

PC417

Compact, Surface Mount Ultra-high Speed Response OPIC Photocoupler

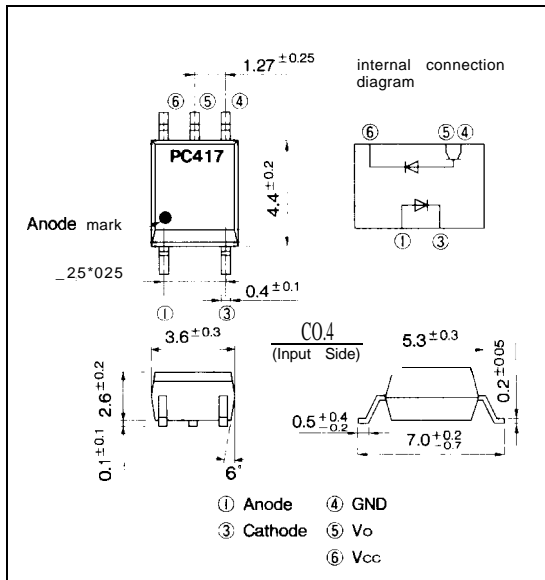
Features

1. Opaque, mini-flat package
2. Ultra-high speed response
(t_{PHL}, t_{PLH} : TYP. $0.3 \mu s$ at $R_L = 1.9k\Omega$)
3. Isolation voltage between input and output
(V_{iso} : 2 500 V_{rms})
4. High instantaneous common mode rejection voltage (CM_{11} : TYP. $1kV/\mu s$)
5. Recognized by UL, file 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)



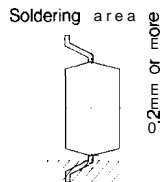
Package Specifications

Model No]	Package specifications	iameter of ree	Tape width
PC417	Taping package(Net:3000pcs.)	4370mm	12mm
PC417T	Taping package(Net: 750pcs.)	$\phi 178$ mm	12mm
PC4172	Sleevepackage(Net: 100 pcs)		

Absolute Maximum Ratings

($T_a = 25^\circ C$)

Parameter	Symbol	Rating	Unit
Input	*1 Forward current	IF	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
	Output current	I_O	8 mA
	Power dissipation	P_O	100 mW
Total power dissipation	P_{tot}	100 mW	
*isolation voltage	V_{iso}	2500	V_{rms}
Operating temperature	T_{opr}	-40 to +100	$^\circ C$
Storage temperature	T_{stg}	-40 to +125	$^\circ C$
*1 Soldering temperature	T_{sol}	260	$^\circ C$



*1 $T_a = 0$ to $+70^\circ C$

*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.

6 photocouplers

■ Electro-optical Characteristics

(Ta=25°C)

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

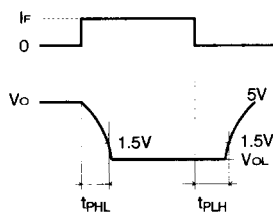
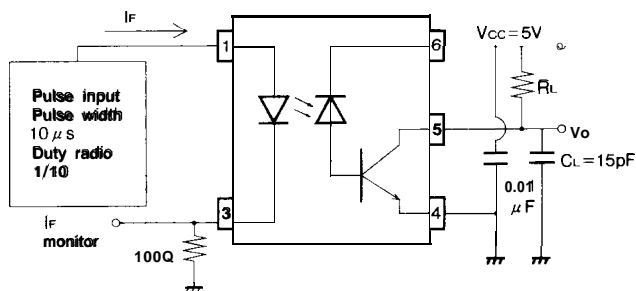
*5 Temperature range : Ta=(1 to 70°C)

*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**

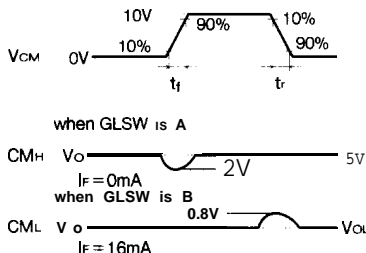
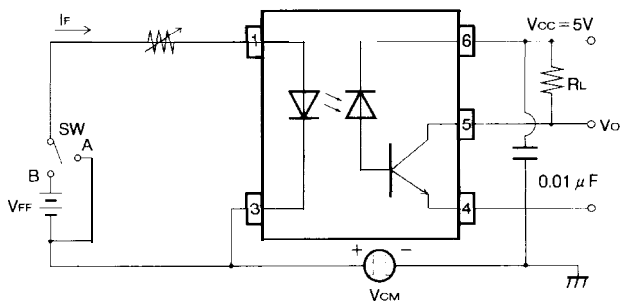


