

# GP1A91LR/GP1A91LC

## Subminiature OPIC Photointerrupter

### ■ Features

1. Compact package (3.7 × 2.6 × 3.1mm)
2. Can be directly connected to C-MOS logic and microcomputer
3. Low voltage operation, low dissipation current  
(Operating supply voltage : 1.4 to 7.0V  
OFF-state consumption current : MAX. 0.5mA)
4. Gap width 1.2mm, slit width 0.23mm
5. General purpose

### ■ Applications

1. Cameras
2. CD-ROM drives

### ■ Absolute Maximum Ratings (Ta=25°C)

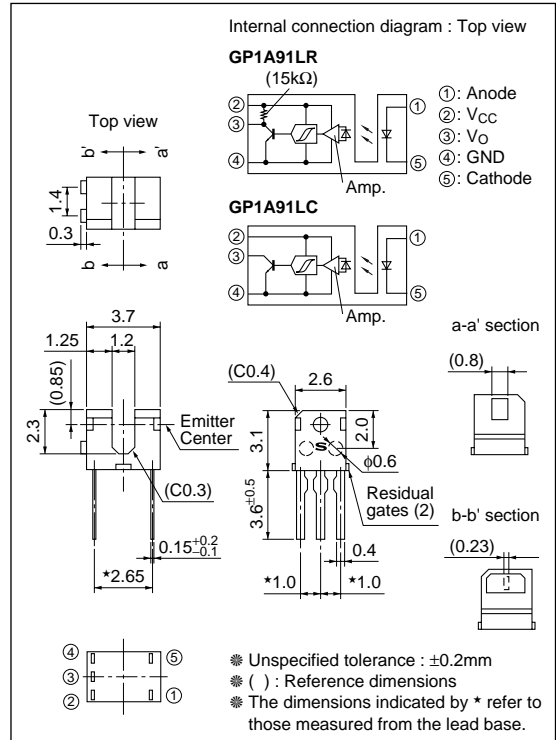
	Parameter	Symbol	Rating	Unit
Input	Forward current	I <sub>F</sub>	50	mA
	Reverse voltage	V <sub>R</sub>	6	V
	Power dissipation	P	75	mW
Output	Supply voltage	V <sub>CC</sub>	7.0	V
	Low level Output current	I <sub>O</sub>	2.0	mA
	Power dissipation	P <sub>O</sub>	80	mW
	Operating temperature	T <sub>opr</sub>	-25 to +85	°C
	Storage temperature	T <sub>stg</sub>	-40 to +100	°C
	*1 Soldering temperature	T <sub>sol</sub>	260	°C

\*1 The derating factors of absolute maximum ratings due to ambient temperature are shown in Fig.3, 4, 5

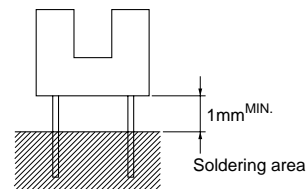
\*2 For 5s or less

### ■ 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.



■ Electro-optical Characteristics

(Ta=25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Input	Forward voltage	$I_f=5\text{mA}$	-	1.15	1.25	V	
	Reverse current	$V_R=3\text{V}$	-	-	10	$\mu\text{A}$	
Output	Operating supply voltage	-	1.4	-	7.0	V	
	Low level output voltage	$V_{CC}=3\text{V}, I_{OL}=1\text{mA}, I_f=5\text{mA}$	-	0.1	0.4	V	
	High level output voltage	$V_{CC}=3\text{V}, I_f=0\text{mA}$	2.9	-	-	V	
	Low level supply current	$V_{CC}=3\text{V}, I_f=5\text{mA}$	-	0.7	1.2	mA	
	High level supply current	$V_{CC}=3\text{V}, I_f=0\text{mA}$	-	0.3	0.5	mA	
Transfer characteristics	*3 "High→Low" threshold input current	$V_{CC}=3\text{V}$	-	1.2	3.5	mA	
	*4 Hysteresis	$V_{CC}=3\text{V}$	0.55	0.8	0.95	-	
	Response time	"Low→High" propagation delay time	$V_{CC}=3\text{V}$ $I_f=5\text{mA}$ $R_L=3\text{k}\Omega$ (GP1A91LR) $R_L=2.4\text{k}\Omega$ (GP1A91LC)	-	10	30	$\mu\text{s}$
		"High→Low" propagation delay time		-	3	15	
		Rise time		-	0.6	3.0	
		Fall time		-	0.2	1.0	

\*3  $I_{FHL}$  represents forward current when output goes from High to Low.

