PC110L/PC111L PC112L/PC113L

Long Creepage Distance Type Photocoupler

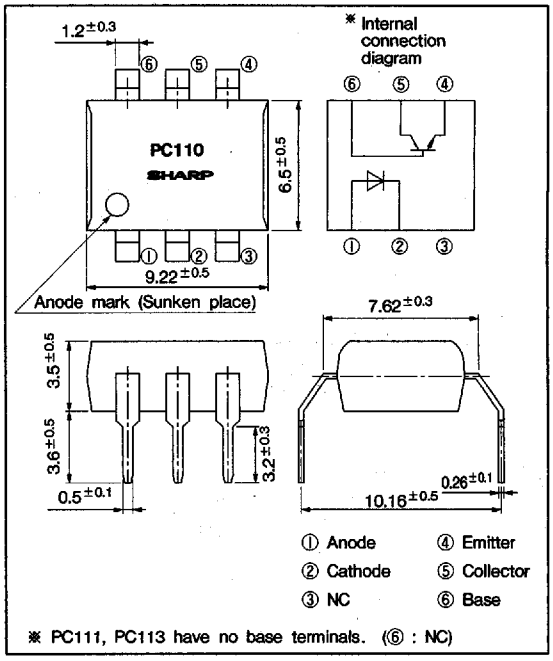
※ Lead forming type (I type) and taping reel type (P type) are also available. (PC110LI/PC111LI/PC112LI/PC113LI, PC110LP0/PC111LP0/PC112LP0/PC113LP0) (Page 656)
※ DIN-VDE0884 approved type is also available as an option.

■ Features

1. Long creepage distance type (Creepage distance : 8mm or more)*1
2. Internal insulation distance : 0.5mm or more
3. Recognized by UL file No. E64380
   Approved by VDE (DIN-VDE0884 ; No. 77292)
   Approved by BSI (BS415 : 6690, BS7002 : 7421)
   Approved by SEMKO (No. 9303049)
   Approved by EI (**PC110** : No. 099447-01
   PC111 : No. 099448-01
   PC112 : No. 099449-01
   PC113 : No. 099450-01)
   Approved by DEMKO (No. 84859)
4. High collector-emitter voltage (V_{CEO} : 70V) : **PC112L/PC113L**
5. High isolation voltage between input and output (V_{iso} : 5 000V_{rms})
6. Dual-in-line package

*1 Allows pin-to-pin distance minus PWB land space to be 8mm or more.

■ Outline Dimensions (Unit : mm)



■ Applications

1. Switching power supplies
2. Home appliances and OA equipment for export to Europe
3. System appliances, measuring instruments

■ Absolute Maximum Ratings (Ta=25℃)

Parameter			Symbol	Rating	Unit
Input	Forward current		I_F	50	mA
	*2Peak forward current		I_{FM}	1	A
	Reverse Voltage		V_R	6	V
	Power dissipation		P	70	mW
Output	Collector-emitter voltage	PC110L/PC111L	V_{CEO}	35	V
		PC112L/PC113L		70	
	Emitter-collector voltage		V_{ECO}	6	V
	*3Collector-base voltage	PC110L	V_{CBO}	35	V
		PC112L		70	
	*3Emitter-base voltage	PC110L/PC112L	V_{EBO}	6	V
	Collector current		I_C	50	mA
	Collector power dissipation	PC110L/PC111L	P_C	150	mW
		PC112L/PC113L		160	
	Total power dissipation	PC110L/PC111L	P_{tot}	170	mW
		PC112L/PC113L		200	
*4Isolation voltage			V_{iso}	5 000	Vrms
Operating temperature			T_{opr}	−30 to +100	℃
Storage temperature			T_{stg}	−55 to +125	℃
*5Soldering temperature			T_{sol}	260	℃

