PC905

Long Creepage Distance Photocoupler with Built-in Voltage Detection Circuit

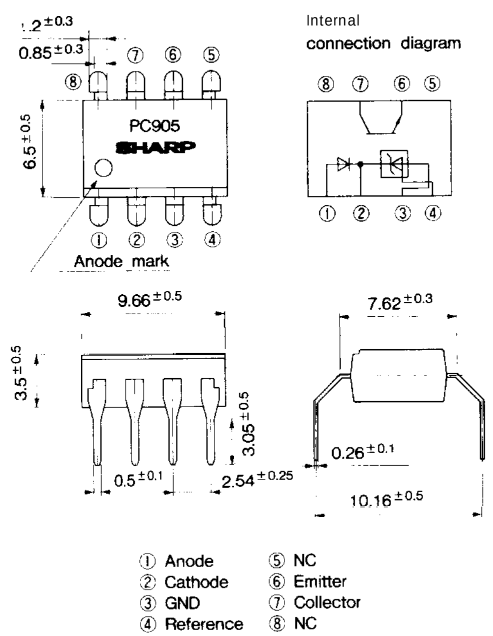
※ Lead forming type (I type) is also available. (PC905I) (Page 656)
※※ TÜV (DIN -VDE0884) approved type is also available as an option.

■ Features

1. Built-in voltage deviation detection circuit
2. Long creepage distance type
   (Creepage distance :8mm or more)
3. Conforms to European Safety Standard
   (Internal insulation distance :0.5mm or more)
4. High collector-emitter voltage (V_{CEO} : 70V)
5. High isolation voltage between input and output (V_{iso} : 5 000V_{rms})
6. Recognized by UL, file No. E64380
   Approved by BSI(BS415 : No. 6990, BS7002 : No. 7567)
   Approved by SEMKO No. 8907261
   Approved by DEMKO No. 392592

■ Outline Dimensions

(Unit : mm)



■ Applications

1. Switching power supplies

6 Photocouplers

■ Absolute Maximum Ratings

(Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Anode current	I_A	50	mA
	Anode voltage	V_A	30	v
	Reference input current	I_{REF}	10	mA
	Power dissipation	P	250	mW
output	Collector -emitter voltage	V_{CEO}	70	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}	350	mW
*1 Isolation voltage		vi.”	5000	V_{rms}
Operating temperature		T_{opr}	–25 to +85	℃
Storage temperature		T_{stg}	–40 to + 125	℃
*2 Soldering temperature		T_{sol}	260	℃

*1 40 to 60%RH, AC for 1 minute
*2 For 10 seconds

Electro-optical Characteristics

(Ta = 25℃ unless otherwise specified.)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Fig.
Input	Reference voltage	V_{REF}	$V_K = V_{REF}$, $I_A = 10mA$	2.40	2.495	2.60	V	1
	*3 Temperature change in reference voltage	$V_{REF}(dev)$	$V_K = V_{REF}$, $I_A = 10mA$, Ta= −25 to +85℃	–	8	40	mV	1
	Voltage variation ratio in reference voltage	$\Delta V_{REF}/\Delta V_A$	$I_A = 10mA$, $\Delta V_A = 30V - V_{REF}$	–	−1.4	−5	mV/V	2
	Reference input current	I_{REF}	$I_A = 10mA$, $R_3 = 10k\Omega$	–	2	10	μA	3
	*4 Temperature change in reference input current	$I_{REF}(dev)$	$I_A = 10mA$, $R_3 = 10k\Omega$, Ta= −25 to +85℃	–	0.4	3	μA	3
	Minimum drive current	I_{MIN}	$V_K = V_{REF}$	–	1	2	mA	1
	OFF-state anode current	I_{OFF}	$V_A = 30V$, $V_{REF} = GND$	–	0.1	2	μA	4
	Anode-cathode forward voltage	V_F	$V_K = V_{REF}$, $I_A = 10mA$	–	1.2	1.4	V	1
output	Collector dark current	I_{CEO}	$V_{CE} = 20V$		10^{-9}	10^{-7}	A	5
Transfer characteristics	*5 Current transfer ratio	CTR	$V_K = V_{REF}$, $I_A = 10mA$, $V_{CE} = 5V$	40		320	%	6
	Collector -emitter saturation voltage	$V_{CE}(sat)$	$V_K = V_{REF}$, $I_A = 20mA$, $I_C = 1mA$	–	0.1	0.2	V	6
	Isolation resistance	R_{ISO}	40 to 60%RH, DC500V	1x 10^{10}	$\times 10^{11}$		Ω	–
	Floating capacitance	C_f	V=0, f=1MHz		0.6	1.0	pF	–

