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GP1A91LR/GP1A91LC

Subminiature OPIC Photointerrupter

■ Features

1. Compact package ($3.7 \times 2.6 \times 3.1\text{mm}$)
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)

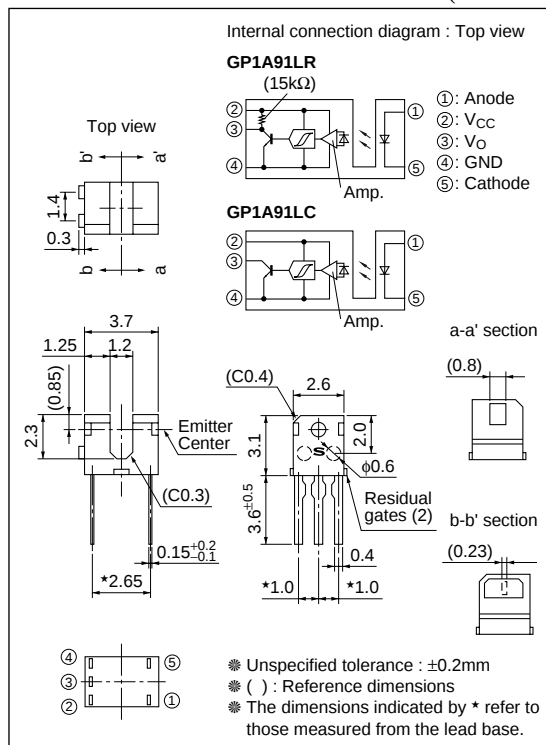
	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	6	V
	Power dissipation	P	75	mW
Output	Supply voltage	V_{CC}	7.0	V
	Low level Output current	I_O	2.0	mA
	Power dissipation	P_O	80	mW
	Operating temperature	T_{opr}	-25 to +85	°C
	Storage temperature	T_{stg}	-40 to +100	°C
	*1 Soldering temperature	T_{sol}	260	°C

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

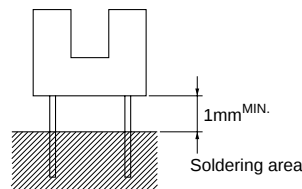
*2 For 5s or less

■ 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	V_F	$I_F=5\text{mA}$	—	1.15	1.25	V
	Reverse current	I_R	$V_R=3\text{V}$	—	—	10	μA
Output	Operating supply voltage	V_{CC}	—	1.4	—	7.0	V
	Low level output voltage	V_{OL}	$V_{CC}=3\text{V}$, $I_{OL}=1\text{mA}$, $I_F=5\text{mA}$	—	0.1	0.4	V
	High level output voltage	V_{OH}	$V_{CC}=3\text{V}$, $I_F=0\text{mA}$	2.9	—	—	V
	Low level supply current	I_{CCL}	$V_{CC}=3\text{V}$, $I_F=5\text{mA}$	—	0.7	1.2	mA
	High level supply current	I_{CCH}	$V_{CC}=3\text{V}$, $I_F=0\text{mA}$	—	0.3	0.5	mA
Transfer characteristics	*3 "High→Low" threshold input current	I_{FHL}	$V_{CC}=3\text{V}$	—	1.2	3.5	mA
	*4 Hysteresis	I_{FLH}/I_{FHL}	$V_{CC}=3\text{V}$	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	μs
		"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 Ω) 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

