

# PC120 Series PC121 Series

## Long Creepage Distance Type Photocoupler

\* Lead forming type (I type) and taping reel type (P type) are also available. (PC120I/PC120FI/PC121I/PC121FI, PC120P/PC120PF/PC121P/PC121PF) (Page 656)

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

### ■ Features

1. Conforms to European Safety Standards
2. Long creepage distance type  
(Creepage distance : 6mm or more)
3. Internal isolation distance : 0.4mm or more
4. Compact dual-in-line package
5. High collector-emitter voltage  
( $V_{CEO}$  : 70V for PC121 series)
6. Recognized by UL file No. E64380

Approved by VDE (DIN-VDE0884 ; No. 76851)

Approved by BSI (BS415 : No. 7087,  
BS7002 : No. 7409)

Approved by SEMKO (No. 9216212)

Approved by DEMKO (No. 108025)

Approved by EI (No. 155030-01)

### ■ Applications

1. Switching power supplies
2. OA equipment
3. TVs

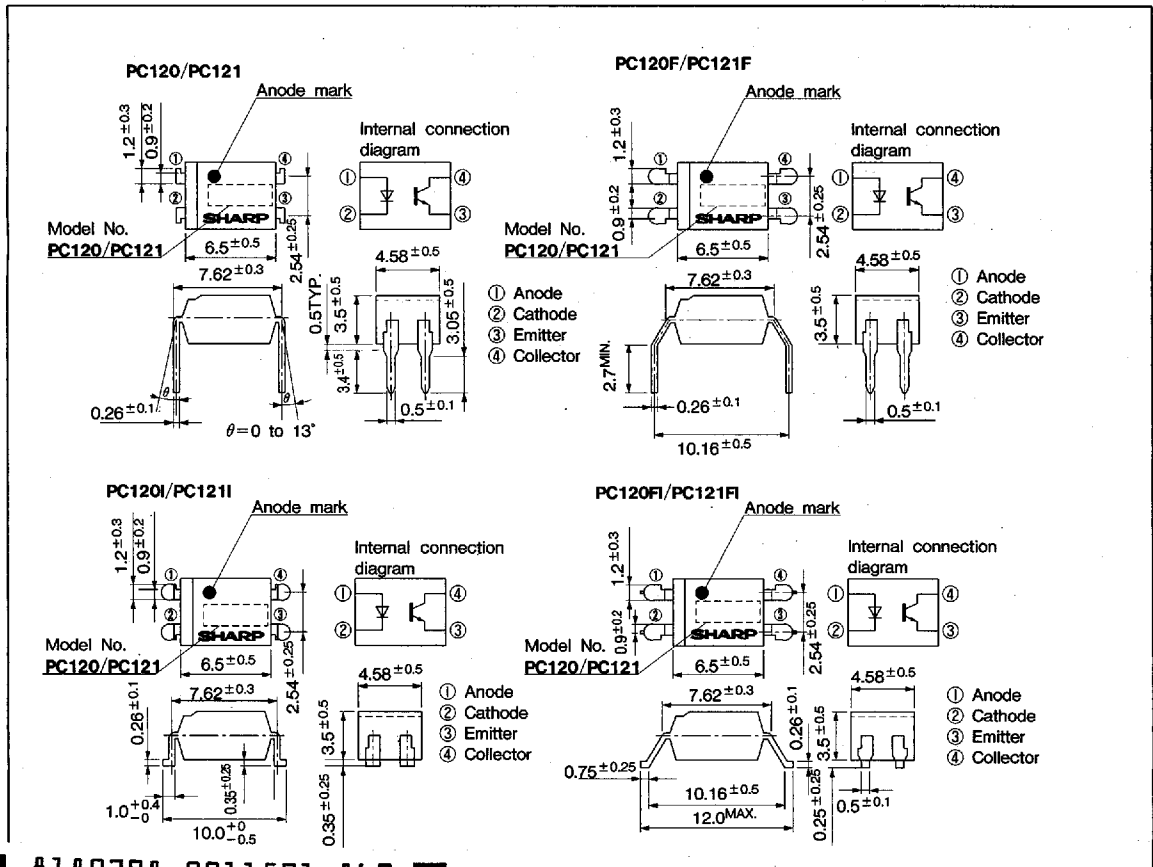
### ■ Model Line-up

	Standard type		High collector-emitter voltage type	
DIP type	PC120	PC120F	PC121	PC121F
Surface mount type	PC120P*	PC120PF*	PC121P*	PC121PF*

\*Lead forming type

(Unit : mm)