\*4 Hysteresis stands for  $I_{FLH}/I_{FHL}$ .

GP1A91LC-- $R_L$  (15k $\Omega$ ) is applied to  $V_{CC}-V_o$  (Condition during measuring response time :  $R_L=2.4\text{k}\Omega$ )

Fig.1 Test Circuit for Response Time

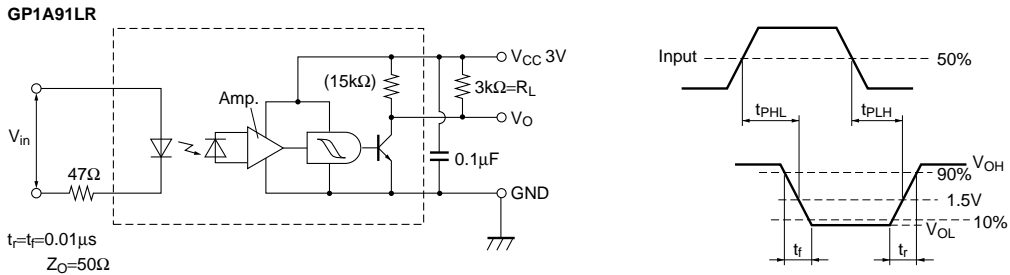
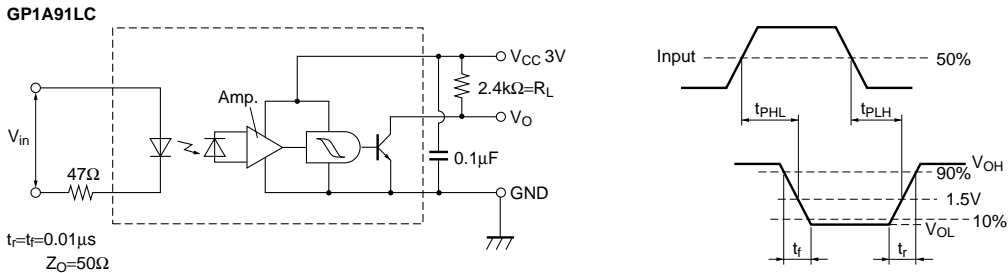
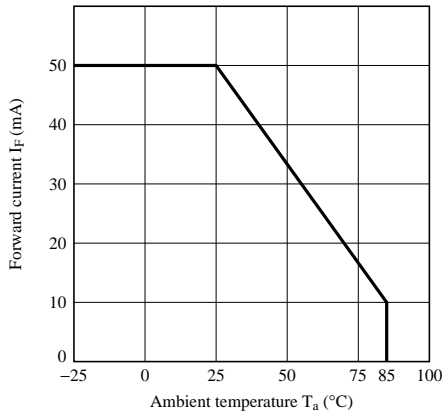


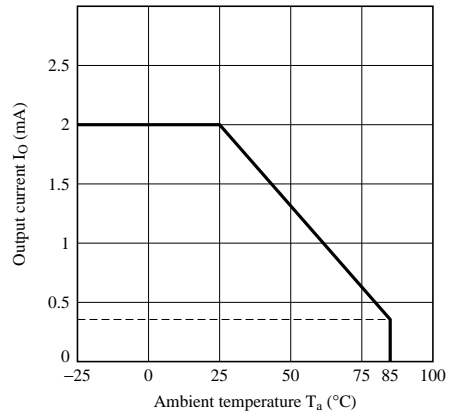
Fig.2 Test Circuit for Response Time



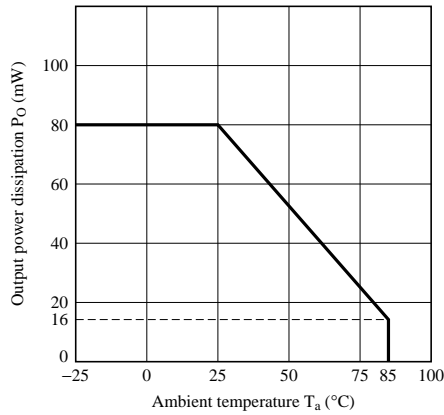
**Fig.3 Forward Current vs. Ambient Temperature**



