PC817(G)

4PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

Features

- Current transfer ratio (CTR: 50~600% at I_F=5mA, V_{CE}=5V)
- High isolation voltage between input and output (Viso=5000 V rms)
- Creepage distance >7.62 mm
- Operating temperature up to+110°C
- Compact small outline package
- Pb free and RoHS compliant.

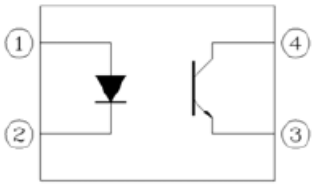
Applications

- Computer terminals.
- System appliances, measuring instruments.
- Registers, copiers, automatic vending machines.
- Electric home appliances, such as fan heaters, etc. of different potentials and impedances.
- Signal transmission between circuits

Description

- The PC817 series are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon phototransistor
- The lead pitch is 2.54mm

Dimensions



Pin Configuration

1. Anode
2. Cathode
3. Emitter
4. Collector

Absolute Maximum Ratings (Ta=25℃)

	Parameter	Symbol	Rating	Unit
INPUT	Forward Current	I_F	50	mA
	INPUT Reverse Voltage	V_R	6	V
	Power Dissipation	P	70	mW
OUTPUT	Collector-Emitter Voltage	V_{CEO}	35	V
	Emitter- Collector Voltage	V_{CEO}	6	
	Collector Current	I_C	50	mA
	Collector Power Dissipation	P_C	150	mW
Total Power Dissipation		Ptot	200	mW
*1 Isolation Voltage		Viso	5000	Vrms
Rated impulse isolation voltage		V_{IOTM}	6000	V

Rated repetitive peak isolation voltage	V_{IORM}	630	V
Operating Temperature	Topr	-40 to+85	℃
Storage Temperature	Tstg	-55 to+125	
*2 Soldering Temperature	Tsol	260	

1. AC For minute, R.H.=40~60%

Isolation voltage shall be measured using the following method.

- Short between anode and cathode on the primary side and between collector and emitter on the secondary side.
- The isolation voltage tester with zero-cross circuit shall be used.
- The waveform of applied voltage shall be a sine wave.

2. For 10 Seconds

Electro-Optical Characteristics (Ta=25℃)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit.
INPUT	Forward Voltage	V_F	I_F=20mA	---	1.2	1.4	V
	Reverse Current	I_R	V_R=4V	---	---	10	μA
	Terminal Capacitance	Ct	V=0,f=1KHz	---	30	250	pF
OUTPUT	Collector Dark Current	I_{CEO}	V_{CE}=20V, I_F=0	---	---	100	nA
	Collector-Emitter Breakdown Voltage	B_{VCEO}	I_C=0.1mA I_F=0	35	---	---	V
	Emitter-Collector Breakdown Voltage	B_{VECO}	I_E=10μA I_F=0	6	---	---	V
TRANSFER CHARACTERISTICS	Collector Current	Ic	I_F=5mA V_{CE}=5V	2.5	---	30	mA
	*1 Current Transfer Ratio	C_{TR}		50	---	600	%
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_F=20mA I_C= 1mA		0.1	0.2	V
	Isolation Resistance	Riso	DC500V 40~60%R.H.	5×10^{10}	1×10^{11}	---	Ω
	Floating Capacitance	Cf	V=0, f=1MHz	---	0.6	1	pF
	Cut-Off Frequency	fc	V_{CE}=5V, I_C=2mA R_L=100Ω,-3dB	---	80		kHz
	Response Time(Rise)	tr	V_{CE}=2V, I_C=2mA R_L=100Ω	---	4	18	μs
	Response Time(Fall)	tf		---	3	18	μs

1 C_{TR}= $I_C/I_F\times100\%$

RANK TABLE OF CURRENT TRANSFER RATIO(CTR)

RANK MARK .	Min . (%)	Max . (%)
L	50	100
A	80	160
B	130	260
C	200	400
D	300	600
L or A or B or C or D	50	600

Conditions: I_F=5mA, V_{CE}=5V, Ta=25℃.

