GP1A35RV

High Sensing Accuracy OPIC Photointerrupter with Encoder Functions

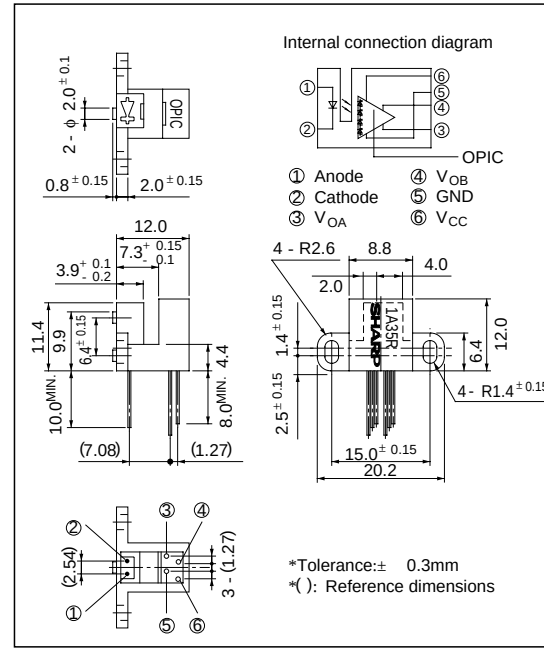
■ Features

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

■ Applications

1. Copiers
2. Electronic typewriters, printers
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	65	mA
	*1 Peak 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 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)

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}	*3 V_{CC} = 5V, I_F = 30mA	-	5	20	mA
Transfer characteristics	Duty ratio			*4 Δ_A	I_F= 30mA	30	50	70	%
				*4 Δ_B	*6 f= 12kHz				
	Phase difference			*5 θ_{AB1}	V_{CC}= 5V	50	90	130	deg.
	Response speed			t_r	I_F= 30mA, V_{CC}= 5V	-	1.0	2.0	μs
				t_f	*6 f= 12kHz	-	1.0	2.0	

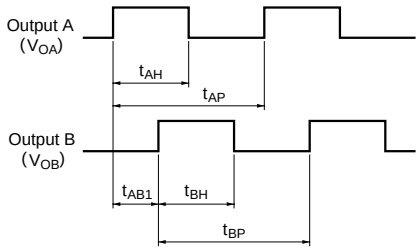
*3 In the condition that output A and B are low level.

*4 $\Delta_A = \frac{t_{AH}}{t_{AP}} \times 100$, $\Delta_B = \frac{t_{BH}}{t_{BP}} \times 100$

*5 $\theta_{AB1} = \frac{t_{AB1}}{t_{AP}} \times 360^\circ$

*6 Measured under the condition shown in Measurement Conditions.