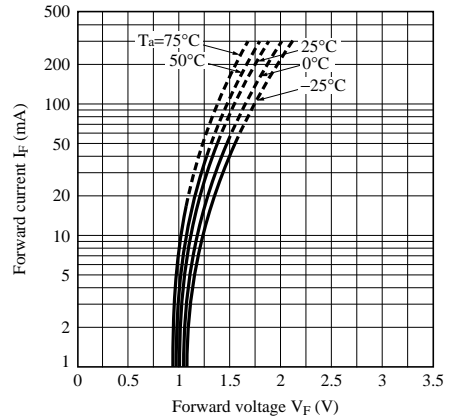
**Fig.4 Output Current vs. Ambient Temperature**



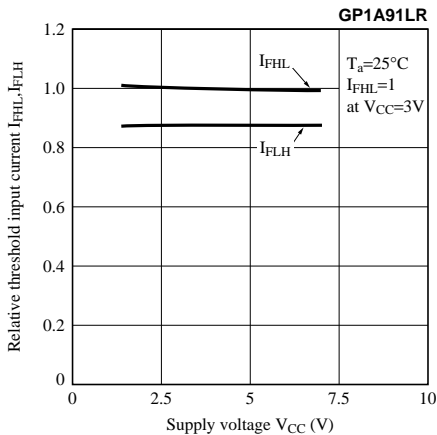
**Fig.5 Output Power Dissipation vs. Ambient Temperature**



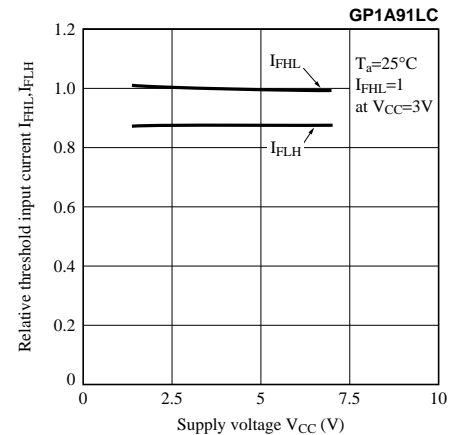
**Fig.6 Forward Current vs. Forward Voltage**



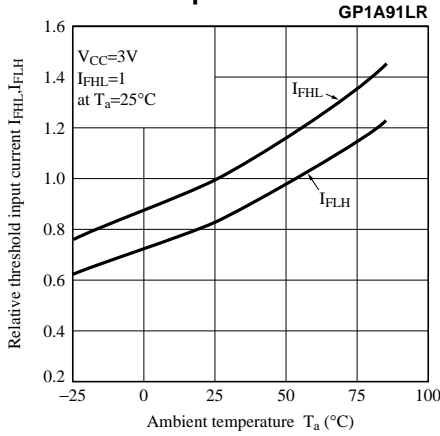
**Fig.7 Relative Threshold Input Current vs. Supply Voltage**



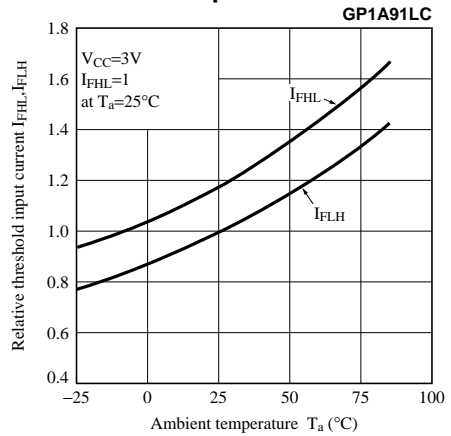
**Fig.8 Relative Threshold Input Current vs. Supply Voltage**



