Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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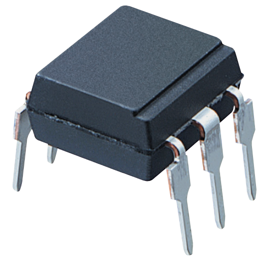
PC713VxNSZX Series

DIP 6 pin Includes Base Terminal Connection Photocoupler



■ Description

PC713VxNSZX Series contains an IRED optically coupled to a phototransistor.

It is packaged in a 6 pin DIP, available in SMT gullwing lead-form option.

Input-output isolation voltage(rms) is 5.0kV.

Collector-emitter voltage is 80V(*) and CTR is 50% to 600% at input current of 5mA.

■ Features

1. 6 pin DIP package
2. Double transfer mold package (Ideal for Flow Soldering)
3. With base terminal
4. High collector-emitter voltage (V_{CEO}:80V(*))
5. High isolation voltage between input and output ($V_{iso(rms)}$: 5.0kV)

(*) Up to Date code "P7" (July 2002) V_{CEO} : 35V.

■ Agency approvals/Compliance

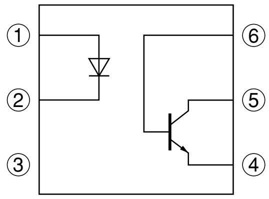
1. Recognized by UL1577 (Double protection isolation), file No. E64380 (as model No. **PC713V**)
2. Approved by TÜV (VDE0884) (as an option) file No. R-9151576 (as model No. **PC713V**)
3. Package resin : UL flammability grade (94V-0)

■ Applications

1. Home appliances
2. Programmable controllers
3. Personal computer peripherals

Sheet No.: D2-A04301EN
Date Nov. 28. 2003

■ Internal Connection Diagram

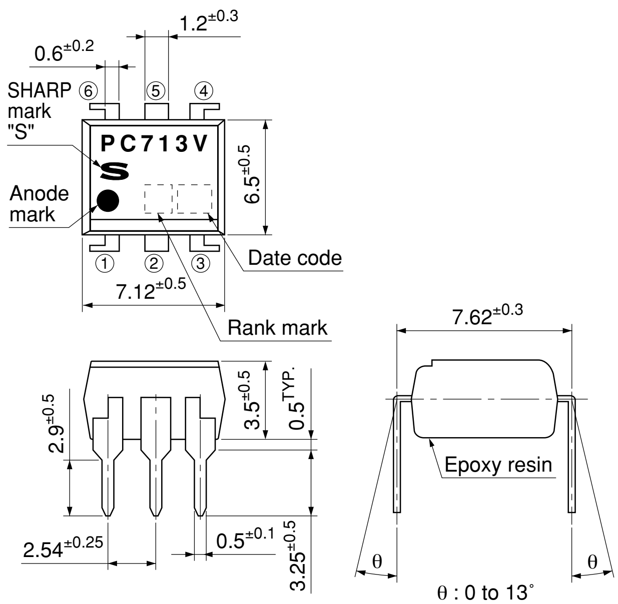


① Anode
② Cathode
③ NC
④ Emitter
⑤ Collector
⑥ Base

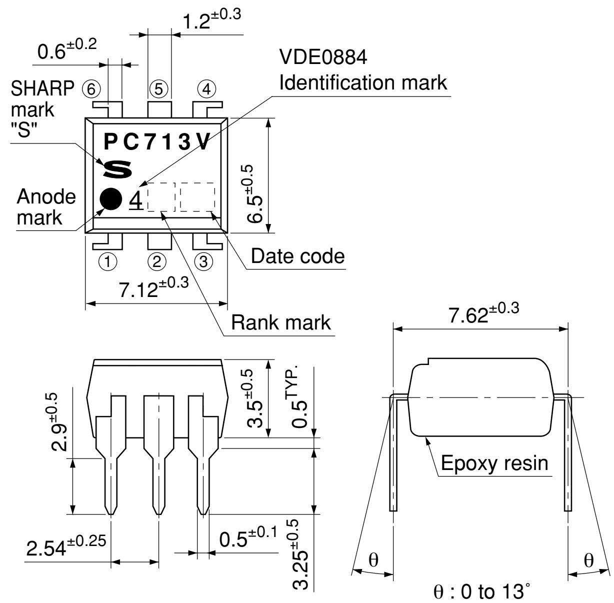
■ Outline Dimensions

(Unit : mm)