■ Output Waveforms



Rotational direction: Counterclockwise when seen from OPIC light detector

Fig. 1 Forward Current vs. Ambient Temperature

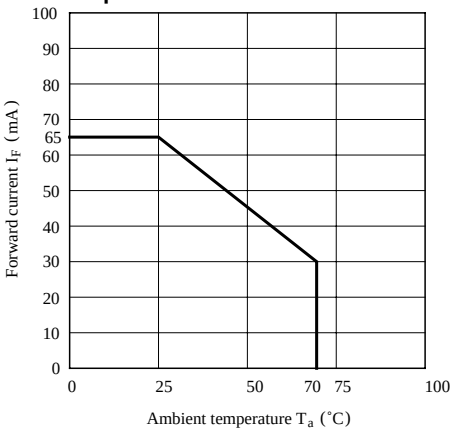


Fig. 2 Output Power Dissipation vs. Ambient Temperature

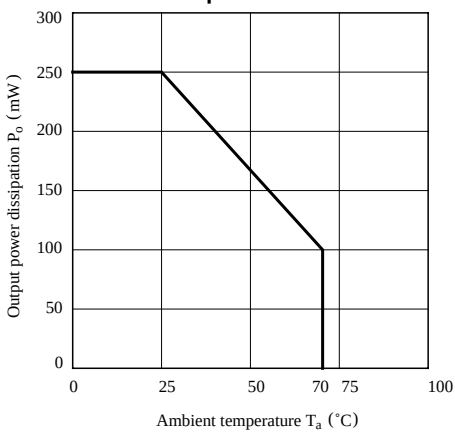


Fig. 3 Duty Ratio vs. Frequency

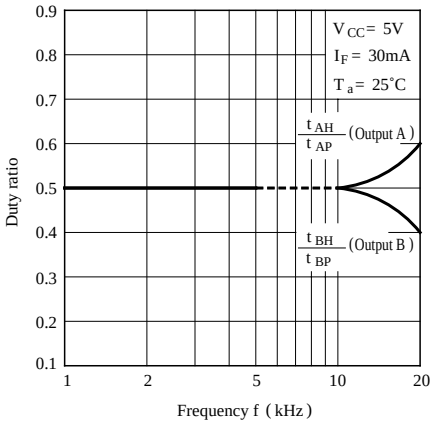


Fig. 4 Phase Difference vs. Frequency

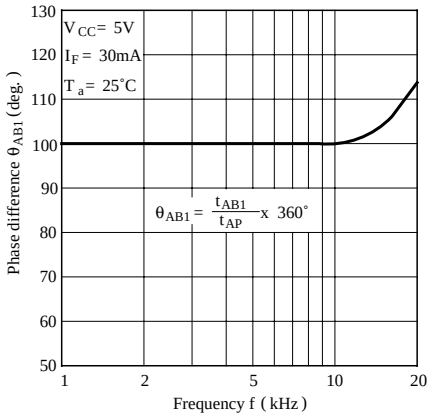


Fig. 5 Duty Ratio vs. Ambient Temperature

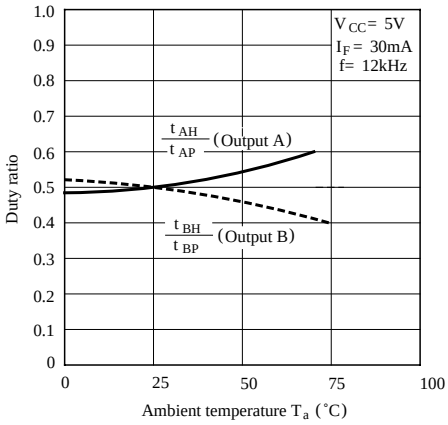


Fig. 6 Phase Difference vs. Ambient Temperature

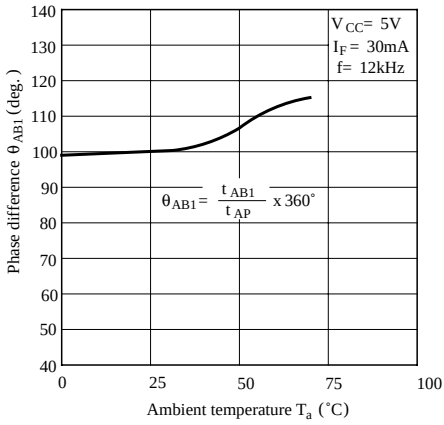


Fig. 7 Duty Ratio vs. Distance （Xdirection）

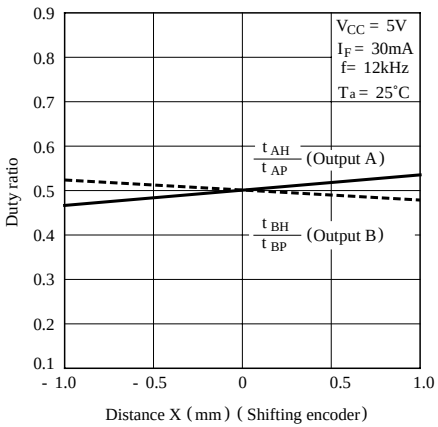


Fig. 8 Phase Difference vs. Distance （Xdirection）

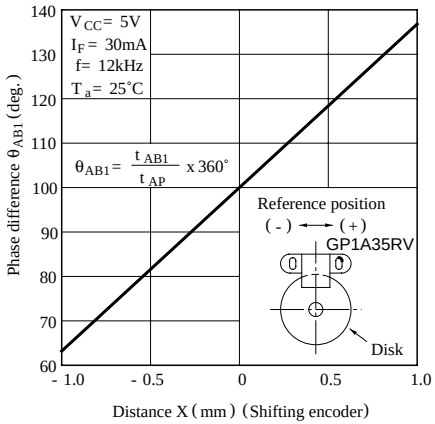


Fig. 9 Duty Ratio vs. Distance（Ydirection）

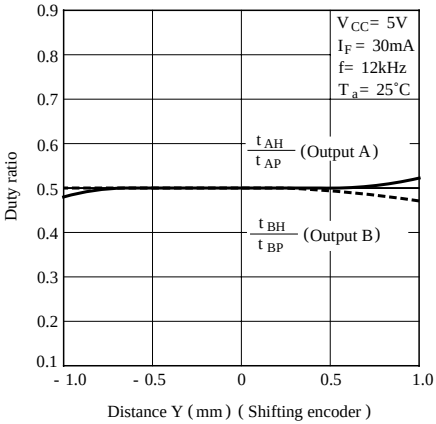


Fig.10 Phase Difference vs. Distance（Ydirection）

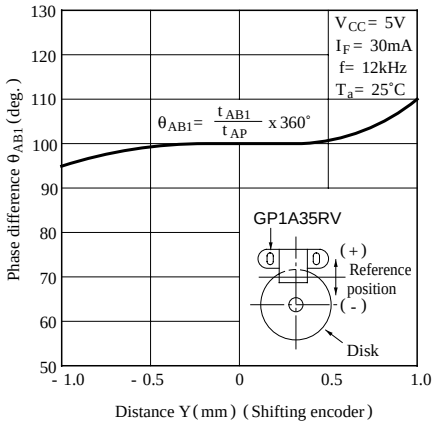


