GP1A35R OPIC Photointerrupter with Encoder Functions

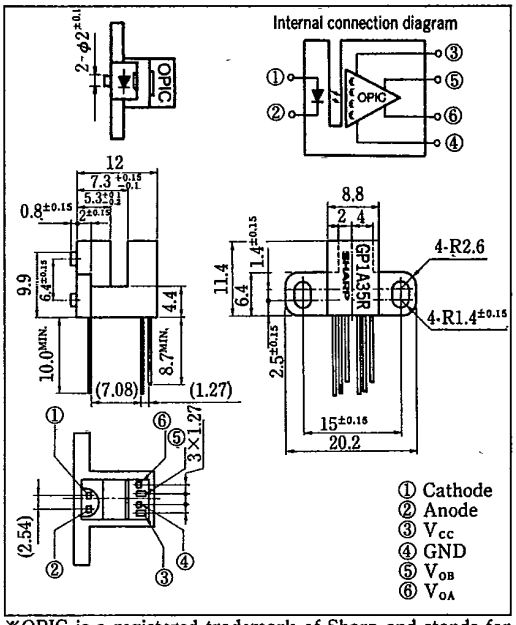
■ Features

1. 2-phase (A, B) digital output
2. High sensing accuracy
   (Disk slit pitch: 0.22mm, Moiré stripe application)
3. TTL compatible output
4. Compact and light

■ Applications

1. Electronic typewriters, printers
2. Robots, X-Y plotter
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.

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■ Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	65	mA
	*1Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P	100	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
*2Soldering temperature		T_{sol}	260	°C

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

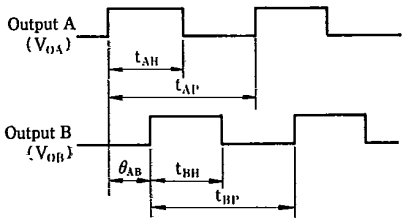
■ Electro-optical Characteristics

(Ta=25°C)

Parameter				Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage			V_F	I_F=30mA	—	1.2	1.5	V
	Reverse current			I_R	V_R=3V	—	—	10	μA
Output	Output voltage	Phase A	High level	V_{AH}	V_{CC}=5V, I_F=30mA	2.4	4.9	—	V
			Low level	V_{AL}	I_{OL}=8mA, I_F=30mA, V_{CC}=5V	—	0.1	0.4	
		Phase B	High level	V_{BH}	V_{CC}=5V, I_F=30mA	2.4	4.9	—	
			Low level	V_{BL}	I_{OL}=8mA, I_F=30mA, V_{CC}=5V	—	0.1	0.4	
	Dissipation current			I_{CC}	V_{CC}=5V, I_F=30mA Both phases A and B at low level	—	—	20	mA
Transfer characteristics	Duty ratio *1			D_A	I_F=30mA f=12kHz V_{CC}=5V	30	50	70	%
				D_B					
	Phase difference *1			θ_{AB}		50	90	130	degree
	Response speed *1			t_r	I_F=30mA, V_{CC}=5V f=12kHz	—	1.0	2.0	μ sec
				t_f		—	1.0	2.0	

Note: It is recommended that the GP1A35R be used under the condition of I_F=30mA Typ. for which it is designed.
*1 Duty ratio, phase difference: Average disk rotation time per turn.