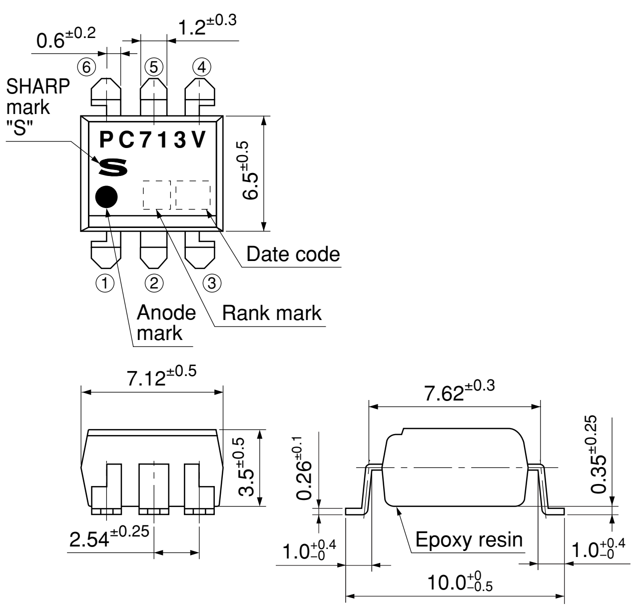
1. Through-Hole [ex. **PC713VxNSZX**]



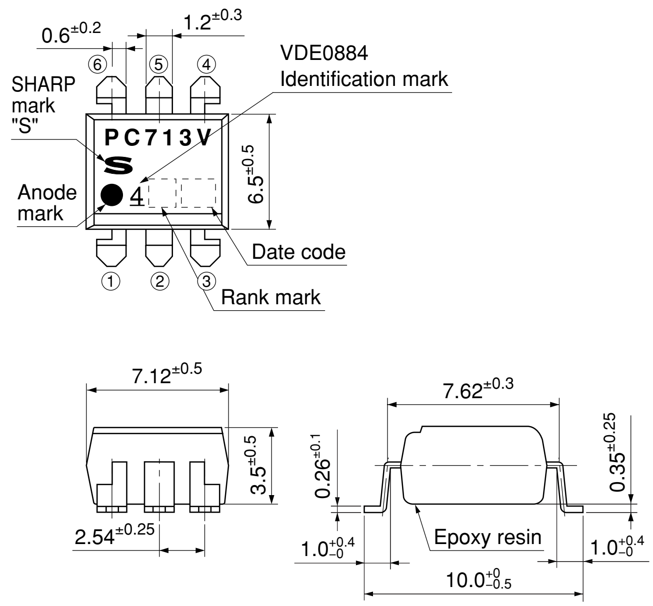
2. Through-Hole (VDE0884 option) [ex. **PC713VxYSZX**]



3. SMT Gullwing Lead-Form [ex. **PC713VxNIPX**]



4. SMT Gullwing Lead-Form (VDE0884 option) [ex. **PC713VxYIPX**]



Product mass : approx. 0.36g

Date code (2 digit)

1st digit				2nd digit	
Year of production				Month of production	
A.D.	Mark	A.D	Mark	Month	Mark
1990	A	2002	P	January	1
1991	B	2003	R	February	2
1992	C	2004	S	March	3
1993	D	2005	T	April	4
1994	E	2006	U	May	5
1995	F	2007	V	June	6
1996	H	2008	W	July	7
1997	J	2009	X	August	8
1998	K	2010	A	September	9
1999	L	2011	B	October	O
2000	M	2012	C	November	N
2001	N	⋮	⋮	December	D

repeats in a 20 year cycle

Country of origin

Japan

Rank mark

Refer to the Model Line-up

■ Absolute Maximum Ratings

(T_a=25˚C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
Input	*1 Peak forward current	I_{FM}	1	A
Input	Reverse voltage	V_R	6	V
Input	Power dissipation	P	70	mW
Output	Collector-emitter voltage	V_{CEO}	*4 80	V
Output	Emitter-collector voltage	V_{ECO}	6	V
Output	Collector-base voltage	V_{CBO}	*4 80	V
Output	Emitter-base voltage	V_{EBO}	6	V
Output	Collector current	I_C	50	mA
Output	Collector power dissipation	P_C	150	mW
Total power dissipation		P_{tot}	170	mW
Operating temperature		T_{opr}	−25 to +100	˚C
Storage temperature		T_{stg}	−40 to +125	˚C
*2 Isolation voltage		$V_{iso\ (rms)}$	5	kV
*3 Soldering temperature		T_{sol}	260	˚C

*1 Pulse width≤100μs, Duty ratio : 0.001
*2 40 to 60%RH, AC for 1minute, f=60Hz
*3 For 10s
*4 Up to Date code "P7" (July 2002) V_{CEO} : 35V, V_{CBO} : 35V.