*3 $V_{REF}(dev) = V_{REF(MAX)} - V_{REF(MIN)}$
*4 $I_{REF}(dev) = I_{REF(MAX)} - I_{REF(MIN)}$
*5 CTR = I_C/I_A X 100(%)

Test Circuit

Fig. 1

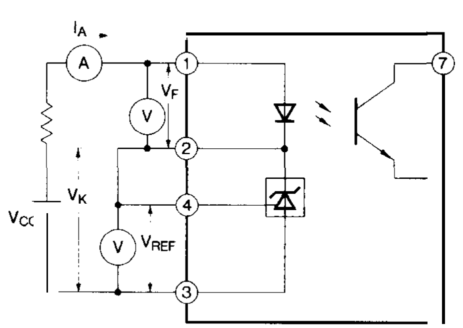
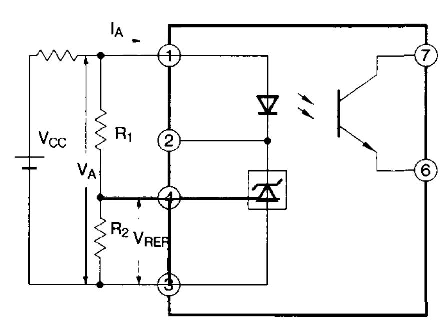