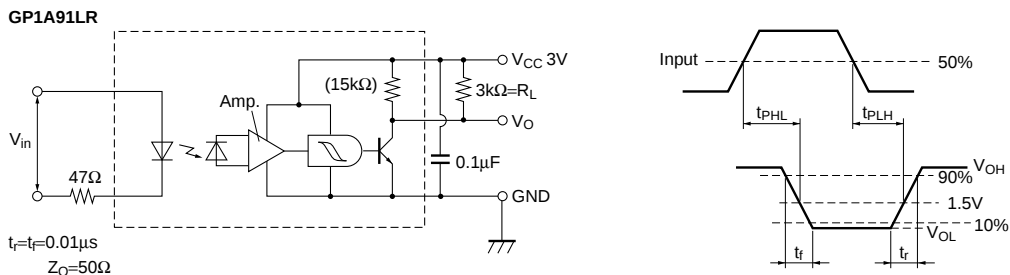


Fig.2 Test Circuit for Response Time

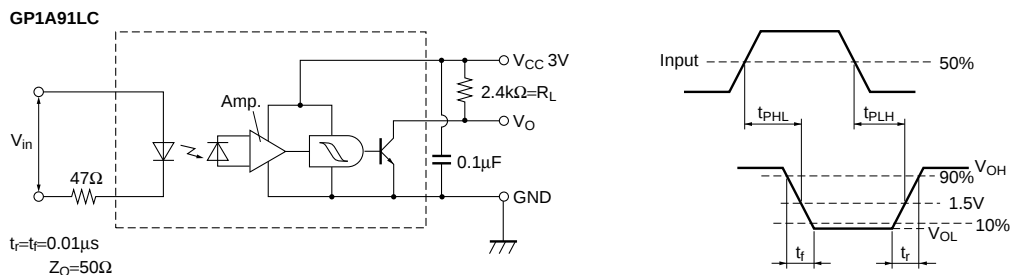


Fig.3 Forward Current vs. Ambient Temperature

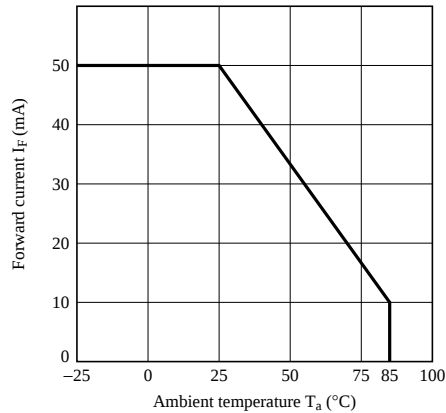


Fig.4 Output Current vs. Ambient Temperature

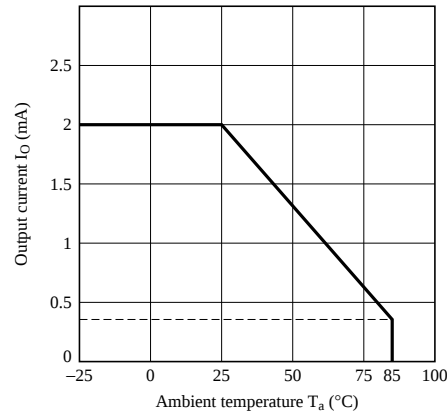


Fig.5 Output Power Dissipation vs. Ambient Temperature

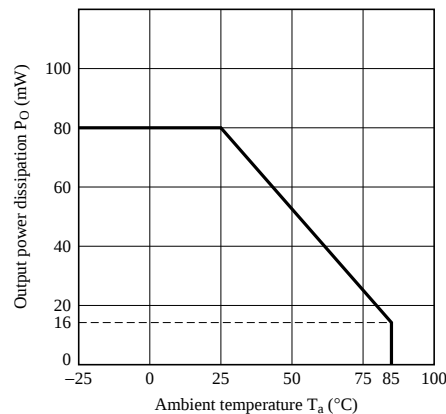


Fig.6 Forward Current vs. Forward Voltage

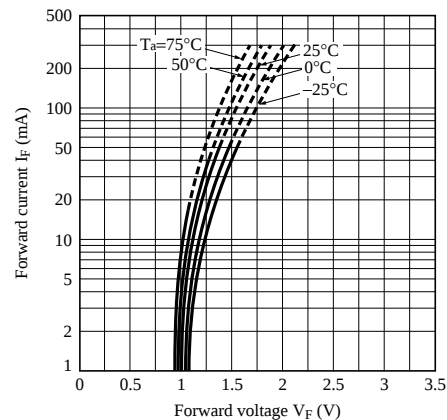


Fig.7 Relative Threshold Input Current vs. Supply Voltage

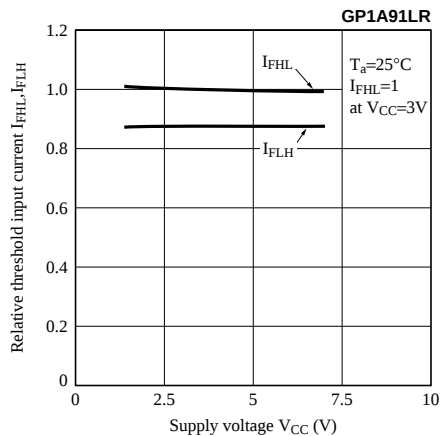


Fig.8 Relative Threshold Input Current vs. Supply Voltage

