

# PC725V0NSZX/ PC725V0YSZX

## High Sensitivity and High Collector-emitter Voltage Type Photocoupler

### ■ Features

1. TTL compatible output
2. High collector-emitter voltage ( $V_{CE0}$ :300V)
3. High sensitivity (CTR:MIN. 1 000%)
4. Isolation voltage (Viso (rms):5kV)
5. Recognized by UL, file No.E64380  
Approved by TÜV (VDE0884)(PC725V0YSZX)
6. 6-pin DIP package

### ■ Applications

1. Home appliances
2. Programmable controllers
3. Peripheral equipment of personal computers

### ■ Model Line-up

Model No.	* Safty Standard Approval		Package	Packing
	UL	TÜV (VDE0884)		
PC725V0NSZX	○	—	DIP	Sleeve
PC725V0YSZX	○	○		

\* Application Model No. PC725V

### ■ Absolute Maximum Ratings

( $T_a=25^\circ\text{C}$ )

	Parameter	Symbol	Rating	Unit
Input	Forward current	$I_F$	50	mA
	*1 Peak forward current	$I_{FM}$	1	A
	Reverse voltage	$V_R$	6	V
	Power dissipation	P	70	mW
Output	Collector-emitter voltage	$V_{CE0}$	300	V
	Collector-base voltage	$V_{CBO}$	300	V
	Emitter-base voltage	$V_{EBO}$	6	V
	Collector current	$I_C$	150	mA
	Collector current (reverse)	$-I_C$	10	mA
	Collector power dissipation	$P_C$	300	mW
	Total power dissipation	$P_{tot}$	350	mW
	*2 Isolation voltage	$V_{iso}$ (rms)	5	kV
	Operating temperature	$T_{opr}$	-25 to +100	$^\circ\text{C}$
	Storage temperature	$T_{stg}$	-40 to +125	$^\circ\text{C}$
	*3 Soldering temperature	$T_{sol}$	260	$^\circ\text{C}$

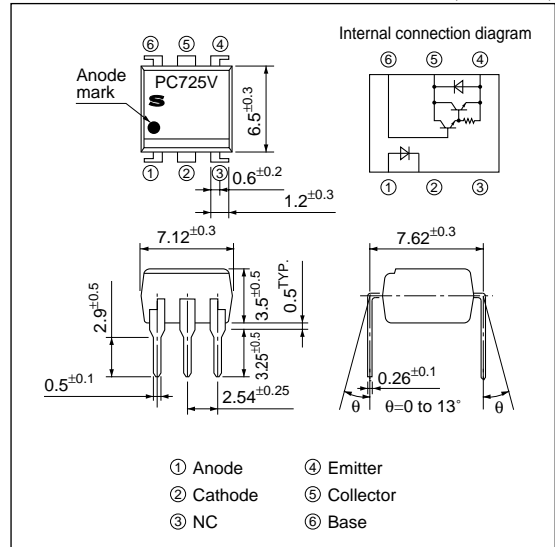
\*1 Pulse width $\leq$ 100 $\mu$ s, Duty ratio=0.001

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

\*3 For 10 s

### ■ Outline Dimensions

(Unit : mm)



■ Electro-optical Characteristics

(Ta=25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Input	Forward voltage	$V_F$	$I_F=10\text{mA}$	-	1.2	1.4	V	
	Peak forward voltage	$V_{FM}$	$I_{FM}=0.5\text{A}$	-	-	3	V	
	Reverse current	$I_R$	$V_R=4\text{V}$	-	-	10	$\mu\text{A}$	
	Terminal capacitance	$C_t$	$V=0, f=1\text{kHz}$	-	30	250	pF	
Output	Collector dark current	$I_{CEO}$	$V_{CE}=200\text{V}, I_F=0, R_{BE}=\infty$	-	-	$10^{-6}$	A	
Transfer characteristics	Collector current	$I_C$	$I_F=1\text{mA}, V_{CE}=2\text{V}, R_{BE}=\infty$	10	40	150	mA	
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F=20\text{mA}, I_C=100\text{mA}, R_{BE}=\infty$	-	-	1.2	V	
	Isolation resistance	$R_{ISO}$	DC500V, 40 to 60% RH	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$	
	Floating capacitance	$C_f$	$V=0, f=1\text{MHz}$	-	0.6	1.0	pF	
	Cut-off frequency	$f_c$	$V_{CE}=2\text{V}, I_C=20\text{mA}, R_L=100\Omega, R_{BE}=\infty, -3\text{dB}$	1	7	-	kHz	
	Response time	Rise time	$t_r$	$V_{CE}=2\text{V}, I_C=20\text{mA}, R_L=100\Omega, R_{BE}=\infty$	-	100	300	$\mu\text{s}$
		Fall time	$t_f$		-	20	100	$\mu\text{s}$

