GP1A57HR
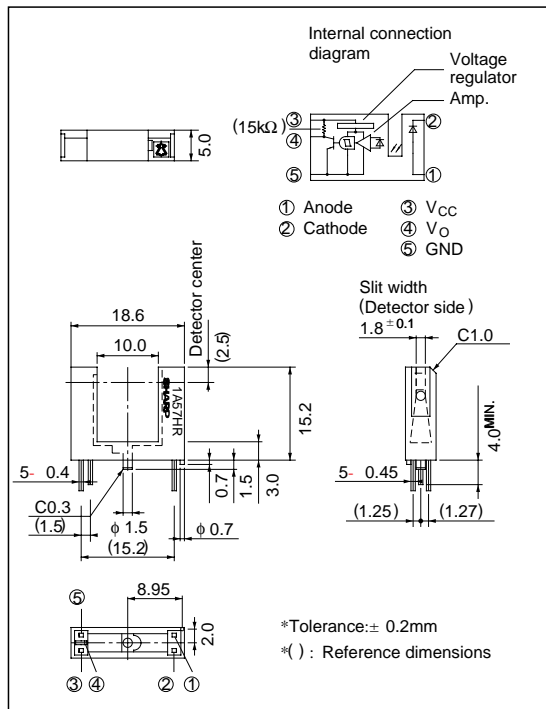
Wide Gap Type OPIC Photointerrupter

■ Features

1. Wide gap between LED and detector（10mm）
2. High accuracy mounting type with positioning pin
3. Built-in schmidt-trigger circuit
4. PWB mounting type package

■ Applications

1. Cameras, video cameras
2. OA equipmet, such as copiers etc.
3. Facsimiles

■ Outline Dimensions （Unit : mm）

Internal connection diagram
Voltage regulator
Amp.
(15kΩ)

① Anode   ③ V_{CC}
② Cathode   ④ V_O
⑤ GND

Slit width (Detector side)

*"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
	[*1]Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P	75	mW
Output	Supply voltage	V_{CC}	- 0.5 to + 17	V
	Output current	I_O	50	mA
	Power dissipation	P_O	250	mW
	Operating temperature	T_{opr}	- 25 to + 85	°C
	Storage temperature	T_{stg}	- 40 to + 100	°C
	[*2]Soldering temperature	T_{sol}	260	°C

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

■ Electro-optical Characteristics

$(Ta = 25°C)$

	Paramerter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	$I_F = 7mA$	-	1.1	1.4	V
	Reverse current	I_R	$V_R = 3V$	-	-	10.0	μA
Output	Operating supply voltage	V_{CC}		4.5	-	17.0	V
	Low level output voltage	V_{OL}	$V_{CC} = 5V$, $I_F = 0$, $I_{OL} = 16mA$	-	0.15	0.4	V
	High level output voltage	V_{OH}	$V_{CC} = 5V$, $I_F = 7mA$	4.9	-	-	V
	Low level supply current	I_{CCL}	$V_{CC} = 5V$, $I_F = 0$	-	1.7	3.8	mA
	High level supply current	I_{CCH}	$V_{CC} = 5V$, $I_F = 7mA$	-	0.7	2.2	mA
Transfer charac-teristics	[*3] "Low→High" threshold input current	I_{FLH}	$V_{CC} = 5V$	-	1.0	7.0	mA
	[*4] Hysteresis	I_{FHL}/I_{FLH}	$V_{CC} = 5V$	0.55	0.75	0.95	-
	Response time — "Low→High" propagation delay time	t_{PLH}	$V_{CC} = 5V$, $I_F = 7mA$ $R_L = 280\Omega$	-	3.0	9.0	μs
	"High→Low" propagation delay time	t_{PHL}		-	5.0	15.0	
	Rise time	t_r		-	0.1	0.5	
	Fall time	t_f		-	0.05	0.5	

*3 I_{FLH} represents forward current when output changes from low to high.
*4 I_{FHL} represents forward current when output changes from high to low.
Hysteresis stands for I_{FHL}/I_{FLH}.

