

# PC917X/PC918X

## High Speed, High CMR OPIC Photocoupler

### ■ Features

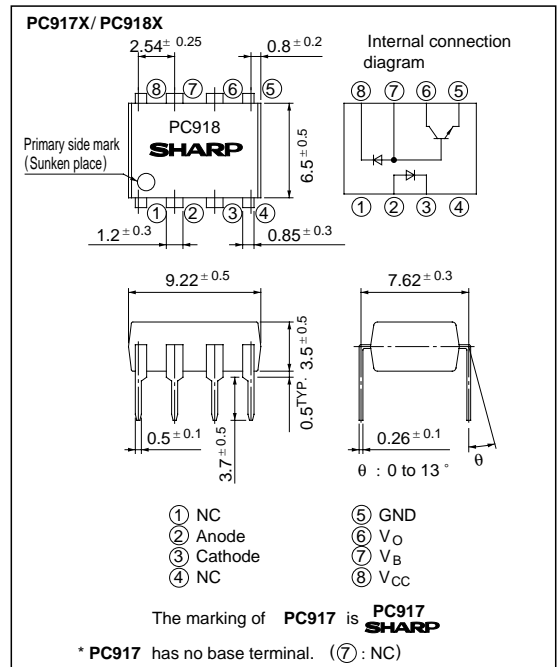
1. High speed response  
( $t_{PHL,PLH}$ : TYP.  $0.3 \mu s$  at  $R_L = 1.9k\Omega$ )
2. High instantaneous common mode rejection voltage  
( $CM_H$ : TYP.  $1kV/\mu s$ )
3. Standard dual-in-line package
4. Recognized by UL, file No. E64380

### ■ Applications

1. Computers, measuring instruments, controllers
2. High speed line receivers high speed logic
3. Switing regulators
4. Signal transmission between circuits of different potentials and impedances

### ■ 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	$I_F$	25	mA
	Reverse voltage	$V_R$	5	V
	Power dissipation	$P$	45	mW
Output	Supply voltage	$V_{CC}$	- 0.5 to + 15	V
	Output voltage	$V_O$	- 0.5 to + 15	V
	*1 Emitter-base voltage	$V_{EBO}$	5	V
	Output current	$I_O$	8	mA
	Power dissipation	$P_O$	100	mW
	*2 Isolation voltage	$V_{iso}$	2 500	$V_{rms}$
	Operating temperature	$T_{opr}$	- 55 to + 100	°C
	Storage temperature	$T_{stg}$	- 55 to + 125	°C
	*3 Soldering temperature	$T_{sol}$	260	°C

\*1 Voltage between pin 5 and pin 7 (applies to PC918X)

\*2 40 to 60% RH, AC for 1 minute

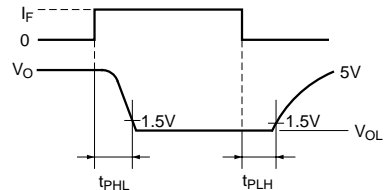
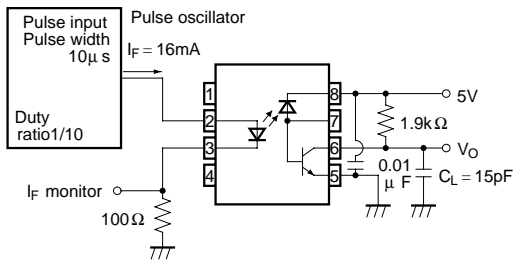
\*3 For 10 seconds