CHARACTERISTICS CURVES

Fig.1 Forword Current vs. Ambient Temperatute

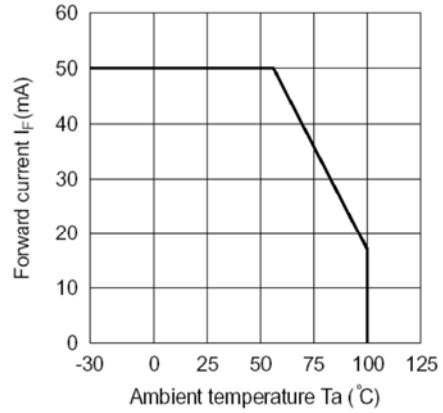


Fig.2 Collector Power Dissipation vs. Ambient Temperature

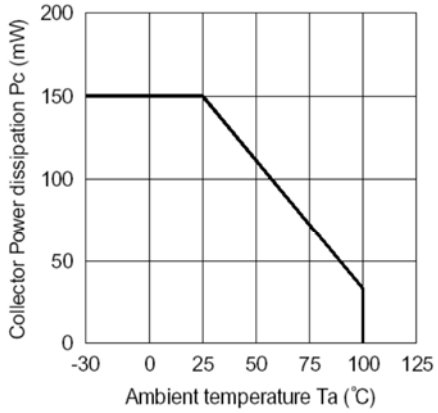


Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

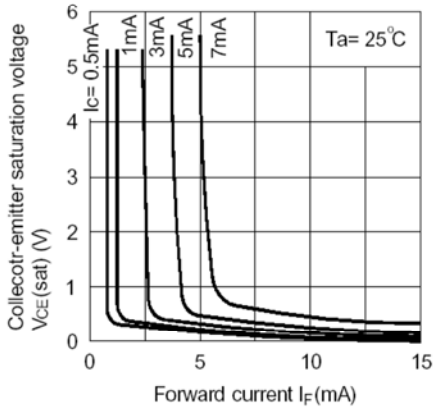


Fig.4 Forward Current vs. Forward Voltage

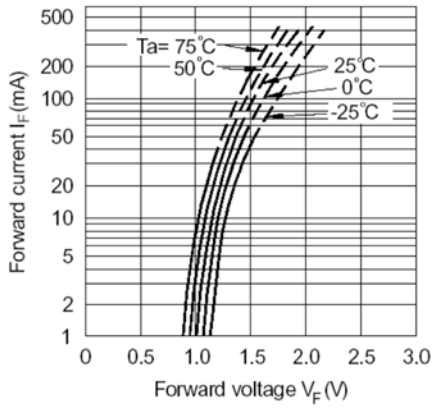


Fig.5 Current Transfer Ratio vs. Forward Current

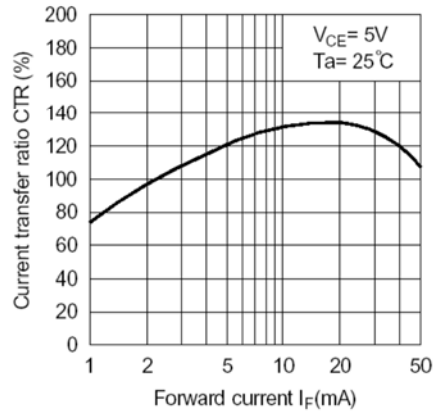
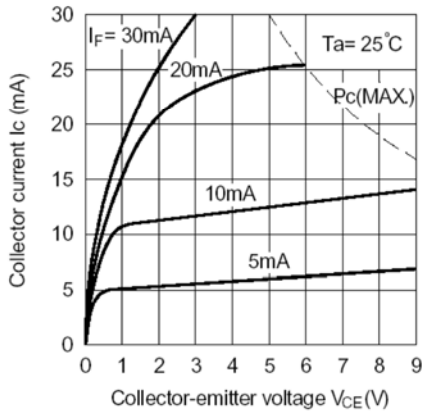