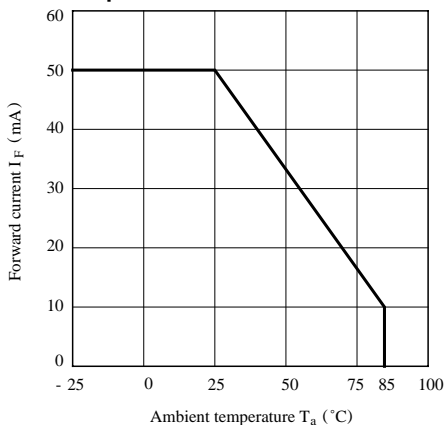**Fig. 1 Forward Current vs. Ambient Temperature**

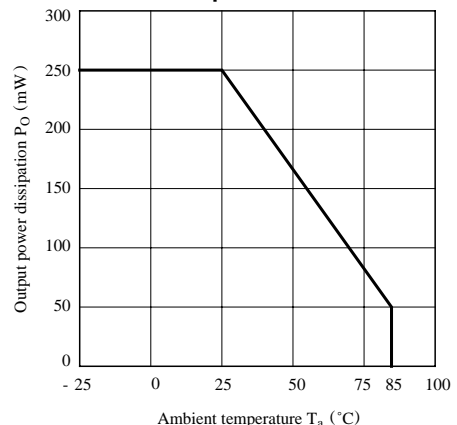**Fig. 2 Output Power Dissipation vs. Ambient Temperature**

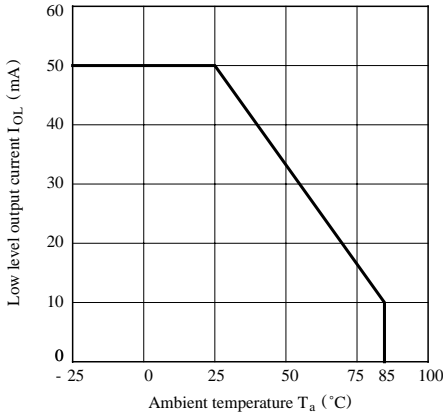**Fig. 3 Low Level Output Current vs.
Ambient Temperature**

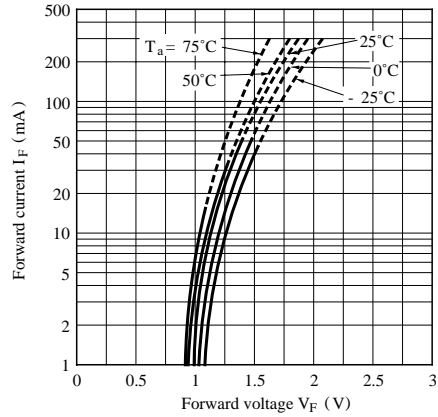**Fig. 4 Forward Current vs. Forward Voltage**

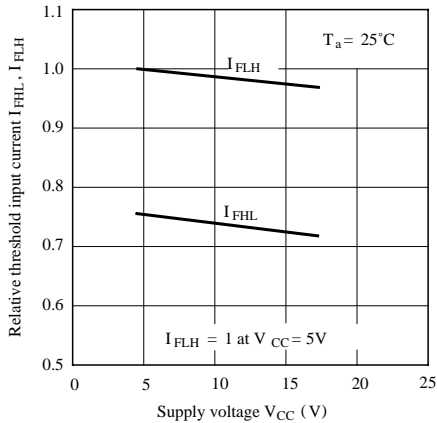**Fig. 5 Relative Threshold Input Current vs.
Supply Voltage**

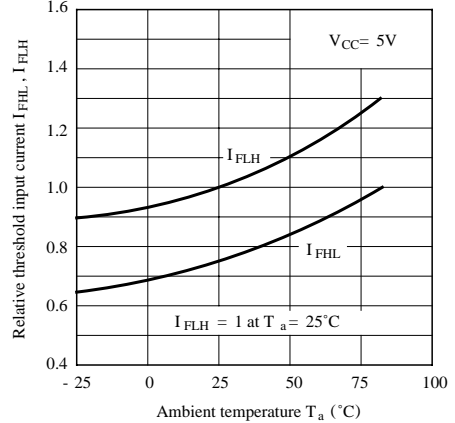**Fig. 6 Relative Threshold Input Current vs.
Ambient Temperature**

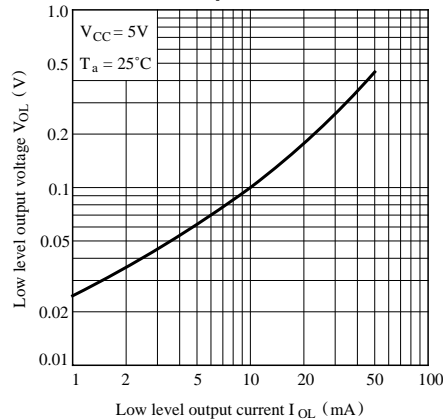**Fig. 7 Low Level Output Voltage vs.
Low Level Output Current**
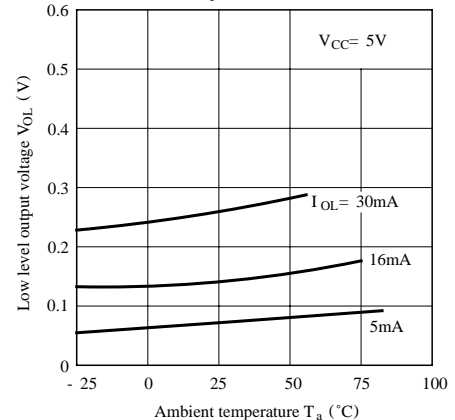

