PC905

Long Creepage Distance Photocoupler with Built-in Voltage Detection Circuit

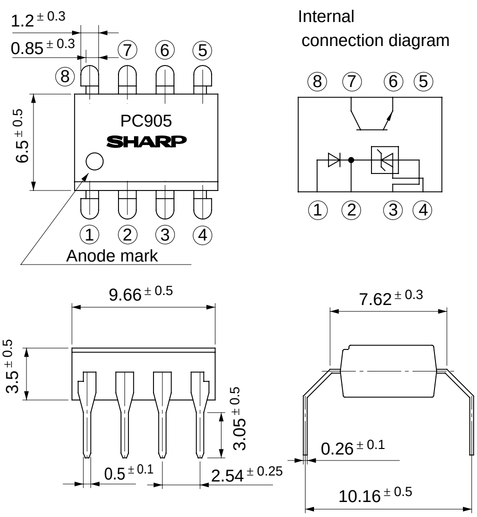
❋ Lead forming type (I type) is also available. (**PC905I**)
❋❋ TÜV (DIN-VDE0884) approved type is also available as an option.

■ 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. 963501101
   Approved by DEMKO No. 392592

■ Outline Dimensions

(Unit : mm)



① Anode ⑤ NC
② Cathode ⑥ Emitter
③ GND ⑦ Collector
④ Reference ⑧ NC

■ Applications

1. Switching power supplies

■ Absolute Maximum Ratings

(Ta= 25˚C)

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		V_{iso}	5 000	V_{rms}
Operating temperature		T_{opr}	- 25 to + 85	˚C
Storage temperature		T_{stg}	- 40 to + 125	˚C
*2 Soldering temperature		T_{sol}	260	˚C

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

■ Electro-optical Characteristics

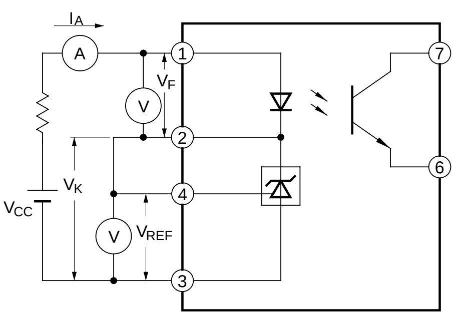
(Ta = 25˚C unless otherwise specified.)

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
	*3Temperature change in reference voltage	V_{REF}(dev)	$V_K = V_{REF}$, I_A = 10mA, Ta = - 25 to + 85˚C	-	8	40	mV	1
	Voltage variation ratio in reference voltage	$\Delta V_{REF} / \Delta V_A$	I_A = 10mA, ΔV_A = 30V- V_{REF}	-	- 1.4	- 5	mV/V	2
	Reference input current	I_{REF}	I_A = 10mA, R_3 = 10kΩ	-	2	10	μA	3
	*4Temperature change in reference input current	I_{REF}(dev)	I_A = 10mA, R_3 = 10kΩ, Ta = - 25 to + 85˚C	-	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 charac-teristics	*5Current 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	5×10^{10}	1×10^{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 $CTR = I_C / I_A \times 100$ (%)