## Electro-optical Characteristics

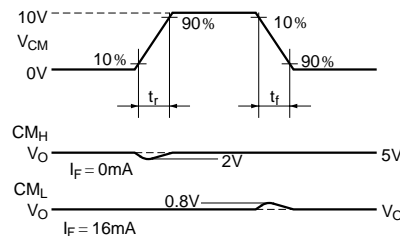
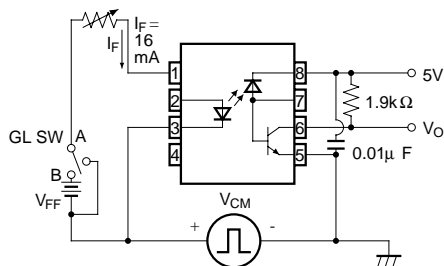
(Unless otherwise specified,  $T_a = 0$  to  $+70^\circ\text{C}$ )

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	$V_F$	$T_a = 25^\circ\text{C}, I_F = 16\text{mA}$	-	1.7	1.95	V
	Reverse current	$I_R$	$T_a = 25^\circ\text{C}, V_R = 5\text{V}$	-	-	10	$\mu\text{A}$
	Terminal capacitance	$C_t$	$T_a = 25^\circ\text{C}, V_F = 0, f = 1\text{MHz}$	-	60	250	pF
Output	High level output current (1)	$I_{OH(1)}$	$T_a = 25^\circ\text{C}, I_F = 0, V_{CC} = V_O = 5.5\text{V}$	-	3	500	nA
	High level output current (2)	$I_{OH(2)}$	$T_a = 25^\circ\text{C}, I_F = 0, V_{CC} = V_O = 15\text{V}$	-	-	1	$\mu\text{A}$
	High level output current (3)	$I_{OH(3)}$	$I_F = 0, V_{CC} = V_O = 15\text{V}$	-	-	50	$\mu\text{A}$
	Low level output voltage	$V_{OL}$	$I_F = 16\text{mA}, I_O = 2.4\text{mA}, V_{CC} = 4.5\text{V}$	-	-	0.4	V
	Low level supply current	$I_{CCL}$	$I_F = 16\text{mA}, V_O = \text{open}, V_{CC} = 15\text{V}$	-	200	-	$\mu\text{A}$
	High level supply current (1)	$I_{CCH(1)}$	$T_a = 25^\circ\text{C}, I_F = 0, V_O = \text{open}, V_{CC} = 15\text{V}$	-	0.02	1	$\mu\text{A}$
	High level supply current (2)	$I_{CCH(2)}$	$I_F = 0, V_O = \text{open}, V_{CC} = 15\text{V}$	-	-	2	$\mu\text{A}$
Transfer characteristics	Current transfer ratio	CTR	$T_a = 25^\circ\text{C}, I_F = 16\text{mA}, V_O = 0.4\text{V}, V_{CC} = 4.5\text{V}$	19	-	-	%
	Isolation resistance	$R_{ISO}$	$T_a = 25^\circ\text{C}, \text{DC}500\text{V}, 40$ to $60\%$ RH	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$
	Floating capacitance	$C_f$	$T_a = 25^\circ\text{C}, V = 0, f = 1\text{MHz}$	-	0.6	1	pF
	*4 "High→Low" propagation delay time	$t_{PHL}$	$T_a = 25^\circ\text{C}, R_L = 1.9\text{k}\Omega, I_F = 16\text{mA}, V_{CC} = 5\text{V}$	-	0.3	0.8	$\mu\text{s}$
	*4 "Low→High" propagation delay time	$t_{PLH}$	$T_a = 25^\circ\text{C}, R_L = 1.9\text{k}\Omega, I_F = 16\text{mA}, V_{CC} = 5\text{V}$	-	0.3	1.2	$\mu\text{s}$
	*5 Instantaneous common mode rejection voltage "Output : High level"	$CM_H$	$T_a = 25^\circ\text{C}, I_F = 0, R_L = 1.9\text{k}\Omega, V_{CM} = 10\text{Vp-p}, V_{CC} = 5\text{V}$	-	1 000	-	V/ $\mu\text{s}$
*5 Instantaneous common mode rejection voltage "Output : Low level"	$CM_L$	$T_a = 25^\circ\text{C}, I_F = 16\text{mA}, R_L = 1.9\text{k}\Omega, V_{CM} = 10\text{Vp-p}, V_{CC} = 5\text{V}$	-	- 1 000	-	V/ $\mu\text{s}$	

