

# Photointerrupter, encased type

## RPI-1391

The RPI-1391 is a transmissive-type photointerrupter that uses a photo IC. A positioning pin is provided on the external case to allow precise snap-in mounting on the PC board.

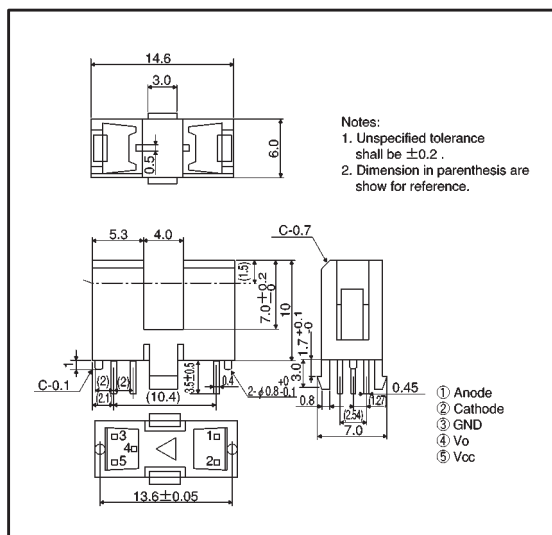
### ● Applications

Optical control equipment

### ● Features

- 1) Small slit width (0.5 mm) for high precision.
- 2) Fast response.

### ● External dimensions (Units: mm)



### ● Absolute maximum ratings (Ta = 25°C)

	Parameter	Symbol	Limits	Unit
Input(LED)	Forward current	$I_F$	50	mA
	Reverse voltage	$V_R$	5	V
	Power dissipation	$P_D$	80	mW
Output(photo-transistor)	Power supply voltage	$V_{CC}$	17	V
	Output voltage	$I_o$	20	mA
	Power dissipation	$P_D$	80	mW
Operating temperature		$T_{opr}$	$-20 \sim +85$	°C
Storage temperature		$T_{stg}$	$-40 \sim +100$	°C

● Electrical and optical characteristics (Ta = 25°C)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditions	
Input characteristics	Forward voltage	V <sub>F</sub>	—	1.3	1.6	V	I <sub>F</sub> =50mA	
	Reverse current	I <sub>R</sub>	—	—	10	μA	V <sub>R</sub> =5V	
Output characteristics	Power supply voltage	V <sub>CC</sub>	4.5	5	17	V	—	
	Output low level voltage	V <sub>OL</sub>	—	0.14	0.4	V	V <sub>CC</sub> =5V, I <sub>OL</sub> =16mA	
	Output high level voltage	V <sub>OH</sub>	3.5	—	—	V	V <sub>CC</sub> =5V, R <sub>L</sub> =1kΩ	
	Low level power supply current	I <sub>CC(L)</sub>	—	1.8	5.0	mA	V <sub>CC</sub> =5V	
	High level power supply current	I <sub>CC(H)</sub>	—	1.7	3.0	mA	V <sub>CC</sub> =5V	
Transfer characteristics	Low → High Threshold input current	I <sub>FLH</sub>	—	1.3	5.0	mA	V <sub>CC</sub> =5V	
	Hysteresis	I <sub>FLH</sub> / I <sub>FHL</sub>	—	0.7	—	—	V <sub>CC</sub> =5V	
	Response time	Low → High Propagation delay time	t <sub>PLH</sub>	—	1.6	—	μs	V <sub>CC</sub> =5V, I <sub>F</sub> =10mA, R <sub>L</sub> =680Ω
		High → Low Propagation delay time	t <sub>PHL</sub>	—	2.2	—		
		Rise time	t <sub>r</sub>	—	0.28	—		
		Fall time	t <sub>f</sub>	—	0.12	—		