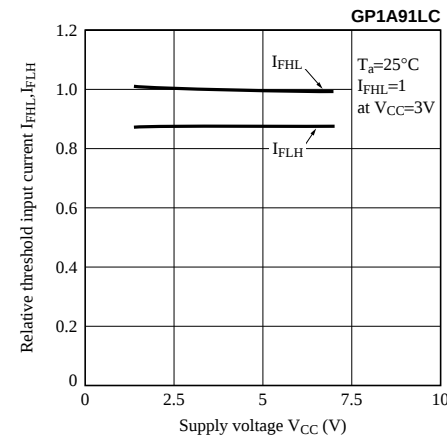


Fig.9 Relative Threshold Input Current vs. Ambient Temperature

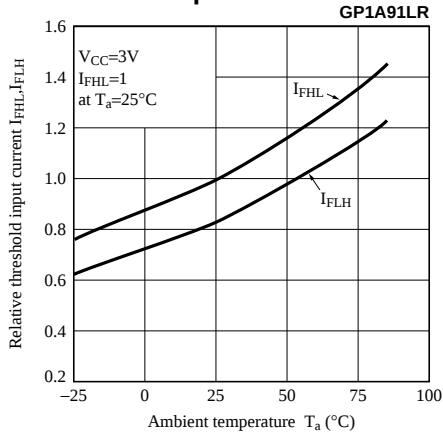


Fig.11 Low Level, High Level Supply Current vs. Supply Voltage (1)

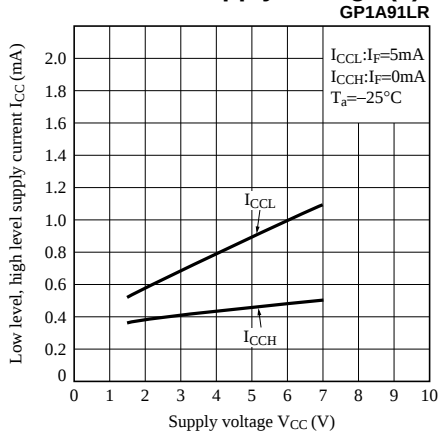


Fig.13 Low Level, High Level Supply Current vs. Supply Voltage (2)

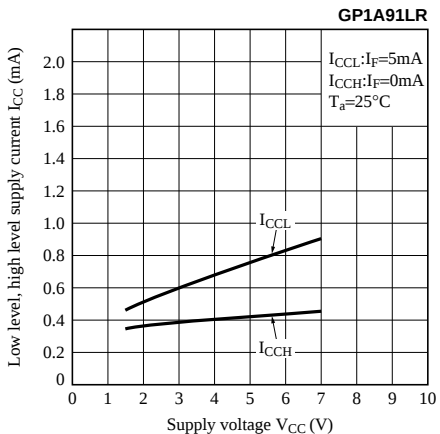


Fig.10 Relative Threshold Input Current vs. Ambient Temperature

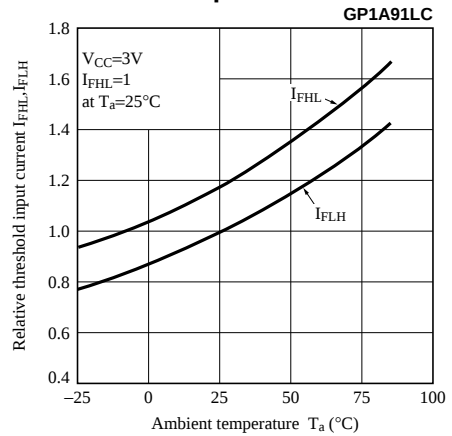


Fig.12 Low Level, High Level Supply Current vs. Supply Voltage (1)

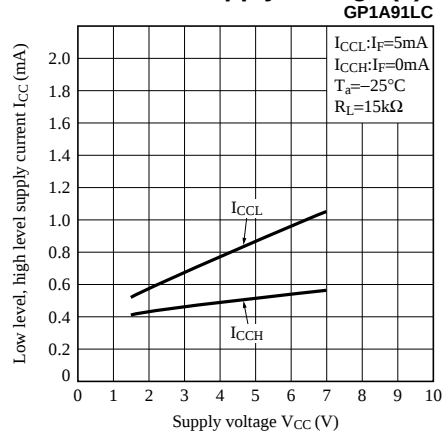


Fig.14 Low Level, High Level Supply Current vs. Supply Voltage (2)