■ Output Waveforms



$$D_A=\frac{t_{AH}}{t_{AP}}\times 100$$

$$D_B=\frac{t_{BH}}{t_{BP}}\times 100$$

Rotational direction: Counterclockwise when seen from OPIC light detector

Fig. 1 Forward Current vs. Ambient Temperature

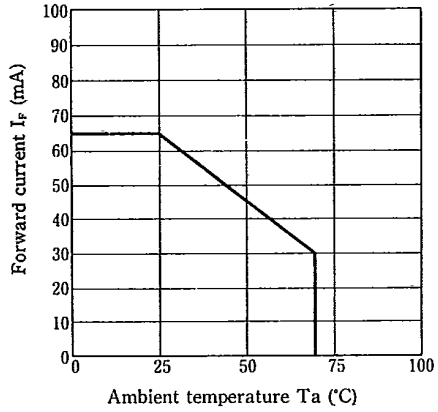


Fig. 2 Output Power Dissipation vs. Ambient Temperature

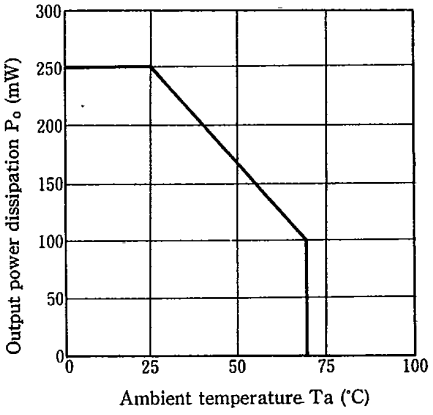


Fig. 3 Duty Ratio vs. Frequency

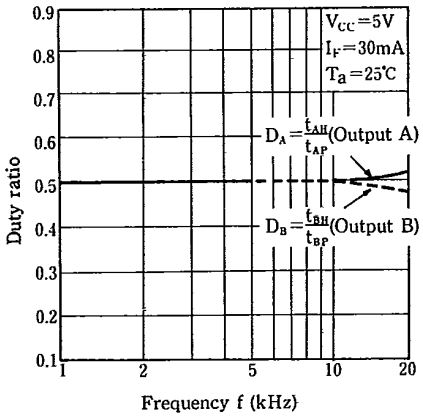


Fig. 4 Phase Difference vs. Frequency

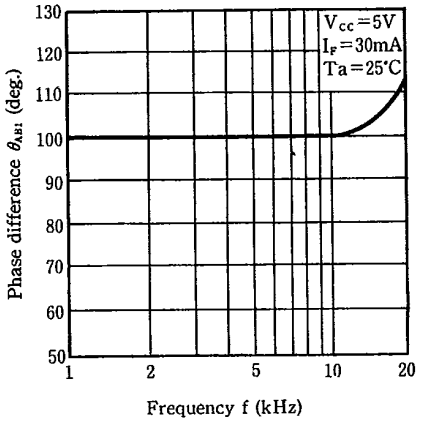


Fig. 5 Duty Ratio vs. Ambient Temperature

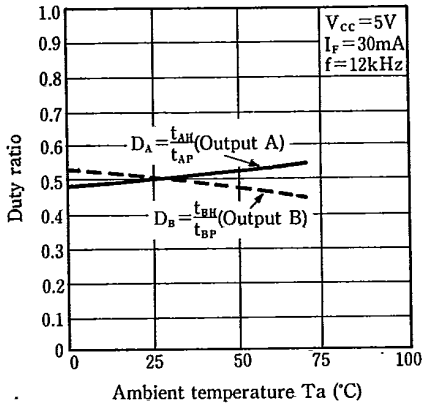


Fig. 6 Phase Difference vs. Ambient Temperature

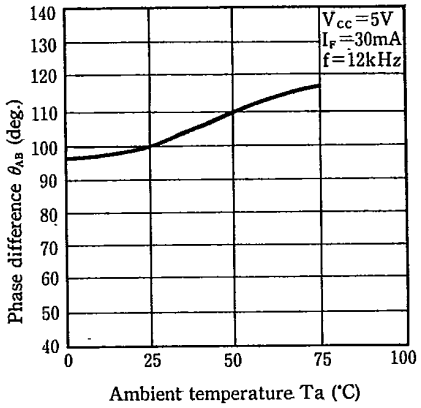


Fig. 7 Duty Ratio vs. Distance (X direction)

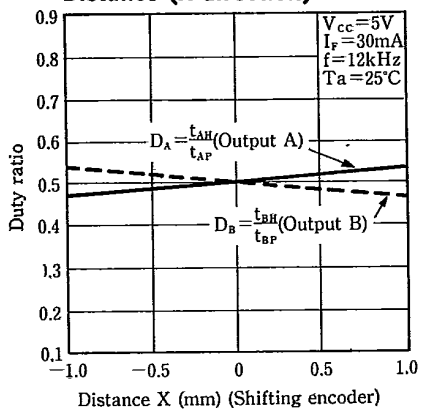


Fig. 8 Phase Difference vs. Distance (X direction)

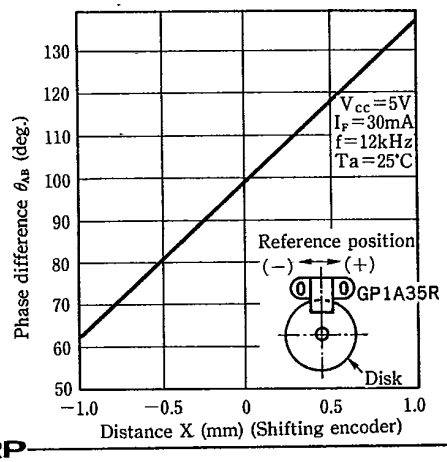


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Fig. 9 Duty Ratio vs. Distance (Y direction)

