PC810 High Speed Under High Load Resistance Photocoupler

※ Lead forming type (I type) is also available. (PC810I) (Page 482)

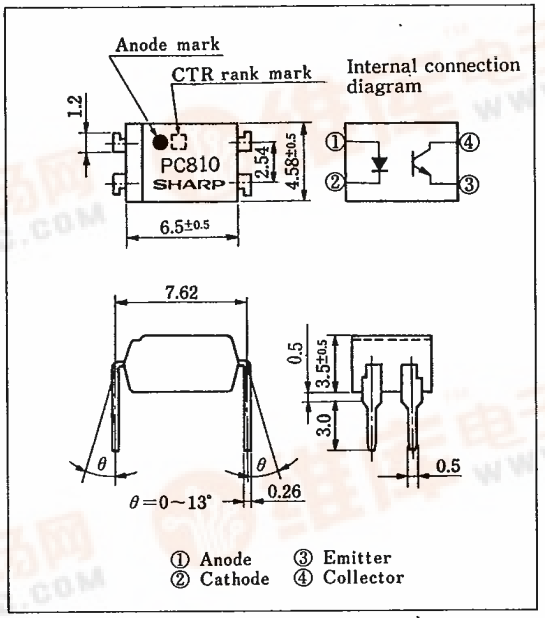
■ Features

1. High speed response under high load resistance
   (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} : 5,000Vrms)
4. Compact dual-in-line package
5. UL recognized, 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)



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■ Absolute Maximum Ratings (Ta=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	Vrms
	Operating temperature	T_{opr}	−30~+100	°C
	Storage temperature	T_{stg}	−55~+125	°C
	*3Soldering temperature	T_{sol}	260	°C

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

■ 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, RH=40~60%	5×10^{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	6	60	—	kHz
	*5Response time (Rise)	t_r	V_{CE}=2V, I_C=2mA, R_L=1kΩ	—	10	50	μs
	*5Response time (Fall)	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	60~120	4	15	3	15	350	500
PC810B	B	100~200	10	50	10	50	500	1,000
PC810	A or B	60~200	—	50	—	50	—	1,000