### ■ Outline Dimensions



8180798 0011591 869

### Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Rating		Unit	
		PC120 Series	PC121 Series		
Input	Forward current	I <sub>F</sub>	50	mA	
	*1 Peak forward current	I <sub>FM</sub>	1	A	
	Reverse voltage	V <sub>R</sub>	6	V	
	Power dissipation	P	70	mW	
Output	Collector-emitter voltage	V <sub>CEO</sub>	35	70	V
	Emitter-collector voltage	V <sub>ECO</sub>	6		V
	Collector current	I <sub>C</sub>	50		mA
	Collector power dissipation	P <sub>C</sub>	150		mW
	Total power dissipation	P <sub>tot</sub>	200		mW
*2 Isolation voltage	V <sub>iso</sub>	5 000		V <sub>rms</sub>	
Operating temperature	T <sub>opr</sub>	-30 to +100		°C	
Storage temperature	T <sub>stg</sub>	-55 to +125		°C	
*3 Soldering temperature	T <sub>sol</sub>	260		°C	

PC120 Series :  
 PC120/PC120I/  
 PC120F/PC120FI  
 PC121 Series :  
 PC121/PC121I/  
 PC121F/PC121FI

\*1 Pulse width ≤ 100 μs, Duty ratio = 0.001

\*2 40 to 60%RH, AC for 1 minute

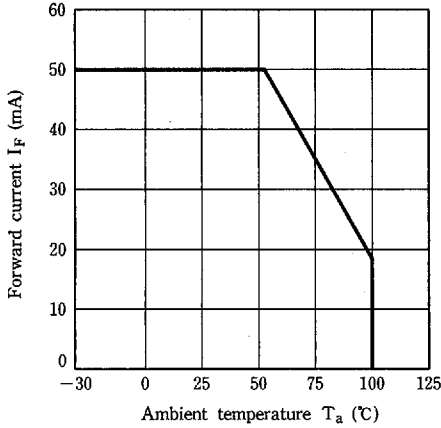
\*3 For 10 seconds

### Electro-optical Characteristics

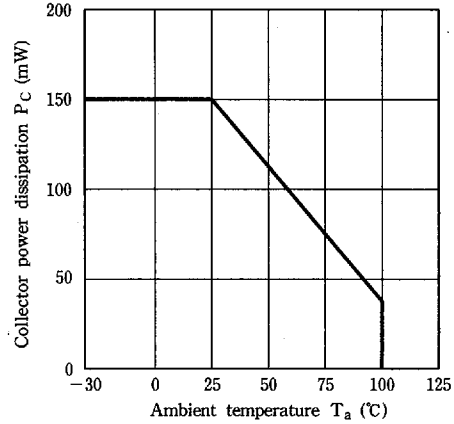
(Ta=25°C)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit		
Input	Forward voltage	V <sub>F</sub>	I <sub>F</sub> =20mA	—	1.2	1.4	V	
	Reverse voltage	I <sub>R</sub>	V <sub>R</sub> =4V	—	—	10	μA	
	Terminal capacitance	C <sub>T</sub>	V=0, f=1kHz	—	30	250	pF	
Output	Collector dark current	I <sub>CEO</sub>	V <sub>CE</sub> =20V, I <sub>F</sub> =0	—	—	10 <sup>-7</sup>	A	
	Collector-emitter breakdown voltage	BV <sub>CEO</sub>	I <sub>C</sub> =0.1mA, I <sub>F</sub> =0	35	—	—	V	
				70	—	—		
Emitter-collector breakdown voltage	BV <sub>ECO</sub>	I <sub>E</sub> =10 μA, I <sub>F</sub> =0	6	—	—	V		
Transfer characteristics	Current transfer ratio	CTR	I <sub>F</sub> =5mA, V <sub>CE</sub> =5V	50	—	400	%	
	Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>F</sub> =20mA, I <sub>C</sub> =1mA	—	0.1	0.2	V	
	Isolation resistance	R <sub>iso</sub>	DC500V, 40 to 60%RH	5 × 10 <sup>10</sup>	10 <sup>11</sup>	—	Ω	
	Floating capacitance	C <sub>f</sub>	V=0, f=1MHz	—	0.6	1.0	pF	
	Cut-off frequency	f <sub>c</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =2mA, R <sub>L</sub> =100Ω -3dB point	—	80	—	kHz	
	Response time	Rise time	t <sub>r</sub>	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA	—	4	18	μs
		Fall time	t <sub>f</sub>	R <sub>L</sub> =100Ω	—	3	18	μs