Fig. 2



V_K : Voltage between terminals 2 and 3

V_{REF} : Voltage between terminals 3, and 4

Fig. 3

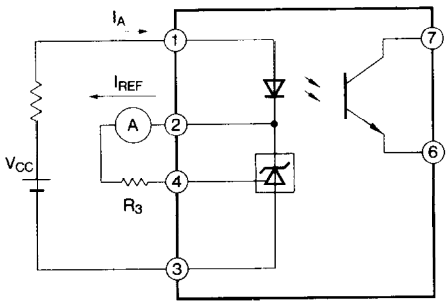


Fig. 4

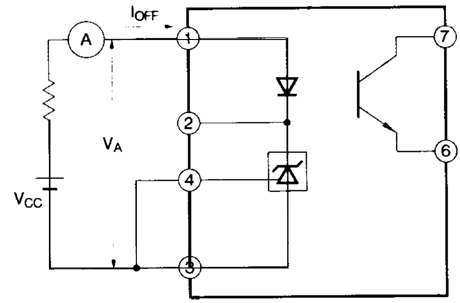


Fig. 5

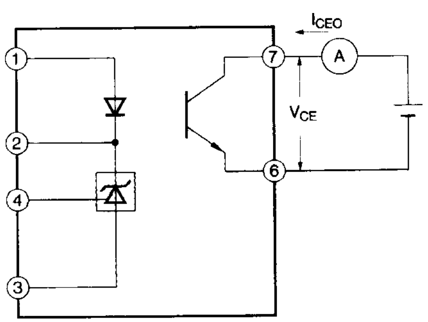


Fig. 6

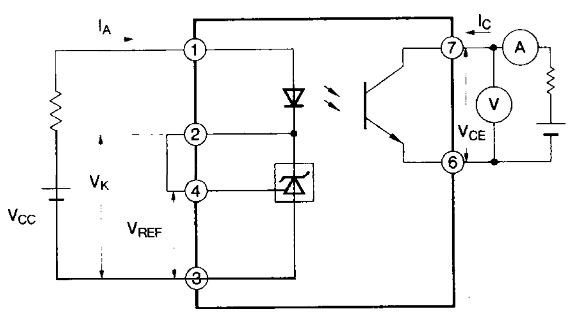


Fig. 7 Anode Current vs. Ambient Temperature

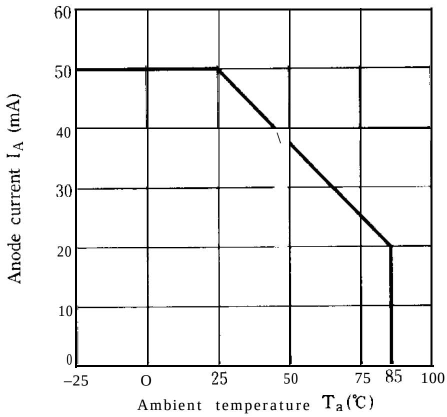


Fig. 8 Input Power Dissipation vs. Ambient Temperature

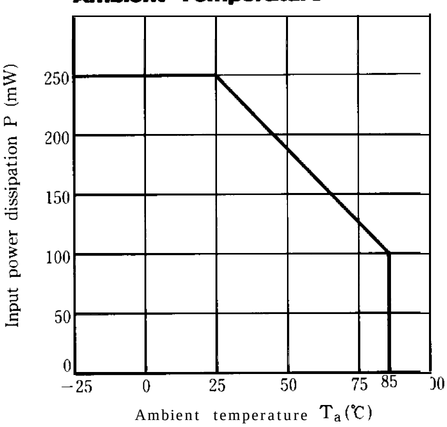


Fig. 9 Collector Power Dissipation vs. Ambient Temperature

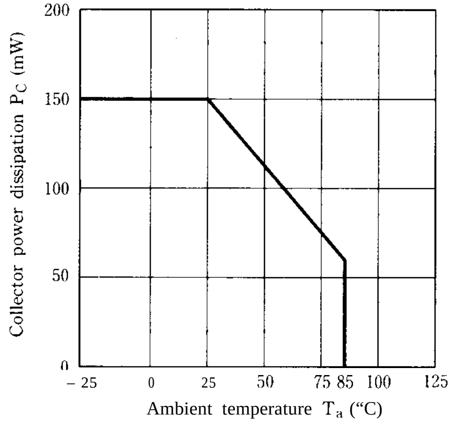


Fig.10 Power Dissipation vs. Ambient Temperature

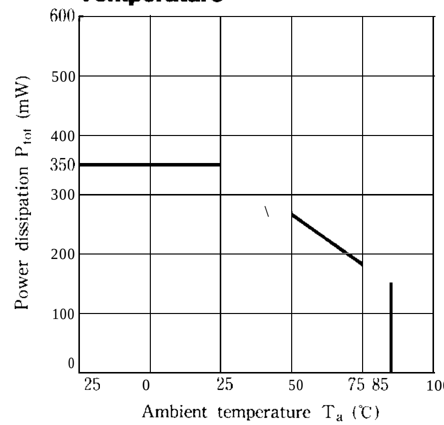


Fig.11 Relative Current Transfer Ratio vs. Ambient Temperature

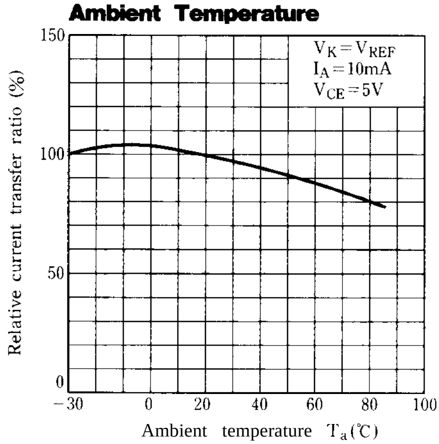


