PC417

Compact, Surface Mount Ultra-high Speed Response OPIC Photocoupler

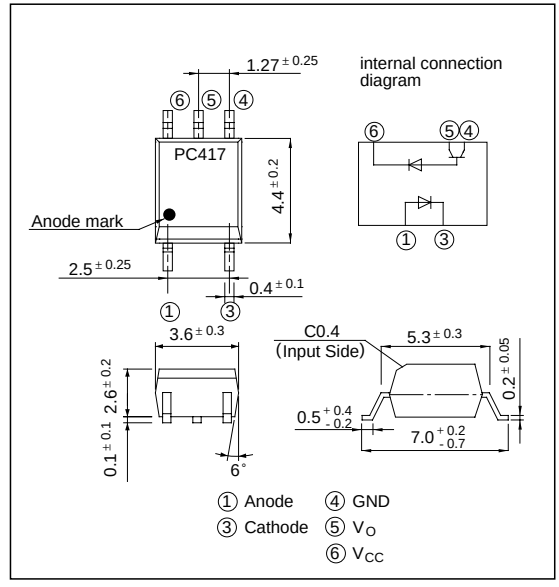
■ Features

1. Mini-flat package
2. Ultra-high speed response
   (t_{PHL} , t_{PLH} : TYP. 0.3 μs at R_L = 1.9kΩ)
3. Isolation voltage between input and output
   (V_{iso} : 2 500 V_{rms})
4. High instantaneous common mode rejection voltage (CM_H : TYP. 1kV/μs)
5. Recognized by UL(No.64380)

■ Applications

1. Hybrid substrate which requires high density mounting
2. Personal computers, office computers and peripheral equipment
3. Audio equipment

■ Outline Dimensions (Unit : mm)



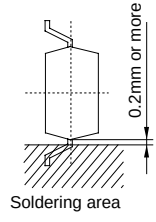
* " OPIC " (Optical IC) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

■ Package Specifications

Model No.	Package specifications	Diameter of reel	Tape width
PC417	Taping package (Net:3 000pcs.)	φ 370mm	12mm
PC417T	Taping package (Net: 750pcs.)	φ 178mm	12mm
PC417Z	Sleeve package (Net: 100pcs.)	-	-

■ Absolute Maximum Ratings (Ta= 25˚C)

Parameter		Symbol	Rating	Unit
Input	*1 Forward current	I_F	25	mA
	Reverse voltage	V_R	5	V
	Power dissipation	P	45	mW
Output	*2 Supply voltage	V_{CC}	- 0.5 to + 15	V
	Output voltage	V_O	- 0.5 to + 15	V
	Output current	I_O	8	mA
	Power dissipation	P_O	100	mW
Total power dissipation		P_{tot}	100	mW
*3 Isolation voltege		V_{iso}	2 500	V_{rms}
Operating temperature		T_{opr}	- 40 to + 100	˚C
Storage temperature		T_{stg}	- 40 to + 125	˚C
*4 Soldering temperature		T_{sol}	260	˚C



*1 Ta= 0 to + 70˚C
*2 For 1 minute max.
*3 40 to 60% RH, For AC 1 minute, Apply the specified voltage between the whole of the electrode pins on the input side and the whole of the electrode pins on the output side.
*4 For 10 seconds.

■ Electro-optical Characteristics

(Ta= 25˚C)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	I_F = 16mA	-	1.7	1.95	V
	Reverse current	I_R	V_R = 5V	-	-	10	μA
	Terminal capacitance	C_t	V_F = 0, f= 1MHz	-	60	250	pF
Output	High level output current	$I_{OH(1)}$	I_F=0, V_{CC}=5.5V V_O=5.5V	-	3	500	nA
		$I_{OH(2)}$	I_F=0, V_{CC}=15V, V_O=15V	-	-	1.0	μA
		$I_{OH(3)}$	I_F=0, V_{CC}=15V, V_O=15V *5	-	-	50	
	High level supply current	$I_{CCH(1)}$	I_F=0, V_{CC}=15V, V_O=OPEN	-	0.02	1.0	μA
		$I_{CCH(2)}$	I_F = 0, V_{CC} = 15V, V_O = OPEN *5	-	-	2.0	
	Low level supply current	I_{CCL}	I_F=16mA, V_{CC}=15V V_O=OPEN *5	-	200	-	μA
	Low level output voltage	V_{OL}	I_F=16mA, V_{CC}=4.5V I_O=2.4mA *5	-	-	0.4	V
Transfer characteristics	Current transfer ratio	CTR	I_F=16mA, V_{CC}=4.5V V_O=0.4V,*5	19	-	-	%
	Isolation resistance	R_{ISO}	DC500V, 40 to 60% RH	5×10^{10}	10^{11}	-	Ω
	Floating capacitance	C_f	V=0V, f=1MHz	-	0.6	1.0	pF
	*6 "H→L" propagation delay time	t_{PHL}	I_F=16mA, V_{CC}=5V R_L=1.9kΩ	-	0.3	0.8	μs
	*6 "L→H" propagation delay time	t_{PLH}		-	0.3	1.2	
	*7 Instantaneous common mode rejection voltage "High level output"	CM_H	I_F=0, R_L=1.9kΩ V_{CM}=10V_{P-P}, V_{CC}=5V	-	1 000	-	V/μs
	*7 Instantaneous common mode rejection voltage "Low level output"	CM_L	I_F=16mA, R_L=1.9kΩ V_{CM}=10V_{P-P}, V_{CC}=5V	-	- 1 000	-	V/μs

