PC817 Series
High Density Mounting Type Photocoupler

※ Lead forming type (I type) is also available. (PC817I) (Page   )

■ Features

1. Current transfer ratio
   CTR : MIN. 50% at $I_F = 5mA$, $V_{CE} = 5V$
2. High isolation voltage between input and output (V_{Iso} : 5,000Vrms)
3. Compact dual-in-line package
   PC817 : 1-channel type
   PC827 : 2-channel type
   PC837 : 3-channel type
   PC847 : 4-channel type
4. UL recognized, file No. E64380
   TÜV approved, No. R20042

■ Applications

1. Computer terminals
2. System appliances, measuring instruments
3. Registers, copiers, automatic vending machines
4. Electric home appliances, such as fan heaters, etc.
5. Medical instruments, physical and chemical equipment
6. Signal transmission between circuits of different potentials and impedances

18 7003
18 7011
18 7020
18 70 38

■ Outline Dimensions

(Unit : mm)



PC817 — Internal connection diagram
① Anode
② Cathode
③ Emitter
④ Collector

PC827 — Internal connection diagram
①③ Anode
②④ Cathode
⑤⑦ Emitter
⑥⑧ Collector

PC847 — Internal connection diagram
①③⑤⑦ Anode
②④⑥⑧ Cathode
⑨⑪⑬⑮ Emitter
⑩⑫⑭⑯ Collector

PC837 — Internal connection diagram
①③⑤ Anode
②④⑥ Cathode
⑦⑨⑪ Emitter
⑧⑩⑫ Collector
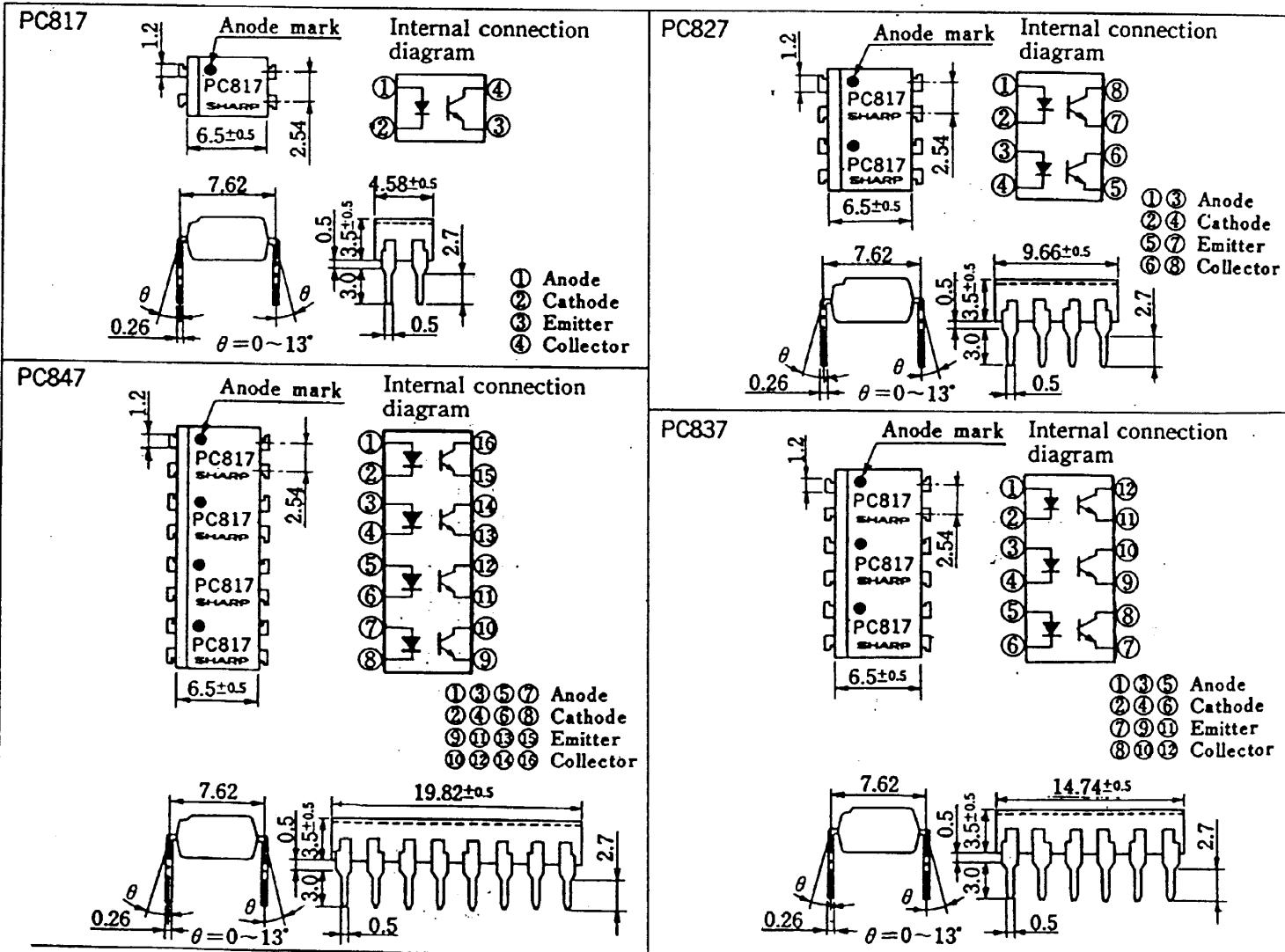
Fig. 2 Collector Power Dissipation vs. Ambient Temperature

