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)

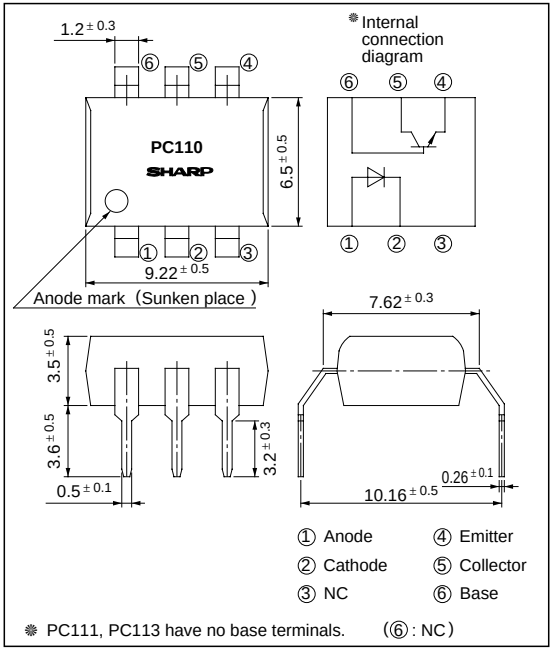
❋ DIN-VDE0884 approved type is also available as an option.

■ Features

1. Long creepage distance type (Creepage distance : 8mm or more)*1
2. Internal insulation distance : 0.5mm or more
3. Recognized by UL(No. E64380)
   Approved by VDE (DIN-VDE0884 : No. 77292)
   Approved by BSI (BS415 : 6690, BS7002 : 7421)
   Approved by SEMKO (**PC110L** : No. 8705118
   PC111L : No. 8705119
   PC112L : No. 8705120
   PC113L : No. 8705121)
   Approved by DEMKO (No. 37150)
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)



❋ PC111, PC113 have no base terminals. (⑥ : NC)

■ Applications

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

" In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that occur in equipment using any of SHARP's devices, shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest version of the device specification sheets before using any SHARP's device."

■ Absolute Maximum Ratings (Ta= 25˚C)

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	˚C
Storage temperature			T_{stg}	- 55 to + 125	˚C
*5Soldering temperature			T_{sol}	260	˚C

*2 Pulse width <=100μs, 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˚C)

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 = 10μA, 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	-	400	%
		PC111L			50	100	400	
		PC112L/PC113L		I_F = 10mA, V_{CE} = 5V, 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