Fig. 1 Forward Current vs. Ambient Temperatur

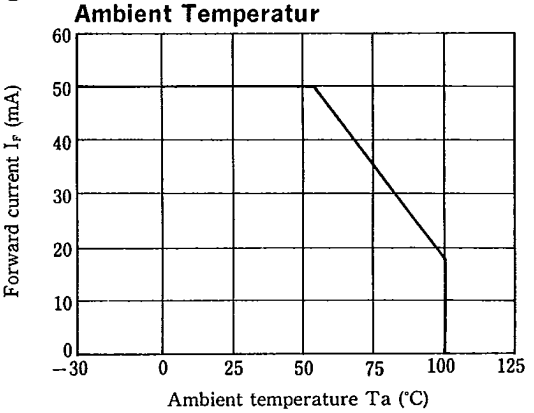

Fig. 2 Collector Power Dissipation vs. Ambient Temperature

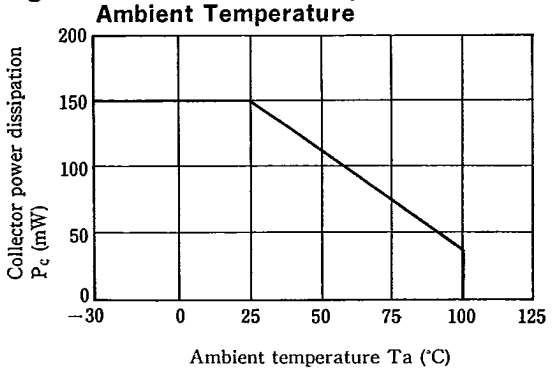

Fig. 3 Peak Forward Current vs. Duty Ratio

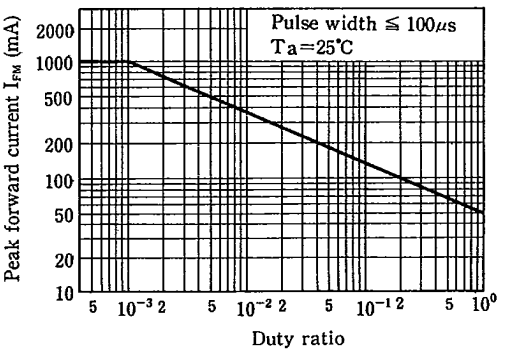

Fig. 4 Forward Current vs. Forward Voltage

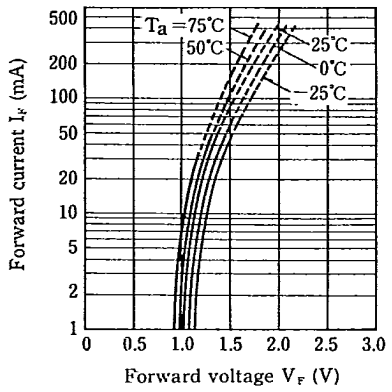

Fig. 5 Current Transfer Ratio vs. Forward Current

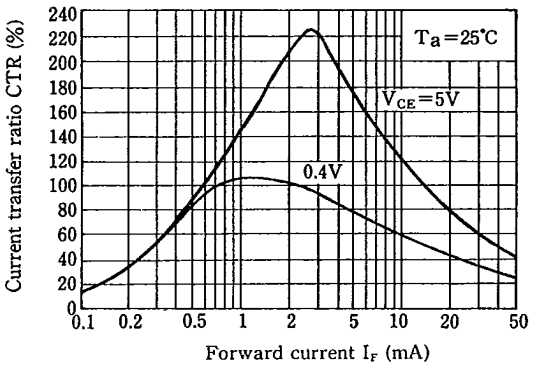

Fig. 6 Collector Current vs. Collector-emitter Voltage

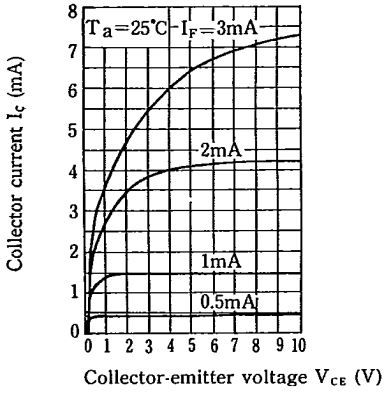

Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

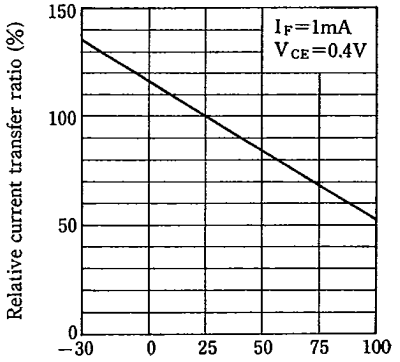

Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature

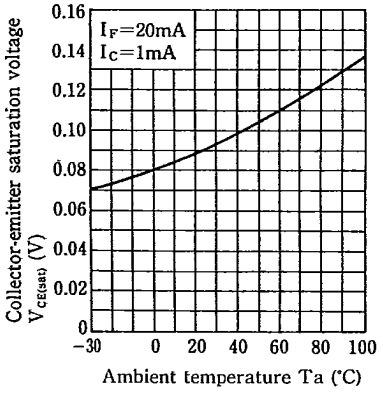

Fig. 9 Collector Dark Current vs. Ambient Temperature

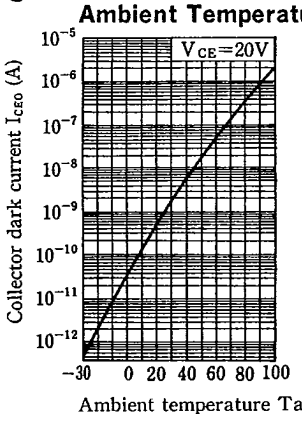

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Fig. 10 Response Time vs. Load Resistance

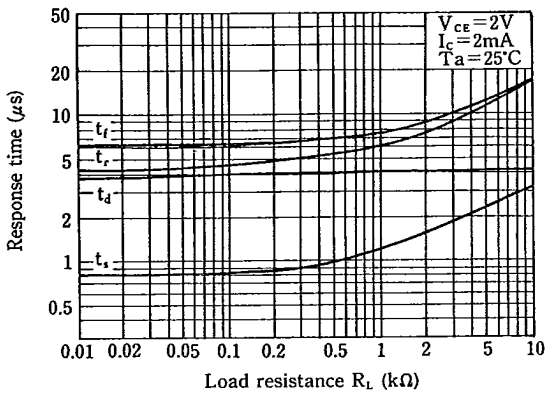


Fig. 11 Turn-off Time vs. Load Resistance

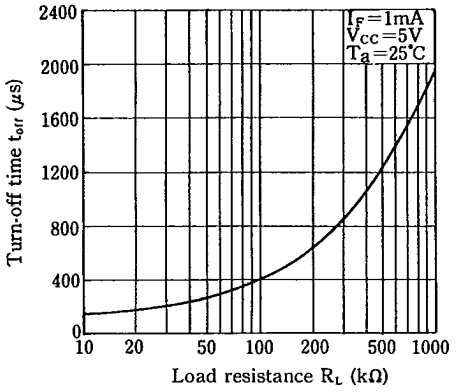


Fig. 12 Turn-off Time vs. Ambient Temperature

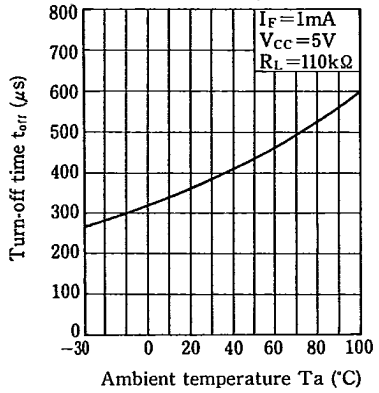
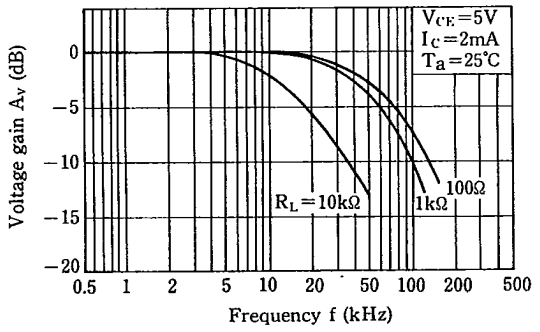
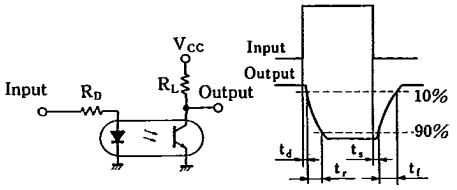


Fig. 13 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response

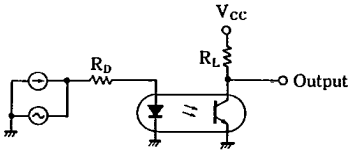


Fig. 14 Collector-emitter Saturation Voltage vs. Forward Current