Collector power dissipation P_c (mW) vs. Ambient temperature T_a (°C)
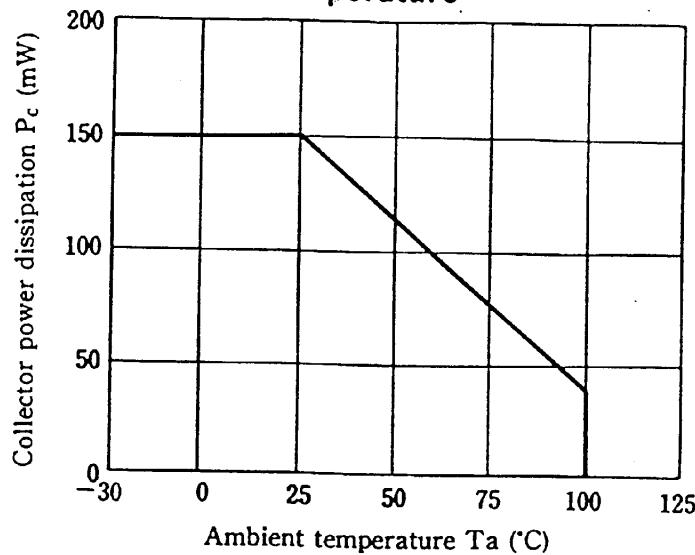
Fig. 3 Peak Forward Current vs. Duty Ratio

Peak forward current I_{FM} (mA) vs. Duty ratio

Pulse width $\leq 100\mu s$
$T_a = 25°C$
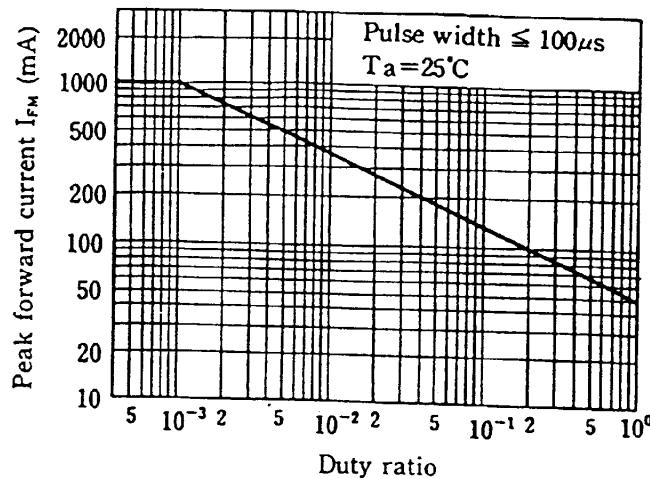
Fig. 4 Current Transfer Ratio vs. Forward Current

Current transfer ratio CTR (%) vs. Forward current I_F (mA)