*2 Pulse width≦100 μs, Duty ratio=0.001
*3 Applies only to **PC110L, PC112L.**
*4 40 to 60%RH, AC for 1 minute
*5 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		C_t	V=0,f=1kHz	−	30	250	pF
Output	Collector dark current		I_{CEO}	V_{CE}=20V, I_F=0, R_{BE}=∞	−	−	10^{-7}	A
	Collector-emitter brakedown voltage	PC110L/PC111L	BV_{CEO}	I_C=0.1mA, I_F=0	35	−	−	V
		PC112L/PC113L			70	−	−	
	Emitter-collector breakdown voltage		BV_{ECO}	I_E=10 μA, I_F=0	6	−	−	V
	Collector-base breakdown voltage	PC110L	BV_{CBO}	I_C=0.1mA, I_F=0	35	−	−	V
		PC112L			70	−	−	
Transfer characteristics	Current transfer ratio	PC110L	CTR	I_F=5mA, V_{CE}=5V, R_{BE}=∞	50	−	600	%
		PC111L			50	100	400	
		PC112L/PC113L		I_F=10mA, V_{CE}=5mA, R_{BE}=∞	40	−	320	
	Collector-emitter saturation voltage		$V_{CE(sat)}$	I_F=20mA, I_C=1mA, R_{BE}=∞	−	0.1	0.2	V
	Isolation resistance		R_{ISO}	DC500V, 40 to 60%RH	5×10^{10}	1×10^{11}	−	Ω
	Floating resistance		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, −3dB	−	80	−	kHz
	Response time Rise time	PC110L/PC111L	t_r	V_{CE}=2V, I_C=2mA, R_L=100Ω	−	4	18	μs
		PC112L/PC113L			−	4	15	
	Response time Fall time	PC110L/PC111L	t_f		−	3	18	μs
		PC112L/PC113L			−	3	15	

PC110L/PC111L

Model No.	CTR(%)
PC110L1/PC111L1	50 to 125
PC110L2/PC111L2	100 to 250
PC110L5/PC111L5	50 to 250
PC110L/PC111L	50 to 400

PC112L/PC113L

Model No.	CTR(%)
PC112L1/PC113L1	40 to 120
PC112L2/PC113L2	80 to 200
PC112L5/PC113L5	40 to 200
PC112L/PC113L	40 to 320