Fig.1 Forward Current vs. Ambient Temperature

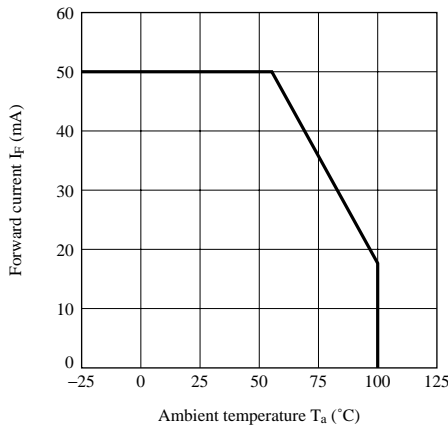


Fig.2 Collector Power Dissipation vs. Ambient Temperature

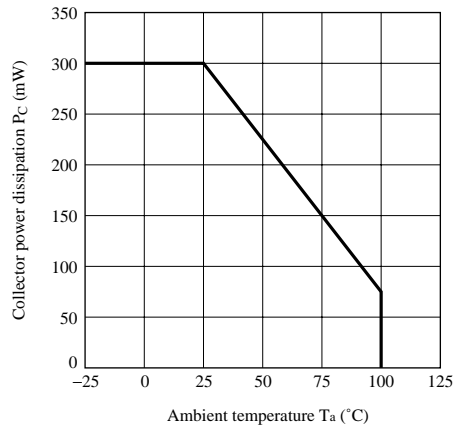


Fig.3 Peak Forward Current vs. Duty Ratio

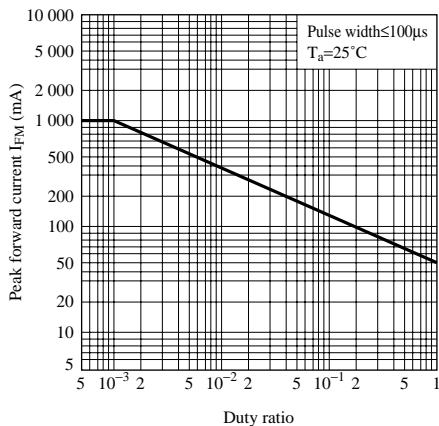
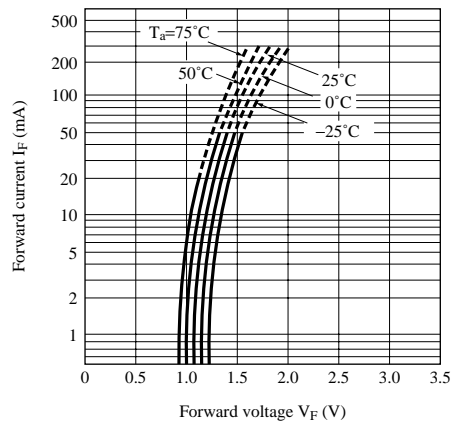
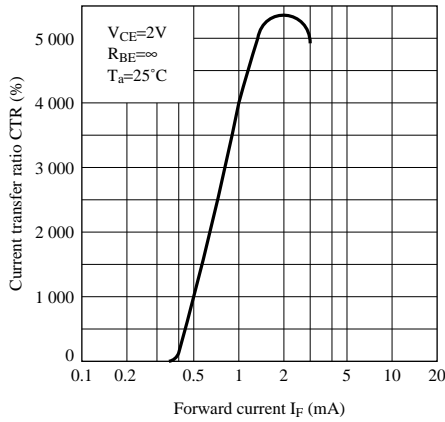


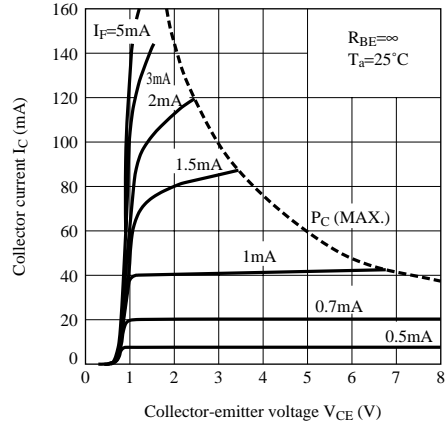
Fig.4 Forward Current vs. Forward Voltage



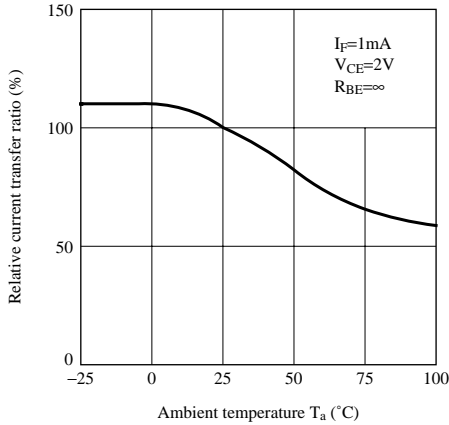
**Fig.5 Current Transfer Ratio vs. Forward Current**



