PC714VxNSZX **Series**

DIP 6 pin General Purpose Photocoupler



Description

PC714VxNSZX Series contains an IRED optically coupled to a phototransistor.

It is packaged in a 6 pin DIP.

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. High collector-emitter voltage (V_{CEO}:80V(*))
- 4. 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. PC714V)
- 2. Approved by TÜV (VDE0884) (as an option) file No. R-9151576 (as model No. PC714V)
- 3. Package resin : UL flammability grade (94V-0)

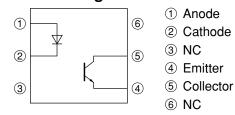
Applications

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

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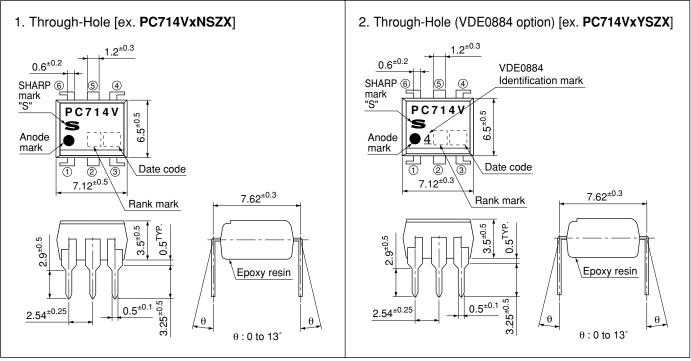


Internal Connection Diagram



Outline Dimensions

(Unit : mm)



Product mass : approx. 0.36g



Date code (2 digit)

	1st o	digit		2nd digit		
		roduction		Month of production		
A.D.	Mark	A.D	Mark	Month	Mark	
1990	A	2002	Р	January	1	
1991	В	2003	R	February	2	
1992	C	2004	S	March	3	
1993	D	2005	Т	April	4	
1994	Е	2006	U	May	5	
1995	F	2007	V	June	6	
1996	Н	2008	W	July	7	
1997	J	2009	Х	August	8	
1998	K	2010	А	September	9	
1999	L	2011	В	October	0	
2000	М	2012	С	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

Absolute Maximum Ratings $(T_a=25^{\circ}C)$							
	Parameter	Symbol	Rating	Unit			
	Forward current	$I_{\rm F}$	50	mA			
Input	*1 Peak forward current	I _{FM}	1	Α			
	Reverse voltage	V _R	6	V			
	Power dissipation	Р	70	mW			
Output	Collector-emitter voltage	V _{CEO}	*4 80	V			
	Emitter-collector voltage	V _{ECO}	6	V			
	Collector current	I _C	50	mA			
	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.

■ Electro-optical Characteristics

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

								· - /
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
	Forward voltage		$V_{\rm F}$	I _F =20mA	-	1.2	1.4	V
Input	Peak forward voltage		V _{FM}	$I_{FM}=0.5A$	-	-	3.0	V
	Reverse current		I _R	$V_R=4V$	-	-	10	μΑ
	Terminal capacitance		Ct	V=0, f=1kHz	-	30	250	pF
Output	Collector dark current		I _{CEO}	V_{CE} =50V, I _F =0	-	_	100	nA
	Collector-emitter breakdown voltage		BV _{CEO}	$I_{C}=0.1 \text{mA}, I_{F}=0$	*5 80	-	-	V
	Emitter-collector breakdown voltage		BV _{ECO}	$I_{E}=10\mu A, I_{F}=0$	6	-	-	V
Transfer charac- teristics	Current transfer ratio		I _C	$I_F=5mA, V_{CE}=5V$	2.5	_	30.0	mA
	Collector-emitter saturation voltage		V _{CE (sat)}	$I_F=20mA$, $I_C=1mA$	-	0.1	0.2	V
	Isolation resistance		R _{ISO}	DC500V, 40 to 60%RH	5×10 ¹⁰	1×10^{11}	-	Ω
	Floating capacitance		C_{f}	V=0, f=1MHz	-	0.6	1.0	pF
	Cut-off frequency		f_{C}	V_{CE} =5V, I_C =2mA, R_L =100 Ω -3dB	-	80	-	kHz
	Response time	Rise time	t _r	$V_{CE}=2V, I_{C}=2mA, R_{I}=100\Omega$	_	4	18	μs
		Fall time	t _f	$v_{CE}=2v, i_{C}=2111A, K_{L}=100S2$	-	3	18	μs

*5 Up to Date code "P7" (July 2002) $BV_{CEO} \ge 35V$.

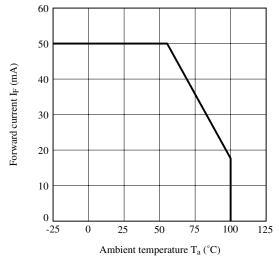


■ Model Line-up

Lead Form	Throug	h-Hole		I _C [mA]	
Package	Sle	eve	Rank mark		
	50pcs/	/sleeve		$(I_{F}=5mA, V_{CE}=5V, T_{a}=25^{\circ}C)$	
VDE0884		Approved			
Model No.	PC714V0NSZX	PC714V0YSZX	with or with out	2.5 to 30.0	
	PC714V1NSZX	PC714V1YSZX	А	4.0 to 8.0	
	PC714V2NSZX	PC714V2YSZX	В	6.5 to 13.0	
	PC714V3NSZX	PC714V3YSZX	С	10.0 to 20.0	
	PC714V5NSZX	PC714V5YSZX	A or B	4.0 to 13.0	
	PC714V6NSZX	PC714V6YSZX	B or C	6.5 to 20.0	
	PC714V8NSZX	PC714V8YSZX	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