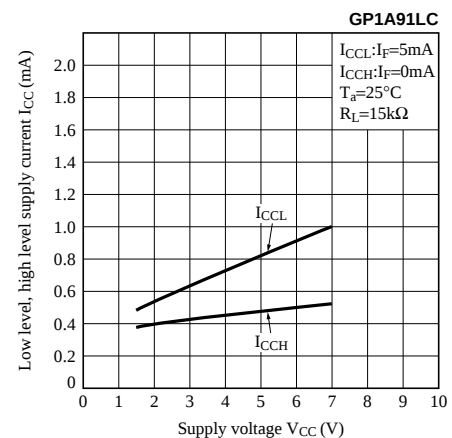


Fig.15 Low Level, High Level Supply Current vs. Supply Voltage (3)

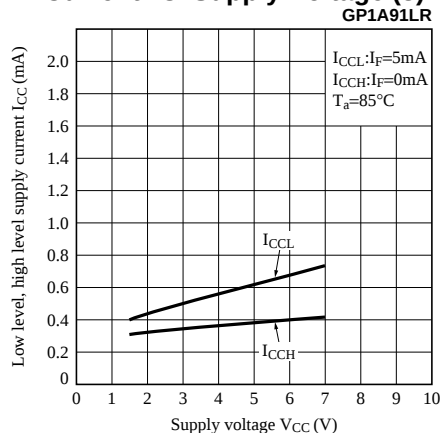


Fig.16 Low Level, High Level Supply Current vs. Supply Voltage (3)