Fig. 1 Forward Current vs. Ambient Temperature

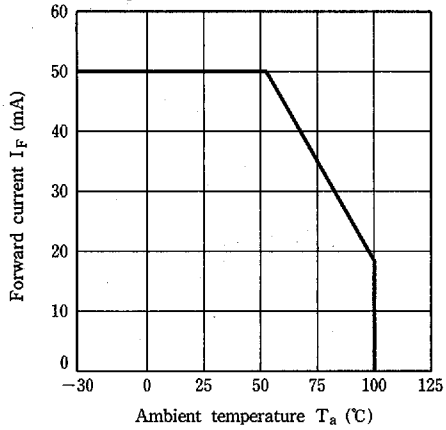


Fig. 2 Diode Power Dissipation vs. Ambient Temperature

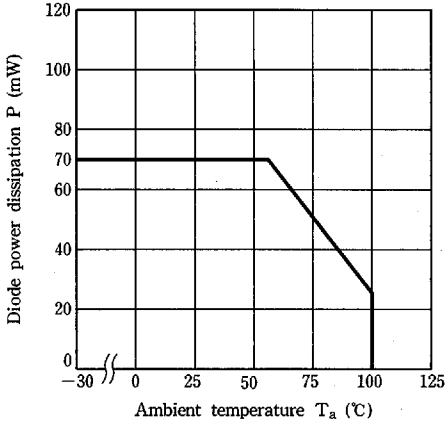


Fig. 3 Collector Power Dissipation vs. Ambient Temperature

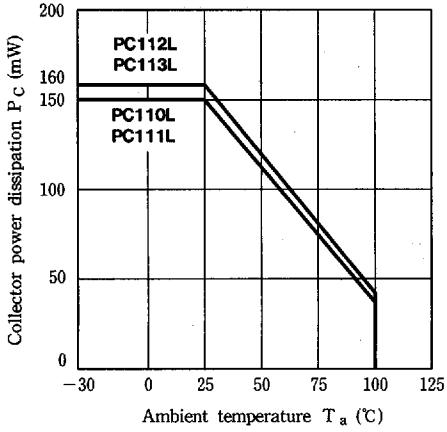


Fig. 4 Power Dissipation vs. Ambient Temperature

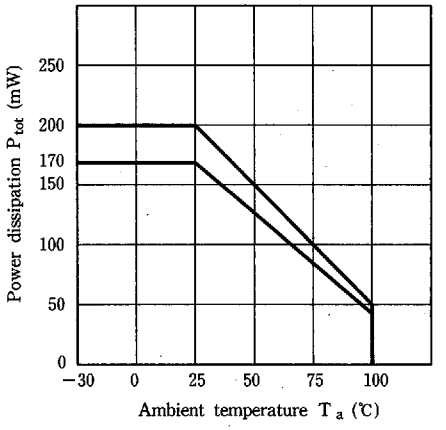


Fig. 5 Peak Forward Current vs. Duty Ratio

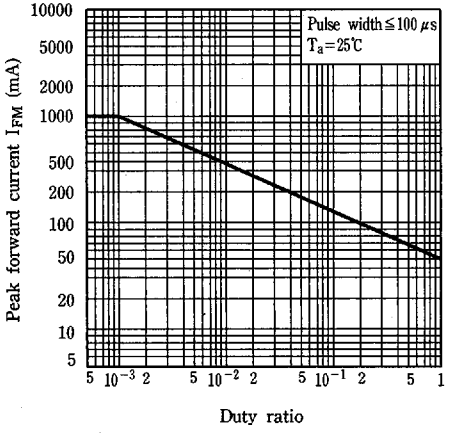


Fig. 6 Forward Current vs. Forward Voltage

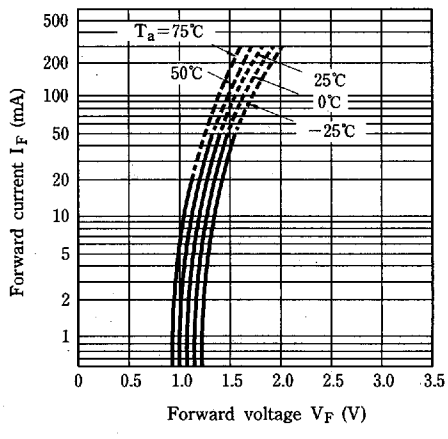


Fig. 7-a Current Transfer Ratio vs. Forward Current (PC110L, PC111L*) (*Applies only to $R_{BE}=\infty$)

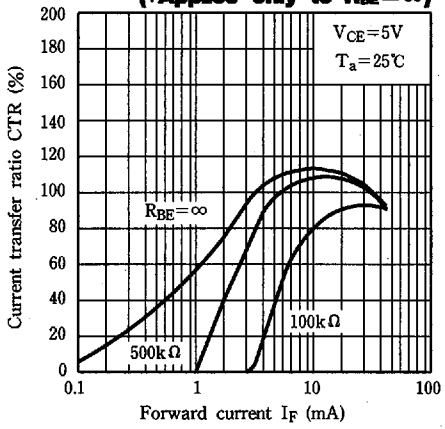


Fig. 7-b Current Transfer Ratio vs. Forward Current (PC112L, PC113L*) (*Applies only to $R_{BE}=\infty$)

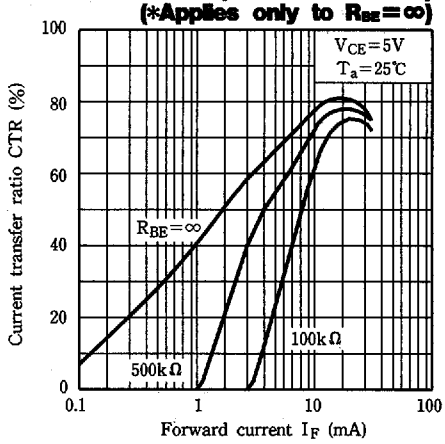


Fig. 8-a Collector Current vs. Collector-emitter Voltage (PC110L, PC111L)