**Fig. 8 Low Level Output Voltage vs.
Ambient Temperature**
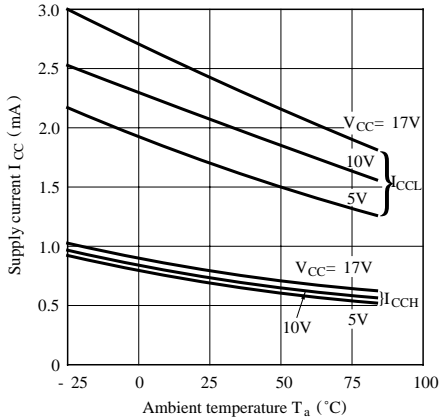
**Fig. 9 Supply Current vs.
Ambient Temperature**

Supply current I_{CC} (mA) vs Ambient temperature T_a (°C)

$V_{CC}= 17V$
10V
5V
I_{CCL}

$V_{CC}= 17V$
I_{CCH}
10V 5V

**Fig.10 Propagation Delay Time vs.
Forward Current**

Propagation delay time t_{PLH}, t_{PHL} (μs) vs Forward current I_F (mA)

$V_{CC}= 5V$
$R_L= 280Ω$
$T_a= 25°C$
t_{PHL}
t_{PLH}
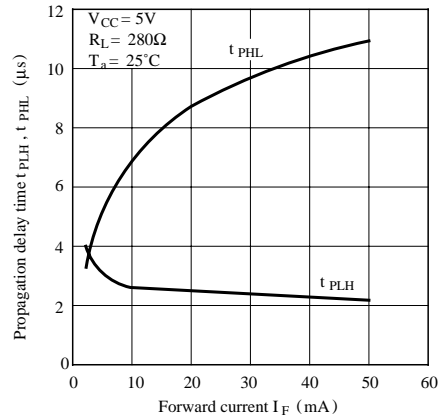
Fig.11 Rise Time, Fall Time vs. Load Resistance

Rise time, fall time t_r, t_f (μs) vs Load resistance R_L (kΩ)

$T_a= 25°C$
$V_{CC}= 5V$
$I_F= 7mA$
t_r
t_f
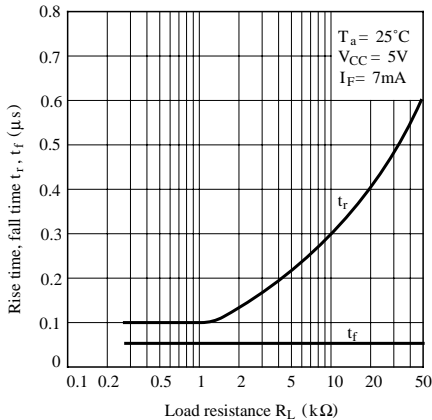
Test Circuit for Response Time

$I_F= 7mA$
Input
Voltage regulator
+5V
(15kΩ)
280Ω
Output
$t_r = t_f = 0.01 μs$
$Zo = 50Ω$
0.01 μF
47Ω
Amp.
GND

Input 50%
t_{PLH} t_{PHL}
Output 90% V_{OH}
1.5V
10% V_{OL}
t_r t_f
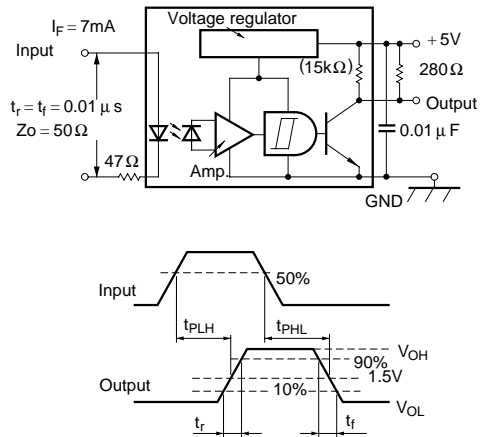
■ **Precautions for Use**

(1) In case of cleaning, use only the following type of cleaning solvent.
Ethyl alcohol, Methyl alcohol, Isopropyl alcohol

(2) 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.

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