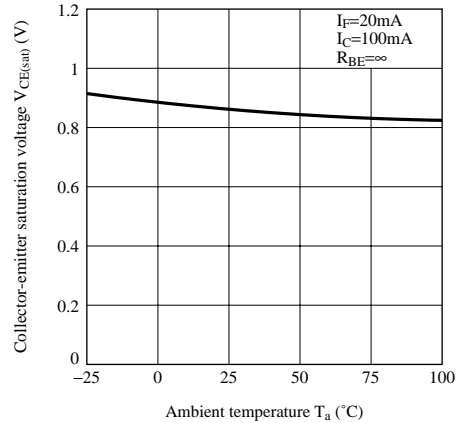
**Fig.6 Collector Current vs. Collector-emitter Voltage**



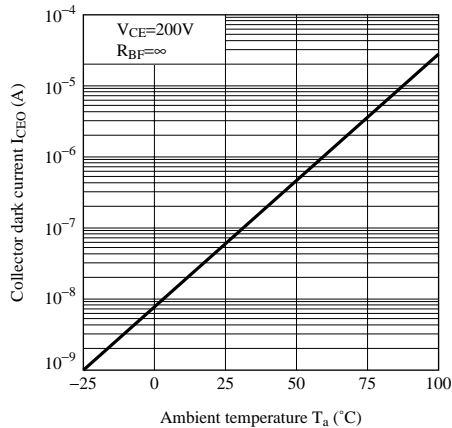
**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**



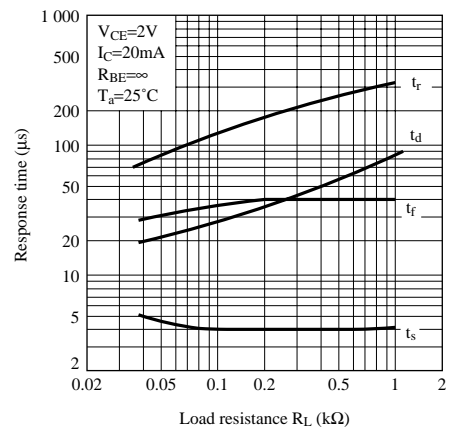
**Fig.8 Collector - emitter Saturation Voltage vs. Ambient Temperature**



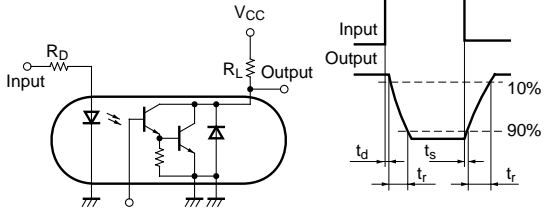
**Fig.9 Collector Dark Current vs. Ambient Temperature**



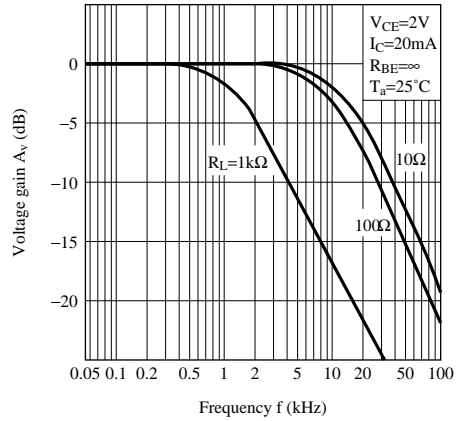
**Fig.10 Response Time vs. Load Resistance**



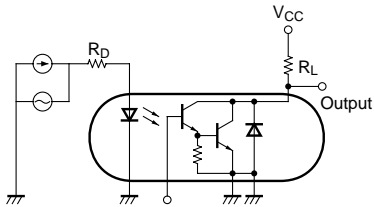
**Fig.11 Test Circuit for Response Time**



**Fig.12 Frequency Response**



**Fig.13 Test Circuit for Frequency Response**



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    - Personal computers
    - Office automation equipment
    - Telecommunication equipment [terminal]
    - Test and measurement equipment
    - Industrial control
    - Audio visual equipment
    - Consumer electronics
  - (ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:
    - Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
    - Traffic signals
    - Gas leakage sensor breakers
    - Alarm equipment
    - Various safety devices, etc.
  - (iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
    - Space applications
    - Telecommunication equipment [trunk lines]
    - Nuclear power control equipment
    - Medical and other life support equipment (e.g., scuba).
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# PC725V0NIZX/ PC725V0NIPX

## ■ Features

1. TTL compatible output
2. High collector-emitter voltage ( $V_{CEO}$ :300V)
3. High sensitivity (CTR:MIN. 1 000%)
4. Isolation voltage (Viso (rms):5kV)
5. Recognized by UL, file No.E64380
6. 6-pin DIP package (Lead forming type)