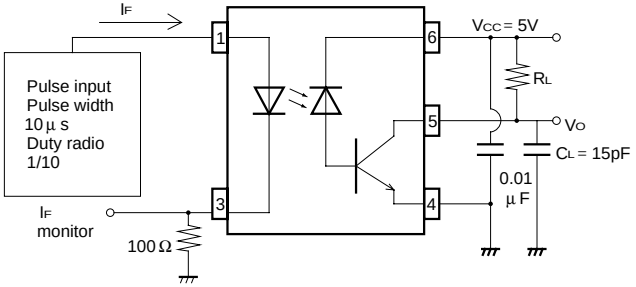
*5 Temperature range : Ta = 0 to 70˚C

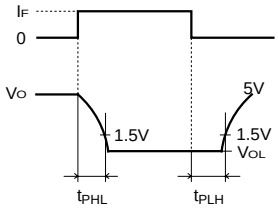
*6 Test circuit for propagation delay time is shown in the next page.

*7 Test circuit for instantaneous common mode rejection voltage is shown in the next page.

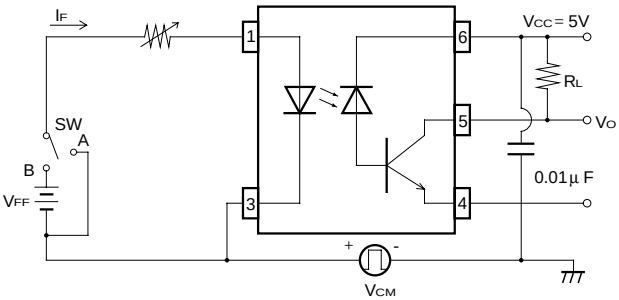
Each characteristics shall be measured under opaque condition.

