

PC810

High Speed Under High Load Resistance Photocoupler

※ Lead forming type (I type) and taping reel type (P type) are also available. (PC810I/PC810P)

■ Features

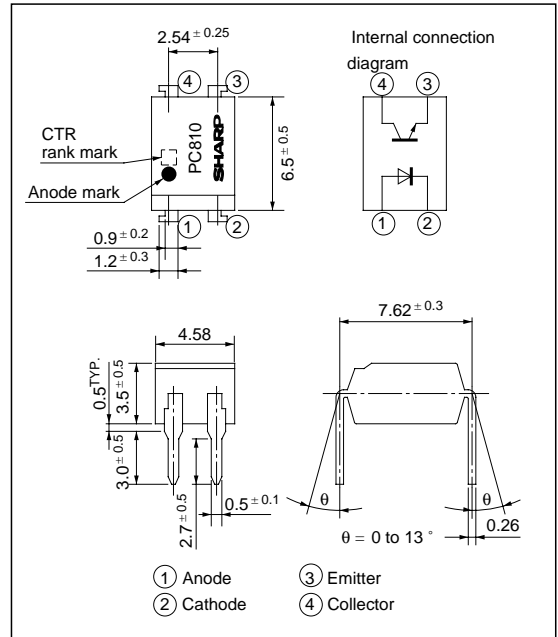
1. High speed response under high resistance load
(t_{off} : MAX. 1ms at $I_F = 1\text{mA}$, $V_{CC} = 5\text{V}$, $R_L = 110\text{k}\Omega$)
2. High current transfer ratio under low input current
(CTR : MIN. 60% at $I_F = 1\text{mA}$, $V_{CE} = 0.4\text{V}$)
3. High isolation voltage between input and output
(V_{iso} : 5 000V_{rms})
4. Compact dual-in-line package
5. Recognized by UL, file No. E64380

■ Applications

1. Solid state relays
2. Motor-control equipment
3. Signal transmission between circuits of different potentials and impedances

■ Outline Dimensions

(Unit : mm)



■ Absolute Maximum Ratings

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

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	*1 Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P	70	mW
Output	Collector-emitter voltage	V_{CEO}	35	V
	Emitter-collector voltage	V_{ECO}	6	V
	Collector current	I_C	50	mA
	Collector power dissipation	P_C	150	mW
Total power dissipation		P_{tot}	200	mW
*2 Isolation voltage		V_{iso}	5 000	V _{rms}
Operating temperature		T_{opr}	- 30 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 Pulse width $\leq 100\mu\text{s}$, Duty ratio : 0.001

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

*3 For 10 seconds

■ Electro-optical Characteristics

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Input	Forward voltage	V_F	$I_F = 20\text{mA}$	-	1.2	1.4	V	
	Peak forward voltage	V_{FM}	$I_{FM} = 0.5\text{A}$	-	-	3.0	V	
	Reverse current	I_R	$V_R = 4\text{V}$	-	-	10	μA	
	Terminal capacitance	C_t	$V = 0, f = 1\text{kHz}$	-	30	250	pF	
Output	Collector dark current	I_{CEO}	$V_{CE} = 20\text{V}, I_F = 0$	-	-	10^{-7}	A	
Transfer characteristics	*5 Current transfer ratio	CTR	$I_F = 1\text{mA}, V_{CE} = 0.4\text{V}$	60	-	200	%	
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F = 20\text{mA}, I_C = 1\text{mA}$	-	0.1	0.2	V	
	Isolation resistance	R_{ISO}	DC500V, 40 to 60% RH	5×10^{10}	10^{11}	-	Ω	
	Floating capacitance	C_f	$V = 0, f = 1\text{MHz}$	-	0.6	1.0	pF	
	Cut-off frequency	f_c	$V_{CE} = 5\text{V}, I_C = 2\text{mA}, R_L = 1\text{k}\Omega, -3\text{dB}$	6	60	-	kHz	
	*5 Response time	Rise time	t_r	$V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 1\text{k}\Omega$	-	10	50	μs
		Fall time	t_f		-	10	50	μs
*5 Turn-off time		t_{off}	$V_{CC} = 5\text{V}, I_F = 1\text{mA}, R_L = 110\text{k}\Omega$	-	0.5	1.0	ms	

*5 Classification table of current transfer ratio and response time is shown below

Model No.	Rank mark	CTR (%)	t_r (μs)		t_f (μs)		t_{off} (μs)	
			TYP.	MAX.	TYP.	MAX.	TYP.	MAX.
PC810A	A	60 to 120	4	15	3	15	350	500
PC810B	B	100 to 200	10	50	10	50	500	1 000
PC810	A or B, or no marking	60 to 200	-	50	-	50	-	1 000
Measurement conditions		$I_F = 1\text{mA}$ $V_{CE} = 0.4\text{V}$ $T_a = 25^\circ\text{C}$	$V_{CE} = 2\text{V}$ $I_C = 2\text{mA}$ $R_L = 1\text{k}\Omega$ $T_a = 25^\circ\text{C}$			$I_F = 1\text{mA}$ $V_{CC} = 5\text{V}$ $R_L = 110\text{k}\Omega$ $T_a = 25^\circ\text{C}$		