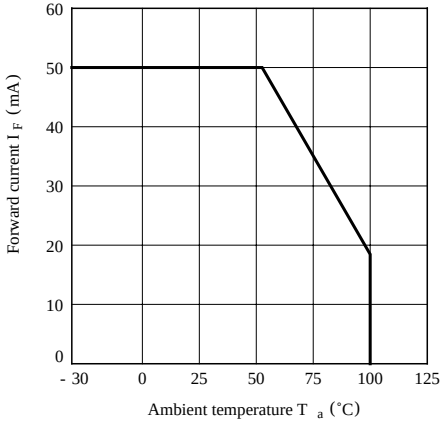


Fig. 2 Diode Power Dissipation vs. Ambient Temperature

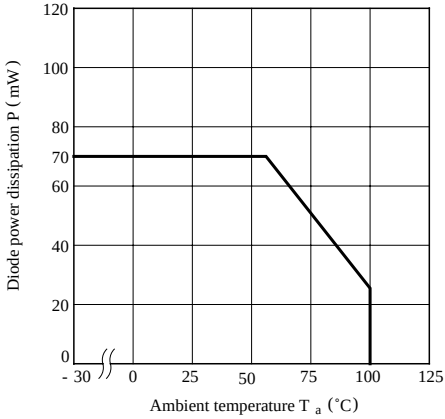


Fig. 3 Collector Power Dissipation vs. Ambient Temperature

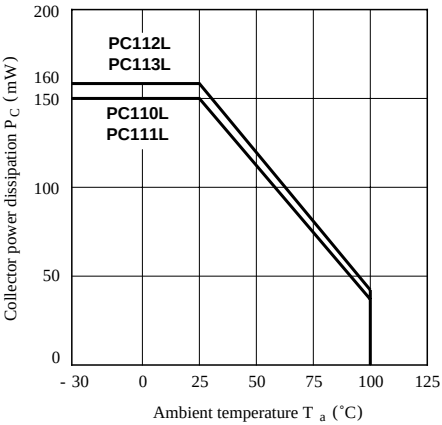


Fig. 4 Power Dissipation vs. Ambient Temperature

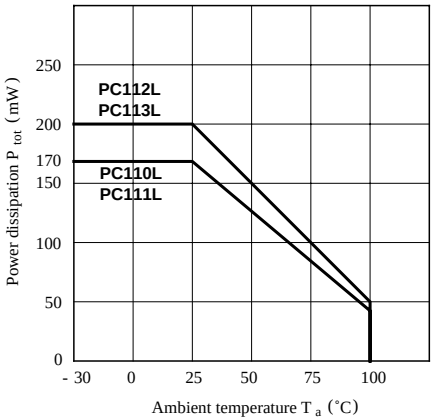


Fig. 5 Peak Forward Current vs. Duty Ratio

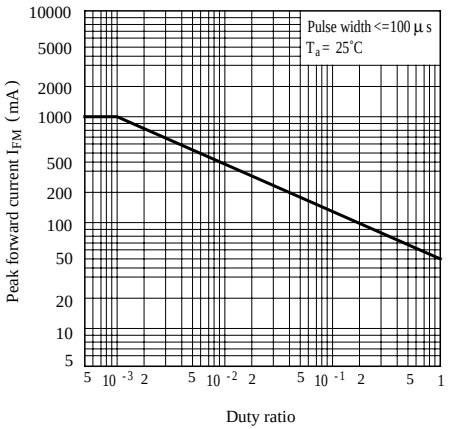


Fig. 6 Forward Current vs. Forward Voltage

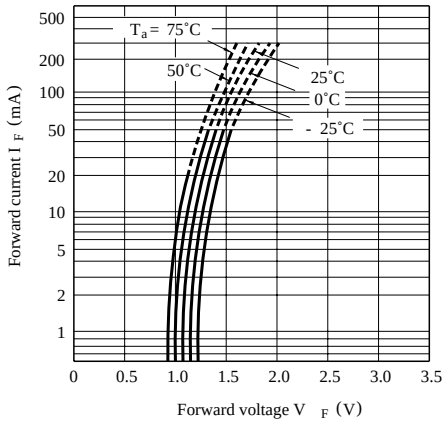


Fig. 7-a Current Transfer Ratio vs. Forward Current (PC110L, PC111L*) (*Applies only to R_{BE}= ∞)

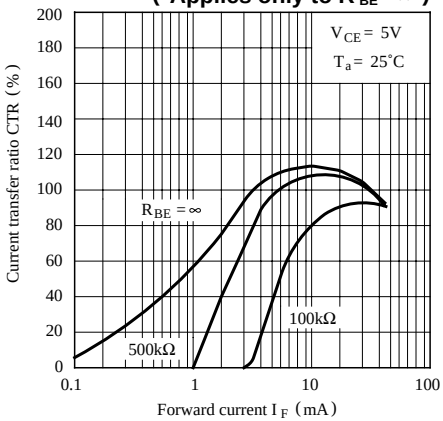


Fig. 7-b Current Transfer Ratio vs. Forward Current (PC112L, PC113L*) (*Applies only to R_{BE}= ∞)

