

# PC9D17

※ Lead forming type (I type) and taping reel type (P type) are also available. (PC9D17I/PC9D17P)

## ■ Features

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

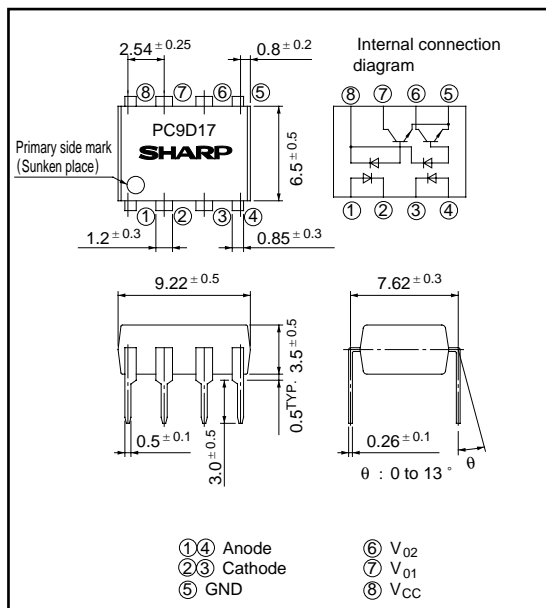
## ■ Applications

1. Electronic calculators, measuring instruments
2. Digital audio equipment
3. High speed receivers
4. Switching regulators

## High Speed, High Common Mode Rejection, 2-channel OPIC Photocoupler

## ■ 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

( $T_a = 25^\circ\text{C}$ )

Parameter		Symbol	Rating	Unit
Input	*1 Forward current	$I_F$	25	mA
	*1 Reverse voltage	$V_R$	5	V
	*1 Power dissipation	$P$	45	mW
Output	Supply voltage	$V_{CC}$	- 0.5 to + 15	V
	*1 Output voltage	$V_O$	- 0.5 to + 15	V
	*1 Output current	$I_O$	8	mA
	*1 Power dissipation	$P_O$	35	mW
*2 Isolation voltage		$V_{iso}$	2 500	$V_{rms}$
Operating temperature		$T_{opr}$	- 55 to + 100	$^\circ\text{C}$
Storage temperature		$T_{stg}$	- 55 to + 125	$^\circ\text{C}$
*3 Soldering temperature		$T_{sol}$	260	$^\circ\text{C}$

\*1 Each channel

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

\*3 For 10 seconds

Electro-optical Characteristics

( Unless otherwise specified, Ta = 0 to + 70°C )