## ■ Applications

1. Home appliances
2. Programmable controllers
3. Peripheral equipment of personal computers

## ■ Model Line-up

Model No.	* Safty Standard Approval		Package	Packing
	UL	TÜV (VDE0884)		
PC725V0NIZX	○	—	Surface Mount	Sleeve
PC725V0NIPX	○	—	Mount	Taping

\* Application Model No. PC725V

## ■ Absolute Maximum Ratings (Ta=25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	$I_F$	50	mA
	*1 Peak forward current	$I_{FM}$	1	A
	Reverse voltage	$V_R$	6	V
	Power dissipation	$P$	70	mW
Output	Collector-emitter voltage	$V_{CEO}$	300	V
	Collector-base voltage	$V_{CBO}$	300	V
	Emitter-base voltage	$V_{EBO}$	6	V
	Collector current	$I_C$	150	mA
	Collector current (reverse)	$-I_C$	10	mA
	Collector power dissipation	$P_C$	300	mW
	Total power dissipation	$P_{tot}$	350	mW
	*2 Isolation voltage	$V_{iso}$ (rms)	5	kV
	Operating temperature	$T_{opr}$	-25 to +100	°C
	Storage temperature	$T_{stg}$	-40 to +125	°C
	*3 Soldering temperature	$T_{sol}$	260	°C

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

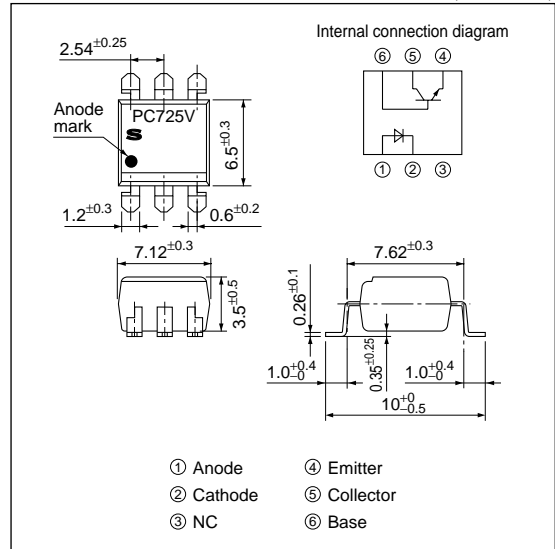
\*2 40 to 60%RH, AC for 1 min

\*3 For 10 s

## High Sensitivity and High Collector-emitter Voltage Type Photocoupler

## ■ Outline Dimensions

(Unit : mm)



■ Electro-optical Characteristics

( $T_a=25^\circ\text{C}$ )

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Input	Forward voltage	$V_F$	$I_F=10\text{mA}$	-	1.2	1.4	V	
	Peak forward voltage	$V_{FM}$	$I_{FM}=0.5\text{A}$	-	-	3	V	
	Reverse current	$I_R$	$V_R=4\text{V}$	-	-	10	$\mu\text{A}$	
	Terminal capacitance	$C_t$	$V=0, f=1\text{kHz}$	-	30	250	pF	
Output	Collector dark current	$I_{CEO}$	$V_{CE}=200\text{V}, I_F=0, R_{BE}=\infty$	-	-	$10^{-6}$	A	
Transfer characteristics	Collector current	$I_C$	$I_F=1\text{mA}, V_{CE}=2\text{V}, R_{BE}=\infty$	10	40	150	mA	
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F=20\text{mA}, I_C=100\text{mA}, R_{BE}=\infty$	-	-	1.2	V	
	Isolation resistance	$R_{ISO}$	DC500V, 40 to 60% RH	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$	
	Floating capacitance	$C_f$	$V=0, f=1\text{MHz}$	-	0.6	1.0	pF	
	Cut-off frequency	$f_c$	$V_{CE}=2\text{V}, I_C=20\text{mA}, R_L=100\Omega, R_{BE}=\infty, -3\text{dB}$	1	7	-	kHz	
	Response time	Rise time	$t_r$	$V_{CE}=2\text{V}, I_C=20\text{mA}$ $R_L=100\Omega, R_{BE}=\infty$	-	100	300	$\mu\text{s}$
		Fall time	$t_f$		-	20	100	$\mu\text{s}$

