GP1A50HR/GP1A51HR GP1A52HR/GP1A53HR

OPIC Photointerrupter

■ Features

1. High sensing accuracy (Slit width : 0.5mm)
2. LSTTL and TTL compatible output
3. Both-sides mounting type : **GP1A50HR** (Gap: 3mm)
   Either-side mounting type : **GP1A51HR** (Gap: 3mm)
   PWB mounting type : **GP1A52HR** (Gap: 3mm)
   GP1A53HR (Gap: 5mm)

■ Applications

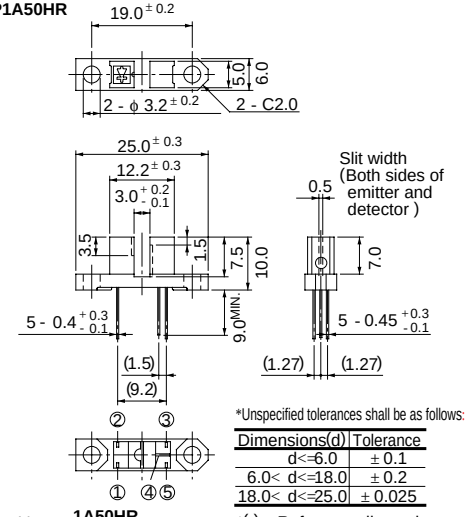
1. OA equipment, such as printers, facsimiles, etc.
2. VCRs

*"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.

■ Outline Dimensions

(Unit : mm)

GP1A50HR



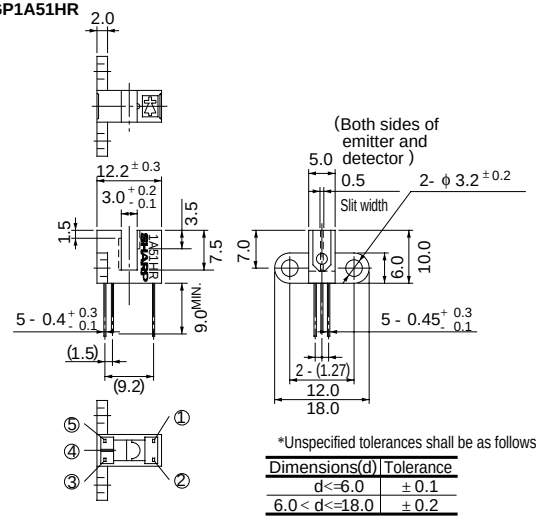
Marking : 1A50HR SHARP

*Unspecified tolerances shall be as follows:

Dimensions(d)	Tolerance
d<=6.0	± 0.1
6.0< d<=18.0	± 0.2
18.0< d<=25.0	± 0.025

*( ) : Reference dimensions

GP1A51HR

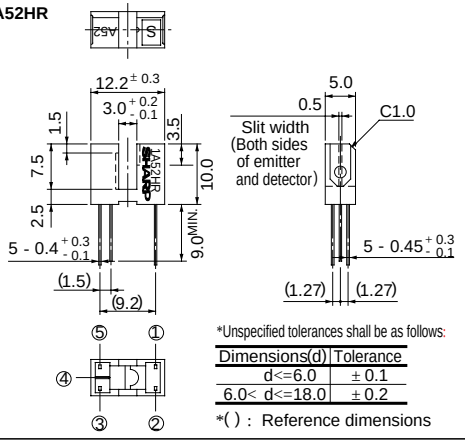


*Unspecified tolerances shall be as follows :

Dimensions(d)	Tolerance
d<=6.0	± 0.1
6.0 < d<=18.0	± 0.2

*( ) : Reference dimensions

GP1A52HR

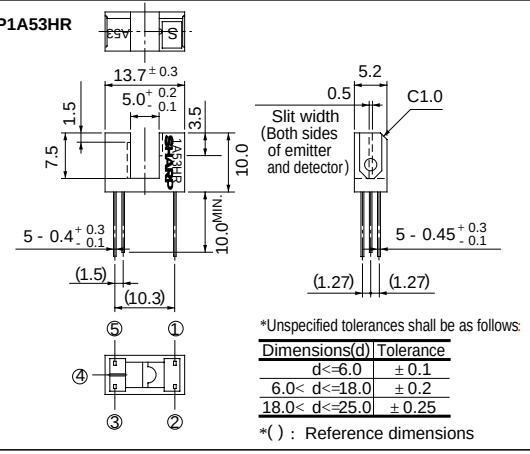


*Unspecified tolerances shall be as follows:

Dimensions(d)	Tolerance
d<=6.0	± 0.1
6.0< d<=18.0	± 0.2

*( ) : Reference dimensions

GP1A53HR

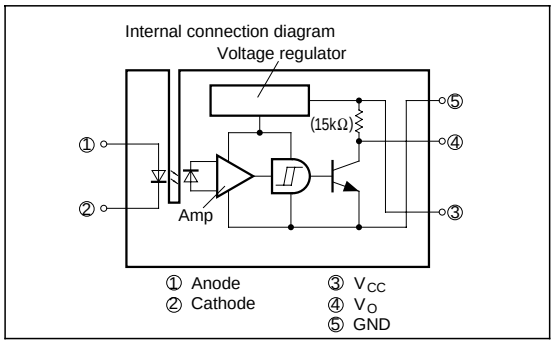


*Unspecified tolerances shall be as follows:

Dimensions(d)	Tolerance
d<=6.0	± 0.1
6.0< d<=18.0	± 0.2
18.0< d<=25.0	± 0.25

*( ) : Reference dimensions

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■ 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)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	GP1A50HR/GP1A51HR GP1A52HR	V_F	I_F= 5mA	-	1.1	1.4	V
		GP1A53HR	V_F	I_F= 8mA	-	1.14	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, *5 I_F= 5mA	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, *5 I_F= 5mA	-	0.7	2.2	mA
Transfer characteristics	*3 "Low→High" threshold input current	GP1A50HR/GP1A51HR GP1A52HR	I_{FLH}	V_{CC}= 5V	-	1.0	5.0	mA
		GP1A53HR	I_{FLH}	V_{CC}= 5V	-	1.5	8.0	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, *5 I_F= 5mA, R_L= 280Ω	-	3.0	9.0	μs
	Response time: "High→Low" propagation delay time		t_{PHL}		-	5.0	15.0	
	Response time: Rise time		t_r		-	0.1	0.5	
	Response time: Fall time		t_r		-	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}.
*5 **GP1A53HR** Condition of V_{OH}, I_{CCH}, Response time; I_F= 8mA

■ Recommended Operating Conditions

Parameter	Symbol	Operating temp.	MIN.	MAX.	Unit
Low level output current	I_{OL}	Ta = 0 to + 70˚C	-	16.0	mA
Forward current	I_F		10.0	20.0	mA