### \*4 Test Circuit for Propagation Delay Time (PC918X)



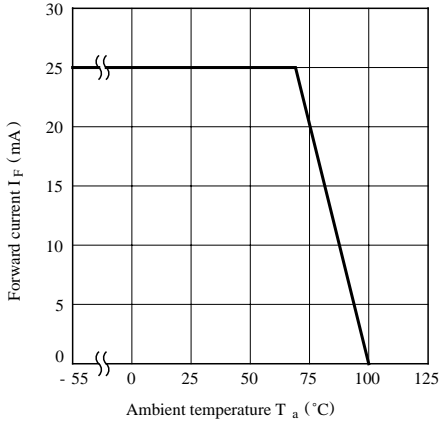
### \*5 Test Circuit for Instantaneous Common Mode Rejection Voltage (PC918X)



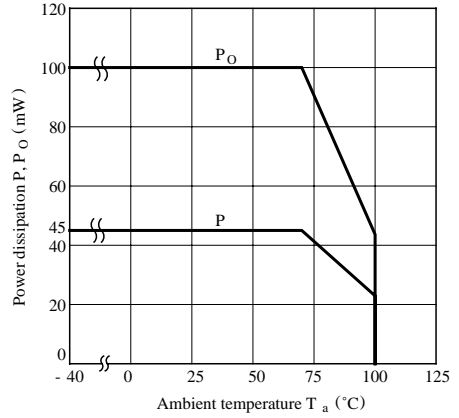
When the switch for infrared light emitting diode sets to A.

When the switch for infrared light emitting diode sets to B.

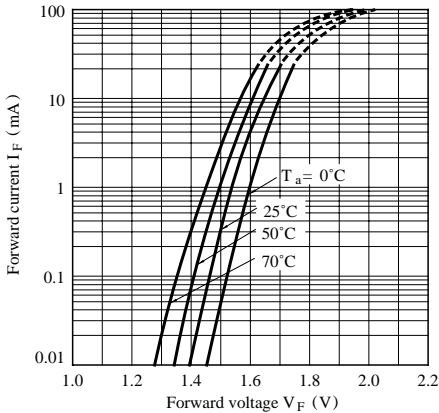
**Fig. 1 Forward Current vs. Ambient Temperature**



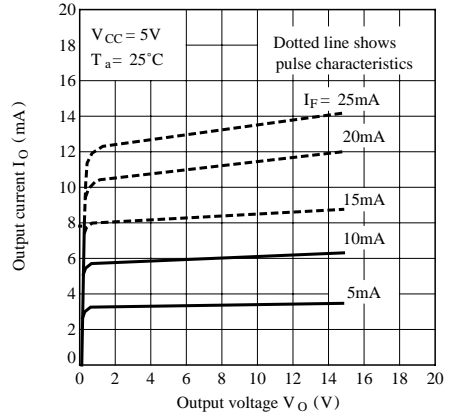
**Fig. 2 Power Dissipation vs. Ambient Temperature**



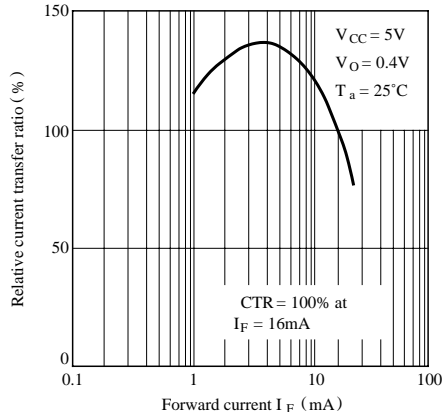
**Fig. 3 Forward Current vs. Forward Voltage**



