PC9D17

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

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

■ Features

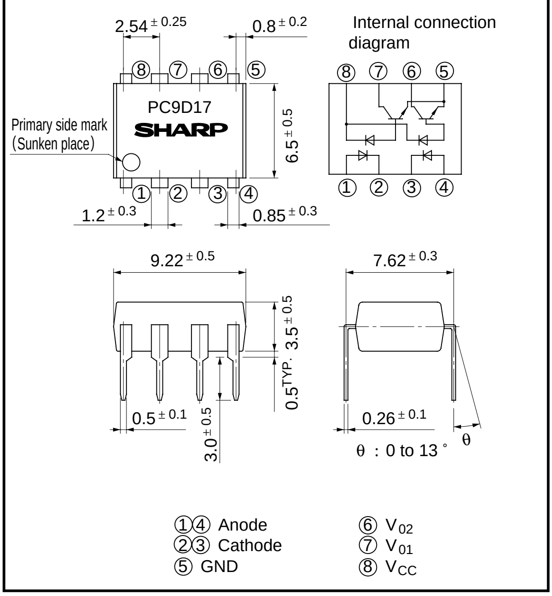
1. Built-in 2-channel
2. High speed response
   (t_{PHL}, t_{PLH} : TYP. 0.3 μs at R_L = 1.9kΩ)
3. High instantaneous common mode rejection voltage
   CM_H : TYP. 1kV/ μs
4. Standard dual-in-line package
5. Recognized by UL, file No. E64380

■ Applications

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

■ 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.

■ Absoulte Maximum Ratings

(Ta= 25˚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	˚C
Storage temperature		T_{stg}	- 55 to + 125	˚C
*3 Soldering temperature		T_{sol}	260	˚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	μA
	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	μA
	High level output current (3)	$I_{OH(3)}$	I_F = 0, V_{CC} = V_O = 15V	-	-	50	μA
	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	-	μA
	High level supply current (1)	$I_{CCH(1)}$	Ta = 25˚C, I_F = 0, V_O = open V_{CC} = 15V	-	0.02	1	μA
	High level supply current (2)	$I_{CCH(2)}$	I_F = 0, V_O = open, V_{CC} = 15V		-	2	μA
Transfer charac-teristics	Current transfer ratio	CTR	Ta = 25˚C, I_F = 16mA, V_O = 0.4V, V_{CC} = 4.5V	19	-	-	%
	Isolation resistance	R_{ISO}	Ta = 25˚C, DC500V, 40 to 60% RH	5 x 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, I_F = 16mA, V_{CC} = 5V (Fig. 1)	-	0.3	0.8	μs
	"Low→High" propagation delay time	t_{PLH}	Ta = 25˚C, R_L = 1.9kΩ, I_F = 16mA, V_{CC} = 5V (Fig. 1)	-	0.3	0.8	μs
	Instantaneous common mode rejection voltage "High level output"	CM_H	Ta = 25˚C, I_F = 0, R_L = 1.9kΩ, V_{CM} = 10Vp-p, V_{CC} = 5V (Fig. 2)	-	1 000	-	V/μs
	Instantaneous common mode rejection voltage "Low level output"	CM_L	Ta = 25˚C, I_F = 16mA, R_L = 19kΩ, V_{CM} = 10Vp-p, V_{CC} = 5V (Fig. 2)	-	- 1 000	-	V/μs