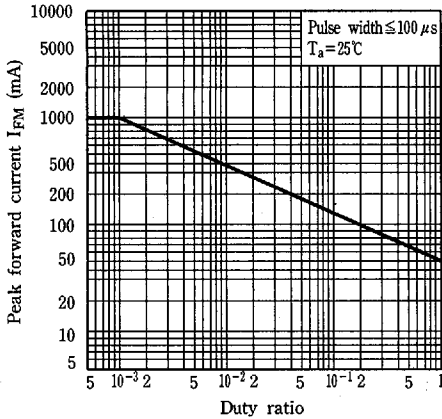
**Fig. 1 Forward Current vs. Ambient Temperature**



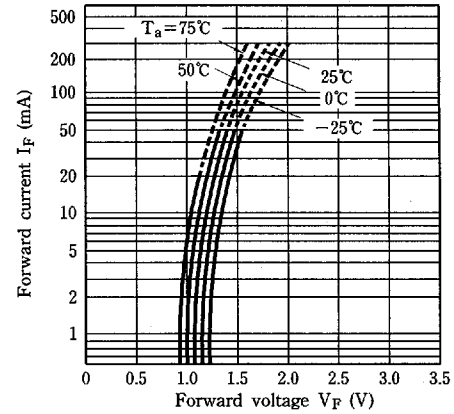
**Fig. 2 Collector Power Dissipation vs. Ambient Temperature**



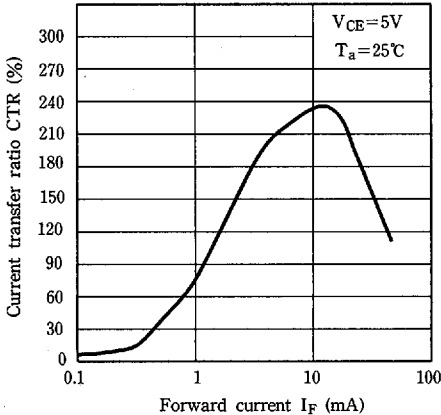
**Fig. 3 Peak Forward Current vs. Duty Ratio**



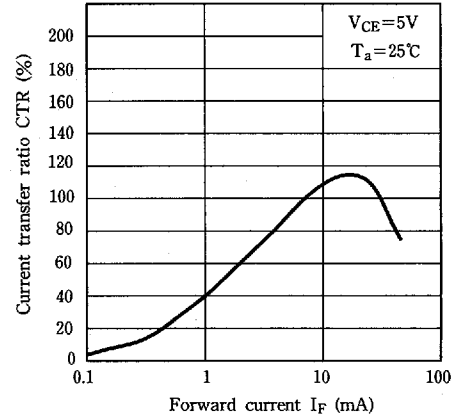
**Fig. 4 Forward Current vs. Forward Voltage**



**Fig. 5-a Current Transfer Ratio vs. Forward Current (PC120 Series)**

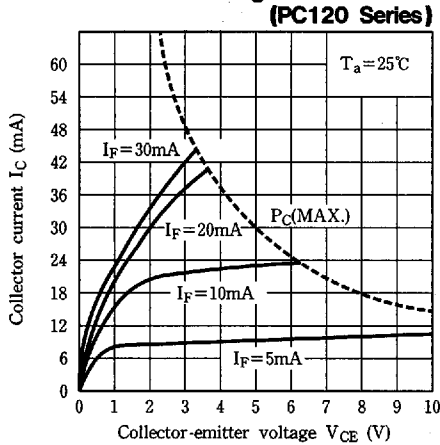


**Fig. 5-b Current Transfer Ratio vs. Forward Current (PC121 Series)**

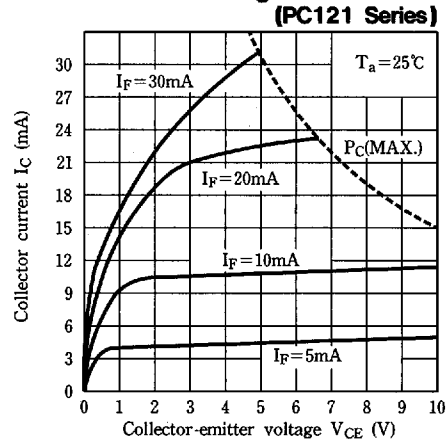


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Photocouplers

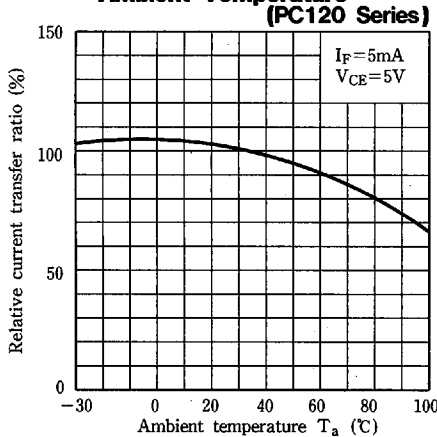
**Fig. 6-a Collector Current vs. Collector-emitter Voltage**