● Electrical and optical characteristic curves

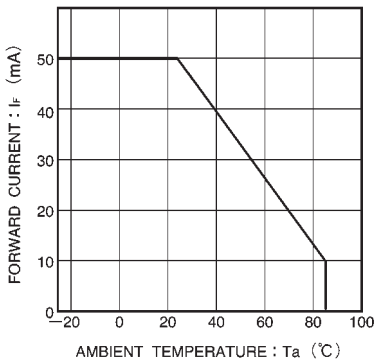


Fig.1 Forward current falloff

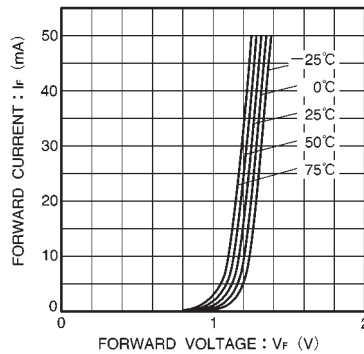


Fig.2 Forward current vs. forward voltage

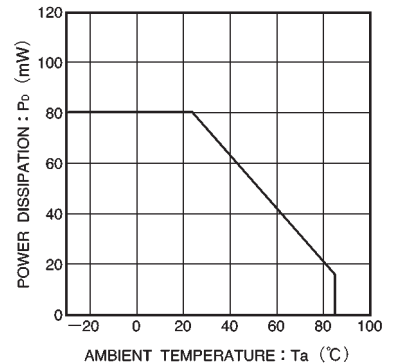


Fig.3 Power dissipation vs. ambient temperature

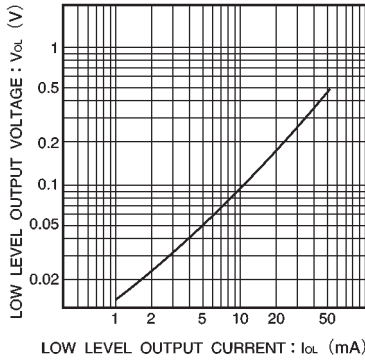


Fig.4 Low level output voltage vs. low level output current

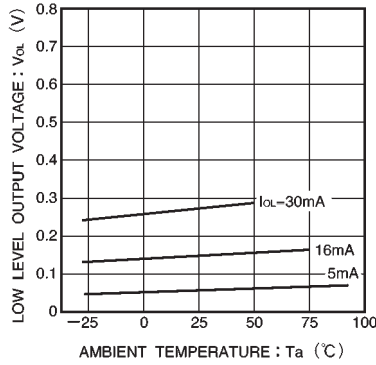


Fig.5 Low level output voltage vs. ambient temperature

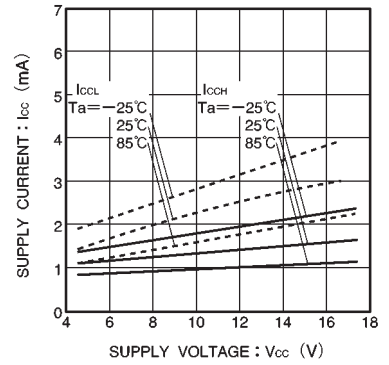


Fig.6 Supply current vs. supply voltage

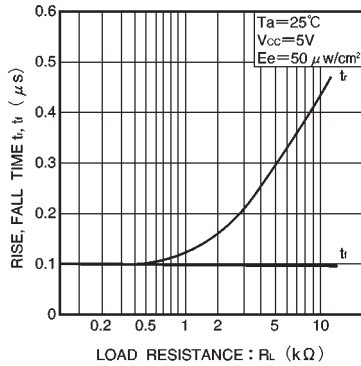


Fig.7 Rise and fall time vs. load resistance

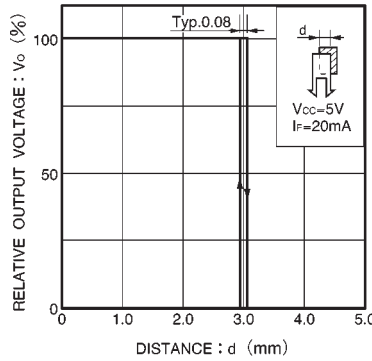
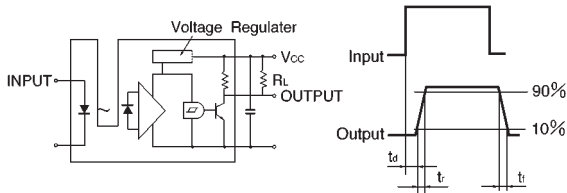


Fig.8 Relative output voltage vs. distance



$t_d$ : Delay time  
 $t_r$ : Rise time (time for output current to rise from 10% to 90% of peak current)  
 $t_f$ : Fall time (time for output current to fall from 90% to 10% of peak current)

Fig.9 Response time measurement circuit