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

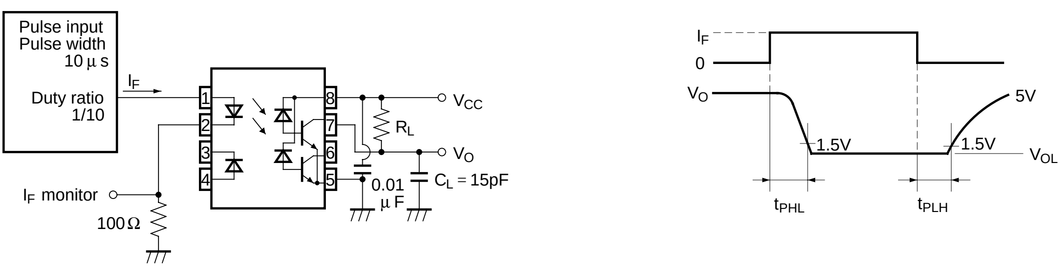


Fig. 2 Test Circuit for Instantaneous Common Mode Rejection Voltage

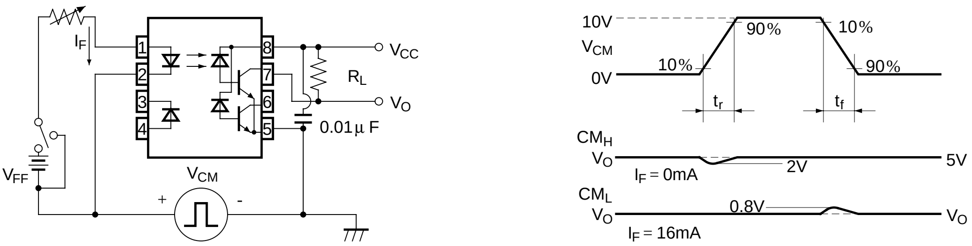


Fig. 3 Forward Current vs. Ambient Temperature

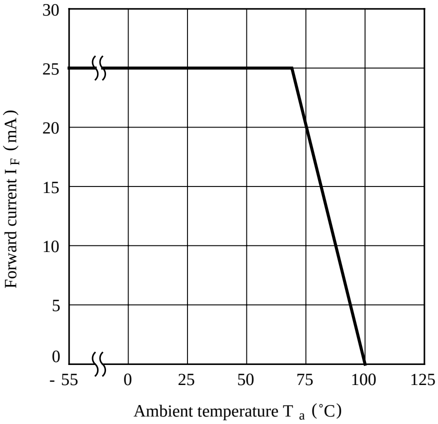


Fig. 4 Power Dissipation vs. Ambient Temperature

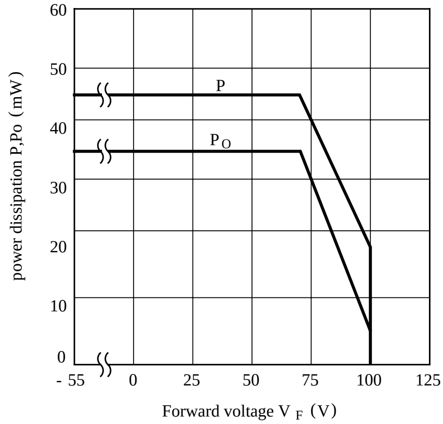


Fig. 5 Forward Current vs. Forward Voltage

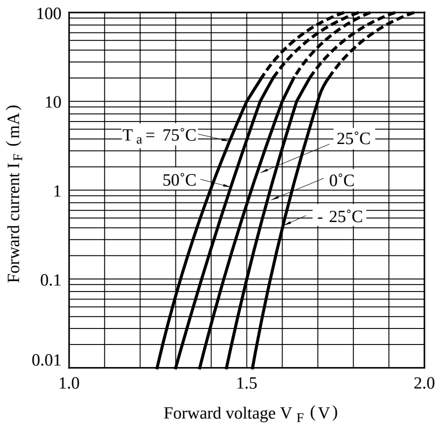


Fig. 6 Output Current vs. Output Voltage (Dotted line shows pulse characteristics)

