GP1A19 High Sensitivity Type OPIC Photointerrupter

■ Features

1. Built-in Schmidt trigger circuit
2. Low threshold input current
   (I_{FLH} : MAX. 5mA)
3. Operating supply voltage V_{cc} : 4.5~17V
4. High sensing accuracy (Slit width : 0.5mm)
5. TTL and CMOS compatible output
6. Side-mounting type

■ Applications

1. Copiers, printers, facsimiles
2. Optoelectronic switches, optoelectronic counters

■ Outline Dimensions   (Unit : mm)

① Anode
②·Cathode
③ GND
④ V_O
⑤ V_{cc}
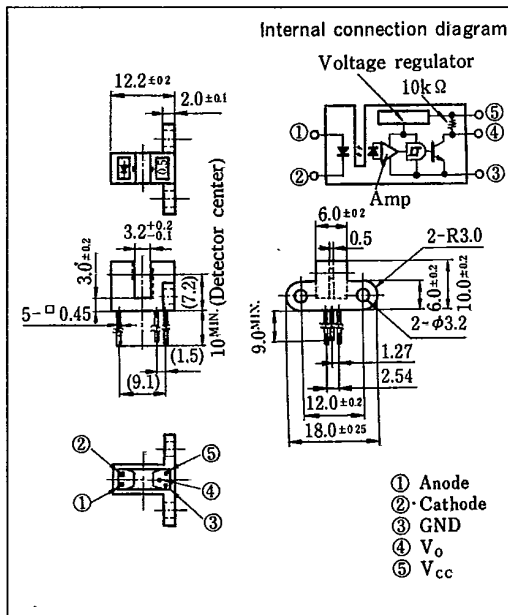
※ OPIC is a registered trademark of Sharp and stands for Optical IC. It has a light detecting element and signal processing circuitry integrated onto a single chip.

■ 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}	17	V
	Low level output current	I_{OL}	50	mA
	Power dissipation	P_O	250	mW
	Operating temperature	T_{opr}	$-25 \sim +85$	°C
	Storage temperature	T_{stg}	$-40 \sim +100$	°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	$I_F=5mA$	—	1.1	1.4	V
	Reverse current		I_R	$V_R=3V$	—	—	10	μA
Output	Operating supply voltage		V_{cc}		4.5	—	17	V
	Low level output voltage		V_{OL}	$I_{OL}=16mA$, $V_{cc}=5V$, $I_F=0$	—	0.15	0.4	V
	High level output voltage		V_{OH}	$V_{cc}=5V$, $I_F=5mA$	4.9	—	—	V
	Low level supply current		I_{CCL}	$V_{cc}=5V$, $I_F=0$	—	2.5	5.0	mA
	High level supply current		I_{CCH}	$V_{cc}=5V$, $I_F=5mA$	—	1.0	3.0	mA
Transfer charac-teristics	*3"Low→High" threshold input current		I_{FLH}	$V_{cc}=5V$	—	1.0	5.0	mA
	*4 Hysteresis		I_{FHL}/I_{FLH}	$V_{cc}=5V$	0.55	0.75	0.95	
	Response time	"Low→High" propagation time	t_{PLH}	$V_{cc}=5V$ $I_F=5mA$ $R_L=280\Omega$	—	3	9	μs
		"High→Low" propagation time	t_{PHL}		—	5	15	
		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}.

(Precautions for Use)
In order to stabilize power supply line, we recommend to connect a by-pass capacitor of more than 0.01μF between V_{cc} and GND near the device.

