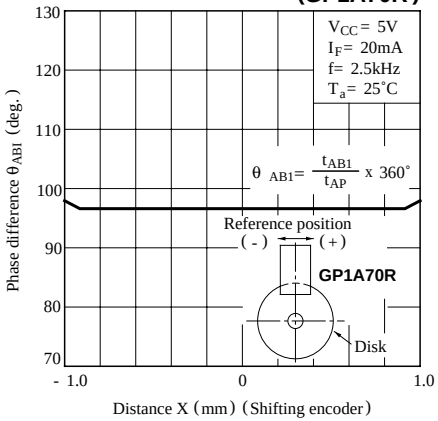


Fig. 8-b Phase Difference vs. Distance (X direction) (GP1A71R)

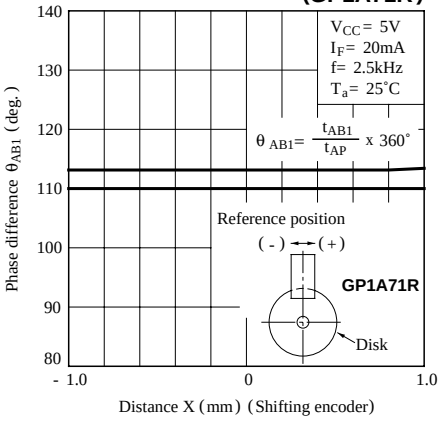


Fig. 9-a Duty Ratio vs. Distance (Ydirection) (GP1A70R)

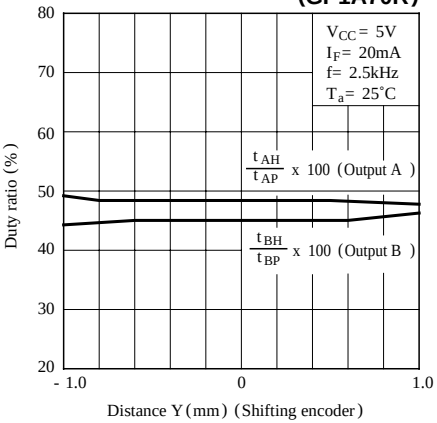


Fig. 9-b Duty Ratio vs. Distance (Y direction) (GP1A71R)

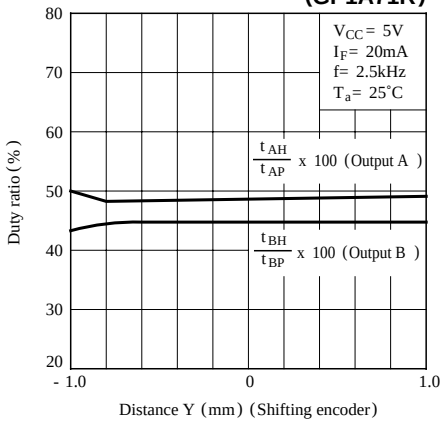


Fig.10-a Phase Difference vs. Distance (Y direction) (GP1A70R)

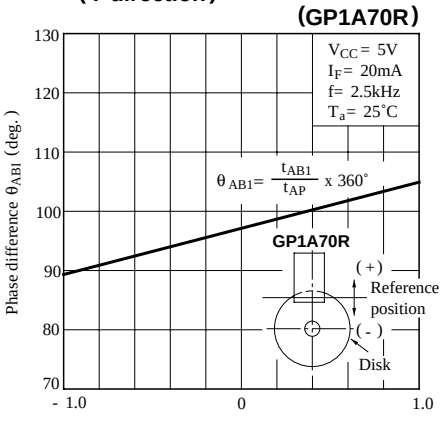


Fig.10-b Phase Difference vs. Distance (Y direction) (GP1A71R)

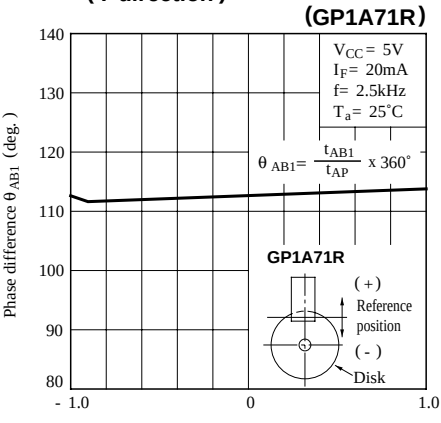


Fig.11-a Duty Ratio vs. Distance (Z direction) (GP1A70R)