$V_{CE} = 5V$
$T_a = 25°C$
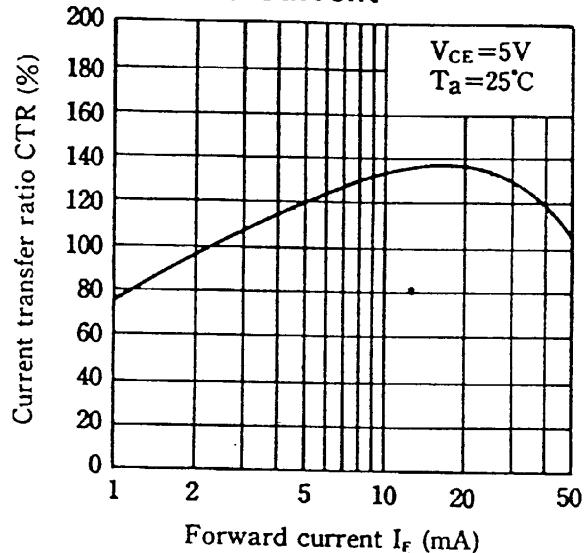
Fig. 5 Forward Current vs. Forward Voltage

Forward current I_F (mA) vs. Forward voltage V_F (V)

$T_a = 75°C$
50°C
25°C
0°C
−25°C
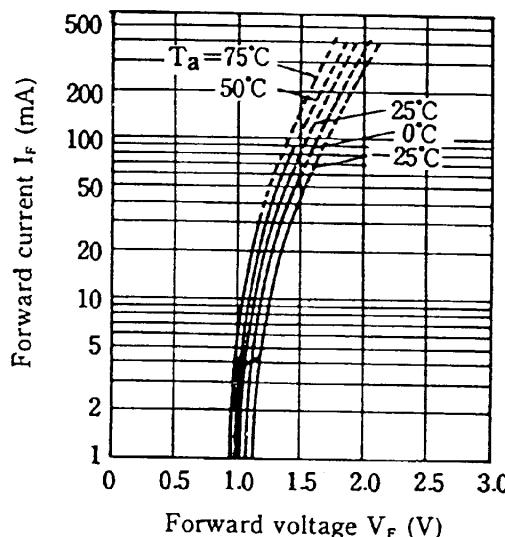
Fig. 6 Collector Current vs. Collector-emitter Voltage

Collector current I_c (mA) vs. Collector-emitter voltage V_{CE} (V)

$I_F = 30mA$
20mA
10mA
5mA
$T_a = 25°C$
P_c(MAX.)

Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

Relative current transfer ratio (%) vs. Ambient temperature T_a (°C)

$I_F = 5mA$
$V_{CE} = 5V$
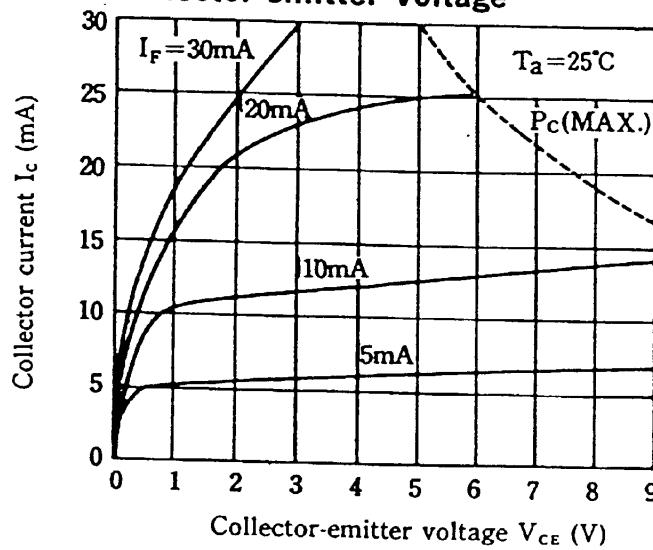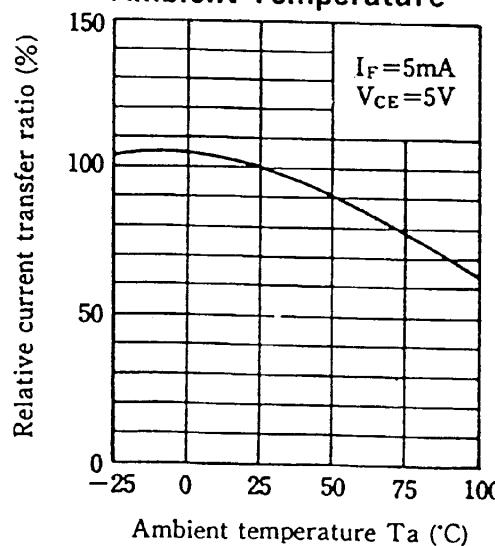
Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature

Collector-emitter saturation voltage $V_{CE(sat)}$ (V) vs. Ambient temperature Ta (°C)

$I_F = 20mA$
$I_C = 1mA$
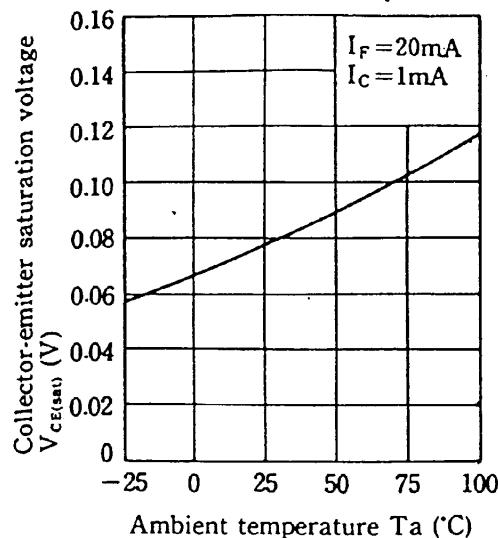
Fig. 9 Collector Dark Current vs. Ambient Temperature

Collector dark current I_{CEO} (A) vs. Ambient temperature Ta (°C)

$V_{CE} = 20V$
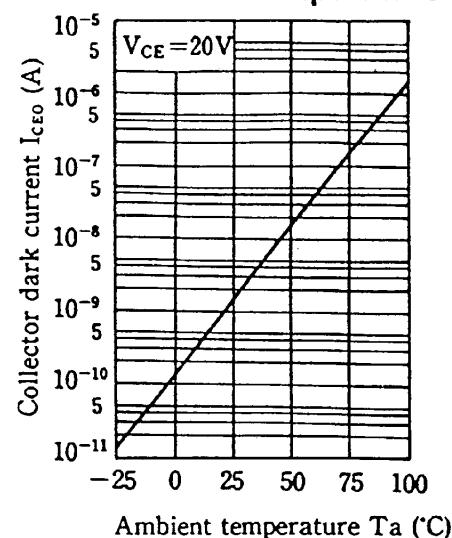
Fig. 10 Response Time vs. Load Resistance

Response time (μs) vs. Load resistance R_L (kΩ)

$V_{CE} = 2V$
$I_C = 2mA$
$T_a = 25°C$

t_r
t_f
t_d
t_s
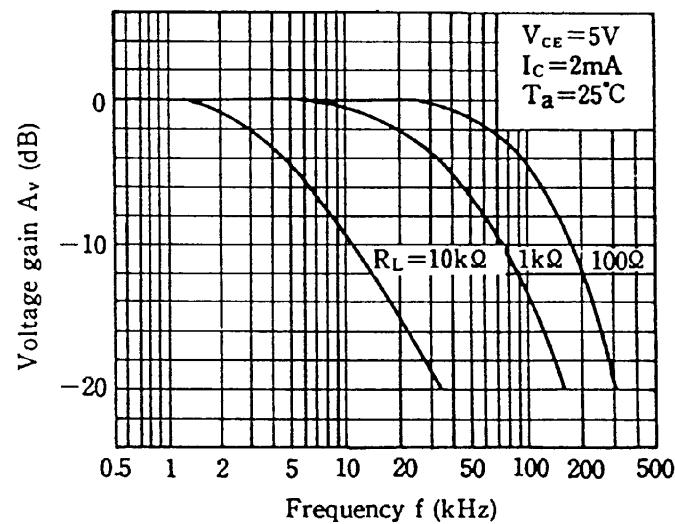
Test Circuit for Response Time