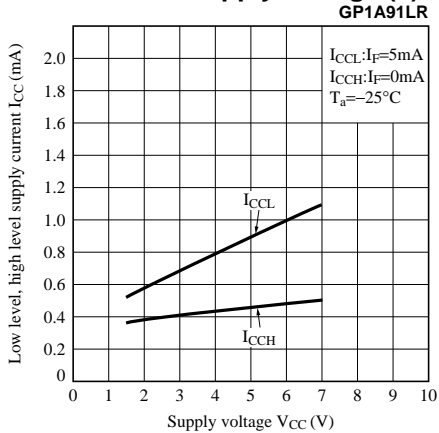
**Fig.9 Relative Threshold Input Current vs. Ambient Temperature**



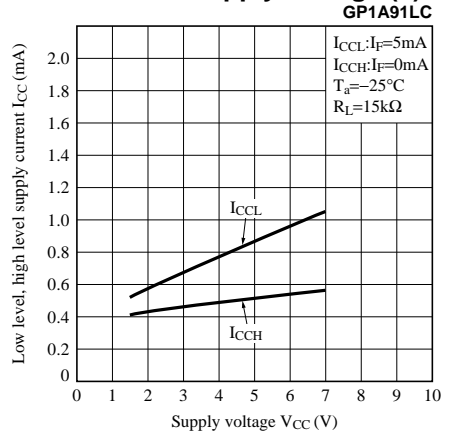
**Fig.10 Relative Threshold Input Current vs. Ambient Temperature**



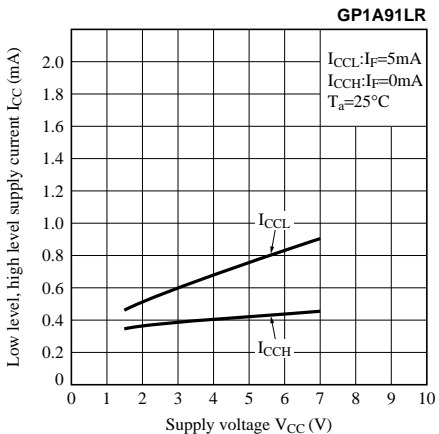
**Fig.11 Low Level, High Level Supply Current vs. Supply Voltage (1)**



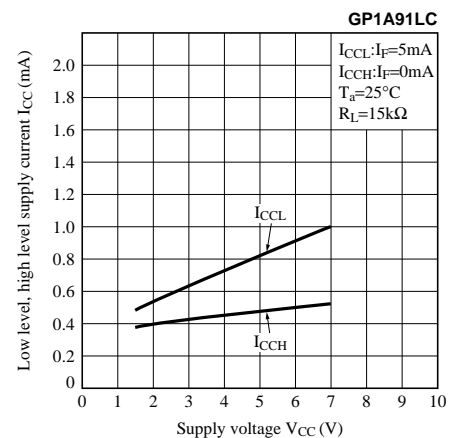
**Fig.12 Low Level, High Level Supply Current vs. Supply Voltage (1)**



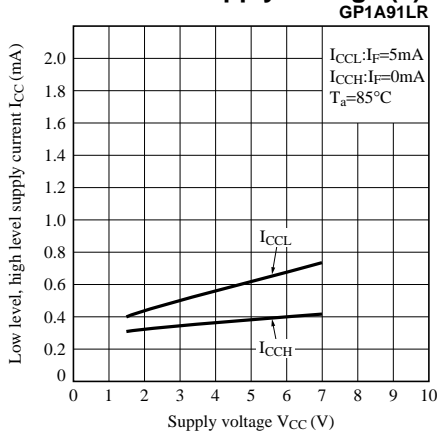
**Fig.13 Low Level, High Level Supply Current vs. Supply Voltage (2)**