Fig.1 Forward Current vs. Ambient Temperature

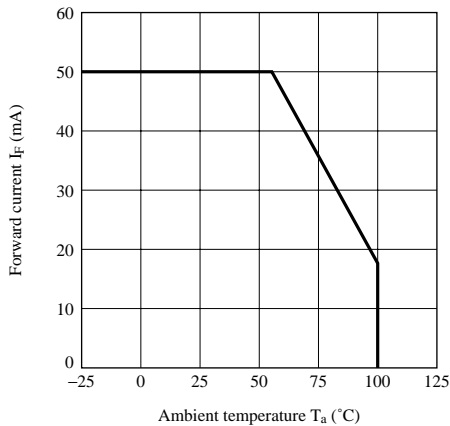


Fig.2 Collector Power Dissipation vs. Ambient Temperature

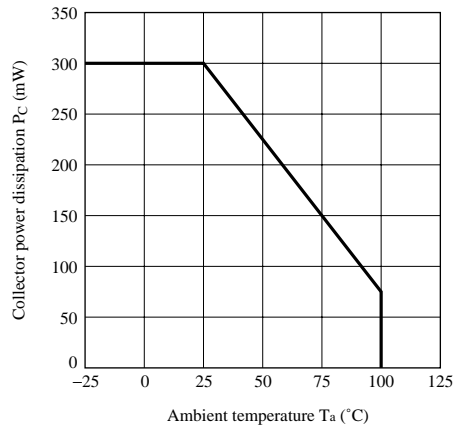


Fig.3 Peak Forward Current vs. Duty Ratio

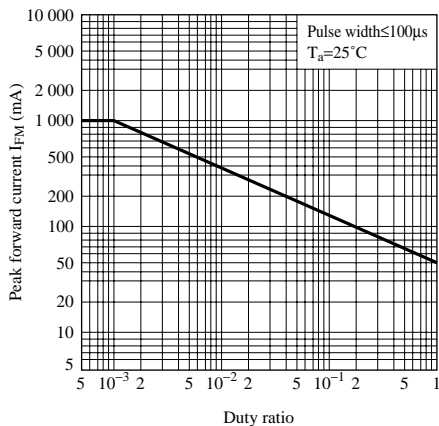
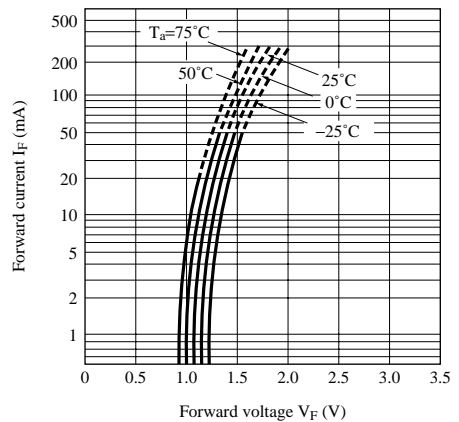
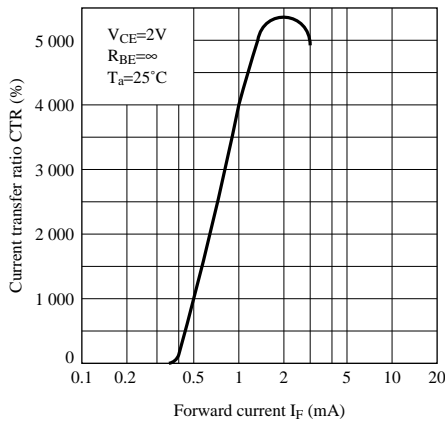


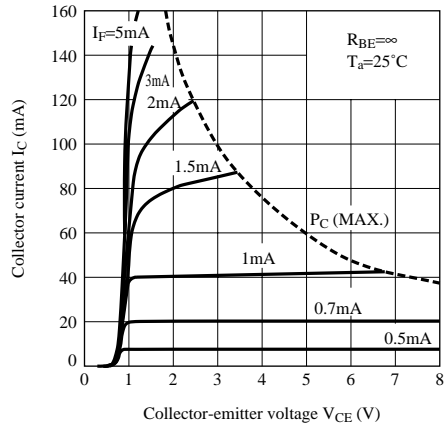
Fig.4 Forward Current vs. Forward Voltage



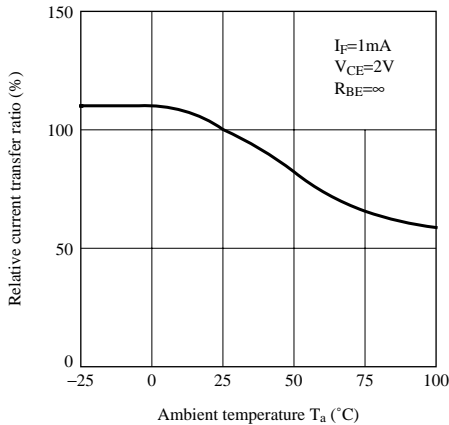
**Fig.5 Current Transfer Ratio vs. Forward Current**



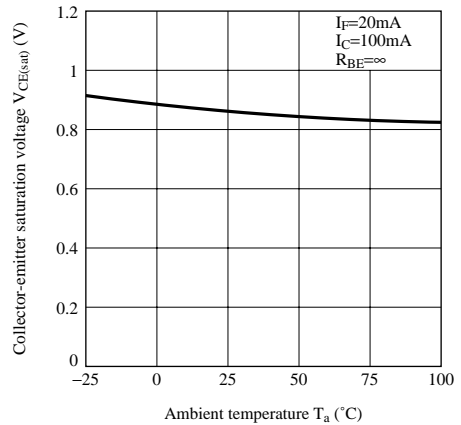
**Fig.6 Collector Current vs. Collector-emitter Voltage**