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	$V_F$	Ta = 25°C, $I_F$ = 16mA	-	1.7	1.95	V
	Reverse current	$I_R$	Ta = 25°C, $V_R$ = 5V	-	-	10	μ A
	Terminal capacitance	$C_t$	Ta = 25°C, $V_F$ = 0, f = 1MHz	-	60	250	pF
Output	High level output current ( 1 )	$I_{OH(1)}$	Ta = 25°C, $I_F$ = 0, $V_{CC}$ = $V_O$ = 5.5V	-	-	500	nA
	High level output current ( 2 )	$I_{OH(2)}$	Ta = 25°C, $I_F$ = 0, $V_{CC}$ = $V_O$ = 15V	-	-	1	μ A
	High level output current ( 3 )	$I_{OH(3)}$	$I_F$ = 0, $V_{CC}$ = $V_O$ = 15V	-	-	50	μ A
	Low level output voltage	$V_{OL}$	$I_F$ = 16mA, $I_O$ = 2.4mA, $V_{CC}$ = 4.5V	-	-	0.4	V
	Low level supply current	$I_{CCL}$	$I_F$ = 16mA, $V_O$ = open, $V_{CC}$ = 15V	-	400	-	μ A
	High level supply current ( 1 )	$I_{CCH(1)}$	Ta = 25°C, $I_F$ = 0, $V_O$ = open $V_{CC}$ = 15V	-	0.02	1	μ A
	High level supply current ( 2 )	$I_{CCH(2)}$	$I_F$ = 0, $V_O$ = open, $V_{CC}$ = 15V	-	-	2	μ A
	Current transfer ratio	CTR	Ta = 25°C, $I_F$ = 16mA, $V_O$ = 0.4V, $V_{CC}$ = 4.5V	19	-	-	%
Transfer characteristics	Isolation resistance	$R_{ISO}$	Ta = 25°C, DC500V, 40 to 60% RH	$5 \times 10^{10}$	$10^{11}$	-	Ω
	Floating capacitance	$C_f$	Ta = 25°C, V = 0, f = 1MHz	-	0.6	-	pF
	“ High→Low ” propagation delay time	$t_{PHL}$	Ta = 25°C, $R_L$ = 1.9kΩ Fig. 1 $I_F$ = 16mA, $V_{CC}$ = 5V	-	0.3	0.8	μ s
	“ Low→High ” propagation delay time	$t_{PLH}$	Ta = 25°C, $R_L$ = 1.9kΩ Fig. 1 $I_F$ = 16mA, $V_{CC}$ = 5V	-	0.3	0.8	μ s
	Instantaneous common mode rejection voltage “ High level output ”	$CM_H$	Ta = 25°C, $I_F$ = 0, $R_L$ = 1.9kΩ Fig. 2 $V_{CM}$ = 10Vp-p, $V_{CC}$ = 5V	-	1 000	-	V/ μ s
	Instantaneous common mode rejection voltage “ Low level output ”	$CM_L$	Ta = 25°C, $I_F$ = 16mA, $R_L$ = 19kΩ Fig. 2 $V_{CM}$ = 10Vp-p, $V_{CC}$ = 5V	-	- 1 000	-	V/ μ s

All typical values : at Ta = 25°C

Recommended Operating Conditions

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Forward current	$I_F$	-	-	16	mA
Supply voltage	$V_{CC}$	-	5	-	V
Operating temperature	$T_{opr}$	0	-	70	°C

Fig. 1 Test Circuit for Propagation Delay Time

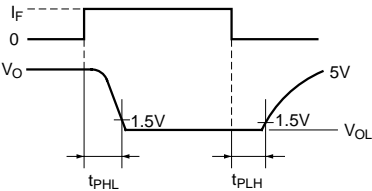
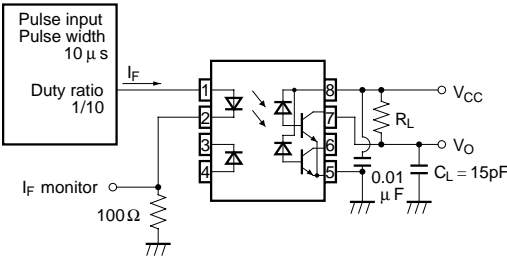


Fig. 2 Test Circuit for Instantaneous Common Mode Rejection Voltage

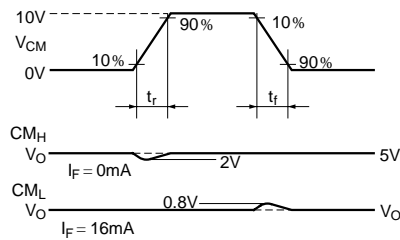
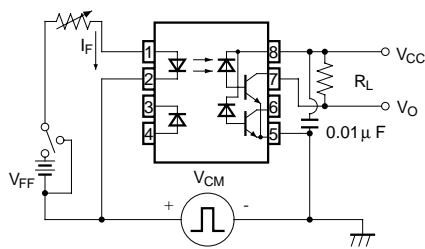