■ Electro-optical Characteristics

(T_a=25˚C)

	Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V_F	I_F=20mA	–	1.2	1.4	V
Input	Peak forward voltage		V_{FM}	I_{FM}=0.5A	–	–	3.0	V
Input	Reverse current		I_R	V_R=4V	–	–	10	μA
Input	Terminal capacitance		C_t	V=0, f=1kHz	–	30	250	pF
Output	Collector dark current		I_{CEO}	V_{CE}=50V, I_F=0	–	–	100	nA
Output	Collector-emitter breakdown voltage		BV_{CEO}	I_C=0.1mA, I_F=0	*5 80	–	–	V
Output	Emitter-base breakdown voltage		BV_{EBO}	I_E=10μA, I_F=0	6	–	–	V
Output	Collector-base breakdown voltage		BV_{CBO}	I_C=0.1mA, I_F=0	*5 80	–	–	V
Transfer characteristics	Current transfer ratio		I_C	I_F=5mA, V_{CE}=5V	2.5	–	30	mA
Transfer characteristics	Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_F=20mA, I_C=1mA	–	0.1	0.2	V
Transfer characteristics	Isolation resistance		R_{ISO}	DC500V, 40 to 60%RH	5×10^{10}	1×10^{11}	–	Ω
Transfer characteristics	Floating capacitance		C_f	V=0, f=1MHz	–	0.6	1.0	pF
Transfer characteristics	Cut-off frequency		f_C	V_{CE}=5V, I_C=2mA, R_L=100Ω −3dB	–	80	–	kHz
Transfer characteristics	Response time	Rise time	t_r	V_{CE}=2V, I_C=2mA, R_L=100Ω	–	4	18	μs
Transfer characteristics	Response time	Fall time	t_f	V_{CE}=2V, I_C=2mA, R_L=100Ω	–	3	18	μs

*5 Up to Date code "P7" (July 2002) BV_{CEO}≥35V and BV_{CBO}≥35V.

■ Model Line-up

Lead Form	Through-Hole		SMT Gullwing				Rank mark	I_C [mA] (I_F=5mA, V_{CE}=5V, T_a=25˚C)
Package	Sleeve				Taping			
	50pcs / sleeve				1 000pcs / reel			
VDE0884	———	Approved	———	Approved	———	Approved		
Model No.	PC713V0NSZX	PC713V0YSZX	PC713V0NIZX	PC713V0YIZX	PC713V0NIPX	PC713V0YIPX	with or with out	2.5 to 30.0
	PC713V1NSZX	PC713V1YSZX	PC713V1NIZX	PC713V1YIZX	PC713V1NIPX	PC713V1YIPX	A	4.0 to 8.0
	PC713V2NSZX	PC713V2YSZX	PC713V2NIZX	PC713V2YIZX	PC713V2NIPX	PC713V2YIPX	B	6.5 to 13.0
	PC713V3NSZX	PC713V3YSZX	PC713V3NIZX	PC713V3YIZX	PC713V3NIPX	PC713V3YIPX	C	10.0 to 20.0
	PC713V5NSZX	PC713V5YSZX	PC713V5NIZX	PC713V5YIZX	PC713V5NIPX	PC713V5YIPX	A or B	4.0 to 13.0
	PC713V6NSZX	PC713V6YSZX	PC713V6NIZX	PC713V6YIZX	PC713V6NIPX	PC713V6YIPX	B or C	6.5 to 20.0
	PC713V8NSZX	PC713V8YSZX	PC713V8NIZX	PC713V8YIZX	PC713V8NIPX	PC713V8YIPX	A, B or C	4.0 to 20.0

Please contact a local SHARP sales representative to inquire about production status and Lead-Free options.