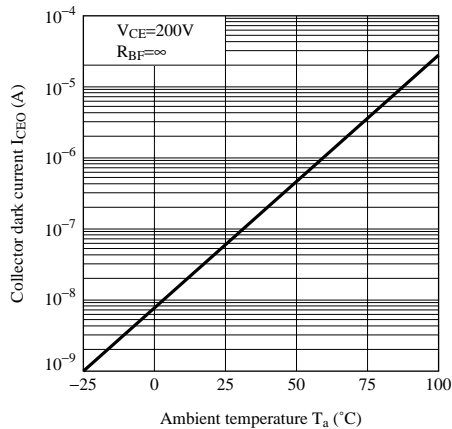
**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**



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



**Fig.9 Collector Dark Current vs. Ambient Temperature**



**Fig.10 Response Time vs. Load Resistance**

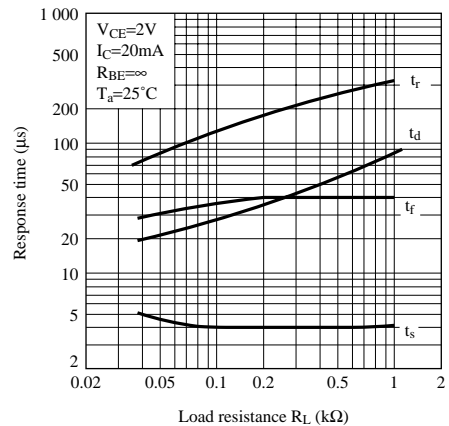




Fig.11 Test Circuit for Response Time

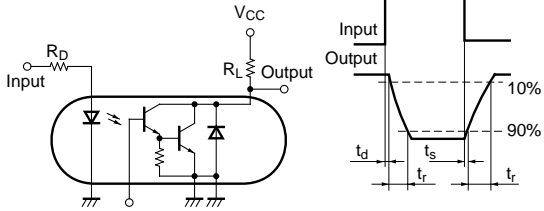


Fig.12 Frequency Response

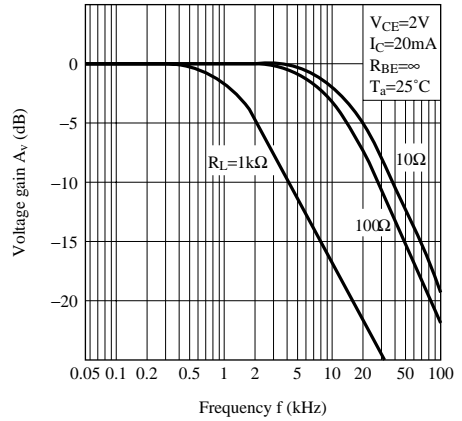
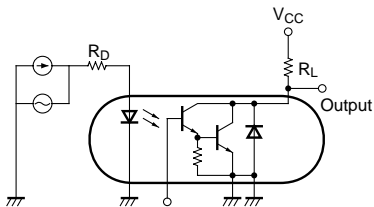


Fig.13 Test Circuit for Frequency Response



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	Total power dissipation	$P_{tot}$	350	mW
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	Storage temperature	$T_{stg}$	-40 to +125	°C
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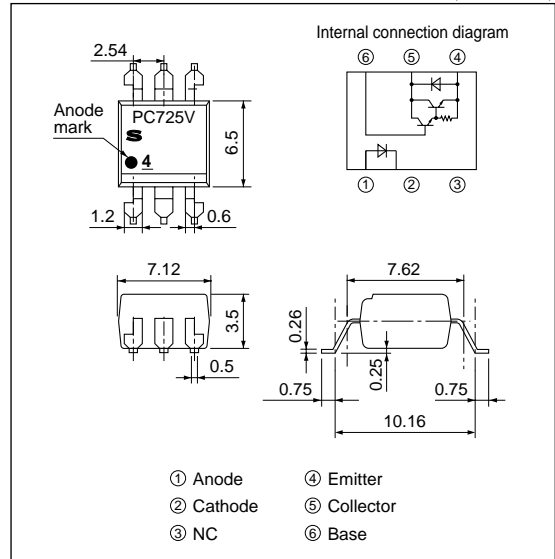
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	Reverse current	$I_R$	$V_R=4\text{V}$	-	-	10	$\mu\text{A}$	
	Terminal capacitance	$C_t$	$V=0, f=1\text{kHz}$	-	30	250	pF	
Output	Collector dark current	$I_{CEO}$	$V_{CE}=200\text{V}, I_F=0, R_{BE}=\infty$	-	-	$10^{-6}$	A	
Transfer characteristics	Collector current	$I_C$	$I_F=1\text{mA}, V_{CE}=2\text{V}, R_{BE}=\infty$	10	40	150	mA	
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F=20\text{mA}, I_C=100\text{mA}, R_{BE}=\infty$	-	-	1.2	V	
	Isolation resistance	$R_{ISO}$	DC500V, 40 to 60% RH	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$	
	Floating capacitance	$C_f$	$V=0, f=1\text{MHz}$	-	0.6	1.0	pF	
	Cut-off frequency	$f_c$	$V_{CE}=2\text{V}, I_C=20\text{mA}, R_L=100\Omega, R_{BE}=\infty, -3\text{dB}$	1	7	-	kHz	
	Response time	Rise time	$t_r$	$V_{CE}=2\text{V}, I_C=20\text{mA}$ $R_L=100\Omega, R_{BE}=\infty$	-	100	300	$\mu\text{s}$
		Fall time	$t_f$		-	20	100	$\mu\text{s}$