Fig. 3 Forward Current vs. Ambient Temperature

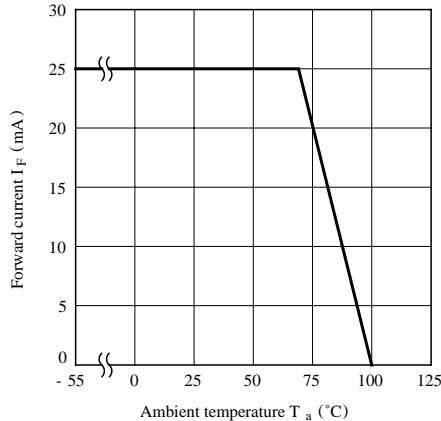


Fig. 4 Power Dissipation vs. Ambient Temperature

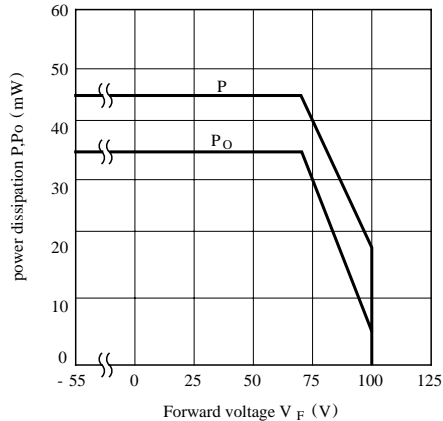


Fig. 5 Forward Current vs. Forward Voltage

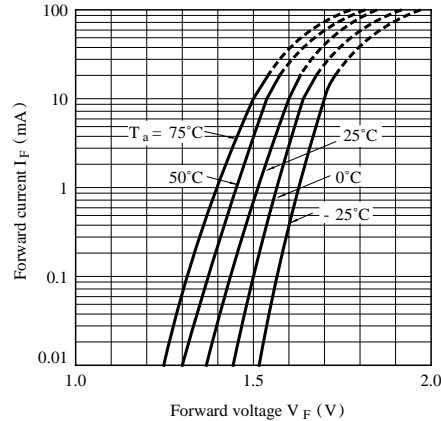


Fig. 6 Output Current vs. Output Voltage (Dotted line shows pulse characteristics)