Fig.1 Forward Current vs. Ambient Temperature

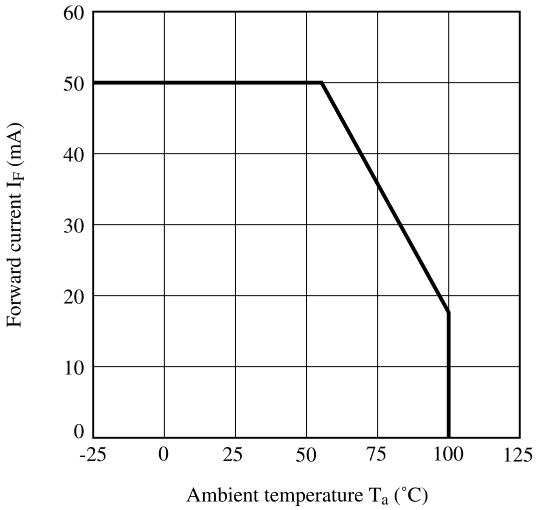


Fig.2 Diode Power Dissipation vs. Ambient Temperature

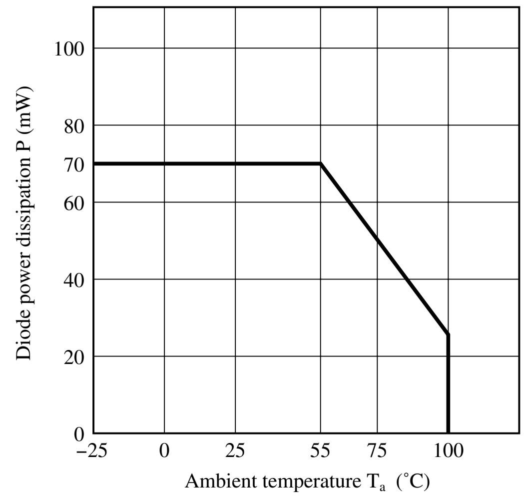


Fig.3 Collector Power Dissipation vs. Ambient Temperature

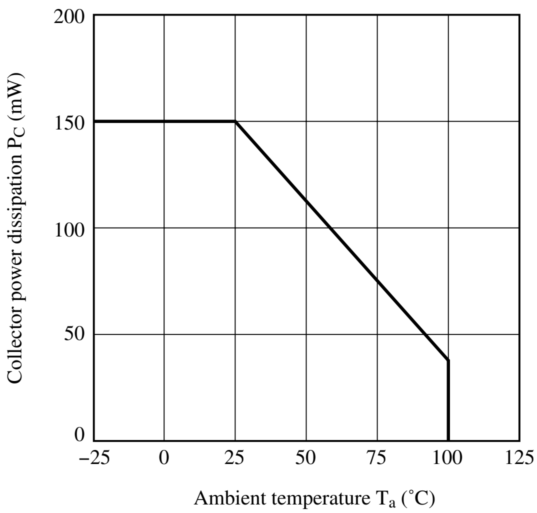


Fig.4 Total Power Dissipation vs. Ambient Temperature

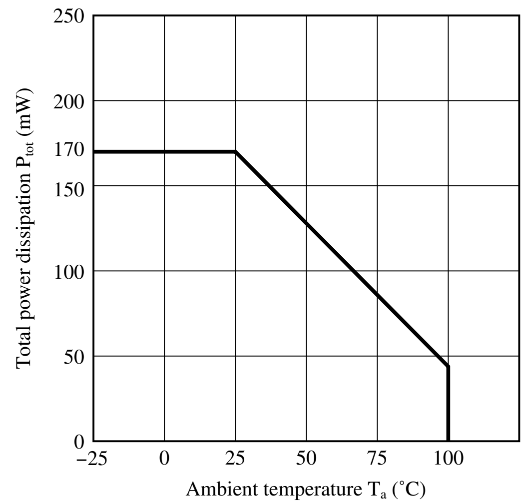


Fig.5 Peak Forward Current vs. Duty Ratio

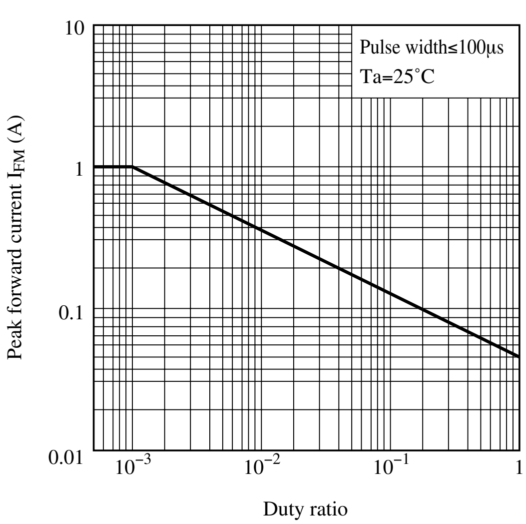


Fig.6 Forward Current vs. Forward Voltage

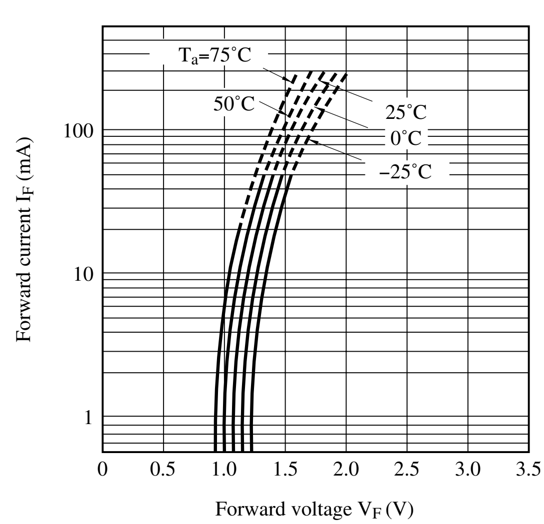


Fig.7 Current Transfer Ratio vs. Forward Current

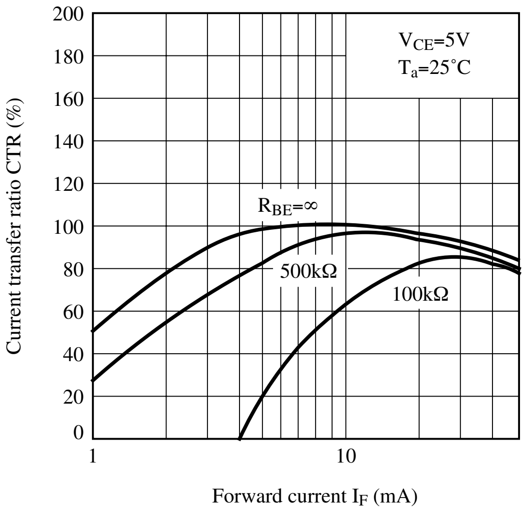


Fig.8 Collector Current vs. Collector-emitter Voltage

