

# GP1A20

## OPIC Photointerrupter with Cover Case

### ■ Features

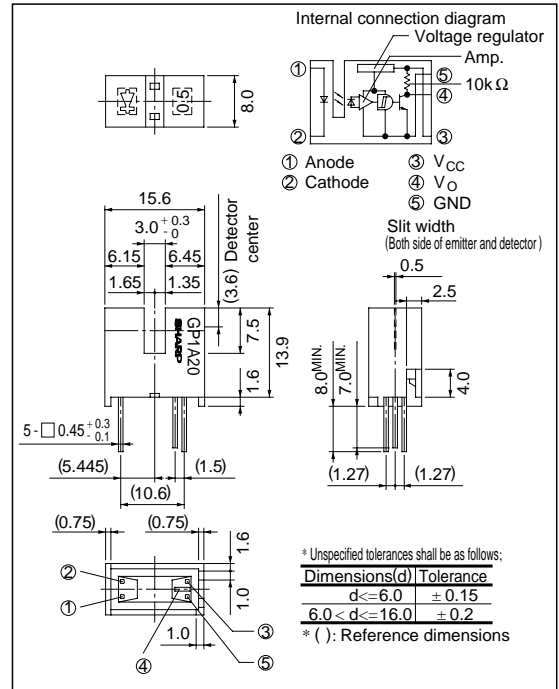
1. With cover case
2. High sensing accuracy (Slit width : 0.5mm)
3. Operating supply voltage  $V_{CC}$  : 4.5 to 17V
4. PWB mounting type package

### ■ Applications

1. Printers
2. Ticket vending 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
	*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  $\leq 100\mu$ s, Duty ratio = 0.01

\*2 For 5 seconds

## Electro-optical Characteristics

(Ta = 25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Input	Forward voltage	$V_F$	$I_F = 10\text{mA}$	-	1.1	1.4	V	
	Reverse current	$I_R$	$V_R = 3\text{V}$	-	-	10	$\mu\text{A}$	
Output	Operating supply voltage	$V_{CC}$		4.5	-	17	V	
	Low level output voltage	$V_{OL}$	$I_{OL} = 16\text{mA}, V_{CC} = 5\text{V}, I_F = 0$	-	0.15	0.4	V	
	High level output voltage	$V_{OH}$	$V_{CC} = 5\text{V}, I_F = 10\text{mA}$	4.9	-	-	V	
	Low level supply current	$I_{CCL}$	$V_{CC} = 5\text{V}, I_F = 0$	-	2.5	5.0	mA	
	High level supply current	$I_{CCH}$	$V_{CC} = 5\text{V}, I_F = 10\text{mA}$	-	1.0	3.0	mA	
	Transfer characteristics	<sup>*3</sup> "Low→High" threshold input current	$I_{FLH}$	$V_{CC} = 5\text{V}$	-	2.0	9.5	mA
<sup>*4</sup> Hysteresis		$I_{FHL} / I_{FLH}$	$V_{CC} = 5\text{V}$	0.55	0.75	0.95	-	
Response time		"Low→High" propagation delay time	$t_{PLH}$	$V_{CC} = 5\text{V}$ $I_F = 10\text{mA}$ $R_L = 280\Omega$	-	3	9	$\mu\text{s}$
		"High→Low" propagation delay 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  $I_{FHL} / I_{FLH}$ .

## Recommended Operating Conditions

Parameter	Symbol	Operating temperature	MIN.	MAX.	Unit
Low level output current	$I_{OL}$	Ta = 0 to + 70°C	-	16	mA
Forward current	$I_F$		10	20	mA

