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. (PC9D171/PC9Dl 7P) (Page 656)

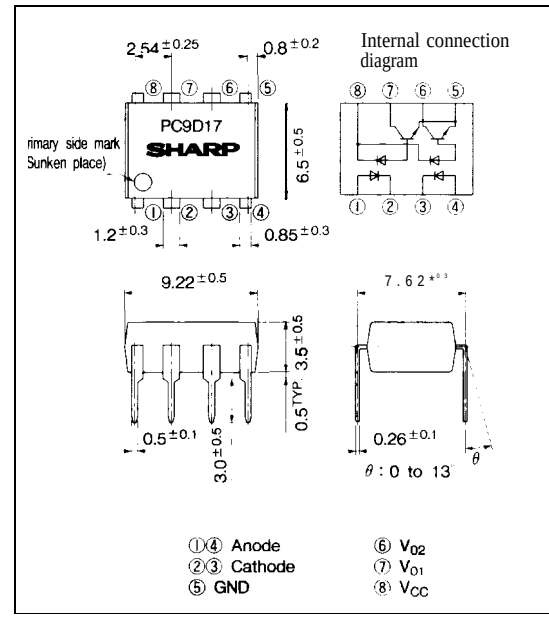
■ Features

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 volt age
   CM_H : TYP. 1kV/μs
4. Standard dual-in-line package
5. Recognized by UL, file No. E64380

■ Applications

1. Electronic calculators, measuring inst uments
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℃)

Parameter		Svmbol	Rating	Unit
Input	*1 Forward current	IF	2.5	mA
	*1 Reverse voltage	V_R	5	v
	*1 Power dissipation	P	45	mVV
output	Supply voltage	V_{CC}	−0.5 to +15	v
	*'Output voltage	V_O	−0.5 to +15	V
	*'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	℃
Storage temperature		T_{stg}	−55 to +125	℃
*3 Soldering temperature		T,.,	260	℃

*1 Each channel
*2 40 to 60 %RH, AC for 1 minute
*3 For 10 seconds

■ Electro-optical Characteristics

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

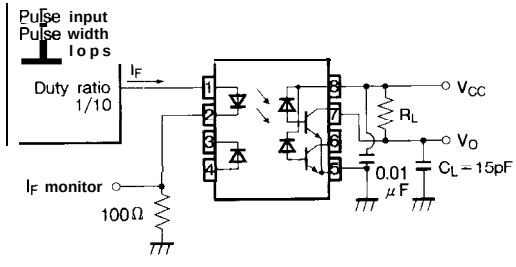
	Parameter	Symbo	Conditions	MIN.	TYP.	MAX	Unit
Input	Forward voltage	V_F	Ta = 25℃, I_F = 16mA		1.7	1.95	v'
	Reverse current	I_R	Ta = 25 ℃, V_R = 5V	—	—	10	μA
	Terminal capacitance	C_t	Ta = 25℃, V_F = 0, f = 1 MHz	–	60	250	pF
output	High level output current (1)	$I_{OH(1)}$	Ta = 25℃, I_F = 0, V_{CC} = V_O = 5.5V	–	–	500	nA
	High level output current (2)	$I_{OH(2)}$	Ta = 25℃, 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	VOL	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℃, 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 characteristics	Current transfer ratio	CTR	Ta = 25℃, I_F = 16mA, V_O = 0.4V, V_{CC} = 4.5V	19	–	–	%
	Isolation resistance	R_{iso}	Ta = 25℃, DC500V, 40 to 60%RH	5×10^{10}	10^{11}	–	Ω
	Floating capacitance	C_f	Ta = 25℃, V = 0, f = 1MHz	–	0.6	–	pF
	"High → Low" propagation delay time	t_{PHL}	Ta = 25℃, R_L = 1.9kΩ Fig. 1 I_F = 16mA, V_{CC} = 5V	–	0.3	0.8	μs
	"Low → High" propagation delay time	t_{PLH}	Ta = 25℃, R_L = 1.9kΩ Fig. 1 I_F = 16mA, V_{CC} = 5V	–	0.3	0.8	μs
	Instantaneous common mode rejection voltage "High level output"	CM_H	Ta = 25℃, I_F = 0, R_L = 1.9kΩ Fig. 2 V_{CM} = **10VP-P,** V_{CC} = 5V	–	1 000	–	V/μs
	Instantaneous common mode rejection voltage "Low level output"	CM_L	Ta = 25℃, I_F = 16mA, R_L = 19kΩ Fig. 2 V_{CM} = 10Vp-p, V_{CC} = 5V	–	−1 000	–	V/μs