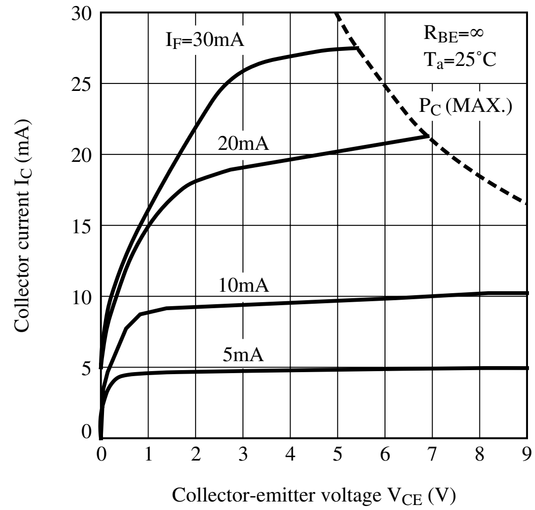


Fig.9 Relative Current Transfer Ratio vs. Ambient Temperature

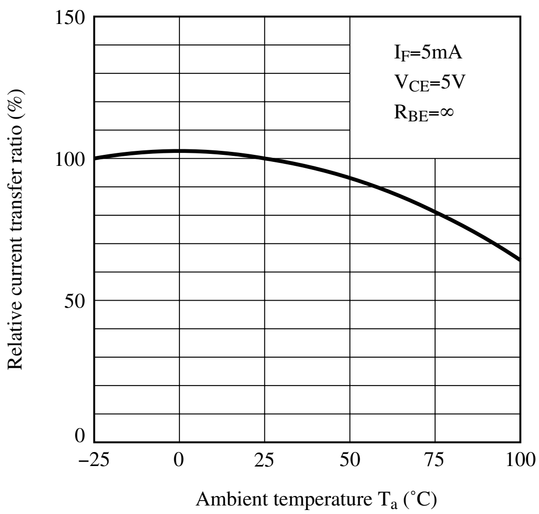


Fig.10 Collector - emitter Saturation Voltage vs. Ambient Temperature

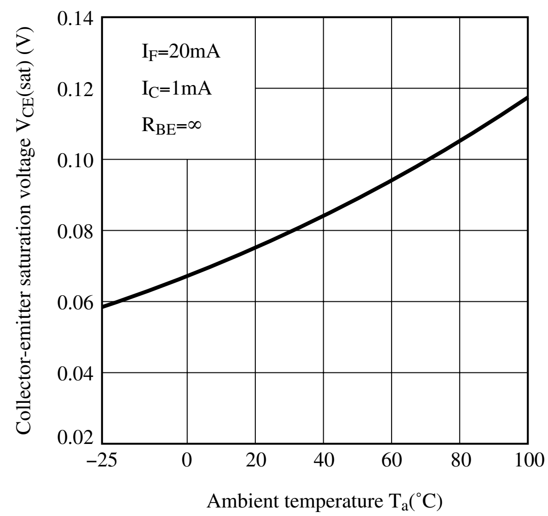


Fig.11 Collector Dark Current vs. Ambient Temperature

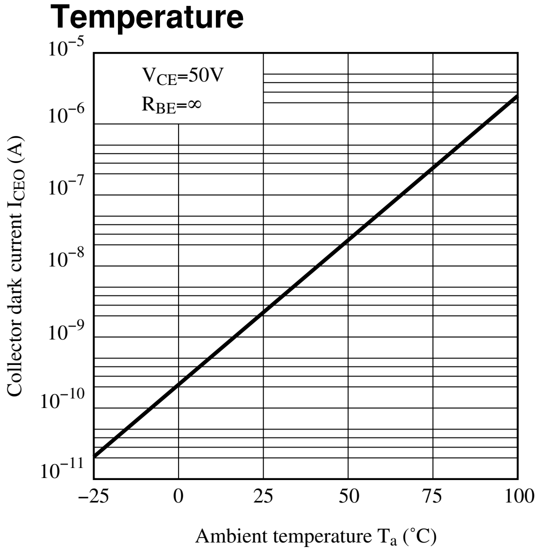


Fig.12 Collector-base Dark Current vs. Ambient Temperature

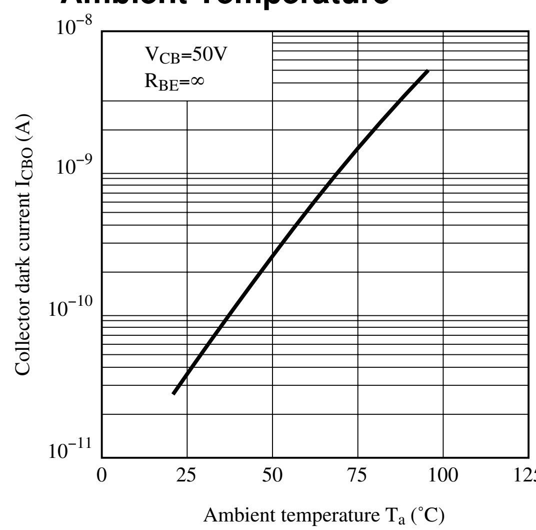


Fig.13 Response Time vs. Load Resistance

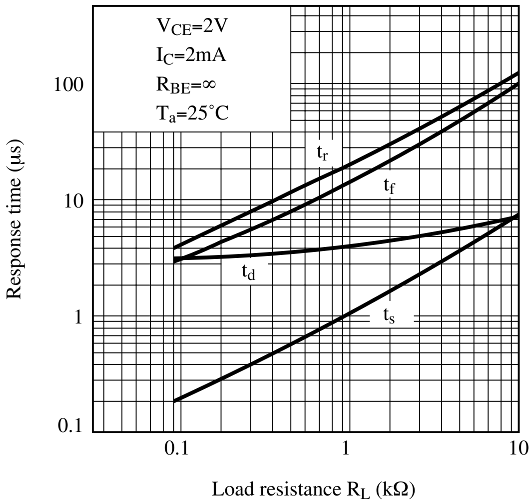
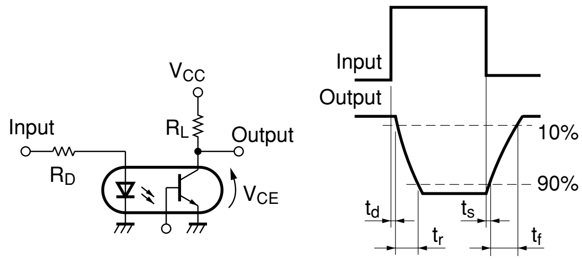


Fig.14 Test Circuit for Response Time



Please refer to the conditions in Fig.13

Fig.15 Frequency Response

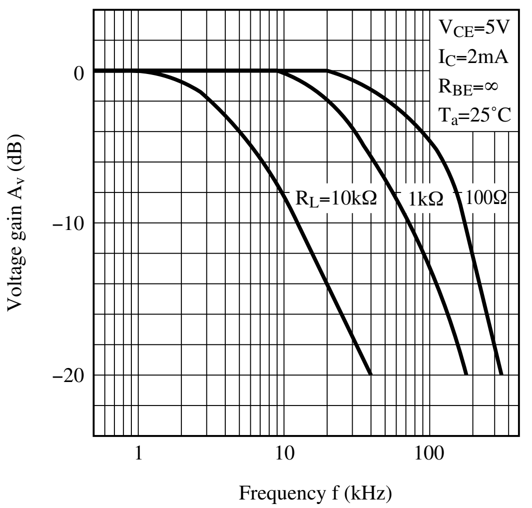