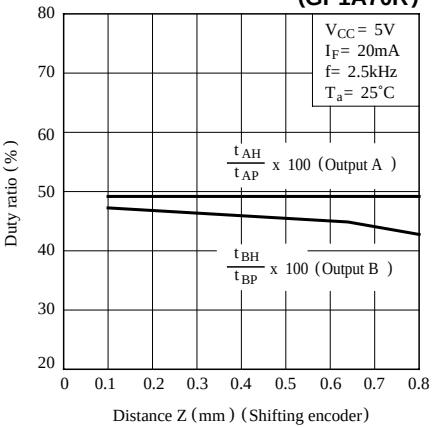


Fig.11-b Duty Ratio vs. Distance (Z direction) (GP1A71R)

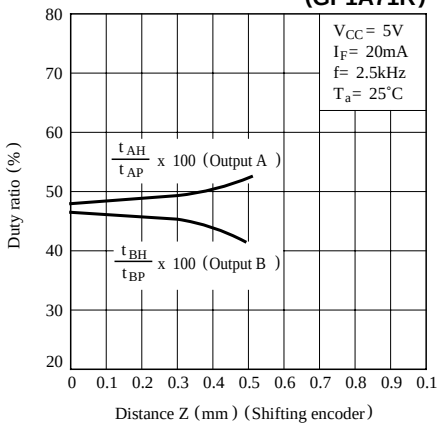


Fig.12-a Phase Difference vs. Distance (Z direction)

(GP1A70R)

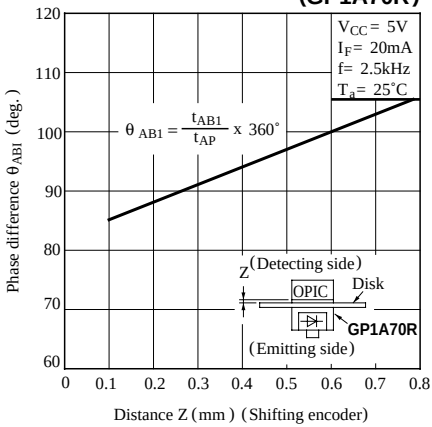
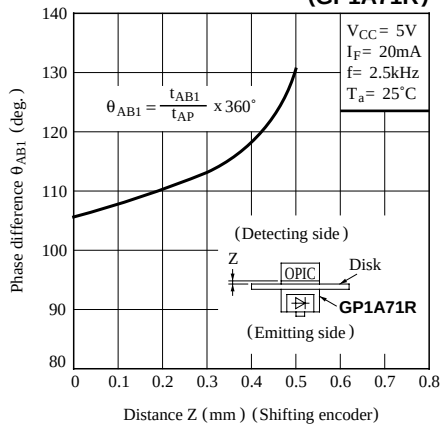
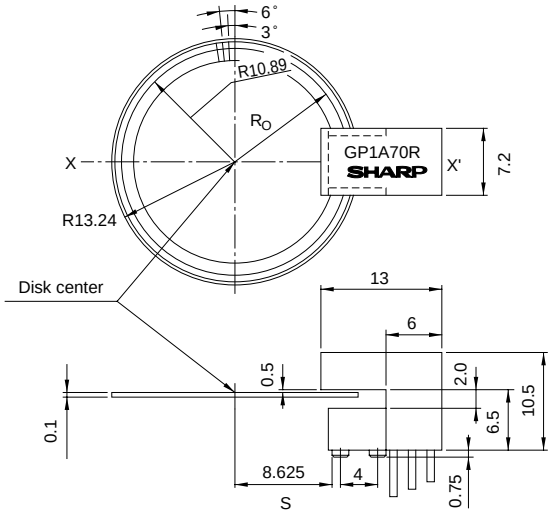


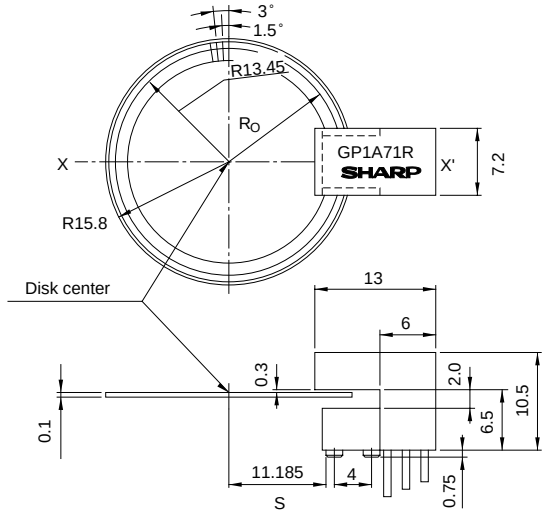
Fig.12-b Phase Difference vs. Distance (Z direction)

(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".