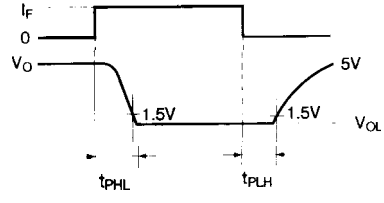
.411 typical values: at Ta = 25℃

■ 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	℃

Fig. 1 Test Circuit for Propagation Delay Time





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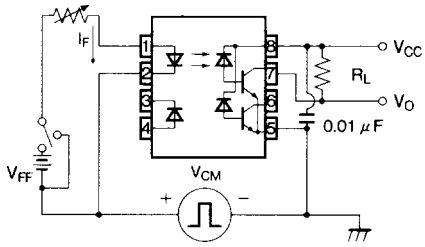
Photocouplers

Fig. 2 Test Circuit for Instantaneous **Common Mode Rejection Voltage**



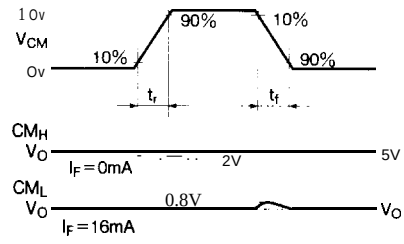


Fig. 3 Forward Current vs. Ambient **Temperature**

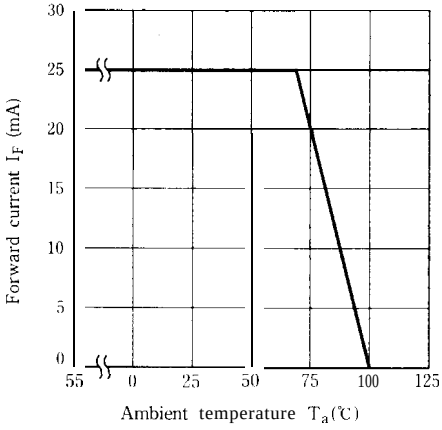


Fig. 4 Power Dissipation vs. Ambient Temperature

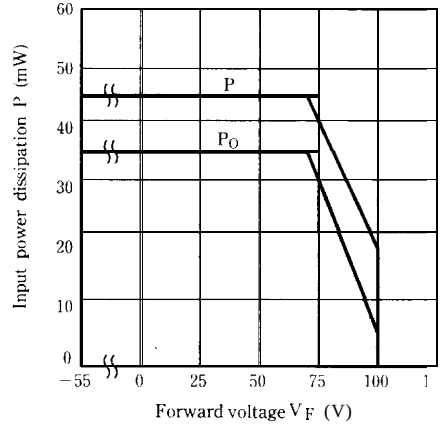


Fig. 5 Forward **Current** vs. **Forward Voltage**

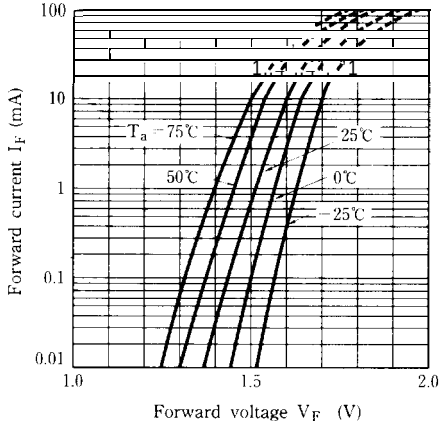


Fig. 6 Output Current vs. Output Voltage (Dotted line shows pulse characteristics)