Fig.12 Collector Dark Current vs. Ambient Temperature

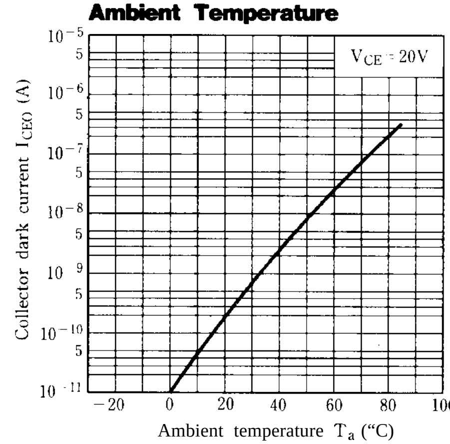


Fig.13-a Anode Current vs. Reference Voltage

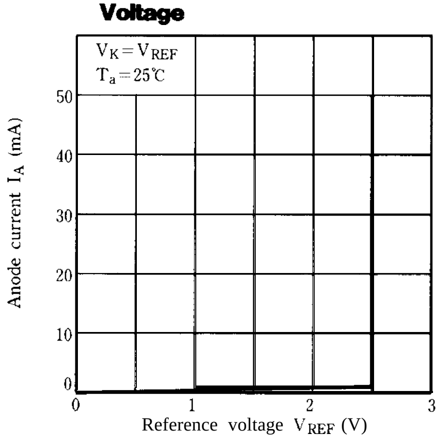


Fig.13-b Anode Current vs. Reference Voltage

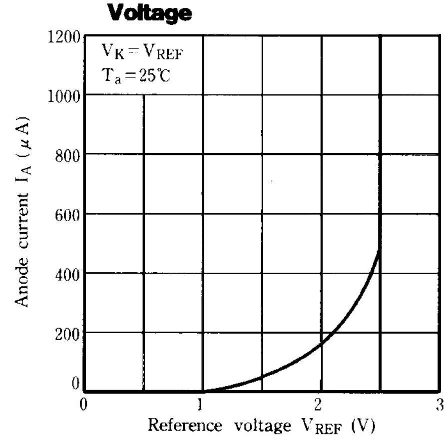


Fig.14 OFF-stats Anode Current vs. Ambient Temperature

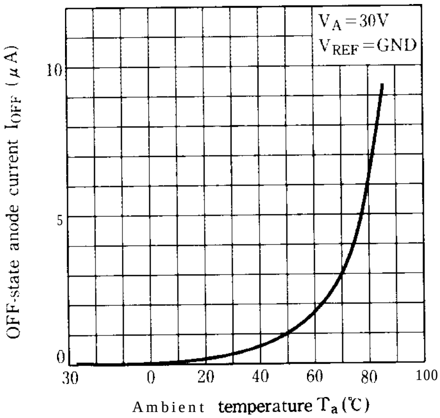


Fig.15 Reference Voltage Change vs. Ambient Temperature

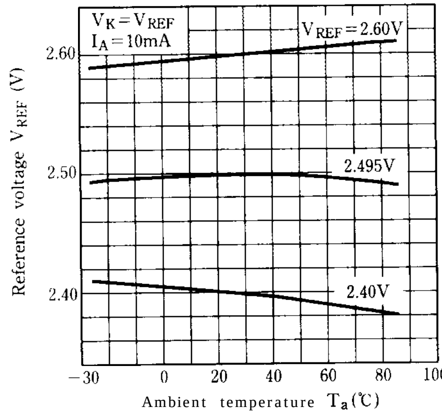


Fig.16 Reference Input Current vs. Ambient Temperature

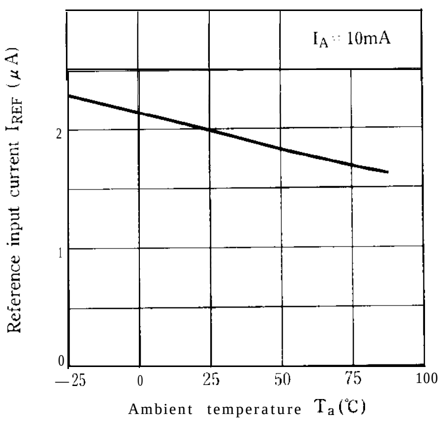


Fig.17 Reference Voltage Change vs. Anode Voltage

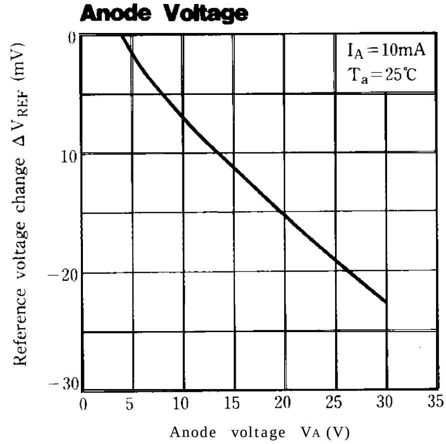
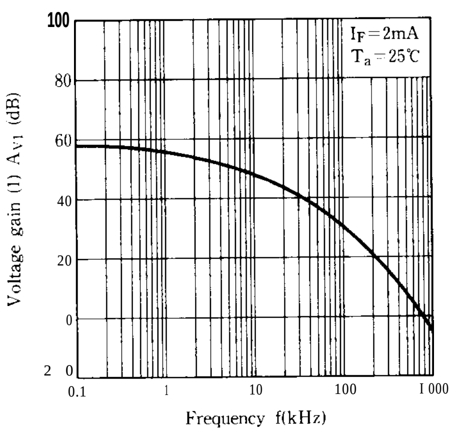
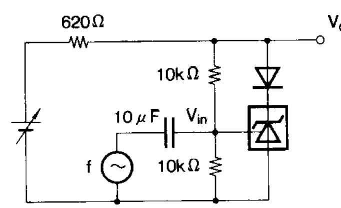