Fig.6 Collector Current vs. Collector-emitter Voltage



Characteristics Curves

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

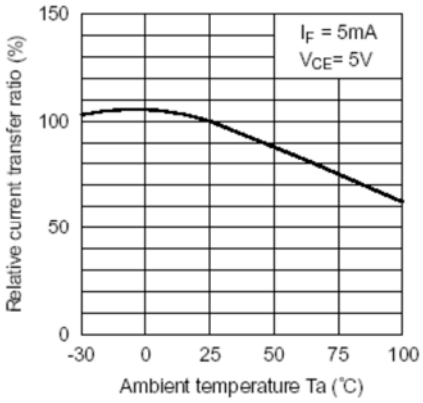


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

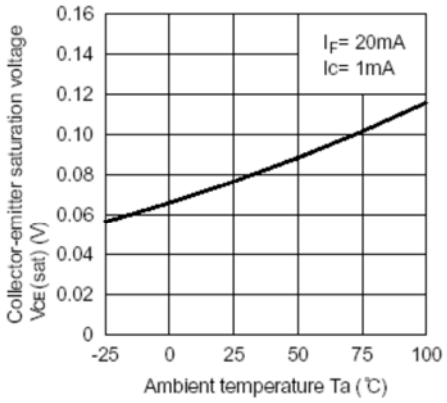


Fig.9 Collector Dark Current vs. Ambient Temperature

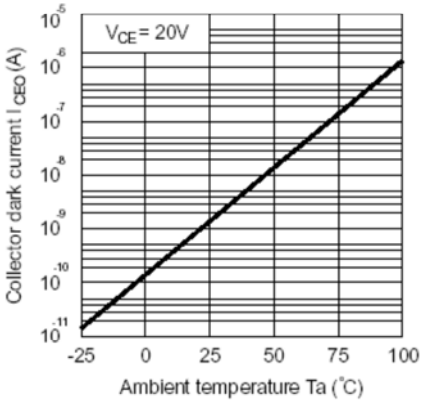


Fig.10 Response Time vs. Load Resistance

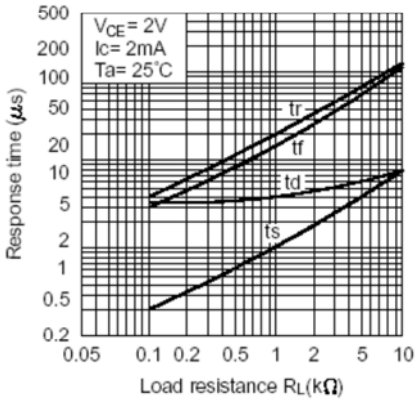
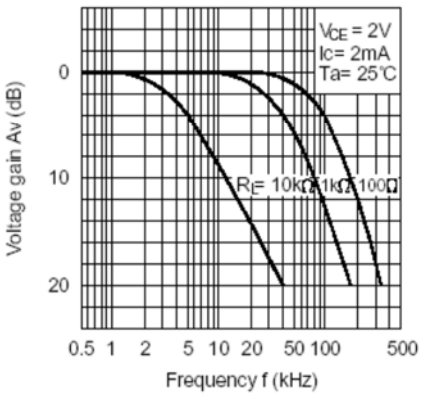
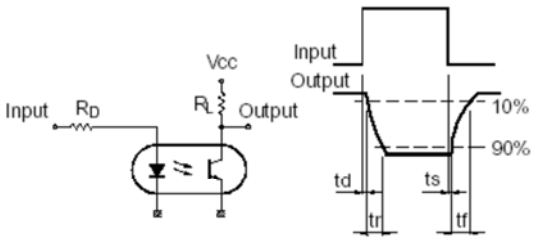


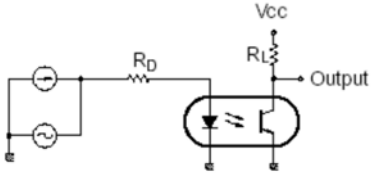
Fig.11 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response