Input R_D
V_{CC}
R_L Output

Input
Output
10%
90%
t_d t_s
t_r t_f
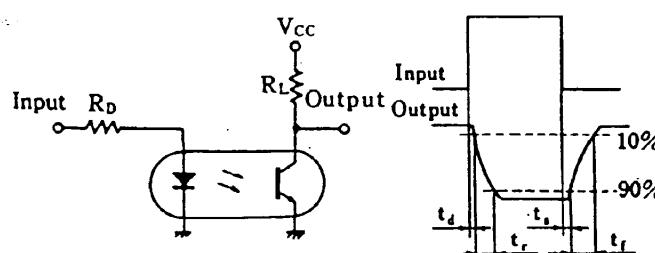
Test Circuit for Frequency Response

R_D
V_{CC}
R_L Output

Fig. 11 Frequency Response

Voltage gain A_V (dB) vs. Frequency f (kHz)

$V_{CE} = 5V$
$I_C = 2mA$
$T_a = 25°C$

$R_L = 10k\Omega$ 1kΩ 100Ω
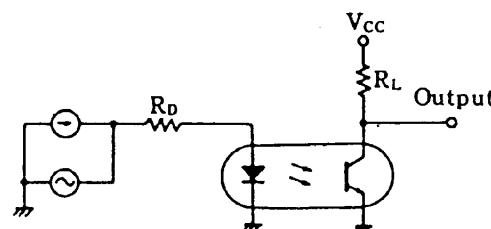
Fig. 12 Collector-emitter Saturation Voltage vs. Forward Current

Collector-emitter saturation voltage $V_{CE(sat)}$ (V) vs. Forward current I_F (mA)

$I_C = 0.5mA$ 1mA   3mA   5mA   7mA
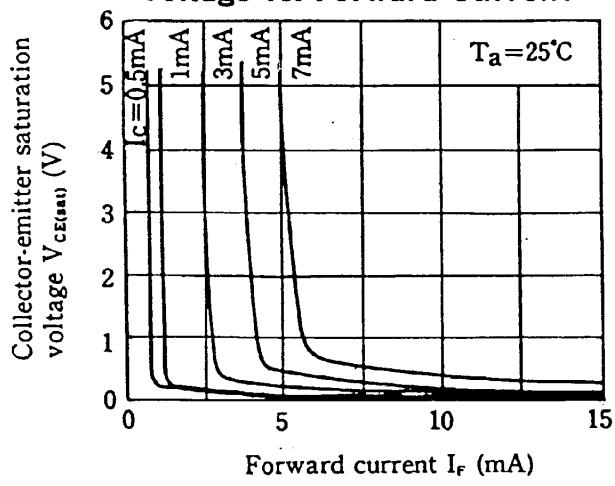
$T_a = 25°C$

■ Absolute Maximum Ratings

(Ta=25°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	Vrms
	Operating temperature	T_{opr}	−30 to +100	°C
	Storage temperature	T_{stg}	−55 to +125	°C
	*3 Soldering temperature	T_{sol}	260	°C

*1 Pulse width≦100μs, Duty ratio=0.001
*2 RH=40 to 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	—	10^{-9}	10^{-7}	A
Transfer characteristics	*4 Current transfer ratio	CTR	I_F=5mA, V_{CE}=5V	50	120	600	%
	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 to 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=100Ω	—	80	—	kHz
	Response time (Rise)	t_r	V_{CE}=2V, I_C=2mA, R_L=100Ω	—	4	18	μs
	Response time (Fall)	t_f		—	3	18	μs

*4 Classification table of current transfer ratio is shown below.

Model No.	CTR (%)
PC817A	80 to 160
PC817B	130 to 260
PC817C	200 to 400
PC817D	300 to 600
PC817AB	80 to 260
PC817BC	130 to 400
PC817CD	200 to 600
PC817AC	80 to 400
PC817BD	130 to 600
PC817AD	80 to 600
PC817	50 to 600

Fig. 1 Forward Current vs. Ambient Temperature