Fig. 1 Forward Current vs. Ambient Temperature

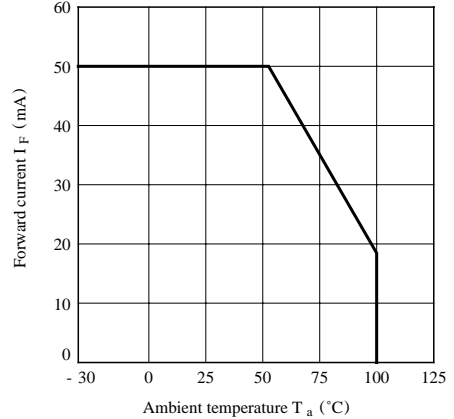


Fig. 2 Collector Power Dissipation vs. Ambient Temperature

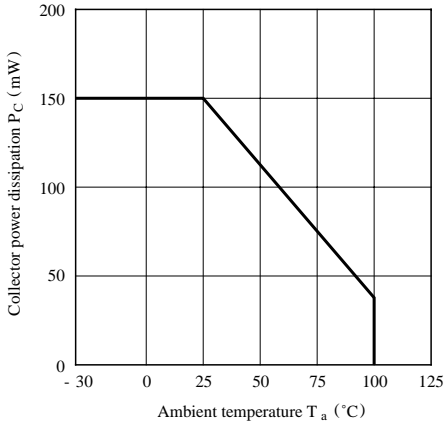


Fig. 3 Peak Forward Current vs. Duty Ratio

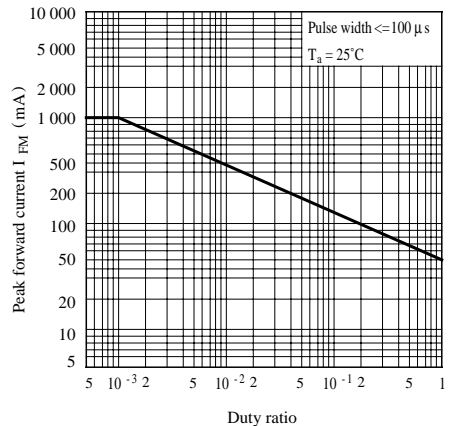


Fig. 4 Forward Current vs. Forward Voltage

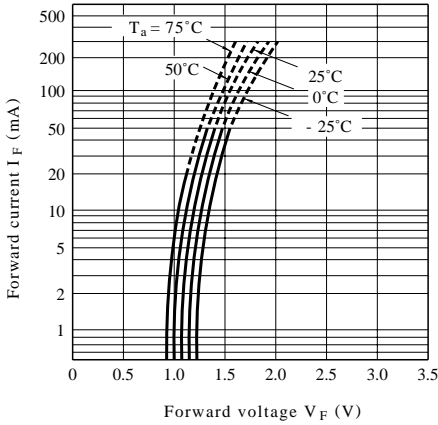


Fig. 5 Current Transfer Ratio vs. Forward Current

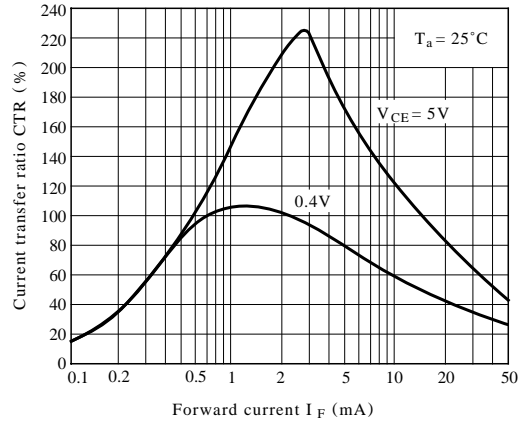


Fig. 6 Collector Current vs. Collector-emitter Voltage

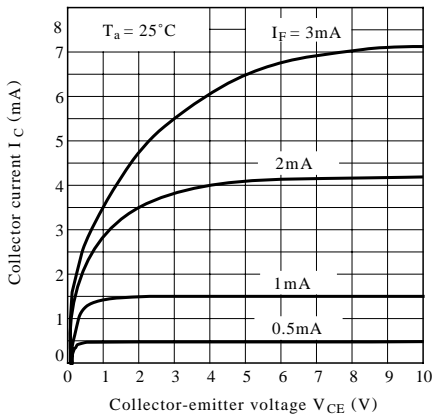


Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

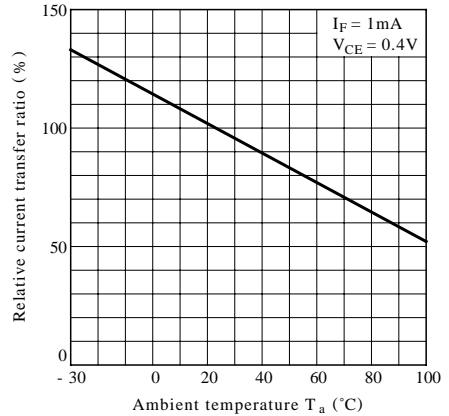


Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature

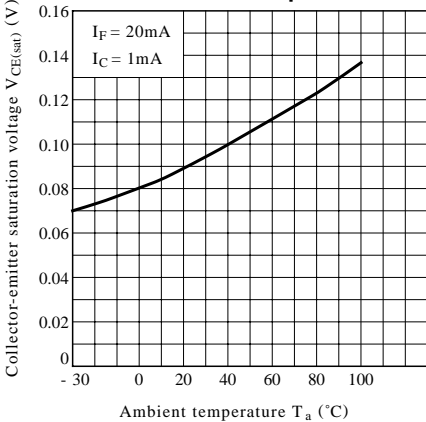


Fig. 9 Collector Dark Current vs. Ambient Temperature

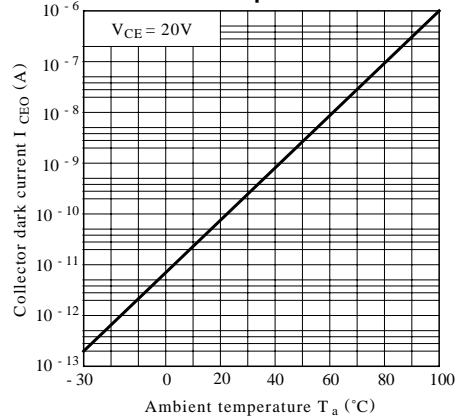


Fig.10 Response Time vs. Load Resistance

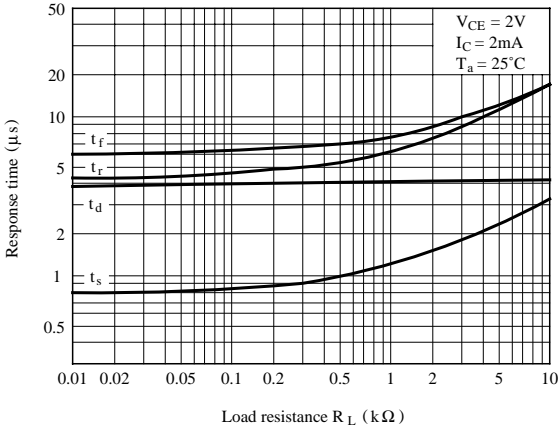


Fig.11 Turn-off Time vs. Load Resistance

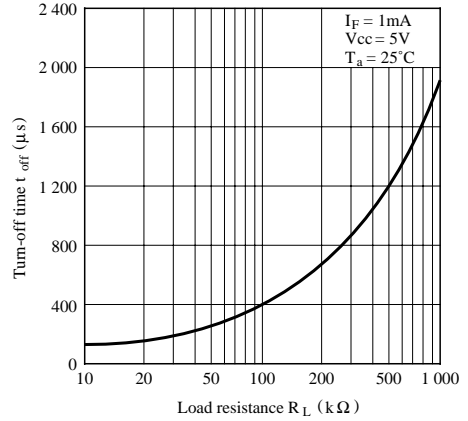


Fig.12 Turn-off Time vs. Ambient Temperature

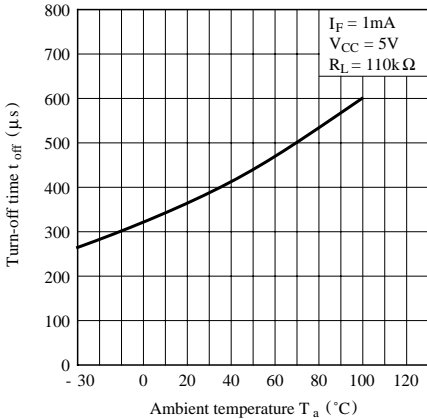
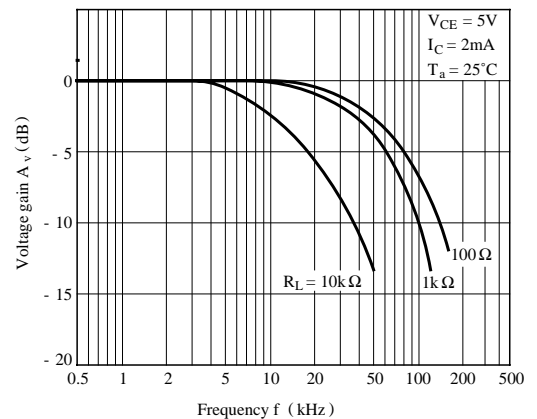
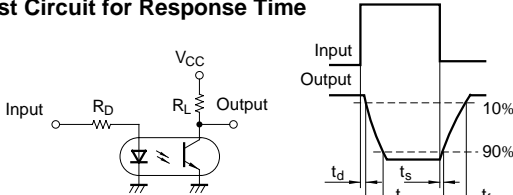


Fig.13 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response

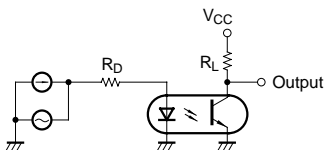


Fig.14 Collector-emitter Saturation Voltage vs. Forward Current