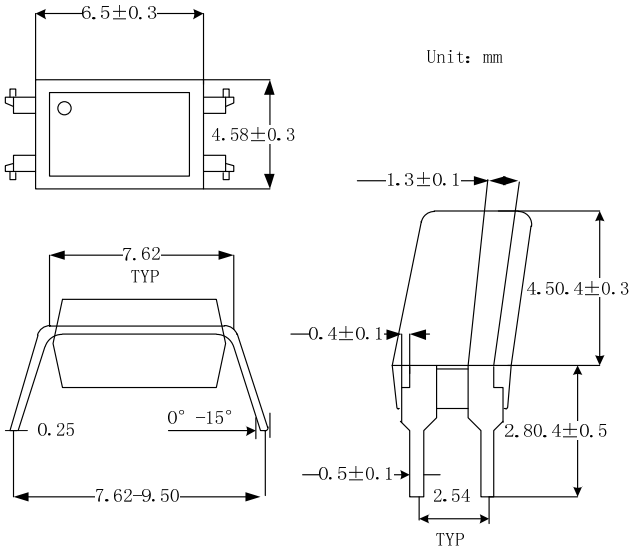
Reliability Test

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS C 7021 :B-1	Connect with a power If=50mA Ta=Under room temperature Test time=1,000hrs	0/20
	High Temperature High Humidity Reverse Bias (H3TRB)	JIS C 7021 :B-11	Ta=+85℃±5℃, RH=85% PTR=VCE absolute max rating*80% Test time=1000hrs	0/20
	High Temperature Reverse Bias (HTRB)	JIS C 7021 :B-8	Ta=+105℃±5℃ PTR=VCE absolute max rating Test time=1000hrs	0/20
	High Temperature Storage	MIL-STD-883:1008 JIS C 7021 :B-10	High Ta=+125℃±5℃ Test time=1,000hrs	0/20
	Low Temperature Storage	JIS-C-7021 :B-12	Low Ta=-55℃±5℃ Test time=1,000hrs	0/20
	Autoclave	JESD 22-A102-B	P=15PSIG, Ta=121℃ Humi. =100%RH, 48hrs	0/20
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS C 7021 :A-4	125℃~25℃~-55℃~25℃ 30min 5min 30min 5min Test Time=20cycle	0/20
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	125℃~-55℃ 20min 20min Test Time=20cycle	0/20
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS C 7021 :A-1	Operation heating： 300℃，within 10±1seconds.	0/20
	Solder Ability	MIL-S-883:2003 JIS C 7021 :A-2	Operation heating： 260℃，within 5±1seconds.	0/20

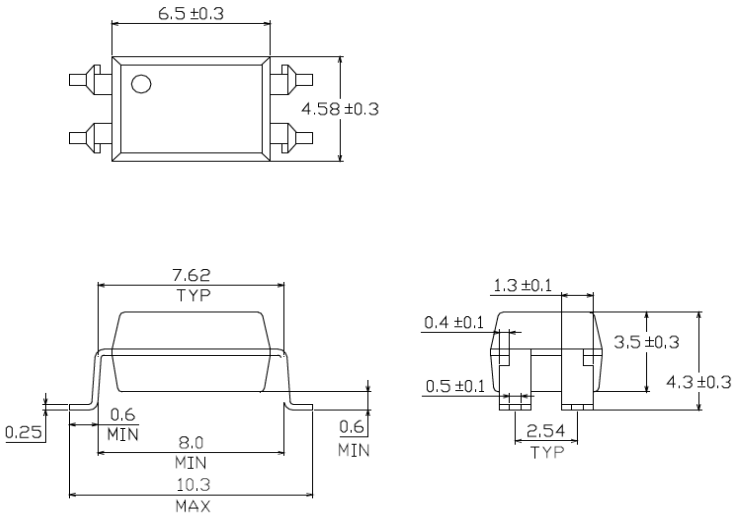
Judgment Criteria Of Failure For The Reliability

Symbol	Measuring conditions	Judgment criteria for failure
$V_{F\ (V)}$	If=20mA	Over Ux1.0
$I_{r(uA)}$	Vr=4V	Over Ux1.0
$C_{TR(\%)}$	If=5mA, V_{CE}=5V	Shift>1.2
$V_{CE(sat)}$	I_F=20mA, I_C=1mA	Over Ux1.0
B_{VCEO}	I_C=0.1mA, I_F=0	Over Lx1.0
B_{VECO}	I_E=10μA, I_F=0	Over Lx1.0

DIP4


6.5±0.3
Unit: mm
4.58±0.3
1.3±0.1
7.62
TYP
4.50.4±0.3
0.4±0.1
0.25
0° -15°
2.80.4±0.5
0.5±0.1
7.62-9.50
2.54
TYP

SOP4


6.5 ±0.3
4.58 ±0.3
7.62
TYP
1.3 ±0.1
0.4 ±0.1
3.5 ±0.3
4.3 ±0.3
0.5 ±0.1
0.25
0.6
MIN
8.0
MIN
0.6
MIN
10.3
MAX
2.54
TYP