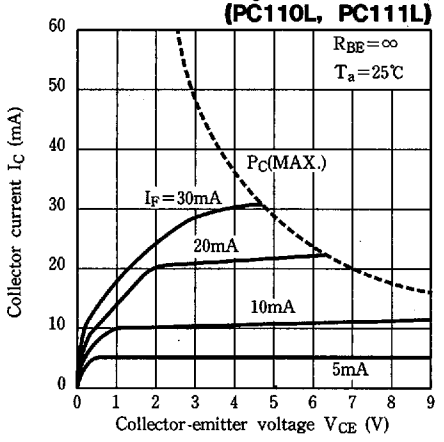


Fig. 8-b Collector Current vs. Collector-emitter Voltage (PC112L, PC113L)

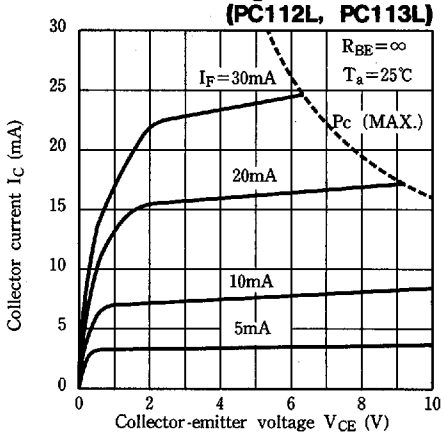


Fig. 9-a Relative Current Transfer Ratio vs. Ambient Temperature (PC110, PC111L)

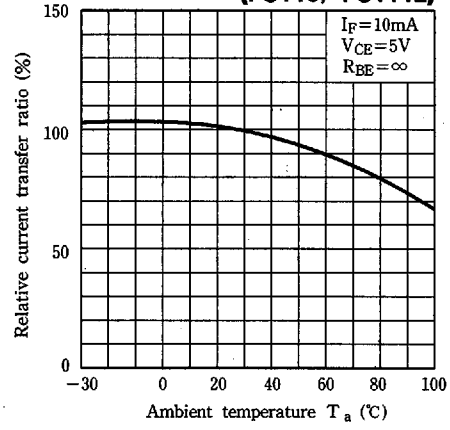


Fig. 9-b Relative Current Transfer Ratio vs. Ambient Temperature (PC112L, PC113L)

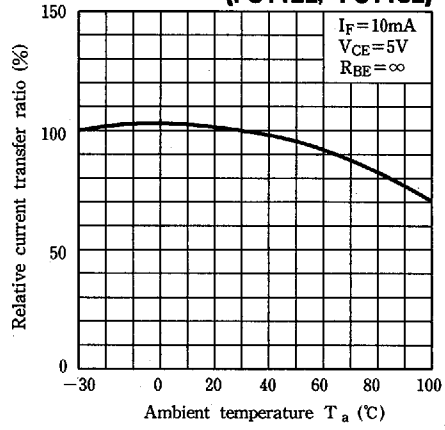


Fig.10-a Collector-emitter Saturation Voltage vs. Ambient Temperature (PC110L, PC111L)

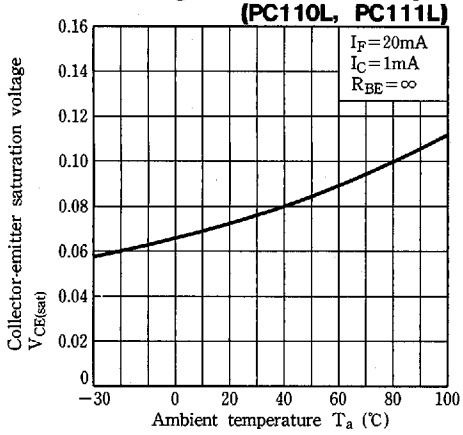


Fig.10-b Collector-emitter Saturation Voltage vs. Ambient Temperature (PC112L, PC113L)