Fig. 1 Forward Current vs. Ambient Temperature

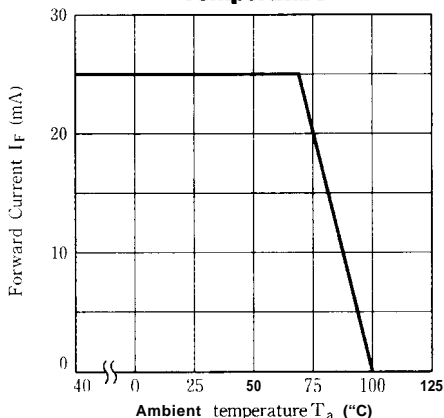


Fig. 2 Power Dissipation vs. Ambient Temperature

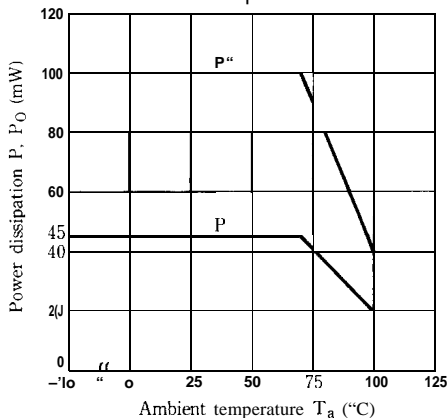


Fig. 3 **Forward Current vs. Forward Voltage**

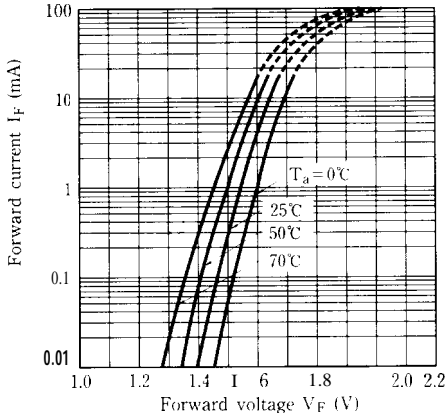


Fig. 4 **Output Current vs. Output Voltage**

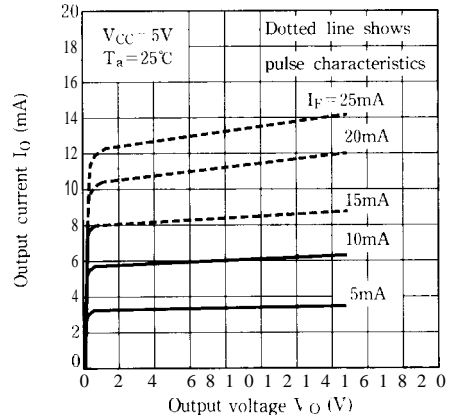


Fig. 5 **Relative Current Transfer Ratio vs. Forward Current**

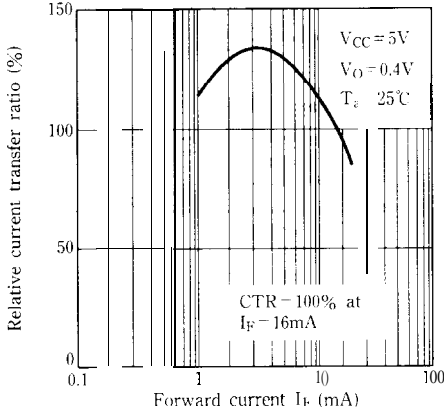


Fig. 6 **Relative Current Transfer Ratio vs. Ambient Temperature**

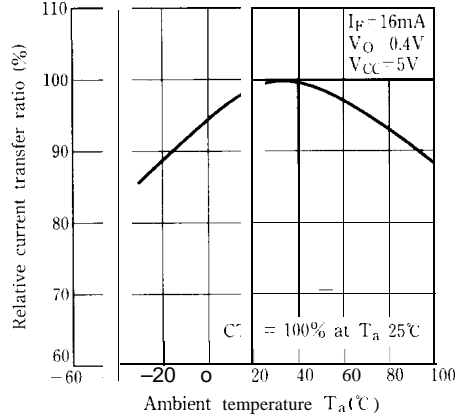


Fig. 7 **Propagation Delay Time vs. Ambient Temperature**

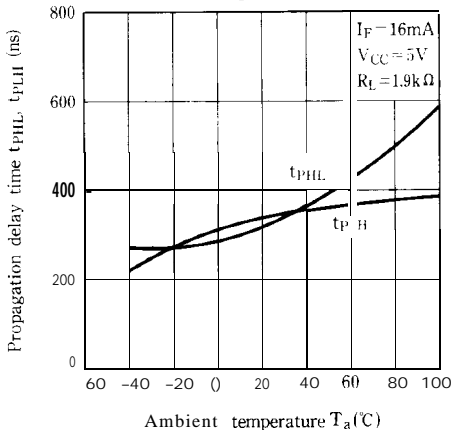


Fig. 8 **High Level Output Current vs. Ambient Temperature**

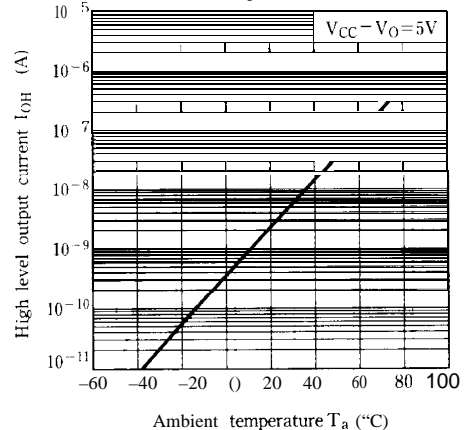
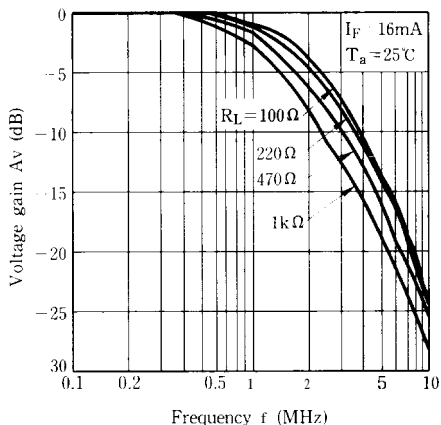
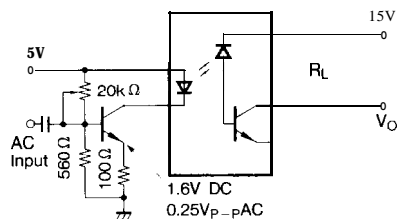


Fig. 9 Frequency Response



Test Circuit for Frequency Response



■ Precautions for Use

- (1) It is recommended that a by-pass capacitor of more than $0.01\ \mu\text{F}$ 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" (Page 78 to 93)