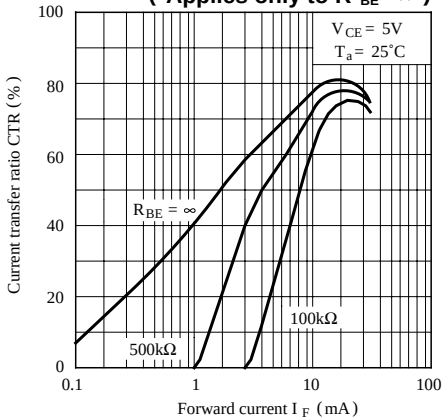


Fig. 8-a Collector Current vs. Collector-emitter Voltage (PC110L, PC111L)

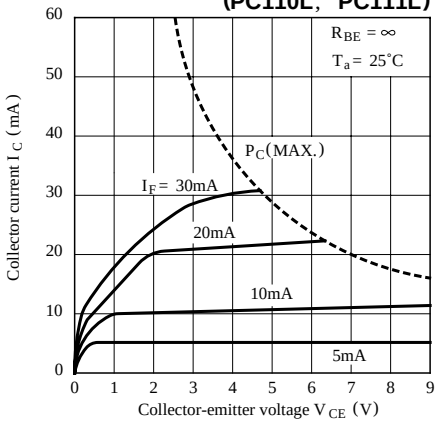


Fig. 8-b Collector Current vs. Collector-emitter Voltage (PC112L, PC113L)

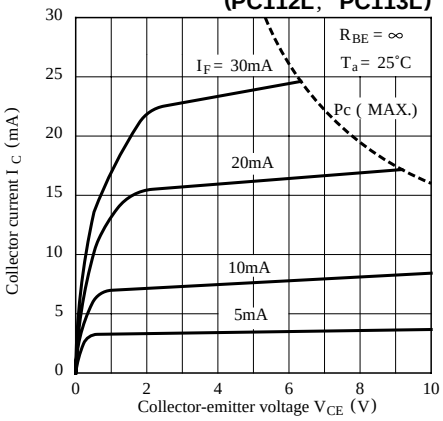


Fig. 9-a Relative Current Transfer Ratio vs. Ambient Temperature (PC110L, PC111L)

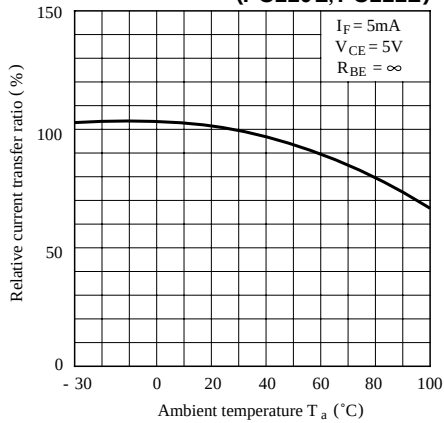


Fig. 9-b Relative Current Transfer Ratio vs. Ambient Temperature (PC112L, PC113L)

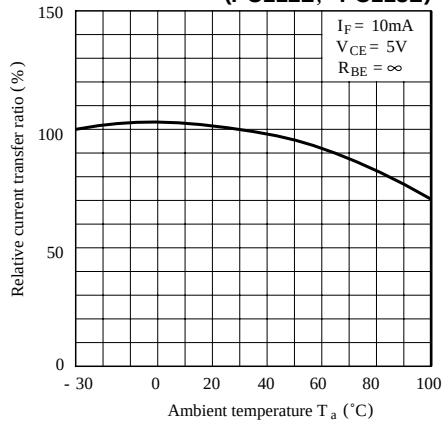


Fig.10-a Collector-emitter Saturation Voltage vs. Ambient Temperature (PC110L, PC111L)