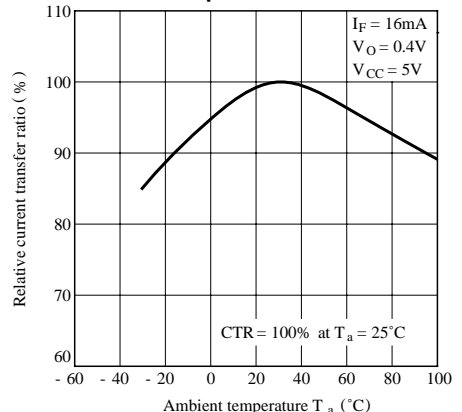
**Fig. 4 Output Current vs. Output Voltage**



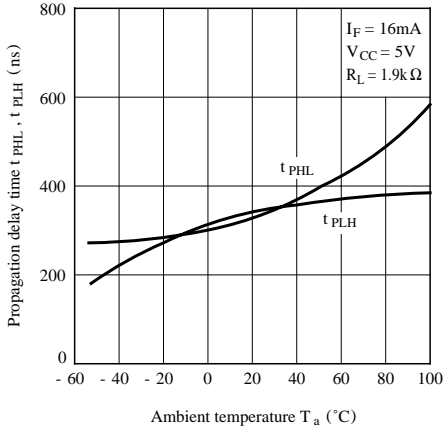
**Fig. 5 Relative Current Transfer Ratio vs. Forward Current**



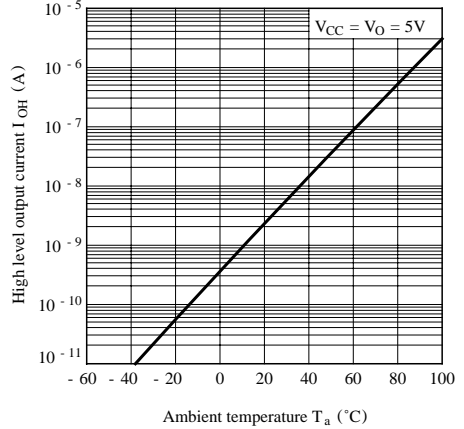
**Fig. 6 Relative Current Transfer Ratio vs. Ambient Temperature**



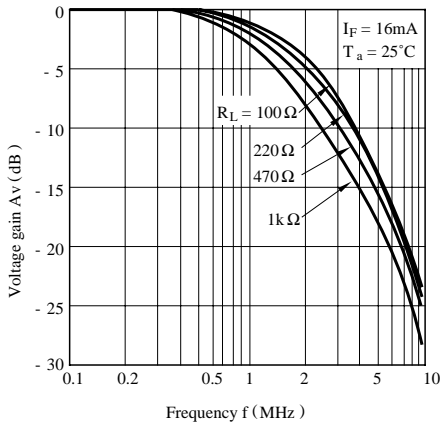
**Fig. 7 Propagation Delay Time vs. Ambient Temperature**



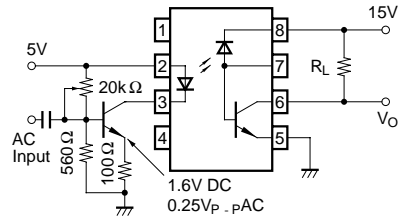
**Fig. 8 High Level Output Current vs. Ambient Temperature**



**Fig. 9 Frequency Response**



**Test Circuit for Frequency Response (PC918X)**



**■ Precautions for Use**

- (1) It is recommended that a by-pass capacitor of more than 0.01  $\mu\text{F}$  is added between  $V_{CC}$  and GND near the device in order to stabilize power supply line.
- (2) Transistor of detector side in bipolar configuration is apt to be affected by static electricity for its minute design. When handling them, general counterplan against static electricity should be taken to avoid breakdown of devices or degradation of characteristics.
- (3) As for other general cautions, refer to the chapter "Precautions for Use".

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