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

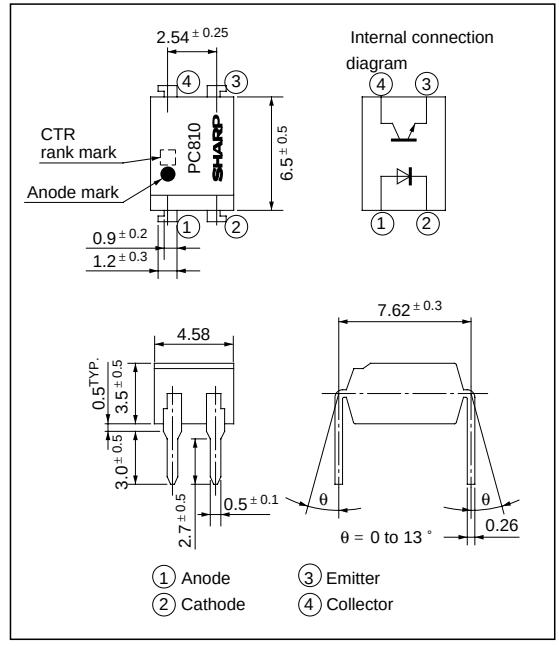
1. High speed response under high resistance load
   （t_{off}： MAX. 1ms at I_F = 1mA, V_{CC} = 5V, R_L = 110kΩ）
2. High current transfer ratio under low input current
   （CTR： MIN. 60% at I_F = 1mA, V_{CE} = 0.4V）
3. High isolation voltage between input and output
   （V_{iso}： 5 000V $_{rms}$ ）
4. Compact 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°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	*1Peak 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
*2Isolation voltage		V_{iso}	5 000	V_{rms}
Operating temperature		T_{opr}	- 30 to + 100	˚C
Storage temperature		T_{stg}	- 55 to + 125	˚C
*3Soldering temperature		T_{sol}	260	˚C

*1 Pulse width<=100μs, Duty ratio： 0.001
*2 40 to 60% RH, AC for 1 minute
*3 For 10 seconds

" In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that occur in equipment using any of SHARP's devices, shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest version of the device specification sheets before using any SHARP's device. "

■ Electro-optical Characteristics

(Ta= 25˚C)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V_F	I_F = 20mA	-	1.2	1.4	V
	Peak forward voltage		V_{FM}	I_{FM} = 0.5A	-	-	3.0	V
	Reverse current		I_R	V_R = 4V	-	-	10	μA
	Terminal capacitance		C_t	V = 0, f = 1kHz	-	30	250	pF
Output	Collector dark current		I_{CEO}	V_{CE} = 20V, I_F = 0	-	-	10^{-7}	A
Transfer characteristics	*5Current transfer ratio		CTR	I_F = 1mA, V_{CE} = 0.4V	60	-	200	%
	Collector-emitter saturation voltage		$V_{CE(sat)}$	I_F = 20mA, I_C = 1mA	-	0.1	0.2	V
	Isolation resistance		R_{ISO}	DC500V, 40 to 60% RH	5 x 10^{10}	10^{11}	-	Ω
	Floating capacitance		C_f	V = 0, f = 1MHz	-	0.6	1.0	pF
	Cut-off frequency		f_c	V_{CE} = 5V, I_C = 2mA, R_L = 1kΩ, - 3dB	6	60	-	kHz
	*5 Response time	Rise time	t_r	V_{CE} = 2V, I_C = 2mA, R_L = 1kΩ	-	10	50	μs
		Fall time	t_f		-	10	50	μs
	*5Turn-off time		t_{off}	V_{CC} = 5V, I_F = 1mA, R_L = 110kΩ	-	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 = 1mA V_{CE} = 0.4V T_a = 25˚C	V_{CE} = 2V I_C = 2mA R_L = 1kΩ T_a = 25˚C				I_F = 1mA V_{CC} = 5V R_L = 110kΩ T_a = 25˚C	