Fig. 1 Forward Current vs. Ambient Temperature

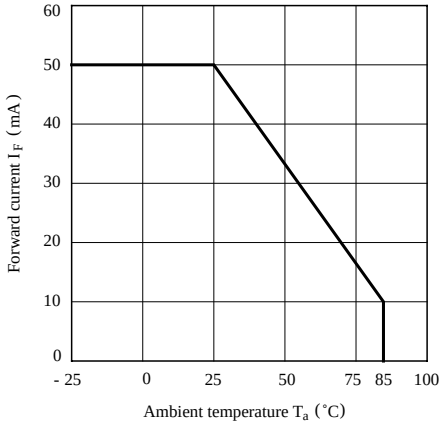


Fig. 2 Output Power Dissipation vs. Ambient Temperature

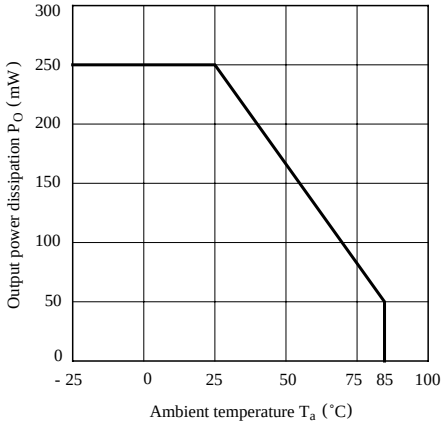


Fig. 3 Low Level Output Current vs. Ambient Temperature

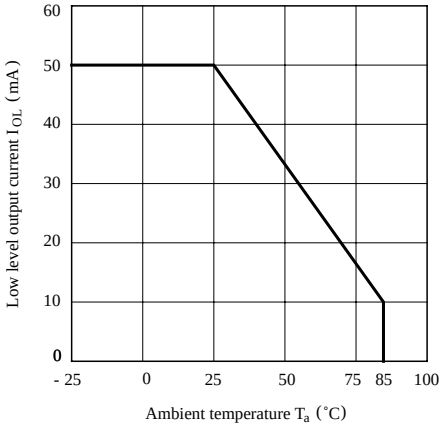


Fig. 4 Forward Current vs. Forward Voltage

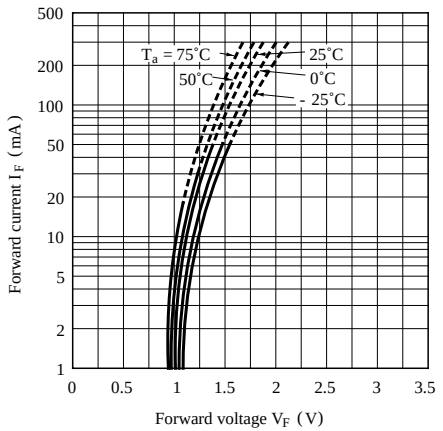


Fig. 5 Relative Threshold Input Current vs. Supply Voltage

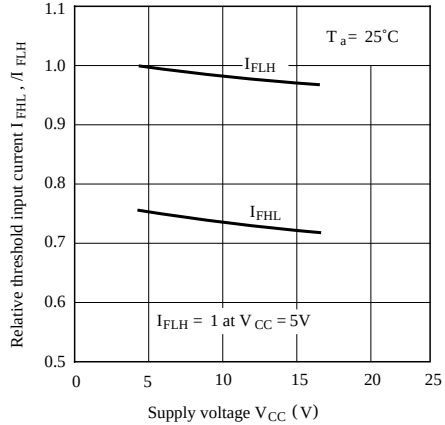


Fig. 6 Relative Threshold Input Current vs. Ambient Temperature

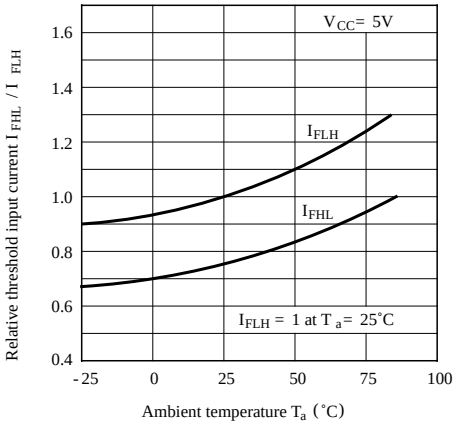


Fig. 7 Low Level Output Voltage vs. Low Level Output Current

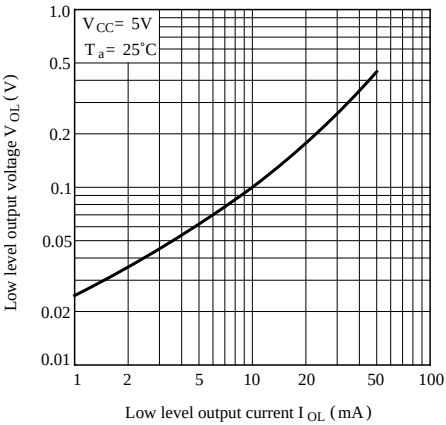


Fig. 8 Low Level Output Voltage vs. Ambient Temperature

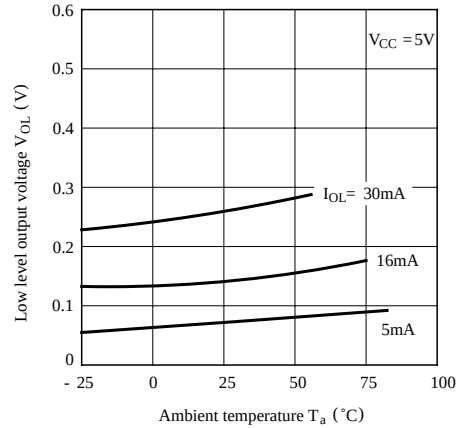


Fig. 9 Supply Current vs. Ambient Temperature

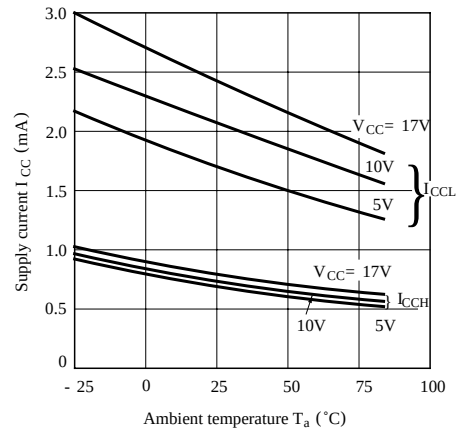


Fig.10-a Propagation Delay Time vs. Forward Current (GP1A50HR/GP1A51HR/GP1A52HR)

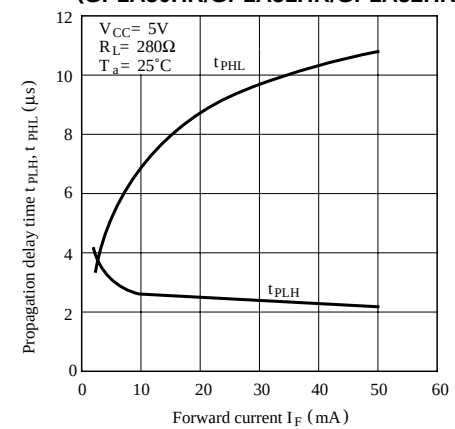