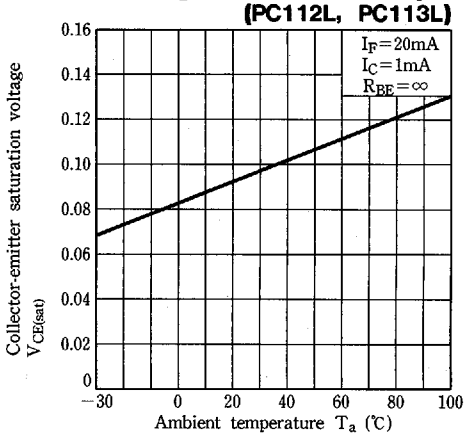


Fig.11-a Collector Dark Current vs. Ambient Temperature (PC110L, PC111L)

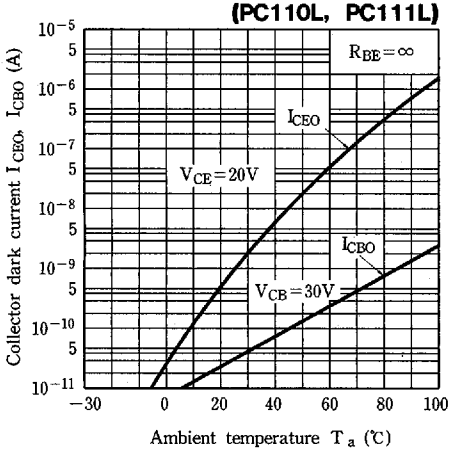


Fig.11-b Collector Dark Current vs. Ambient Temperature (PC112L, PC113L)

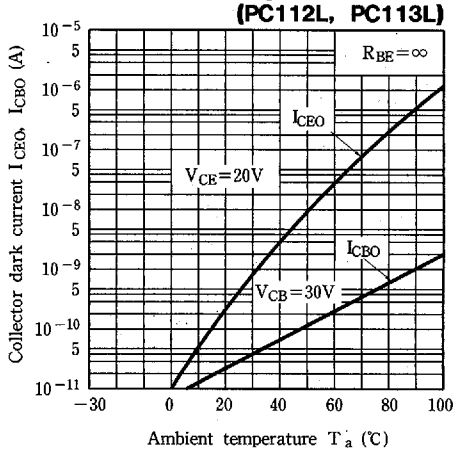


Fig.12-a Response Time vs. Load Resistance (PC110L, PC111L)

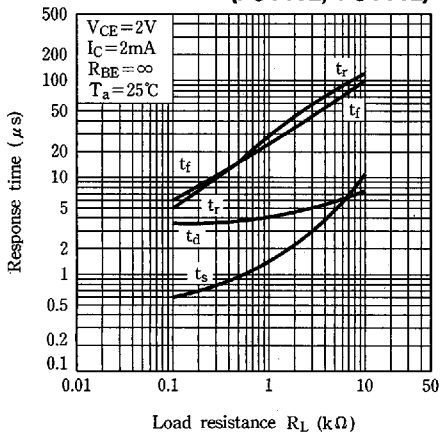
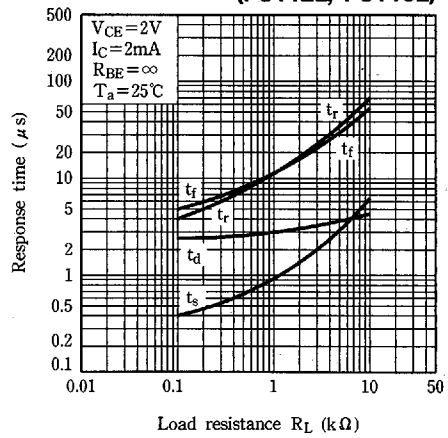
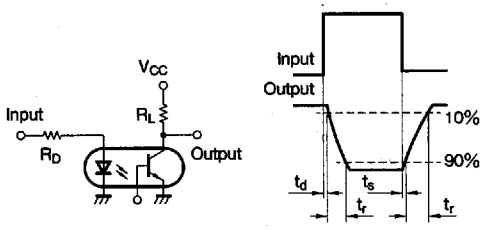