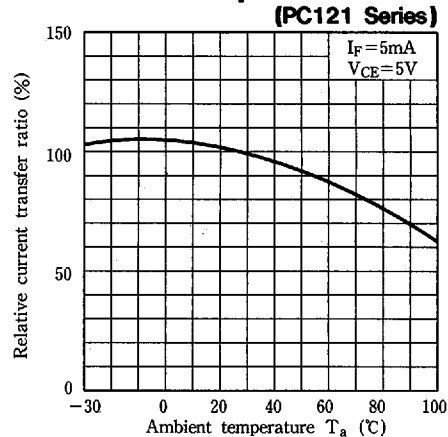
**Fig. 6-b Collector Current vs. Collector-emitter Voltage**



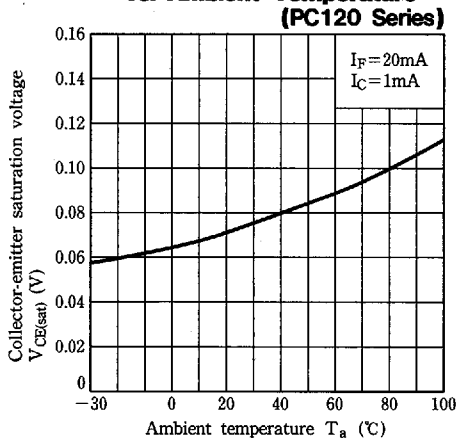
**Fig. 7-a Relative Current Transfer Ratio vs. Ambient Temperature**



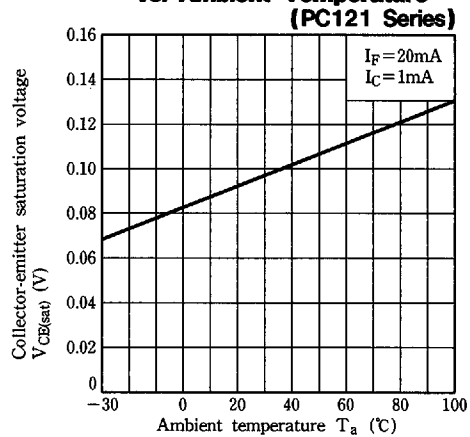
**Fig. 7-b Relative Current Transfer Ratio vs. Ambient Temperature**



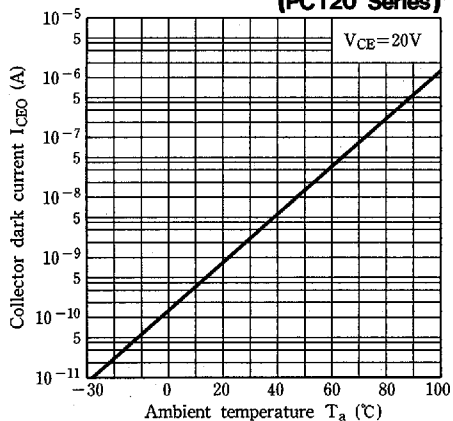
**Fig. 8-a Collector-emitter Saturation Voltage vs. Ambient Temperature**



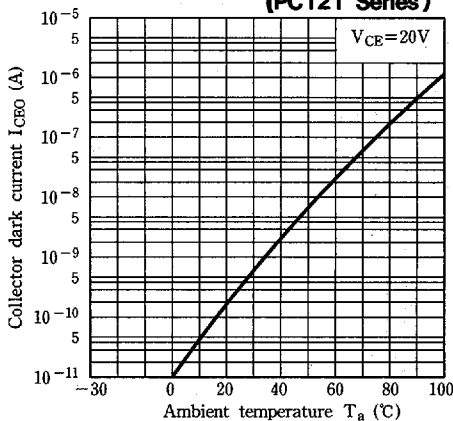
**Fig. 8-b Collector-emitter Saturation Voltage vs. Ambient Temperature**