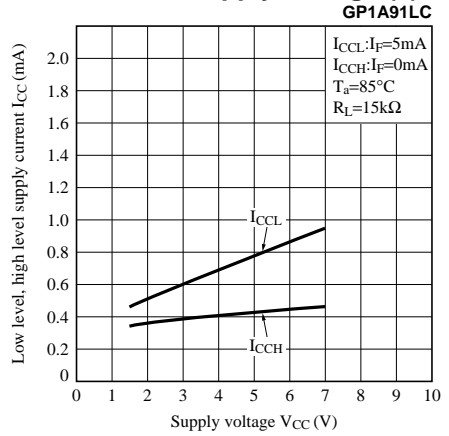
**Fig.14 Low Level, High Level Supply Current vs. Supply Voltage (2)**



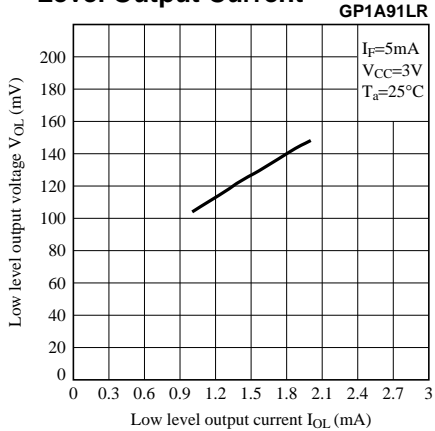
**Fig.15 Low Level, High Level Supply Current vs. Supply Voltage (3)**



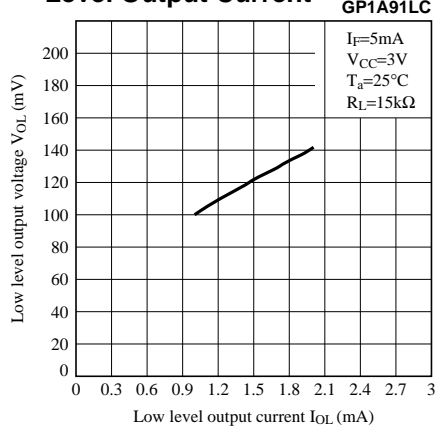
**Fig.16 Low Level, High Level Supply Current vs. Supply Voltage (3)**



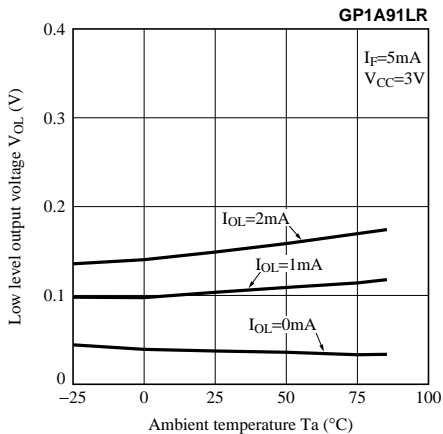
**Fig.17 Low Level Output Voltage vs. Low Level Output Current**



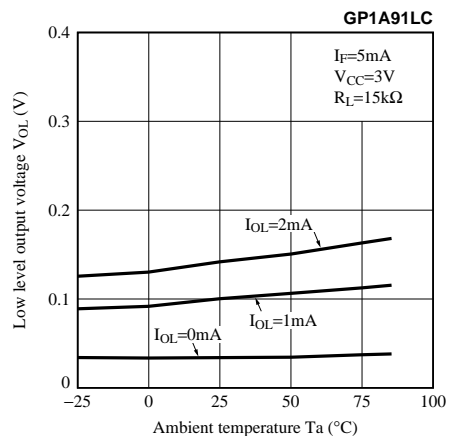
**Fig.18 Low Level Output Voltage vs. Low Level Output Current**



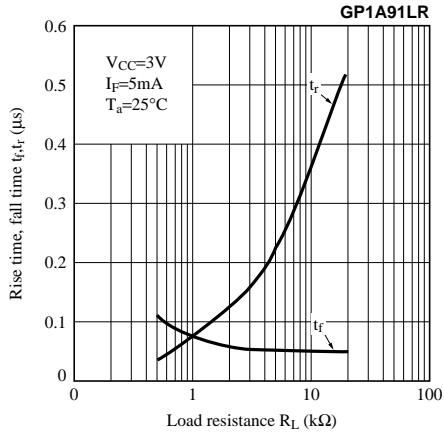
**Fig.19 Low Level Output Voltage vs. Ambient Temperature**