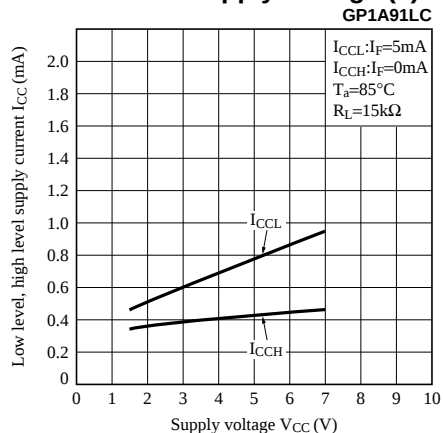


Fig.17 Low Level Output Voltage vs. Low Level Output Current

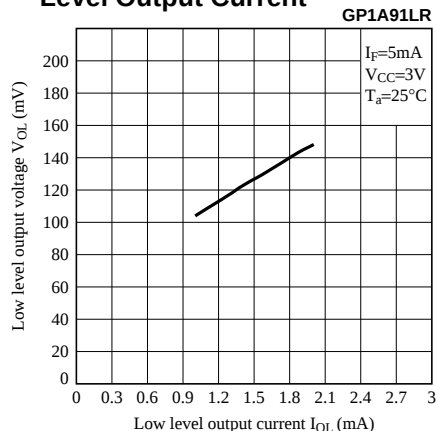


Fig.18 Low Level Output Voltage vs. Low Level Output Current

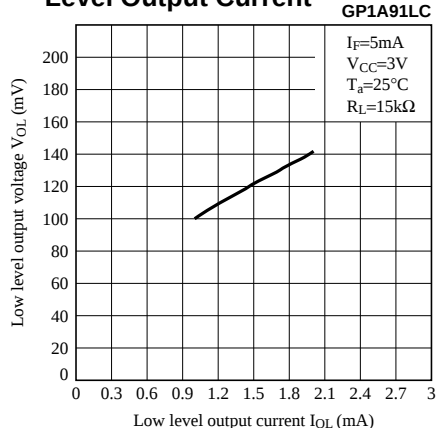


Fig.19 Low Level Output Voltage vs. Ambient Temperature

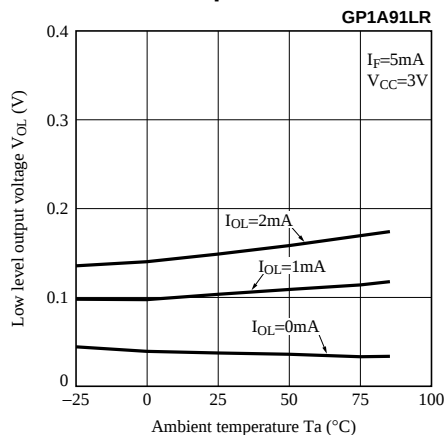


Fig.20 Low Level Output Voltage vs. Ambient Temperature

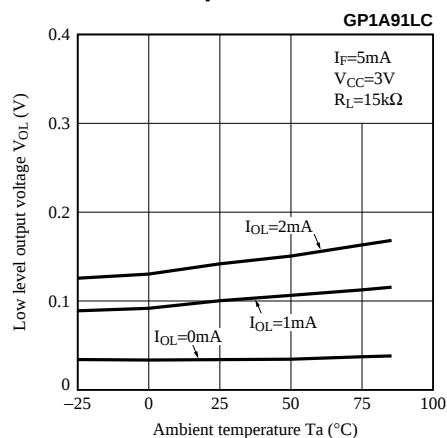


Fig.21 Rise Time, Fall Time vs. Load Resistance

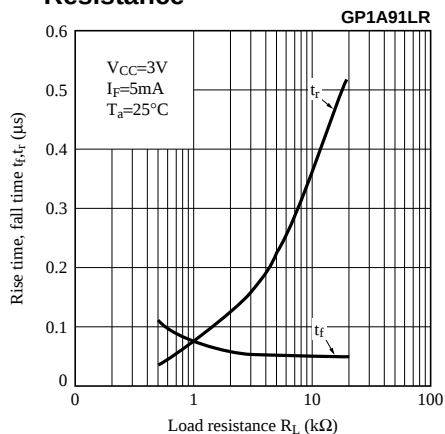


Fig.22 Rise Time, Fall Time vs. Load Resistance

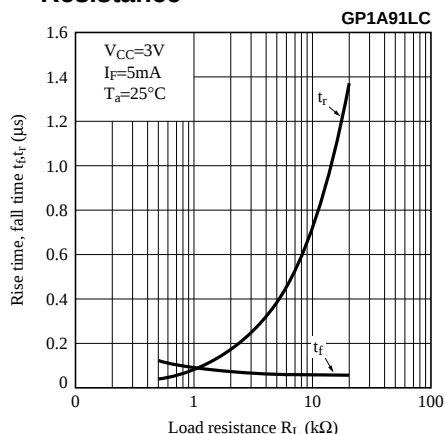


Fig.23 Propagation Delay Time vs. Forward Current

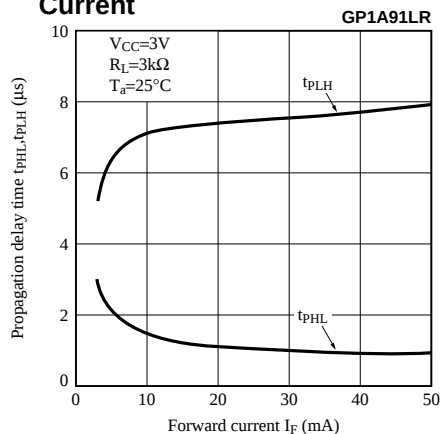


Fig.24 Propagation Delay Time vs. Forward Current

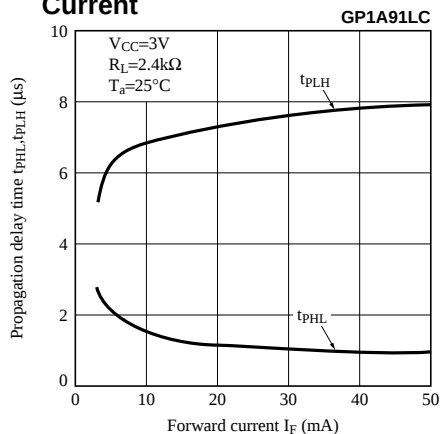


Fig.25 Low, High Level Output vs. Shield Distance (1) (Typical Value)

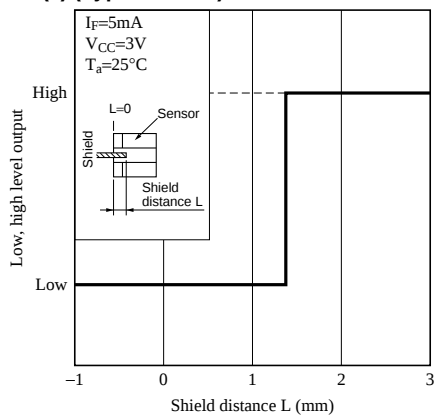
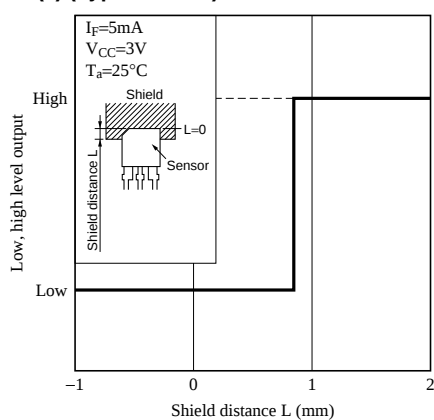


Fig.26 Low, High Level Output vs. Shield Distance (2) (Typical Value)



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