Fig.12-b Response Time vs. Load Resistance (PC112L, PC113L)



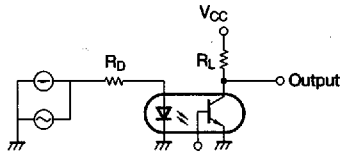
6 Photocouplers

Test Circuit for Response Time



PC111L and PC113L have no base terminal.

Test Circuit for Frequency Response



PC111L and PC113L have no base terminal.

Fig.13-a Frequency Response (PC110L, PC111L)

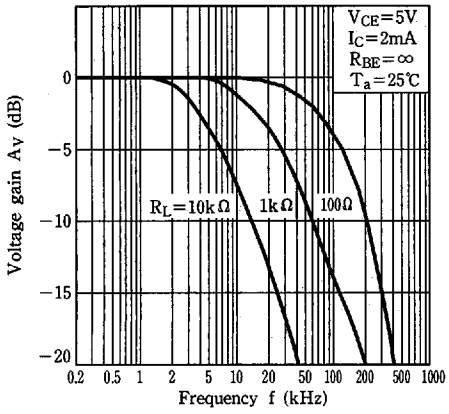


Fig.13-b Frequency Response (PC112L, PC113L)

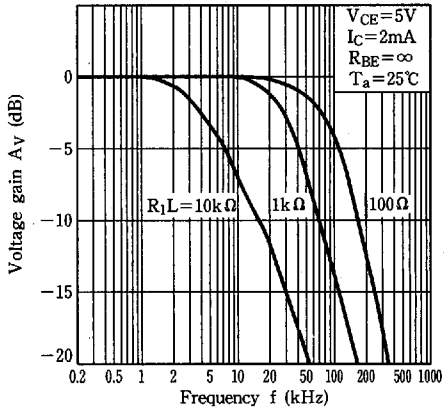


Fig.14-a Collector-emitter Saturation Voltage vs. Forward Current (PC110L, PC111L)

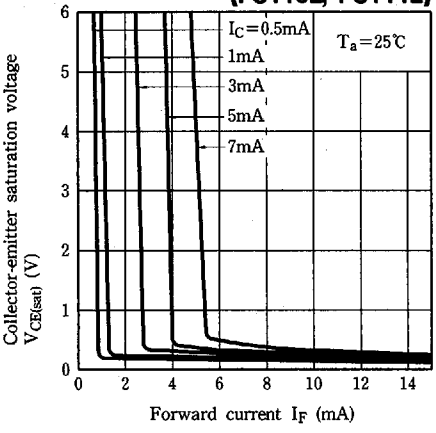
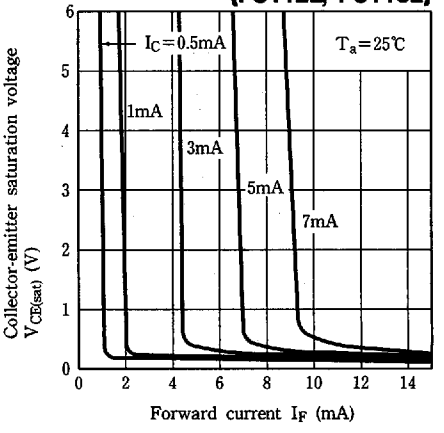


Fig.14-b Collector-emitter Saturation Voltage vs. Forward Current (PC112L, PC113L)



● Please refer to the chapter "Precautions for Use" (Page 78 to 93)