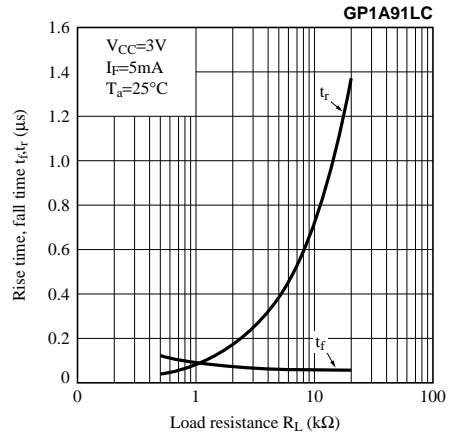
**Fig.20 Low Level Output Voltage vs. Ambient Temperature**



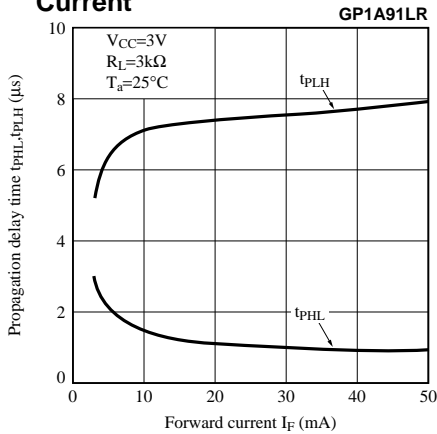
**Fig.21 Rise Time, Fall Time vs. Load Resistance**



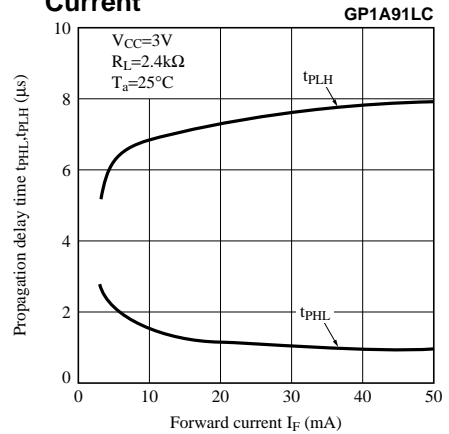
**Fig.22 Rise Time, Fall Time vs. Load Resistance**



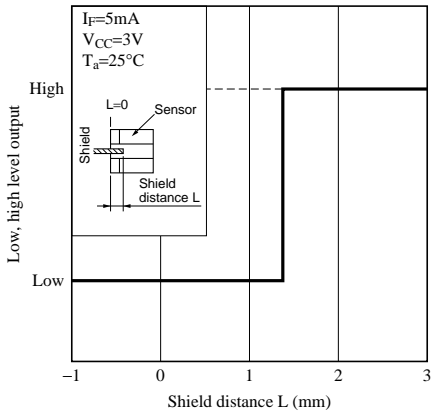
**Fig.23 Propagation Delay Time vs. Forward Current**



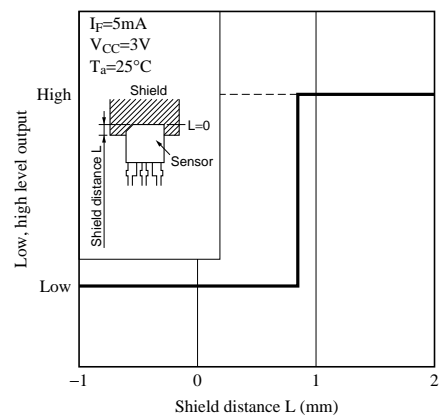
**Fig.24 Propagation Delay Time vs. Forward Current**



**Fig.25 Low, High Level Output vs. Shield Distance (1) (Typical Value)**



**Fig.26 Low, High Level Output vs. Shield Distance (2) (Typical Value)**



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