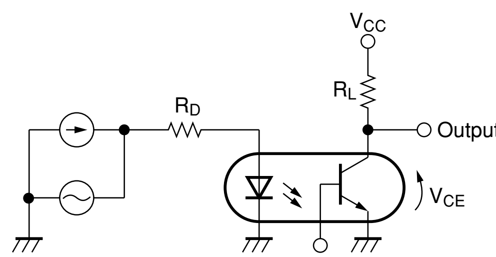


Fig.16 Test Circuit for Frequency Response



Please refer to the conditions in Fig.15

Remarks : Please be aware that all data in the graph are just for reference and not for guarantee.

■ Design Considerations

● Design guide

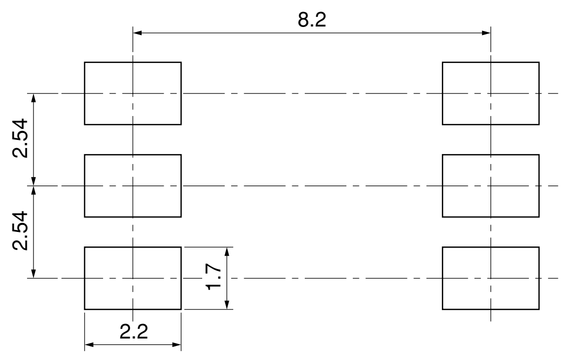
While operating at I_F<1.0mA, CTR variation may increase.
Please make design considering this fact.

This product is not designed against irradiation and incorporates non-coherent IRED.

● Degradation

In general, the emission of the IRED used in photocouplers will degrade over time.
In the case of long term operation, please take the general IRED degradation (50% degradation over 5years) into the design consideration.