■ Test Circuit

Fig. 1



V_K : Voltage between terminals ② and ③

V_{REF} : Voltage between terminals ③ and ④

Fig. 2

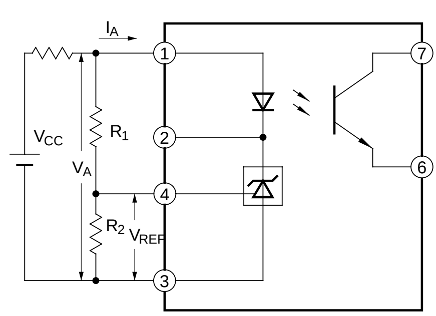


Fig. 3

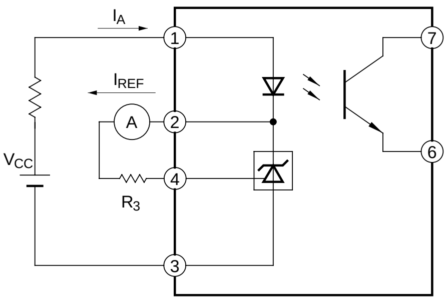


Fig. 4

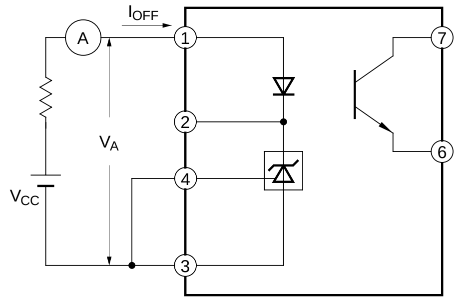


Fig. 5

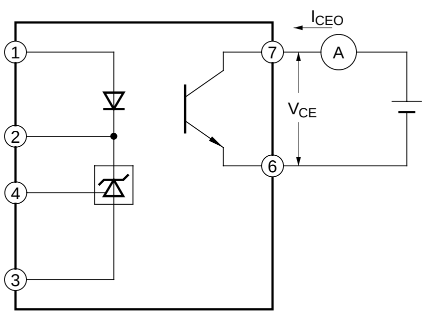


Fig. 6

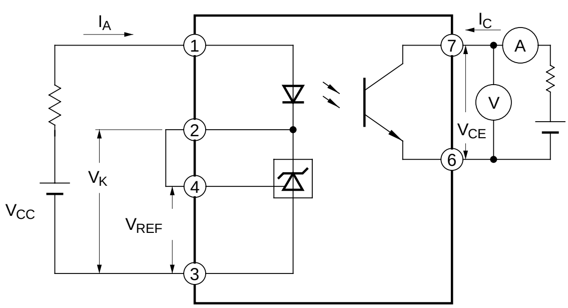


Fig. 7 Anode Current vs. Ambient Temperature

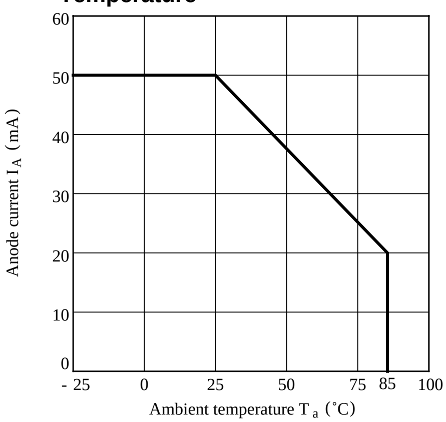


Fig. 8 Input Power Dissipation vs. Ambient Temperature

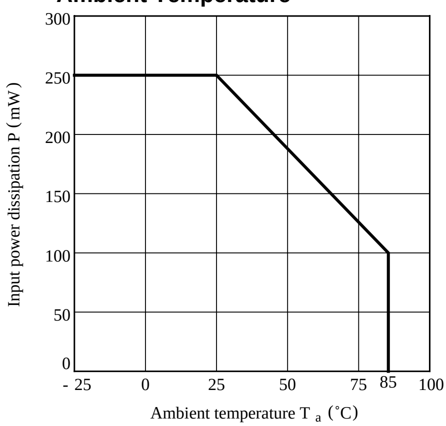


Fig. 9 Collector Power Dissipation vs. Ambient Temperature

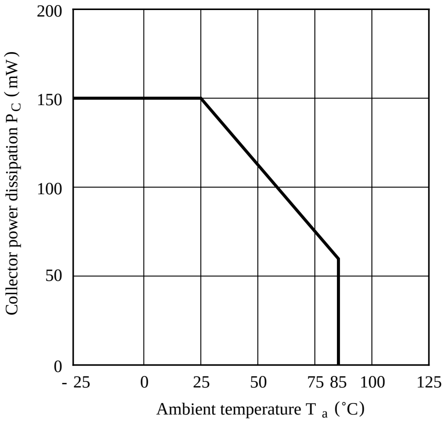


Fig.10 Power Dissipation vs. Ambient Temperature

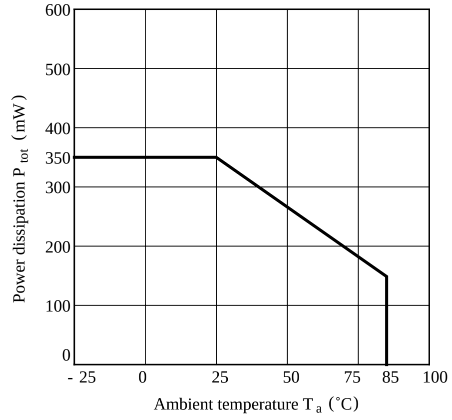


Fig.11 Relative Current Transfer Ratio vs. Ambient Temperature