*5 Test Circuit for Propagation Delay Time





*6 Test Circuit for Instantaneous Common Mode Rejection Voltage



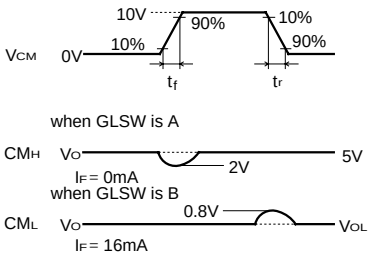


Fig. 1 Forward Current vs. Ambient Temperature

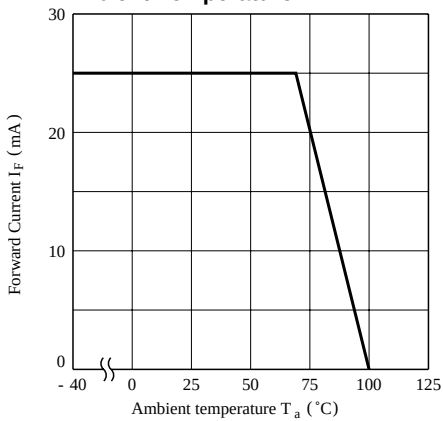


Fig. 2 Power Dissipation vs. Ambient Temperature

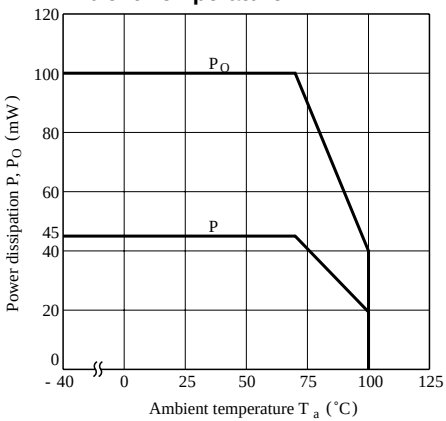


Fig. 3 Forward Current vs. Forward Voltage

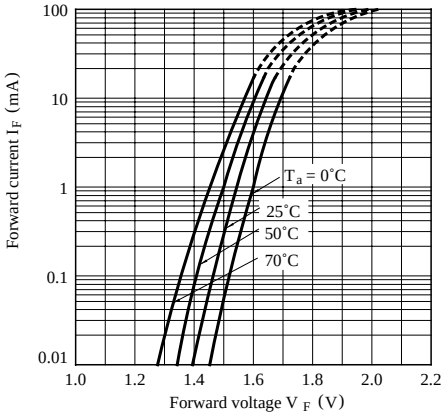


Fig. 4 Output Current vs. Output Voltage

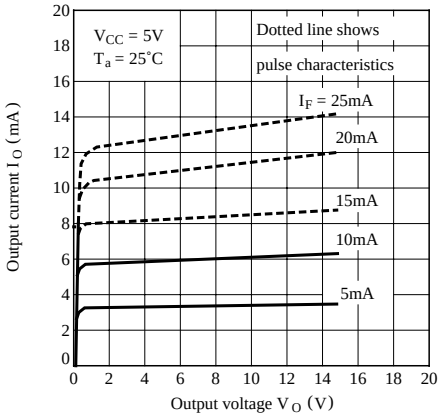


Fig. 5 Relative Current Transfer Ratio vs. Forward Current

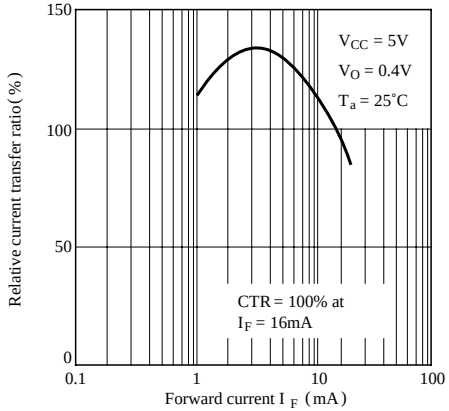


Fig. 6 Relative Current Transfer Ratio vs. Ambient Temperature

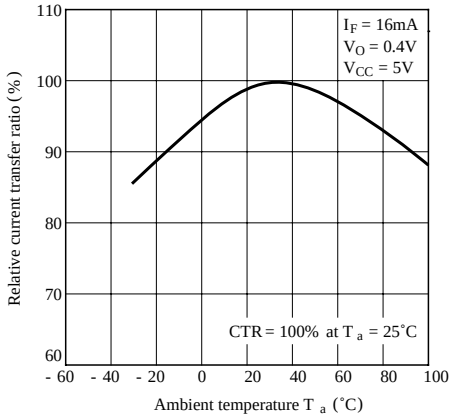


Fig. 7 Propagation Delay Time vs. Ambient Temperature

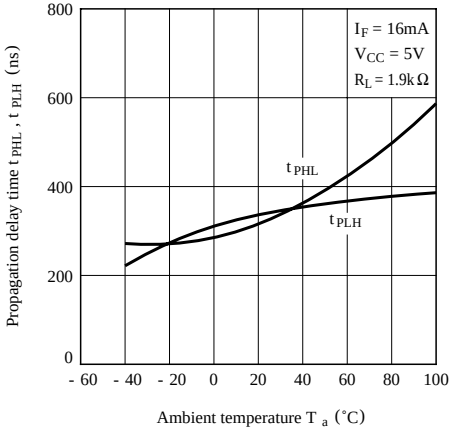


Fig. 8 High Level Output Current vs. Ambient Temperature

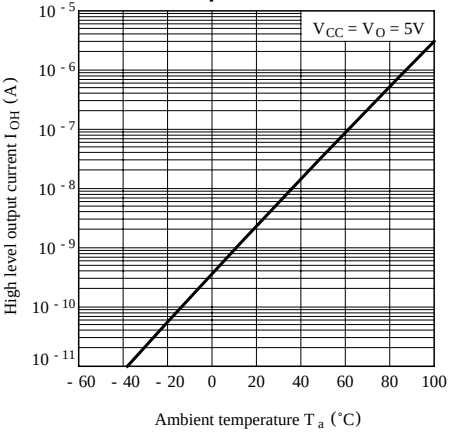
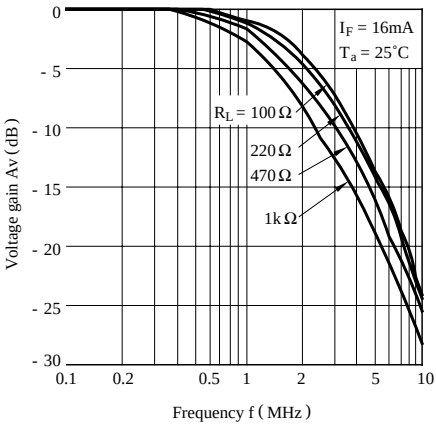
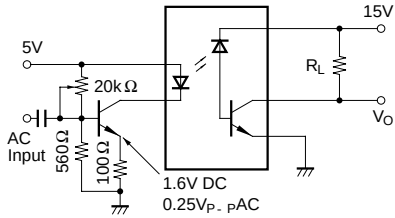


Fig. 9 Frequency Response



Test Circuit for Frequency Response



■ Precautions for Use

(1) It is recommended that a by-pass capacitor of more than 0.01μF be 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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— 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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