Fig.1 Forward Current vs. Ambient Temperature

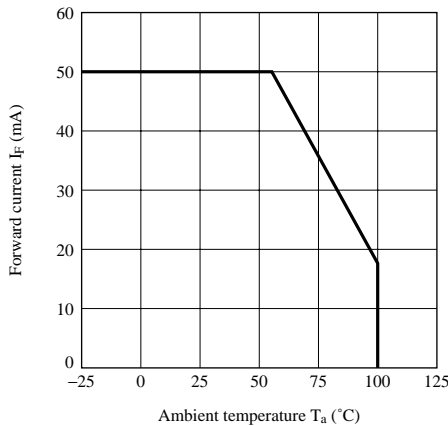


Fig.2 Collector Power Dissipation vs. Ambient Temperature

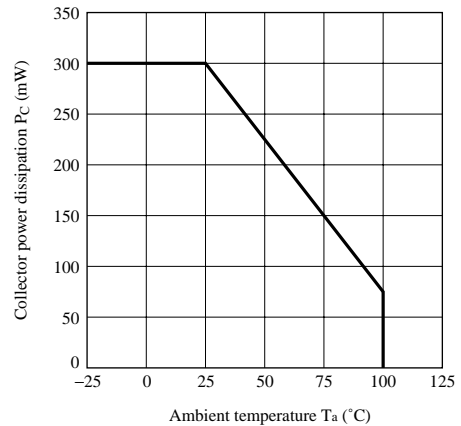


Fig.3 Peak Forward Current vs. Duty Ratio

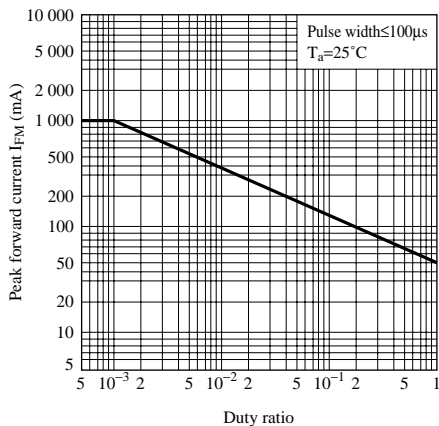
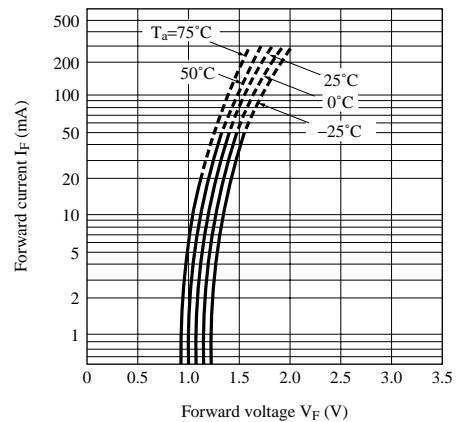
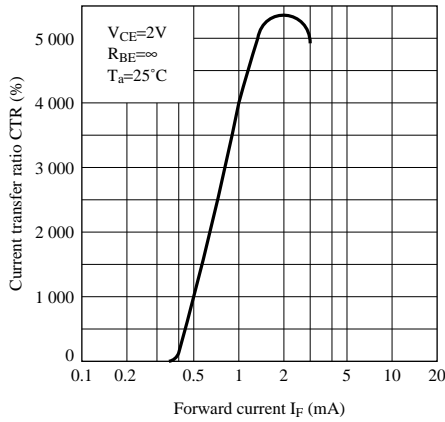


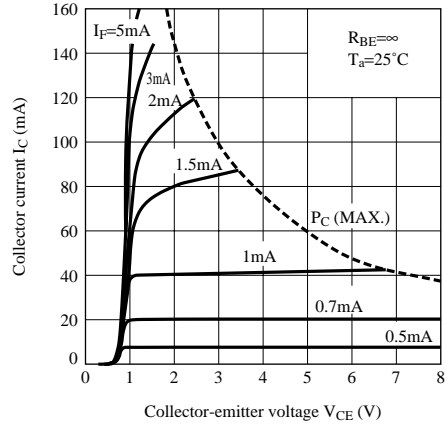
Fig.4 Forward Current vs. Forward Voltage