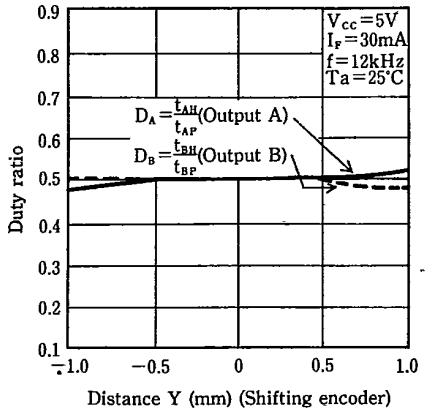


Fig. 10 Phase Difference vs. Distance (Y direction)

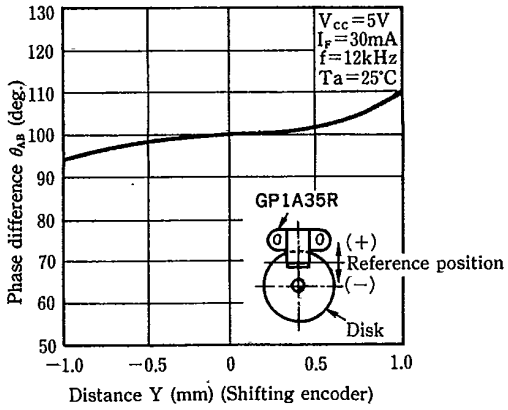


Fig. 11 Duty Ratio vs. Distance (Z direction)

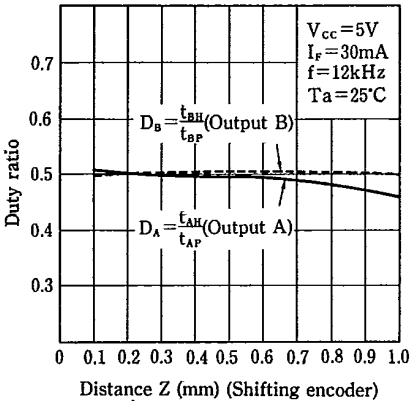
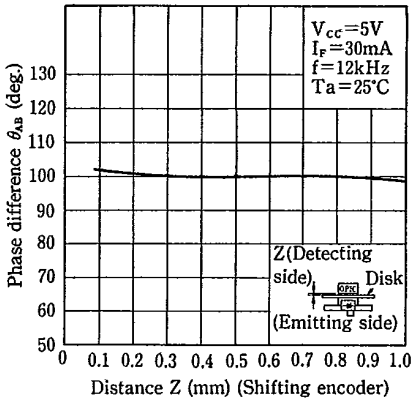
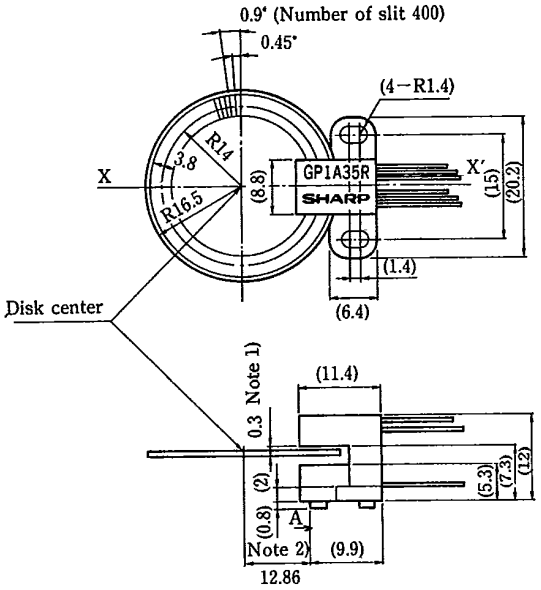


Fig. 12 Phase Difference vs. Distance (Z direction)



<Measurement conditions>



Note 1) Distance between disk surface and case surface in the detector side is 0.3mm.
2) Encoder positioning pin is positioned on X−X′ axis.
Distance between center of disk and portion A of positioning pin is 12.86mm.
3) Center of disk slit is R14.0.

(Precausions for Use)
Note 1) In order to stabilize power supply line, connect a by-pass capacitor of more than 0.01μF between V_{CC} and GND near the device.
Note 2) This module is designed to be operated at I_F=30mA TYP.

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