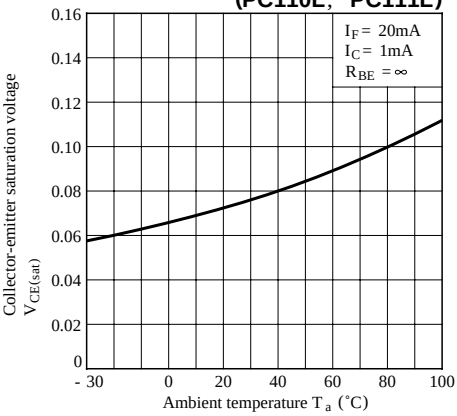


Fig.10-b Collector-emitter Saturation Voltage vs. Ambient Temperature (PC112L, PC113L)

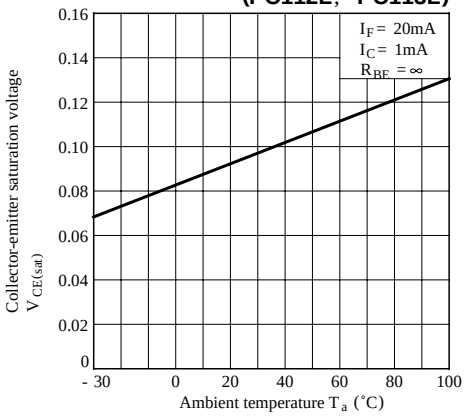


Fig.11-a Collector Dark Current vs. Ambient Temperature (PC110L, PC111L)

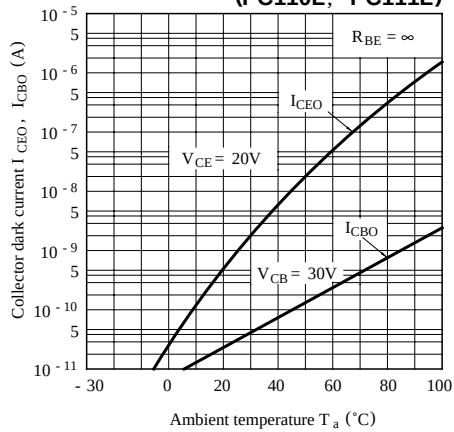


Fig.11-b Collector Dark Current vs. Ambient Temperature (PC112L, PC113L)

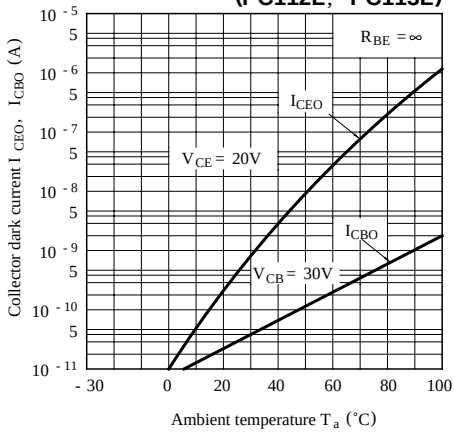


Fig.12-a Response Time vs. Load Resistance (PC110L, PC111L)

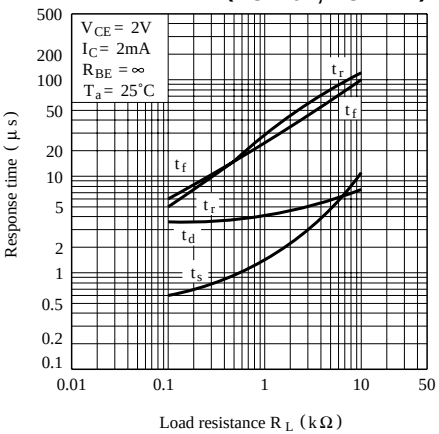
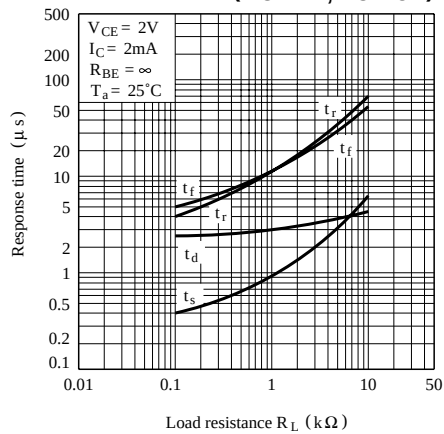
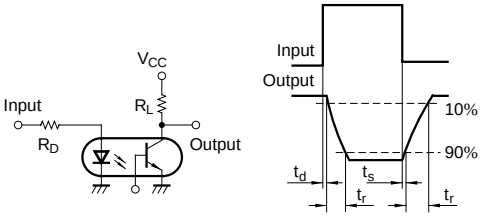