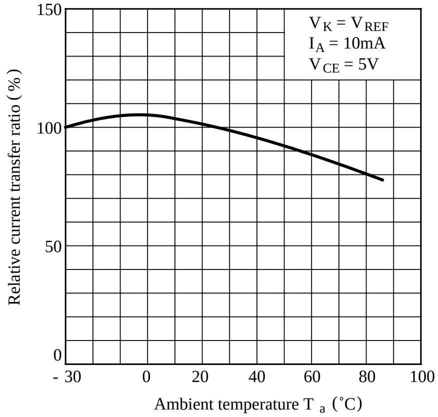


Fig.12 Collector Dark Current vs. Ambient Temperature

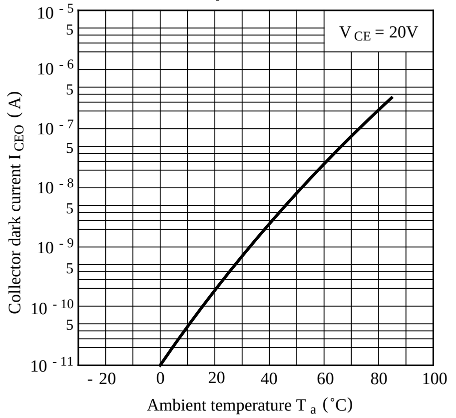


Fig.13-a Anode Current vs. Reference Voltage

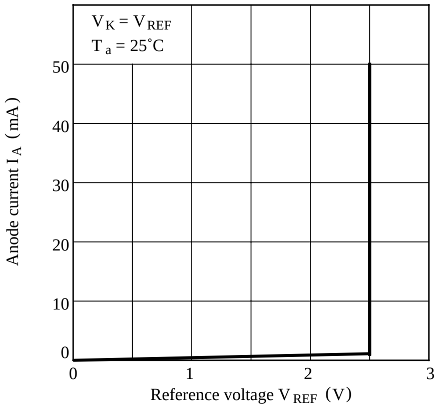


Fig.13-b Anode Current vs. Reference Voltage

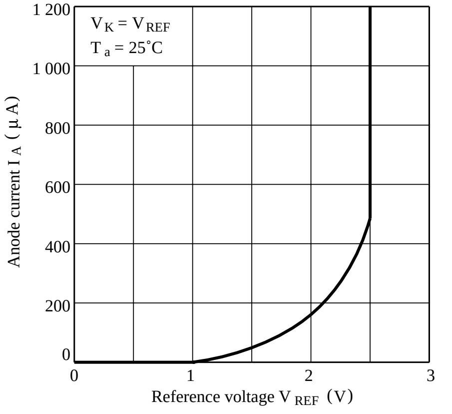


Fig.14 OFF-state Anode Current vs. Ambient Temperature

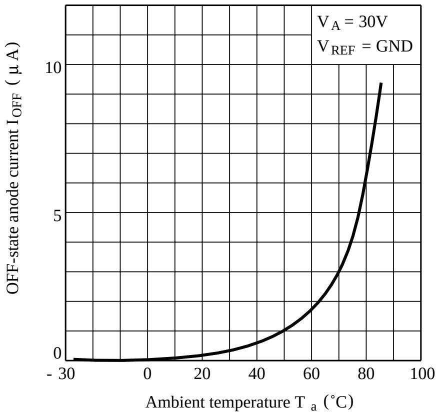


Fig.15 Reference Voltage vs. Ambient Temperature

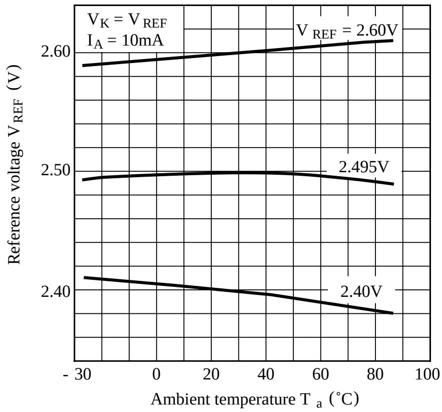


Fig.16 Reference Input Current vs. Ambient Temperature

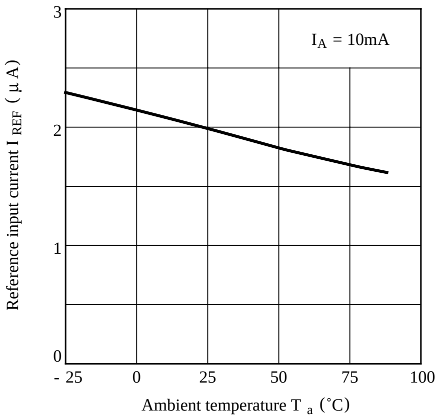


Fig.17 Reference Voltage Change vs. Anode Voltage

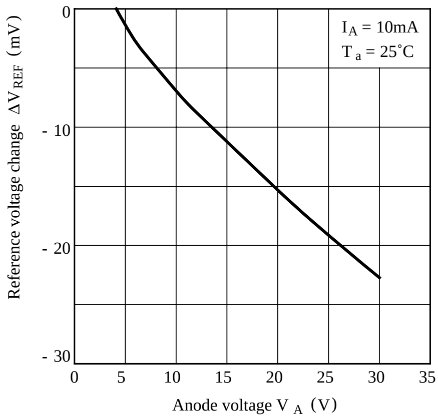
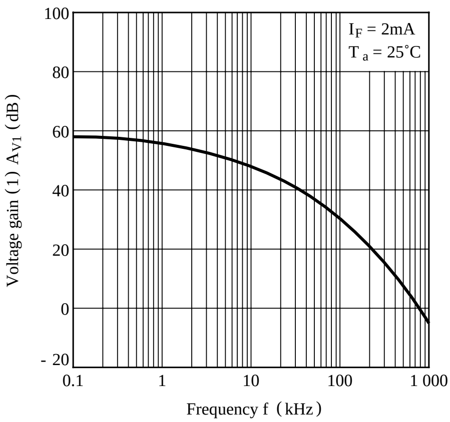