● Recommended Foot Print (reference)



(Unit : mm)

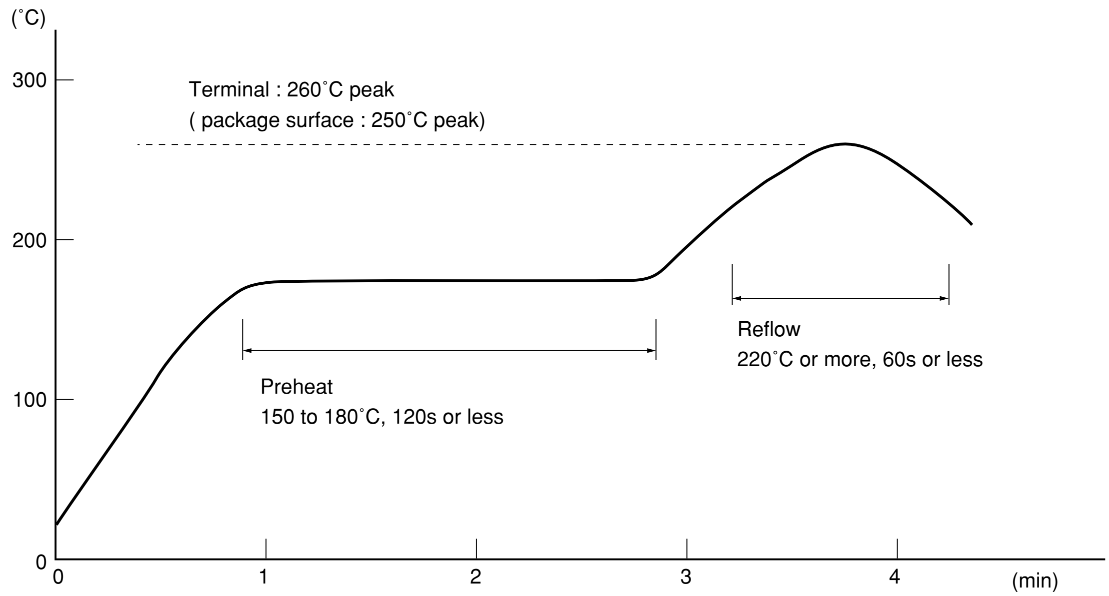
☆ For additional design assistance, please review our corresponding Optoelectronic Application Notes.

■ Manufacturing Guidelines

● Soldering Method

Reflow Soldering:

Reflow soldering should follow the temperature profile shown below.
Soldering should not exceed the curve of temperature profile and time.
Please don't solder more than twice.



Flow Soldering :

Due to SHARP's double transfer mold construction submersion in flow solder bath is allowed under the below listed guidelines.

Flow soldering should be completed below 270˚C and within 10s.
Preheating is within the bounds of 100 to 150˚C and 30 to 80s.
Please don't solder more than twice.

Hand soldering

Hand soldering should be completed within 3s when the point of solder iron is below 400˚C.
Please don't solder more than twice.

Other notices

Please test the soldering method in actual condition and make sure the soldering works fine, since the impact on the junction between the device and PCB varies depending on the tooling and soldering conditions.

● Cleaning instructions

Solvent cleaning:

Solvent temperature should be 45˚C or below Immersion time should be 3minutes or less

Ultrasonic cleaning:

The impact on the device varies depending on the size of the cleaning bath, ultrasonic output, cleaning time, size of PCB and mounting method of the device.
Therefore, please make sure the device withstands the ultrasonic cleaning in actual conditions in advance of mass production.

Recommended solvent materials:

Ethyl alcohol, Methyl alcohol and Isopropyl alcohol
In case the other type of solvent materials are intended to be used, please make sure they work fine in actual using conditions since some materials may erode the packaging resin.

● Presence of ODC

This product shall not contain the following materials.
And they are not used in the production process for this device.
Regulation substances:CFCs, Halon, Carbon tetrachloride, 1.1.1-Trichloroethane (Methylchloroform)
Specific brominated flame retardants such as the PBBOs and PBBs are not used in this product at all.

■ Package specification

● Sleeve package

Package materials

Sleeve : HIPS (with anti-static material)

Stopper : Styrene-Elastomer

Package method

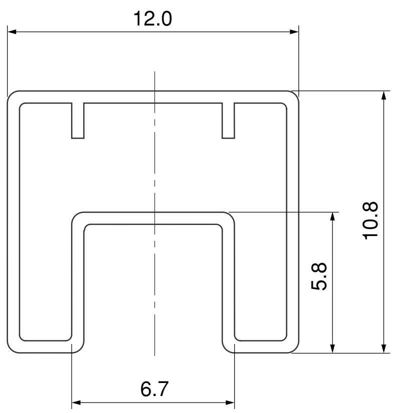
MAX. 50 pcs. of products shall be packaged in a sleeve.