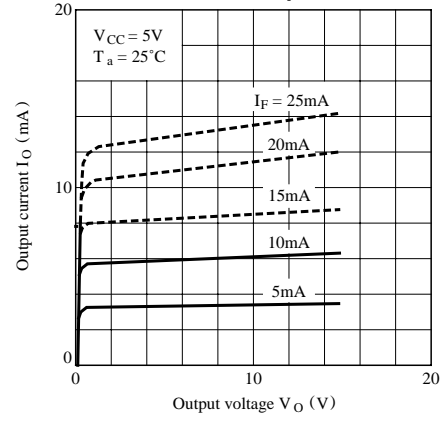


Fig. 7 Relative Current Transfer Ratio vs. Forward Current

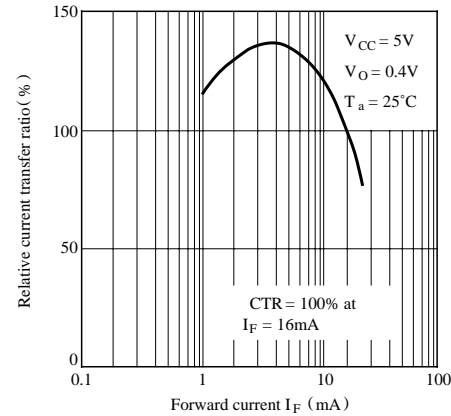


Fig. 8 Relative Current Transfer Ratio vs. Ambient Temperature

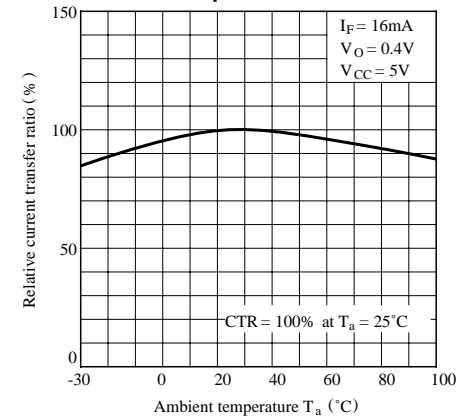


Fig. 9 Propagation Delay Time vs. Ambient Temperature

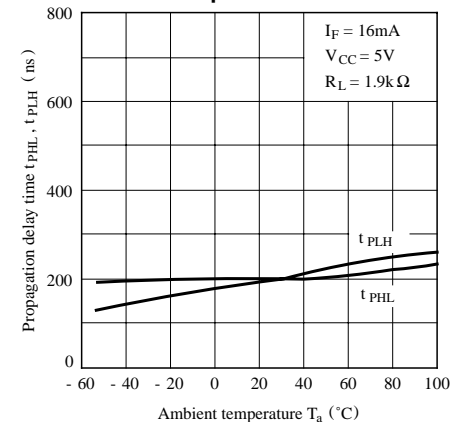


Fig.10 Propagation Delay Time vs. Load Resistance

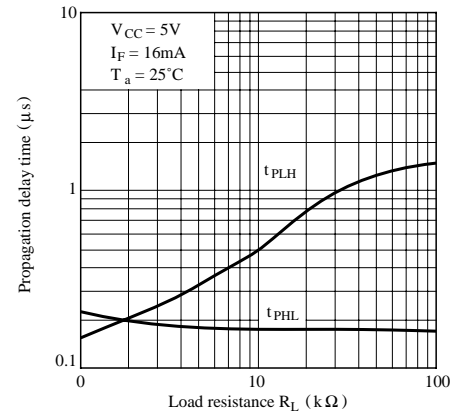


Fig.11 Output Voltage vs. Forward Current

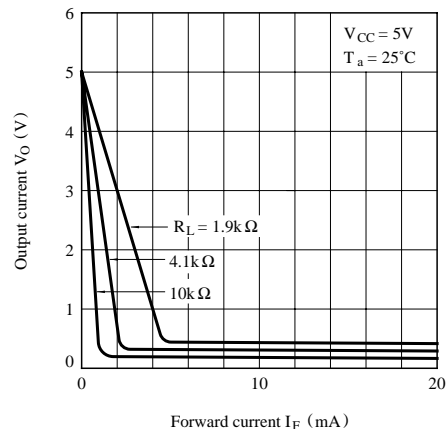


Fig.12 High Level Output Current vs. Ambient Temperature

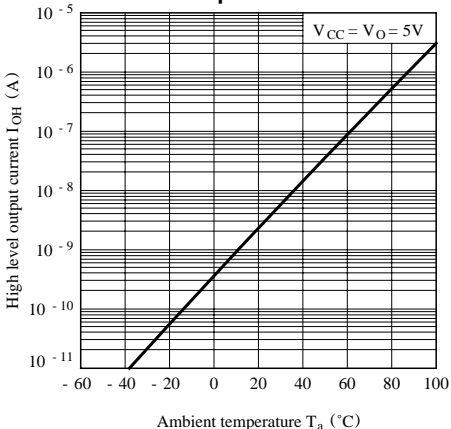
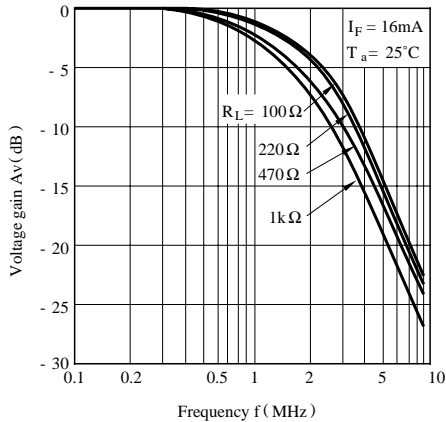
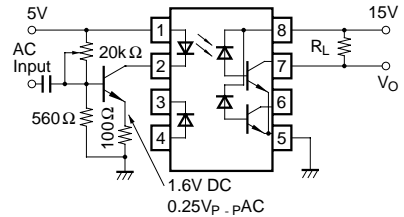


Fig.13 Frequency Response



Test Circuit for Frequency Response



### ■ Precautions for Use

- (1) It is recommended that a by-pass capacitor of more than  $0.01\mu\text{F}$  is added between  $V_{\text{CC}}$  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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