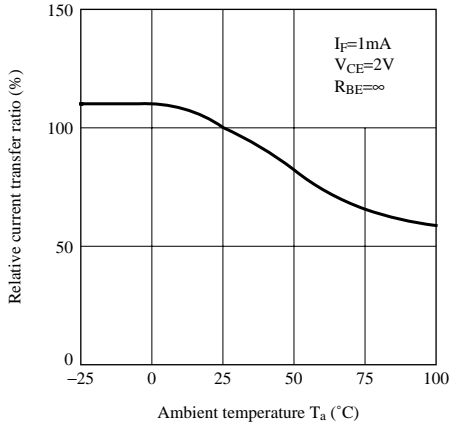
**Fig.5 Current Transfer Ratio vs. Forward Current**



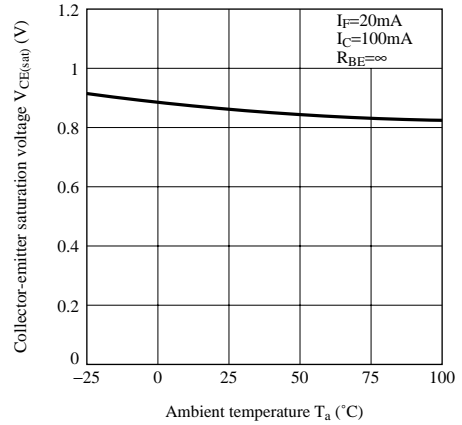
**Fig.6 Collector Current vs. Collector-emitter Voltage**



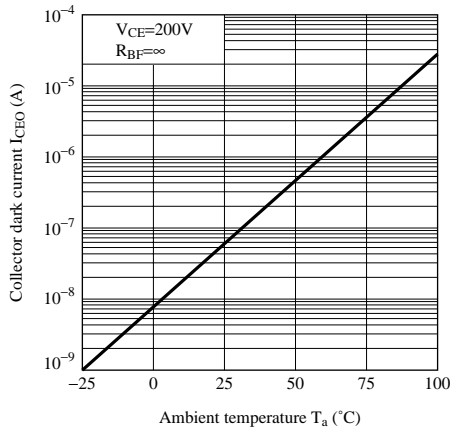
**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**



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



**Fig.9 Collector Dark Current vs. Ambient Temperature**



**Fig.10 Response Time vs. Load Resistance**

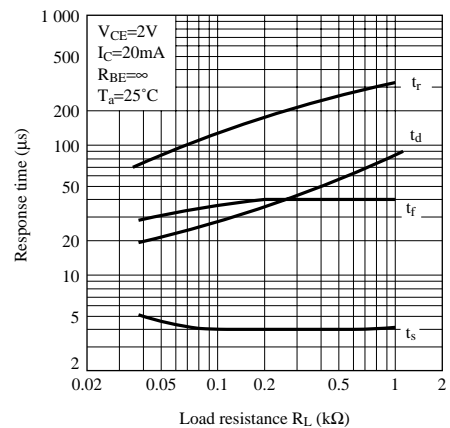


Fig.11 Test Circuit for Response Time

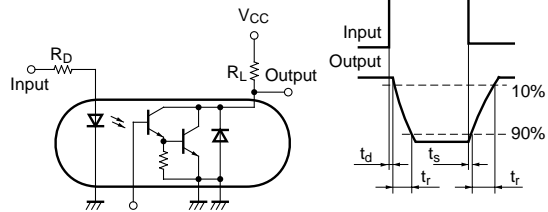


Fig.12 Frequency Response

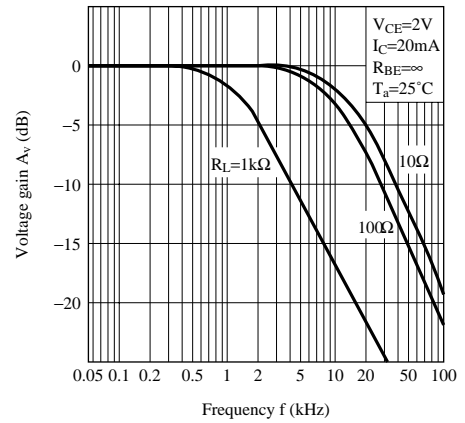
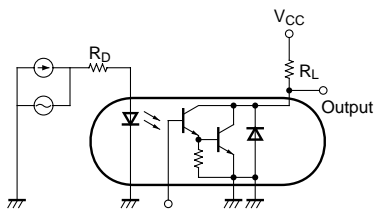


Fig.13 Test Circuit for Frequency Response



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