Fig.10-b Propagation Delay Time vs. Forward Current (GP1A53HR)

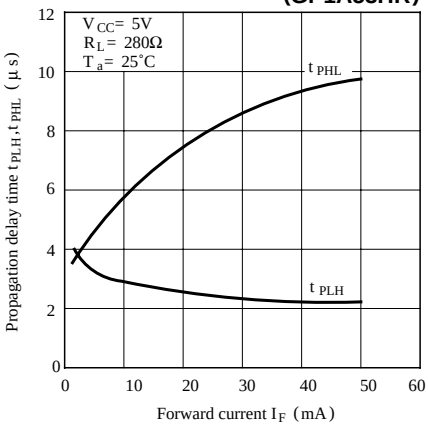
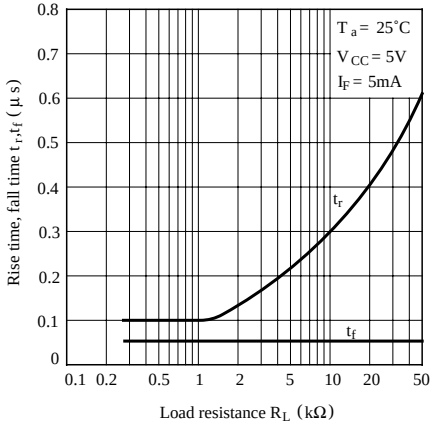
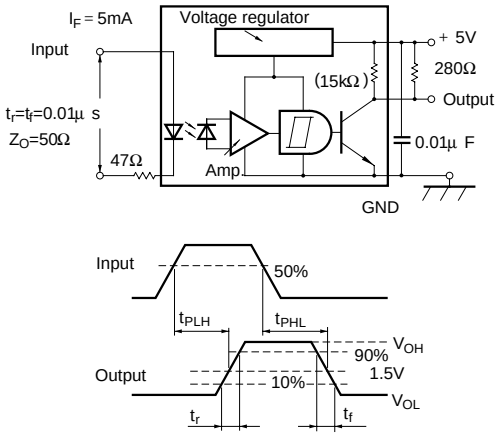


Fig.12 Rise Time, Fall Time vs. Load Resistance



Test Circuit for Response Time



■ Precautions for Use

(1) In order to stabilize power supply line, connect a by-pass capacitor of more than 0.01μF between Vcc and GND near the device.

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

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

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- Office automation equipment
- Telecommunication equipment [terminal]
- Test and measurement equipment
- Industrial control
- Audio visual equipment
- Consumer electronics

(ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:
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- Traffic signals
- Gas leakage sensor breakers
- Alarm equipment
- Various safety devices, etc.

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