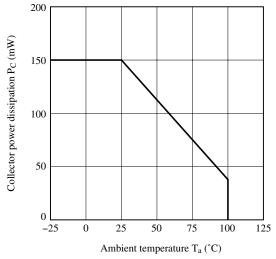


Fig.5 Peak Forward Current vs. Duty Ratio

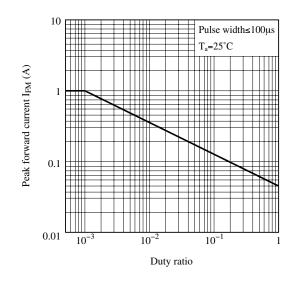


Fig.2 Diode Power Dissipation vs. Ambient Temperature

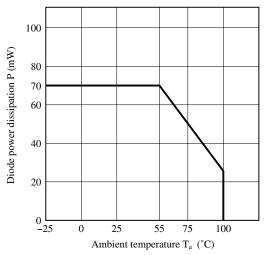


Fig.4 Total Power Dissipation vs. Ambient Temperature

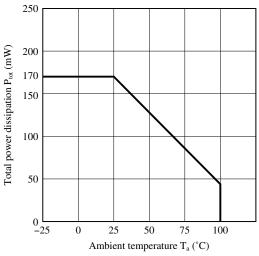


Fig.6 Forward Current vs. Forward Voltage

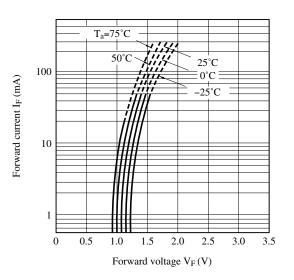
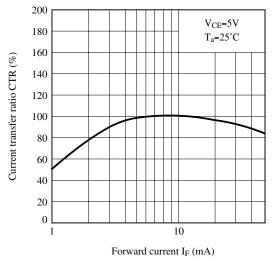
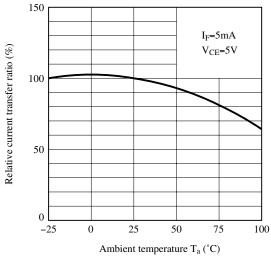




Fig.7 Current Transfer Ratio vs. Forward Current









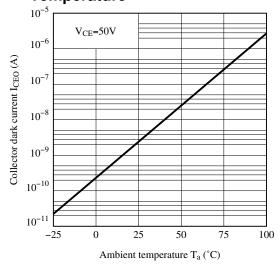


Fig.8 Collector Current vs. Collectoremitter Voltage

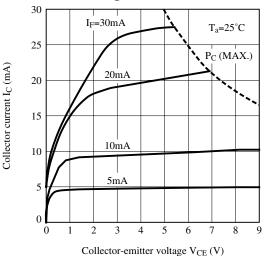


Fig.10 Collector - emitter Saturation Voltage vs. Ambient Temperature

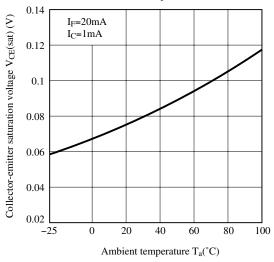


Fig.12 Response Time vs. Load Resistance

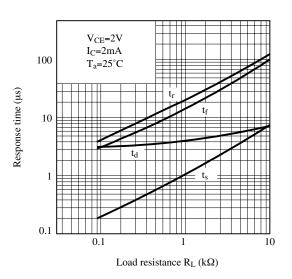
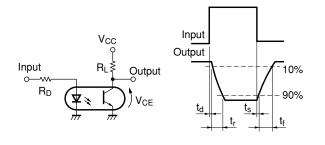




Fig.13 Test Circuit for Response Time



Please refer to the conditions in Fig.12

Fig.14 Frequency Response

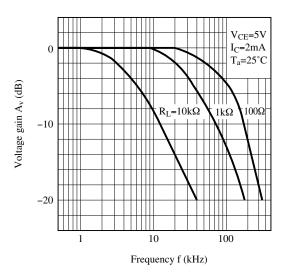
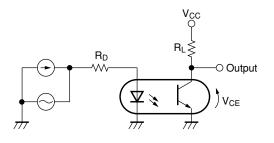


Fig.15 Test Circuit for Frequency Response



Please refer to the conditions in Fig.14

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.

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



Manufacturing Guidelines

Soldering Method

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

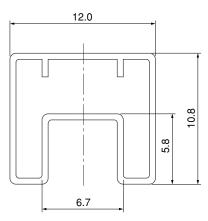
• Sleeve package

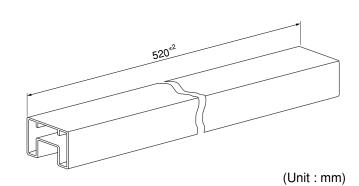
Package materials Sleeve : HIPS (with anti-static material) Stopper : Styrene-Elastomer

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 tabbed stopper side.MAX. 20 sleeves in one case.

Sleeve outline dimensions





Sheet No.: D2-A04101EN

SHARP

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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:

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- --- Telecommunication equipment [trunk lines]
- --- Nuclear power control equipment
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