Fig.11 Duty Ratio vs. Distance（Zdirection）

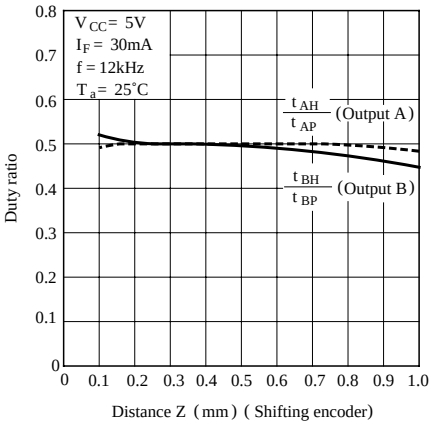
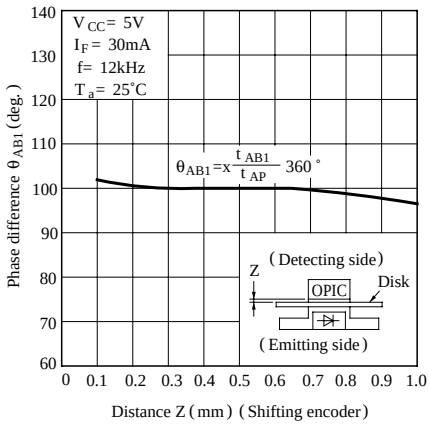
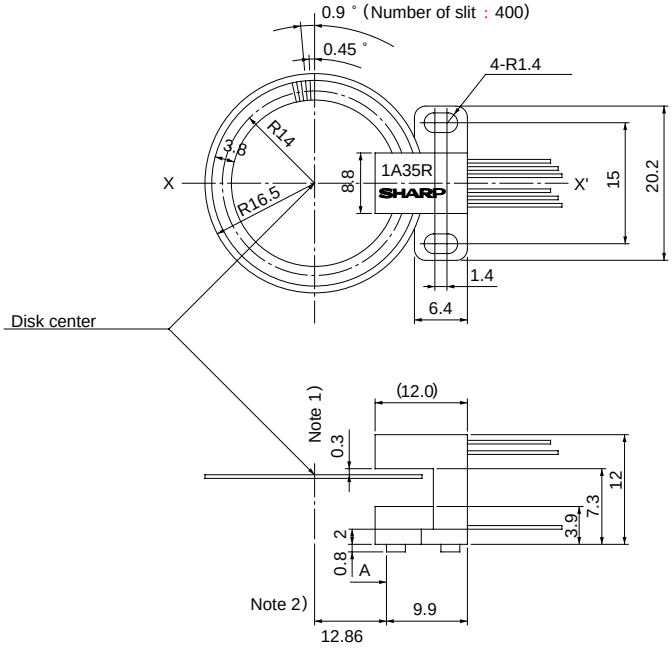


Fig.12 Phase Difference vs. Distance（Zdirection）



Measurement Conditions

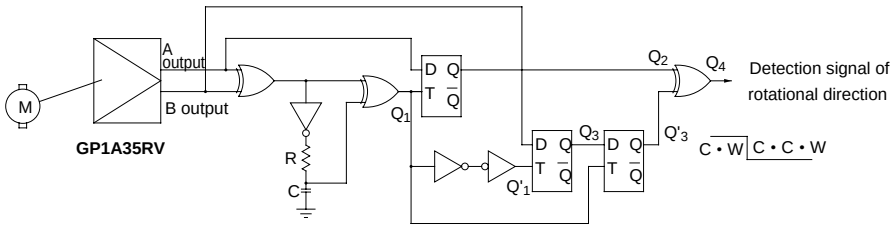


Note 1) Distance between disk surface and case surface in the detector side is 0.3mm.
2) Encoder positioning pin is positioned on X-X' axis.
Distance between center of disk and portion A of positioning pin is 12.86mm.
3) Center of disk slit is R14.0.

■ Precautions for Use

(1) This module is designed to be operated at I_F = 30mA TYP.
(2) Fixing torque : MAX. 0.6N • m
(3) In order to stabilize power supply line, connect a by-pass capacitor of more than 0.01μF between Vcc and GND near the device.
(4) As for other general cautions, refer to the chapter "Precautions for Use".

■ Application Circuit （Detection of Rotational Direction ）



When gate delay causes pulse noise in Q4 output, apply the CR filter to remove pulse noise.