Fig. 1 Forward Current vs. Ambient Temperature

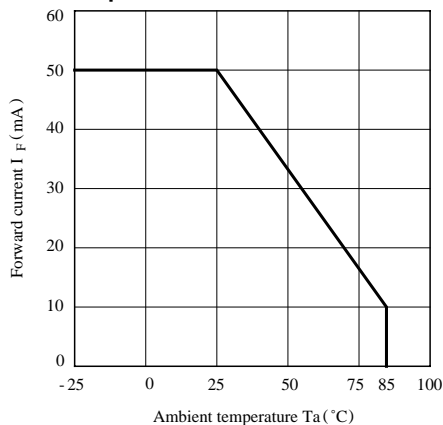
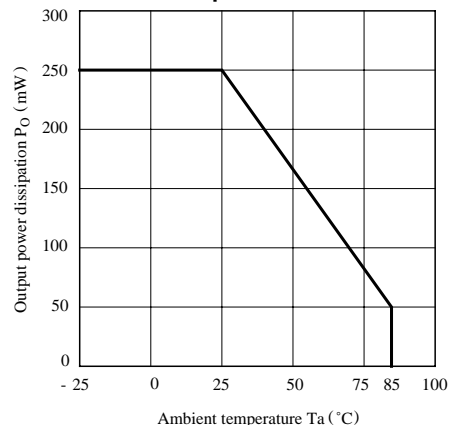
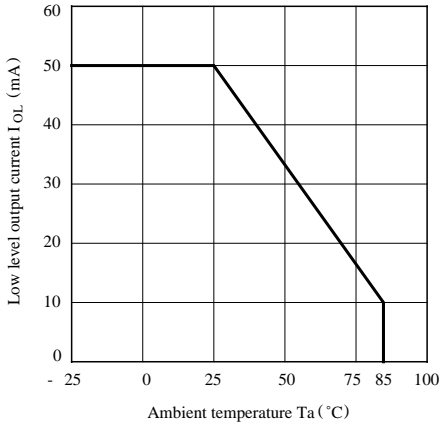


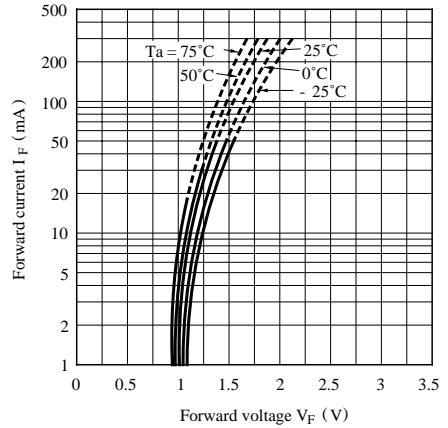
Fig. 2 Output Power Dissipation vs. Ambient Temperature



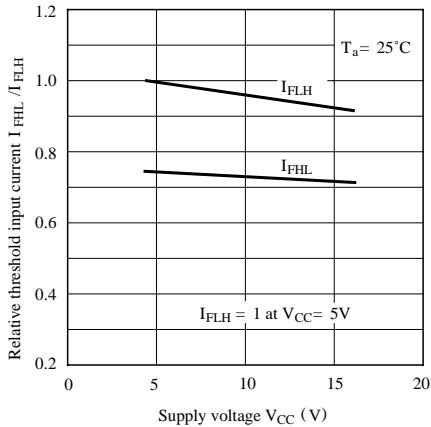
**Fig. 3 Low Level Output Current vs. Ambient Temperature**



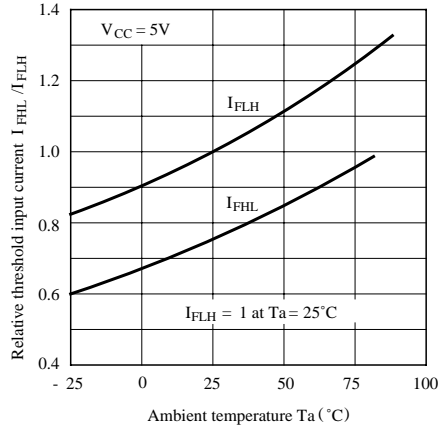
**Fig. 4 Forward Current vs. Forward Voltage**



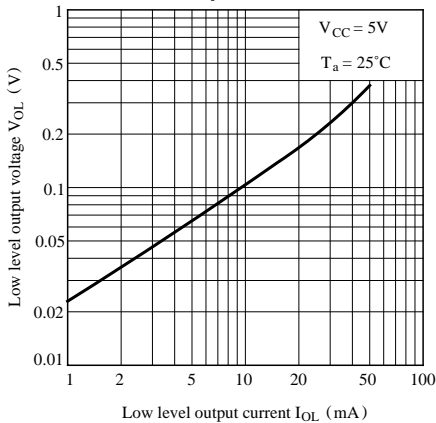
**Fig. 5 Relative Threshold Input Current vs. Supply Voltage**