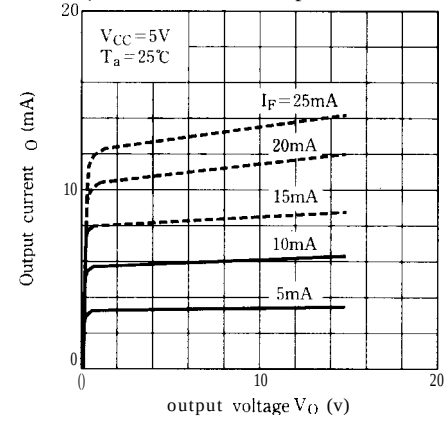


Fig. 7 Relative Current Transfer Ratio vs. Forward Current

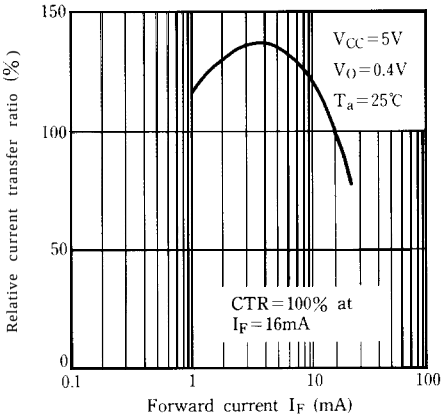


Fig. 8 Relative Current Transfer Ratio vs. Ambient Temperature

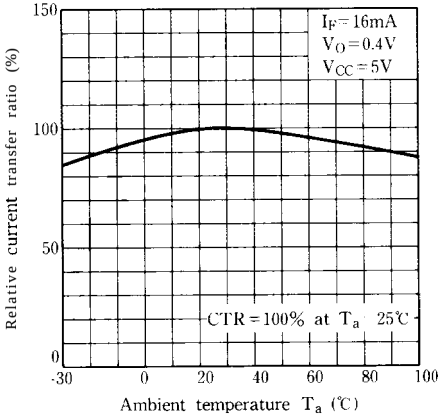


Fig 9 Propagation Delay Time vs. Ambient Temperature

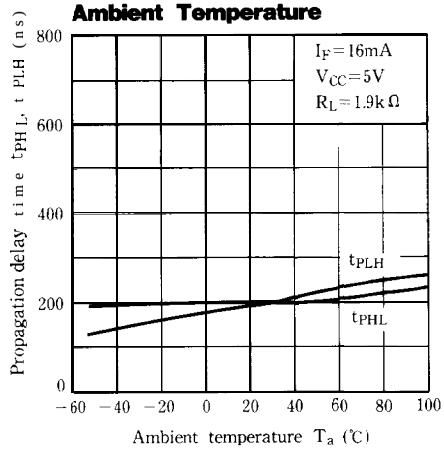


Fig.10 Propagation Delay Time vs. Load Resistance

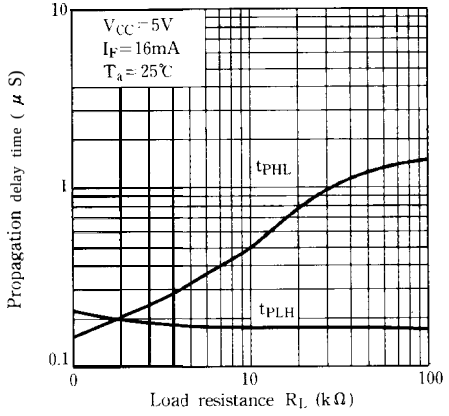


Fig.11 Output Voltage vs. Forward Current

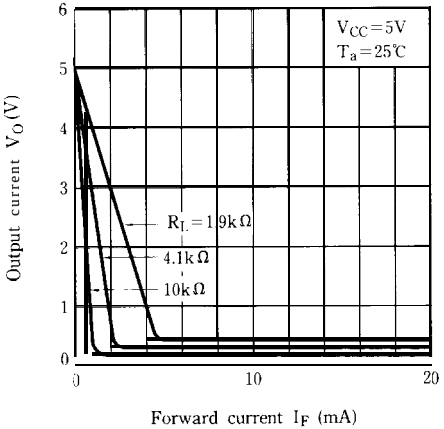


Fig.12 High Level Output Current vs. Ambient Temperature

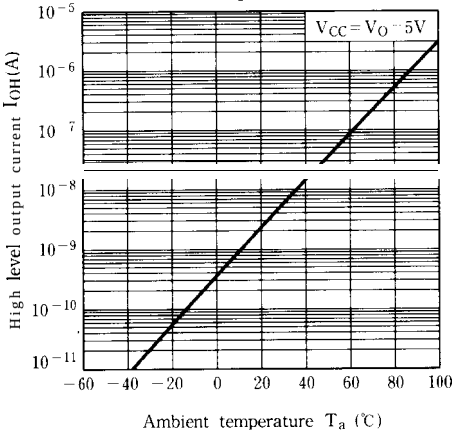
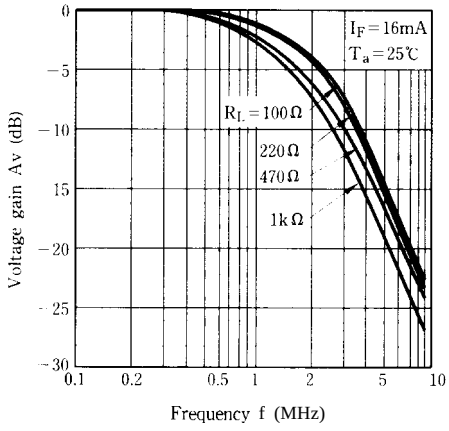
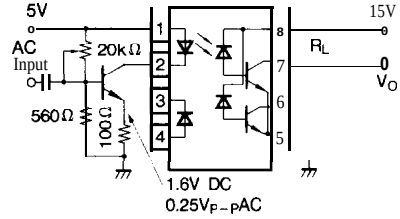


Fig.13 Frequency **Response**



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" (Page 78 to 93).