Fig.12-b Response Time vs. Load Resistance (PC112L, PC113L)

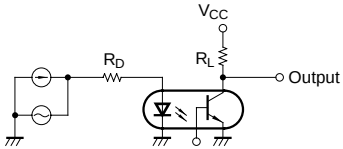


Test Circuit for Response Time



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)

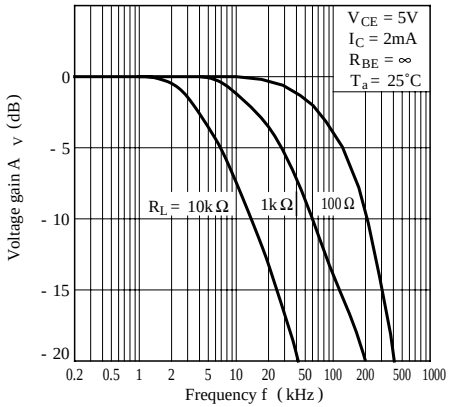


Fig.13-b Frequency Response (PC112L, PC113L)

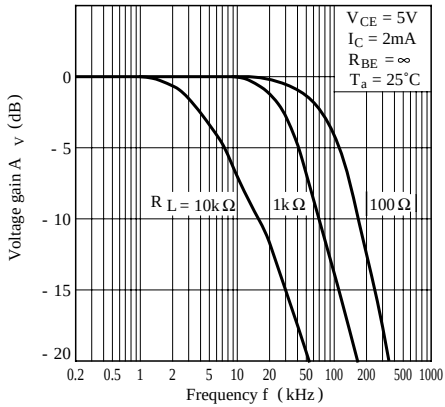


Fig.14-a Collector-emitter Saturation Voltage vs. Forward Current (PC110L, PC111L)

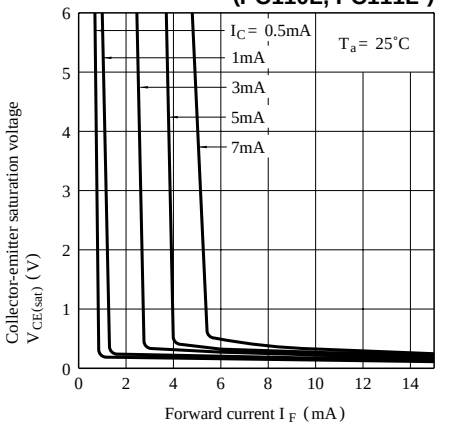
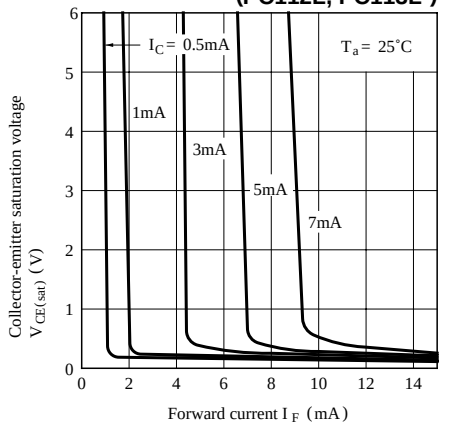


Fig.14-b Collector-emitter Saturation Voltage vs. Forward Current (PC112L, PC113L)



● Please refer to the chapter "Precautions for Use"

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