**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**

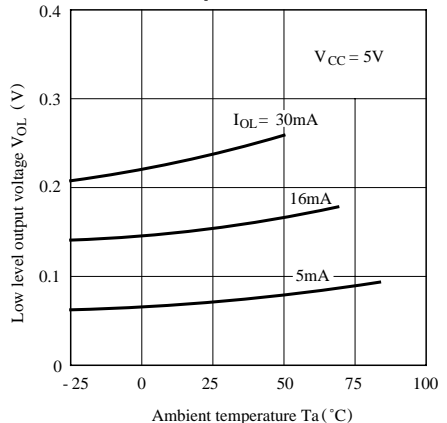


Fig. 9 Supply Current vs. Supply Voltage

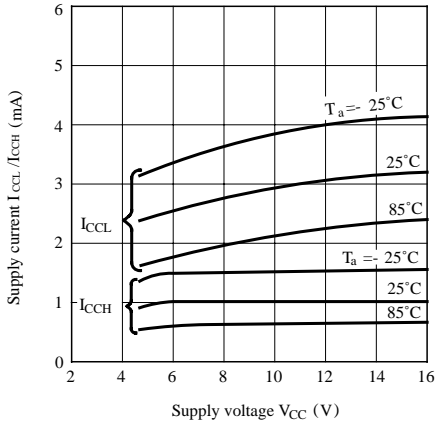


Fig.10 Propagation Delay Time vs. Forward Current

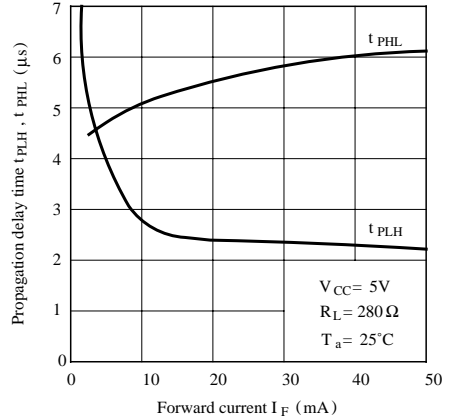
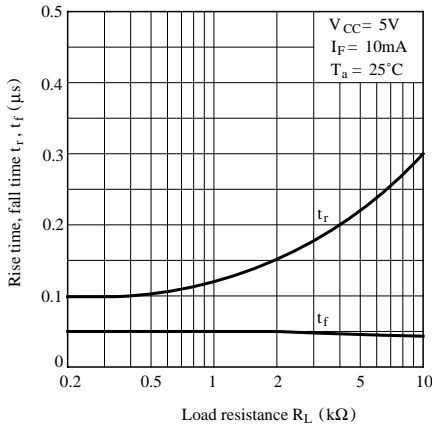
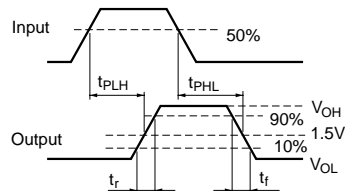
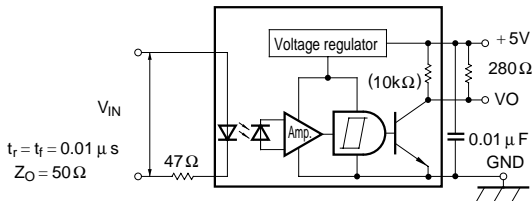


Fig.11 Rise Time, Fall Time vs. Load Resistance



Test Circuit for Response Time



■ Precautions for Use

- (1) In this product, flux in the cleaning solvent may remain inside the slit of holder. It sometimes causes lower output; therefore, cleaning is prohibited.
- (1) In order to stabilize power supply line, connect a by-pass capacitor of more than 0.01 μF between V<sub>CC</sub> and GND near the device.
- (3) As for other general cautions refer to the chapter “Precautions for Use”.