Fig.18-a Voltage Gain (1) vs. Frequency



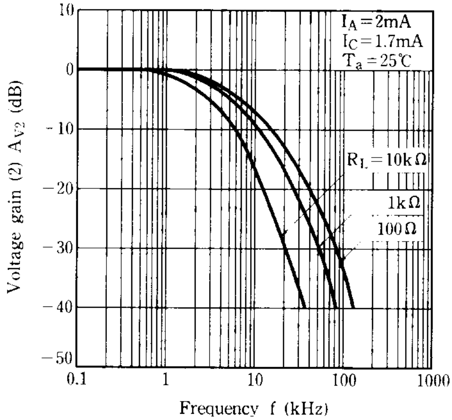
Test Circuit for Voltage Gain (1) vs. Frequency



$$A_{v1} = 20 \log \frac{V_o}{V_{in}}$$

6 Photocouplers

Fig.18-b Voltage Gain (2) vs. Frequency



Test **Circuit** for Voltage **Gain** (2) vs. **Frequency**

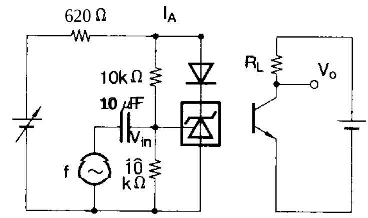
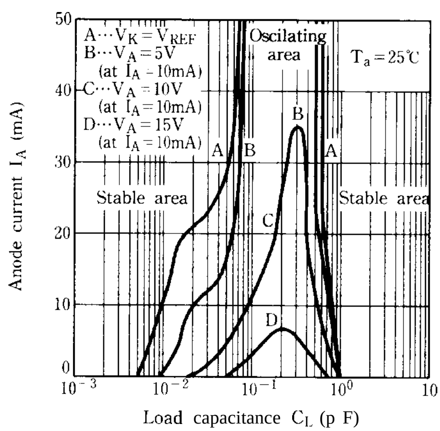
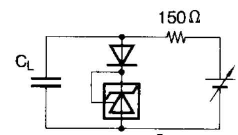


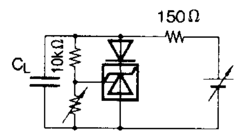
Fig.19 Anode Current vs. Load Capacitance



Test Circuit for Anode Current vs. Load Capacitance



Test circuit I (A)



Test circuit II (B, C, D)

Fig.20 Collector -emitter Saturation voltage **vs. Ambient Temperature**

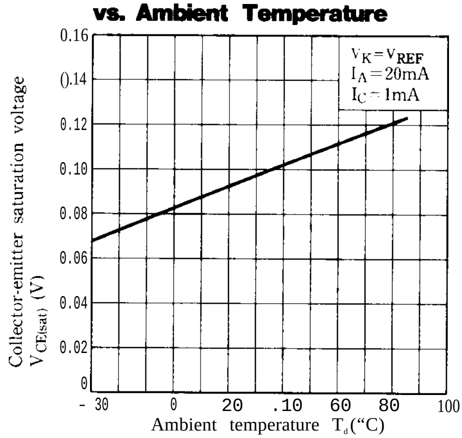
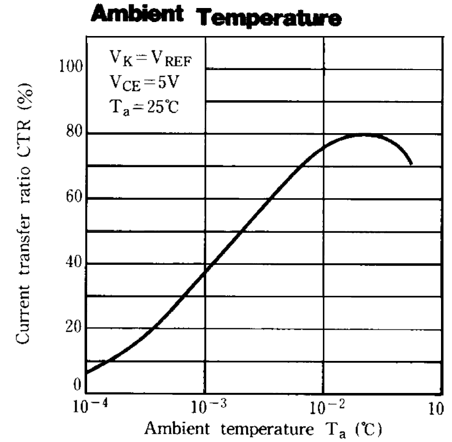


Fig.21 Current Transfer **Ratio vs. Ambient Temperature**



■ Precautions for Use

Handle this product the same as with other integrated circuits against static electricity.

- As for other general cautions, refer to the chapter "Precautions for Use" (Page 78 to 93).