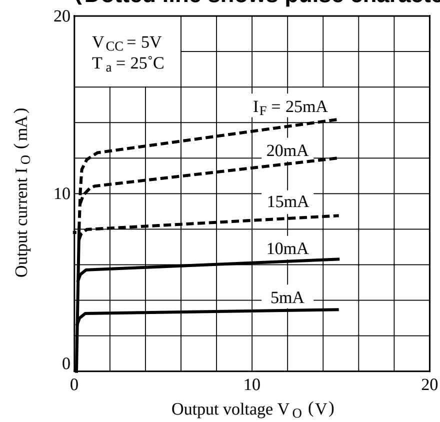


Fig. 7 Relative Current Transfer Ratio vs. Forward Current

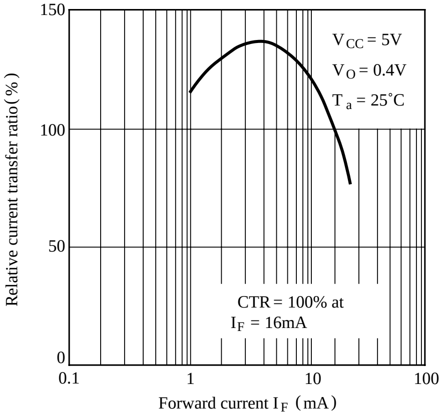


Fig. 8 Relative Current Transfer Ratio vs. Ambient Temperature

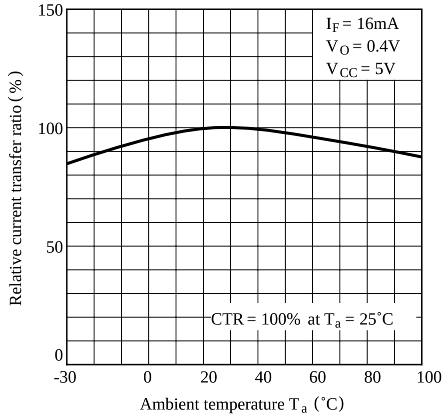


Fig. 9 Propagation Delay Time vs. Ambient Temperature

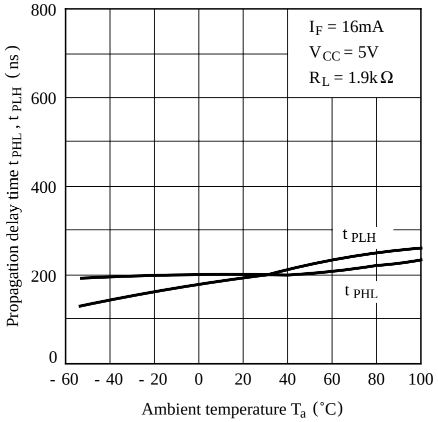


Fig.10 Propagation Delay Time vs. Load Resistance

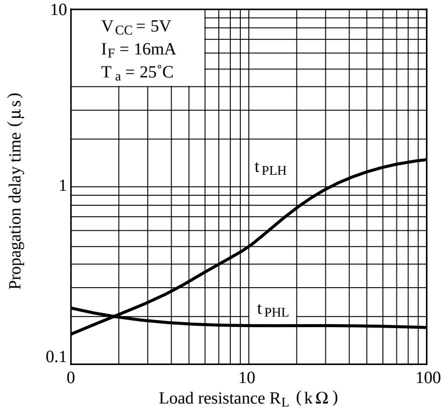


Fig.11 Output Voltage vs. Forward Current

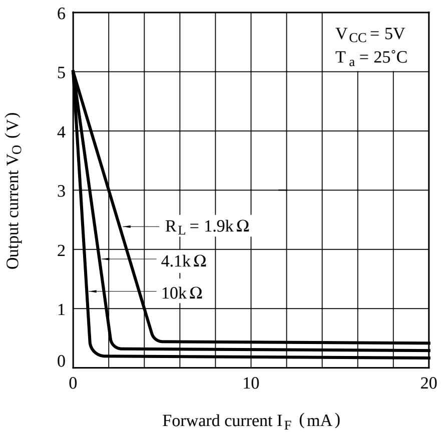


Fig.12 High Level Output Current vs. Ambient Temperature

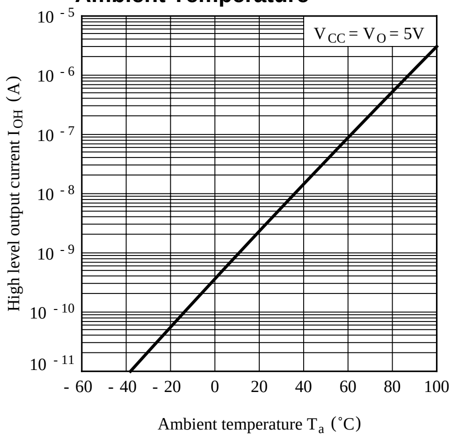
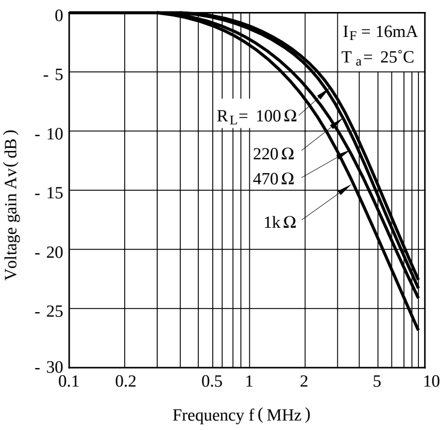
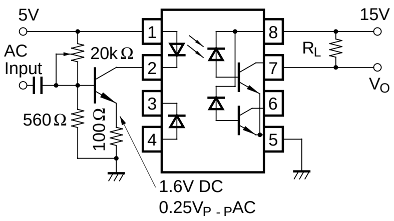


Fig.13 Frequency Response



Test Circuit for Frequency Response



■ Precautions for Use

(1) It is recommended that a by-pass capacitor of more than 0.01 µF 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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— Office automation equipment
— Telecommunication equipment [terminal]
— Test and measurement equipment
— Industrial control
— Audio visual equipment
— Consumer electronics

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— Traffic signals
— Gas leakage sensor breakers
— Alarm equipment
— Various safety devices, etc.

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