■ Recommended Operating Conditions

Parameter	Symbol	Operating temperature	MIN.	MAX.	Unit
Low level output current	I_{OL}	Ta=0~+70°C	—	16.0	mA
Forward current	I_F		10.0	20.0	mA

Fig. 1   Forward Current vs. Ambient Temperature
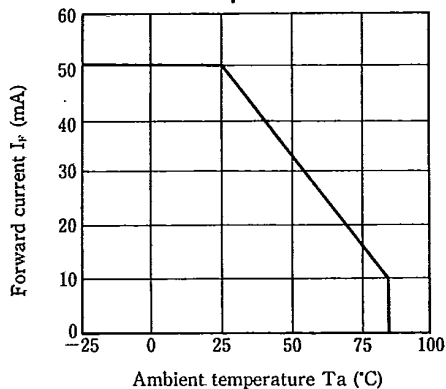
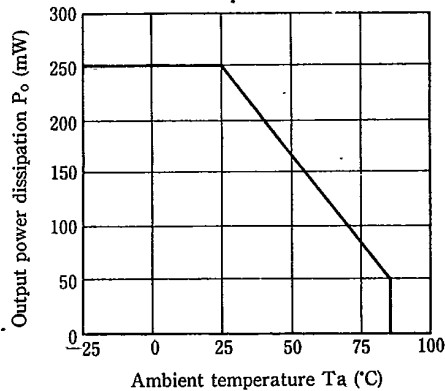**Fig. 2   Output Power Dissipation vs. Ambient Temperature**

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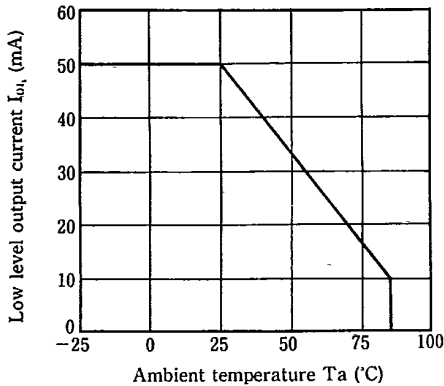
Fig. 3 Low Level Output Current vs. Ambient Temperature

Low level output current I_{OL} (mA) vs. *Ambient temperature Ta (°C)*

Fig. 4 Forward Current vs. Forward Voltage
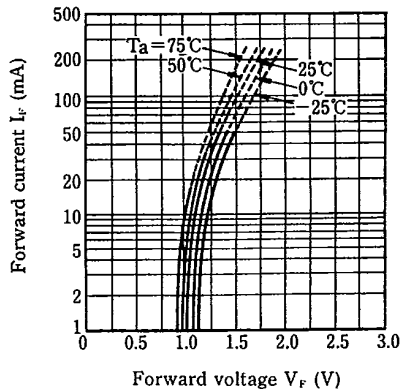
Forward current I_F (mA) vs. *Forward voltage V_F (V)*

Ta=75°C
50°C
25°C
0°C
−25°C

Fig. 5 Relative Threshold Input Current vs. Supply Voltage

Relative threshold input current vs. *Supply voltage V_{CC} (V)*

Ta=25°C

I_{FLH}

I_{FHL}

$I_{FLH}=1$ at $V_{CC}=5V$

Fig. 6 Relative Threshold Input Current vs. Ambient Temperature

Relative threshold input current vs. *Ambient temperature Ta (°C)*

$V_{CC}=5V$

I_{FLH}

I_{FHL}

$I_{FLH}=1$ at Ta=25°C
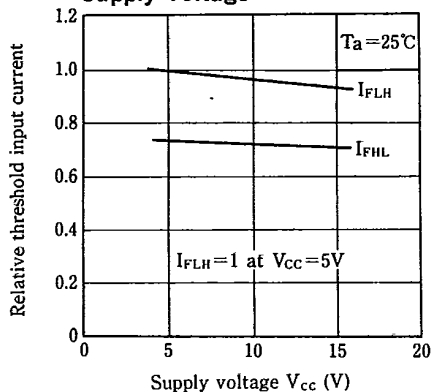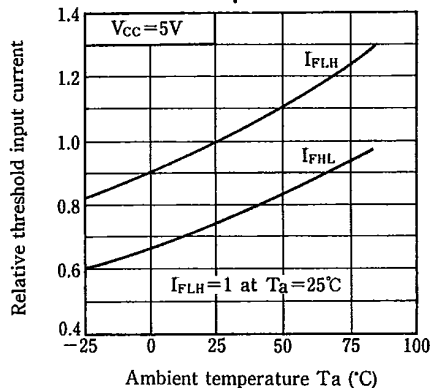
Fig. 7 Low Level Output Voltage vs. Low Level Output Current