Fig. 1 Forward Current vs. Ambient Temperature

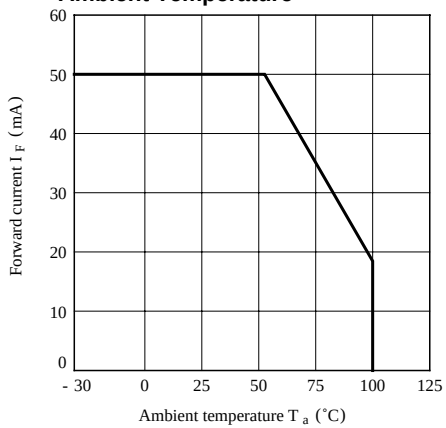


Fig. 2 Collector Power Dissipation vs. Ambient Temperature

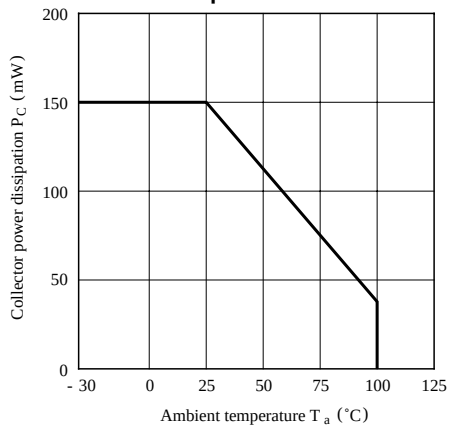


Fig. 3 Paek Foward Current vs. Duty Ratio

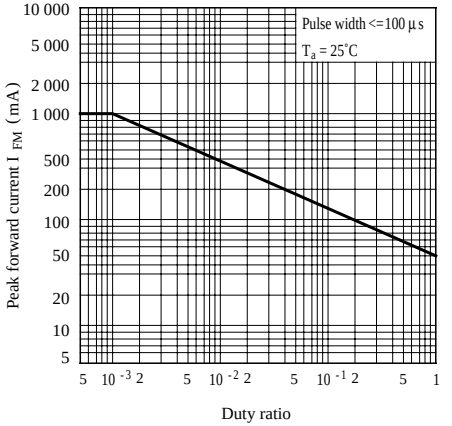


Fig. 4 Forward Current vs. Forward Voltage

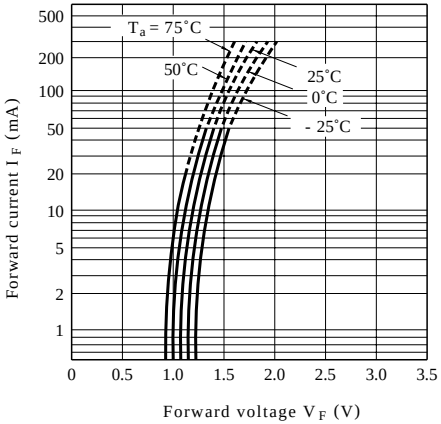


Fig. 5 Current Transfer Ratio vs. Forward Current

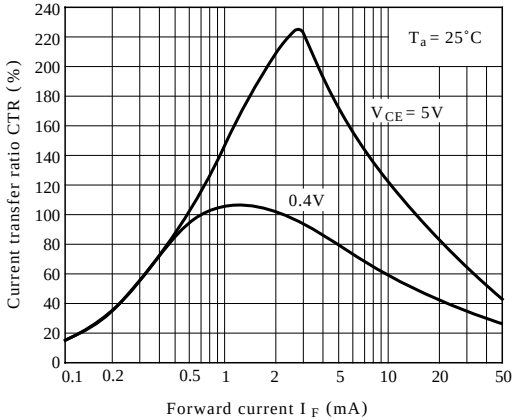


Fig. 6 Collector Current vs. Collector-emitter Voltage

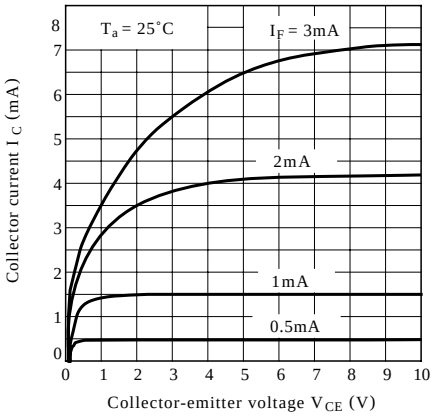


Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

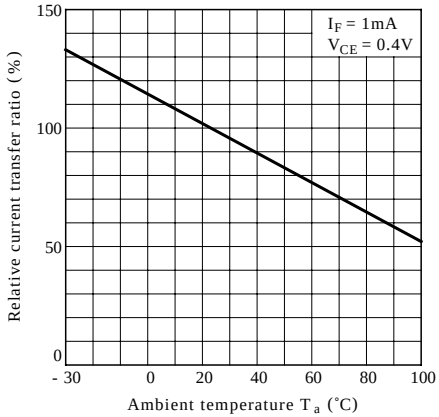


Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature

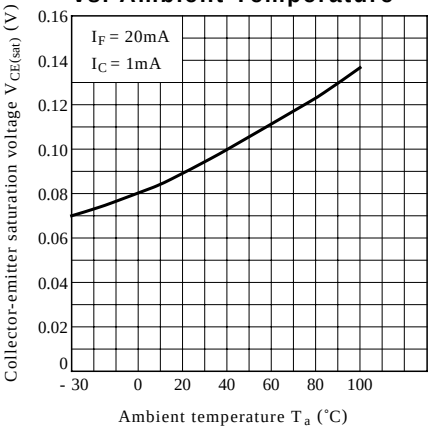


Fig. 9 Collector Dark Current vs. Ambient Temperature

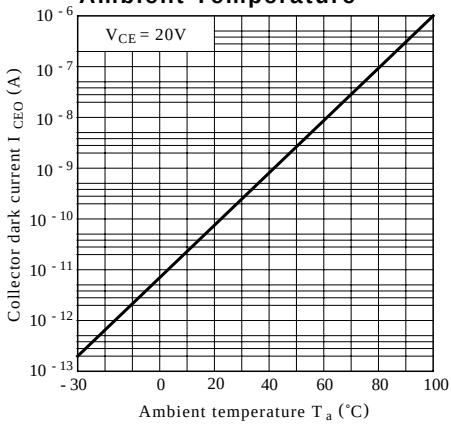


Fig.10 Response Time vs. Load Resistance

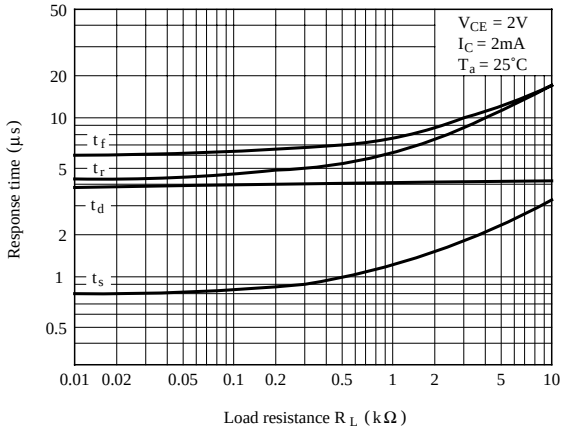


Fig.11 Turn-off Time vs. Load Resistance

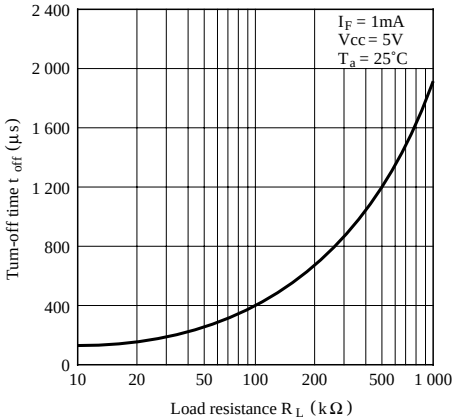


Fig.12 Turn-off Time vs. Ambient Temperature

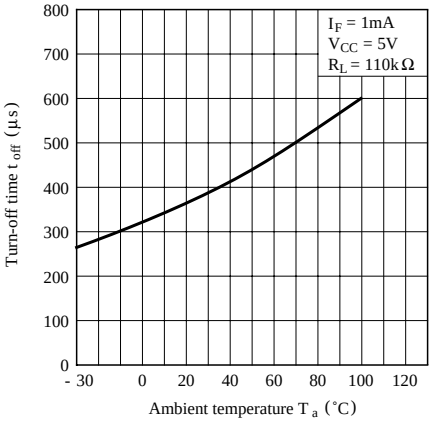
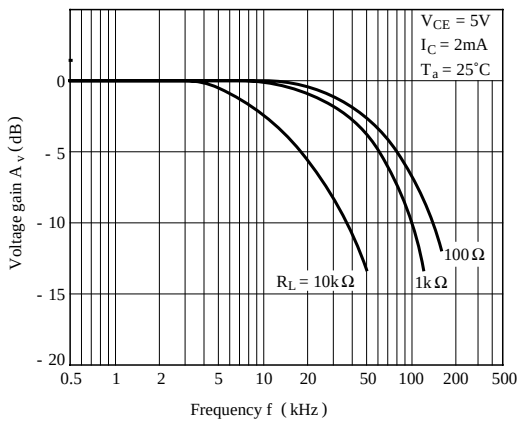
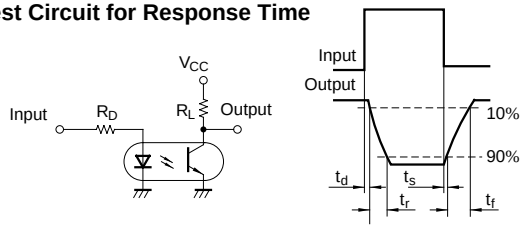


Fig.13 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response

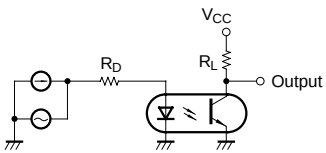
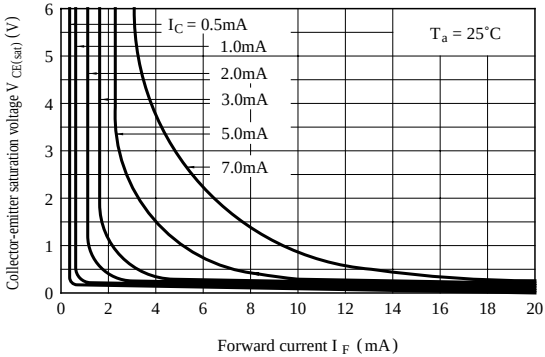


Fig.14 Collector-emitter Saturation Voltage vs. Forward Current



● Please refer to the chapter "Precautions for Use"