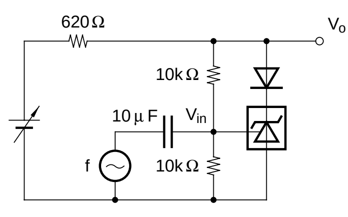


Fig.18-a Voltage Gain (1) vs. Frequency

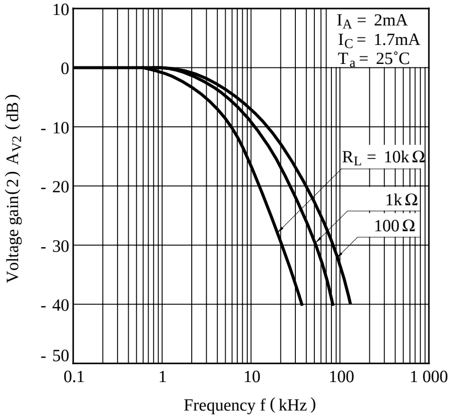


Test Circuit for Voltage Gain (1) vs. Frequency



$$A_{V1} = 20 \log \frac{V_o}{V_{in}}$$

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



Test Circuit for Voltage Gain (2) vs. Frequency

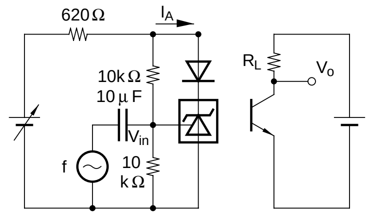
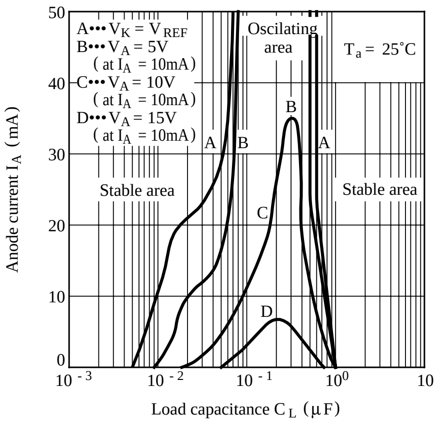


Fig.19 Anode Current vs. Load Capacitance



Test Circuit for Anode Current vs. Load Capacitance

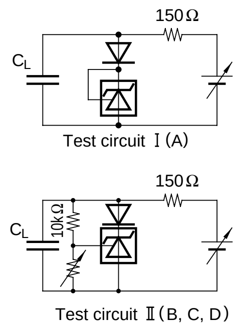


Fig.20 Collector-emitter Saturation Voltage vs. Ambient Temperature

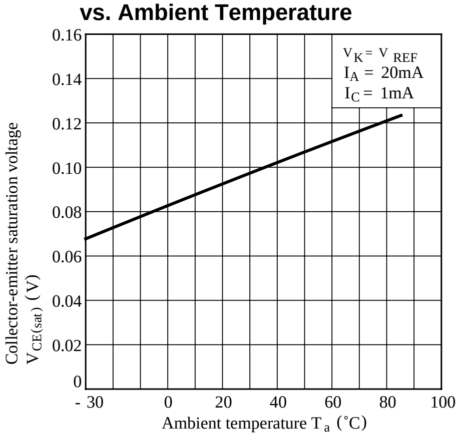
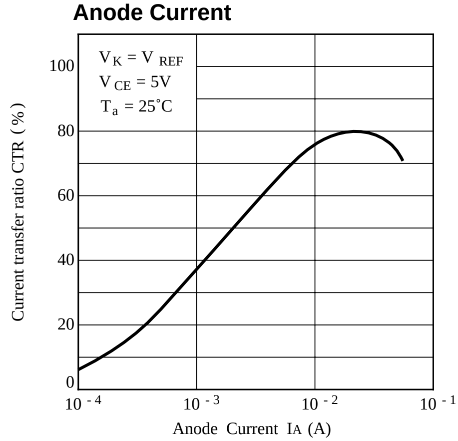


Fig.21 Current Transfer Ratio vs. Anode Current



■ 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"