Low level output voltage V_{OL} (V) vs. *Low level output current I_{OL} (mA)*

$V_{CC}=5V$
Ta=25°C
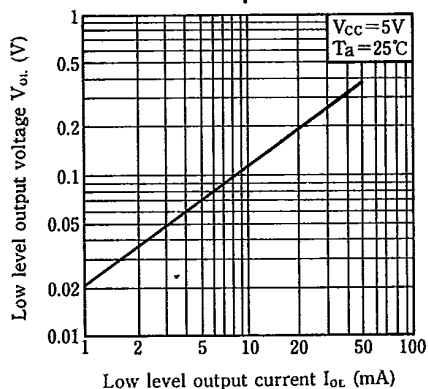
Fig. 8 Low Level Output Voltage vs. Ambient Temperature

Low level output voltage V_{OL} (V) vs. *Ambient temperature Ta (°C)*

$V_{CC}=5V$

$I_{OL}=30mA$

16mA

5mA

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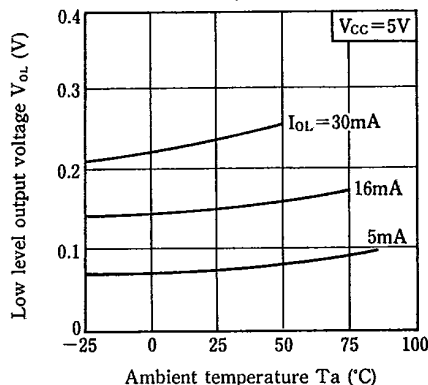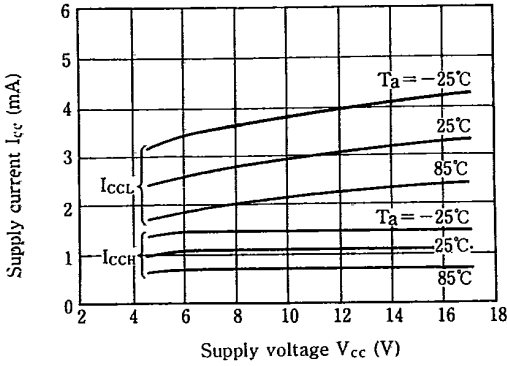### Fig. 9 Supply Current vs. Supply Voltage

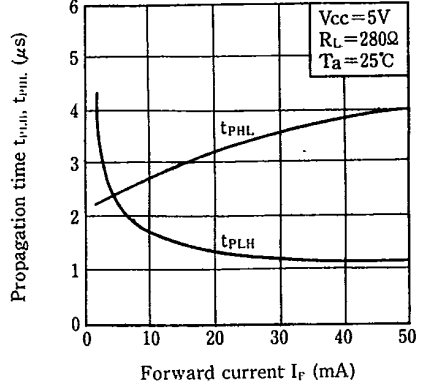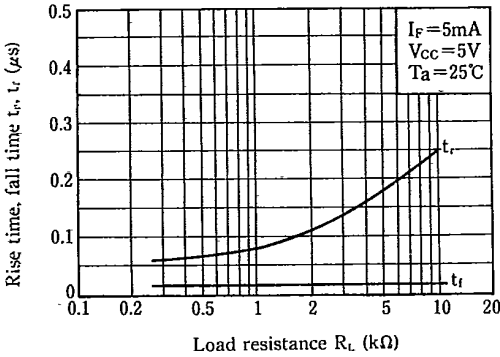### Fig. 10 Propagation Time vs. Forward Current

Fig. 11 Rise Time, Fall Time vs. Load Resistance

Test Circuit for Response Time