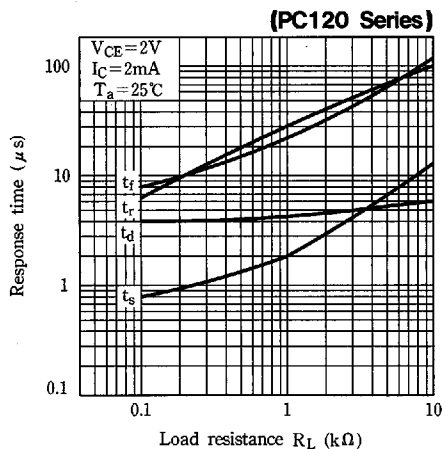
**Fig. 9-a Collector Dark Current vs. Ambient Temperature (PC120 Series)**



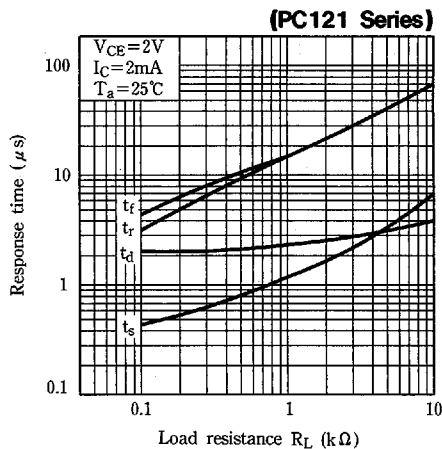
**Fig. 9-b Collector Dark Current vs. Ambient Temperature (PC121 Series)**



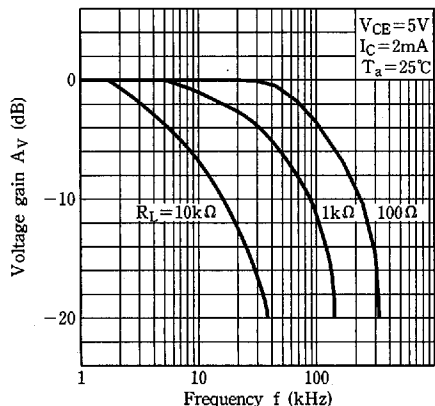
**Fig. 10-a Response Time vs. Load Resistance (PC120 Series)**



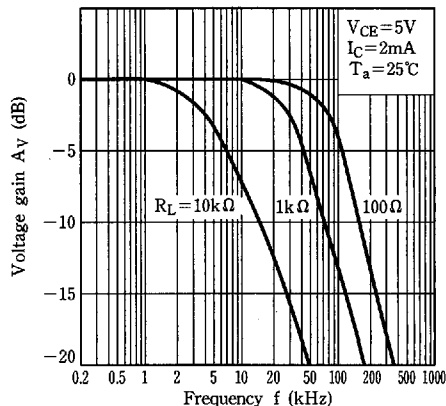
**Fig. 10-b Response Time vs. Load Resistance (PC121 Series)**



**Fig. 11-a Frequency Response (PC120 Series)**

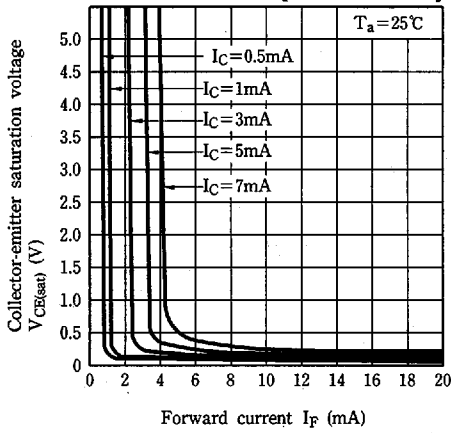


**Fig. 11-b Frequency Response (PC121 Series)**

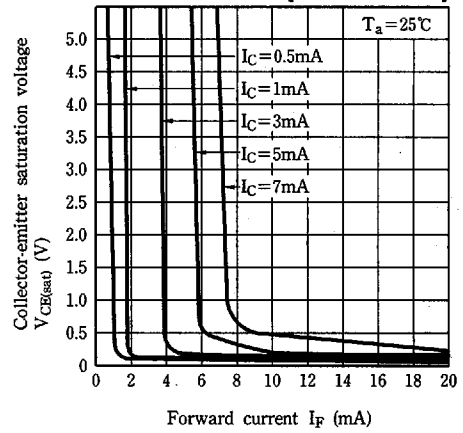


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**Fig.12-a Collector-emitter Saturation Voltage vs. Forward Current (PC120 Series)**



**Fig.12-b Collector-emitter Saturation Voltage vs. Forward Current (PC121 Series)**



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