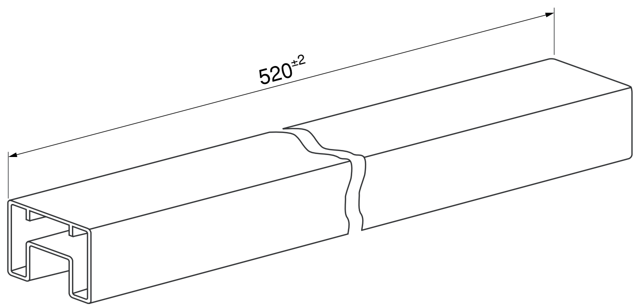
Both ends shall be closed by tabbed and tabless stoppers.

The product shall be arranged in the sleeve with its anode mark on the tabless stopper side.

MAX. 20 sleeves in one case.

Sleeve outline dimensions





(Unit : mm)

● Tape and Reel package

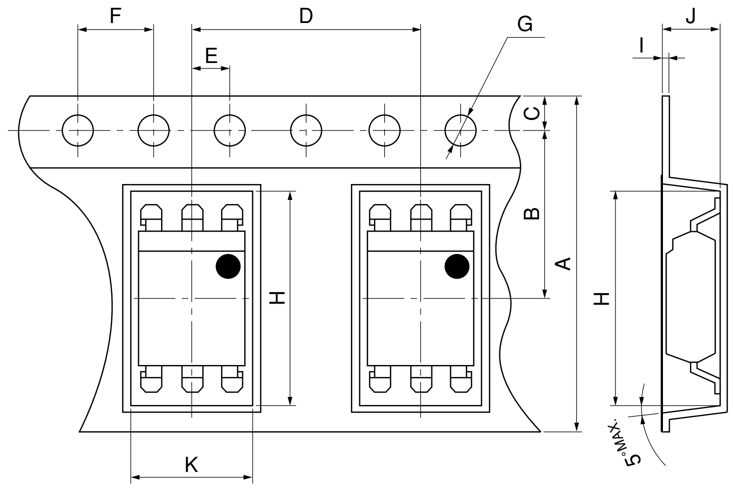
Package materials

Carrier tape : A-PET (with anti-static material)

Cover tape : PET (three layer system)

Reel : PS

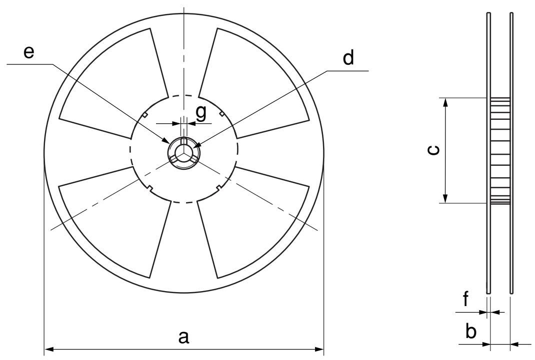
Carrier tape structure and Dimensions



Dimensions List (Unit:mm)

A	B	C	D	E	F	G
$16.0^{\pm0.3}$	$7.5^{\pm0.1}$	$1.75^{\pm0.1}$	$12.0^{\pm0.1}$	$2.0^{\pm0.1}$	$4.0^{\pm0.1}$	$\phi1.5^{+0.1}_{-0}$
H	I	J	K			
$10.4^{\pm0.1}$	$0.4^{\pm0.05}$	$4.2^{\pm0.1}$	$7.8^{\pm0.1}$			

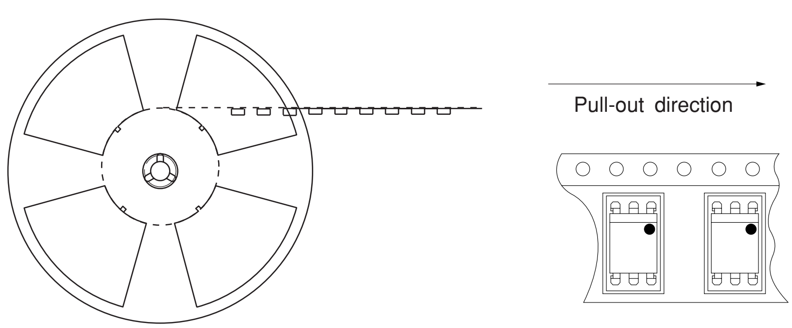
Reel structure and Dimensions



Dimensions List (Unit : mm)

a	b	c	d
330	$17.5^{\pm1.5}$	$100^{\pm1.0}$	$13^{\pm0.5}$
e	f	g	
$23^{\pm1.0}$	$2.0^{\pm0.5}$	$2.0^{\pm0.5}$	

Direction of product insertion



[Packing : 1 000pcs/reel]

■ Important Notices

· The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.

· Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device. SHARP reserves the right to make changes in the specifications, characteristics, data, materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.

· Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:

(i) The devices in this publication are designed for use in general electronic equipment designs such as:
- --- 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).

· If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Law of Japan, it is necessary to obtain approval to export such SHARP devices.

· Contact and consult with a SHARP representative if there are any questions about the contents of this publication.