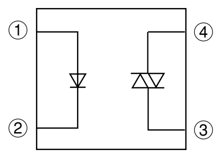
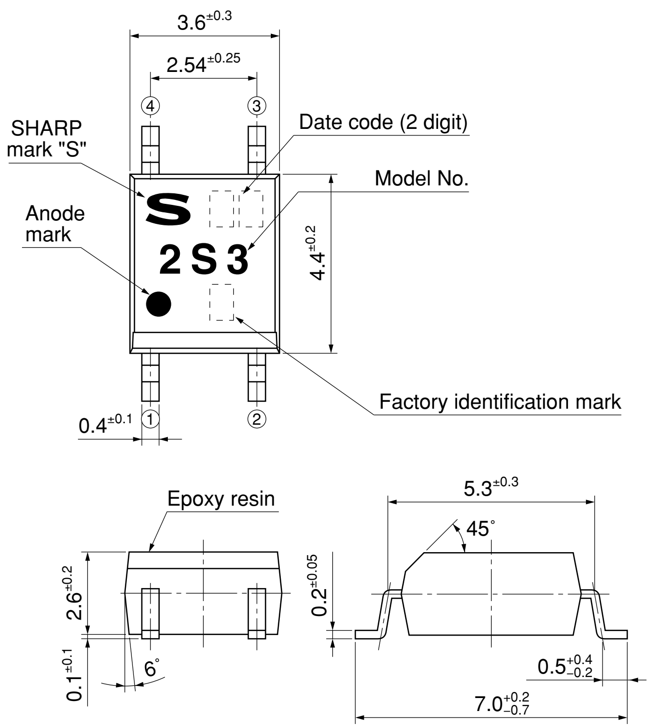
■ Internal Connection Diagram



① Anode
② Cathode
③ Anode/Cathode
④ Cathode/Anode

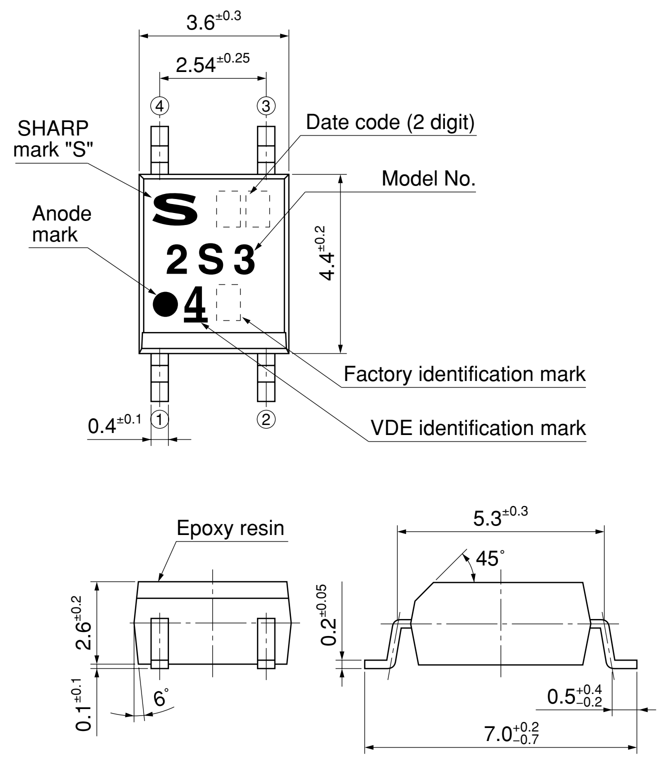
■ Outline Dimensions

(Unit : mm)



Product mass : approx. 0.09g

VDE option



Product mass : approx. 0.09g

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

Factory identification mark

Factory identification Mark	Country of origin
no mark	Japan
■	
◢	Indonesia
◸	Philippines
◥	China

* This factory marking is for identification purpose only.
Please contact the local SHARP sales representative to see the actural status of the production.

Rank mark

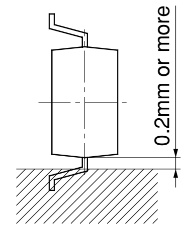
There is no rank mark indicator.

■ Absolute Maximum Ratings

(T_a=25˚C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	6	V
Output	RMS ON-state current	I_T(rms)	0.05	A
	Peak one cycle surge current	I_{surge}	0.6 *3	A
	Repetitive peak OFF-state voltage	V_{DRM}	600	V
*1 Isolation voltage		V_{iso}(rms)	3.75	kV
Operating temperature		T_{opr}	-30 to +100	˚C
Storage temperature		T_{stg}	-40 to +125	˚C
*2 Soldering temperature		T_{sol}	260	˚C

*1 40 to 60%RH, AC for 1minute, f=60Hz
*2 For 10s
*3 f=50Hz sine wave



■ 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
	Reverse current		I_R	V_R=3V	–	–	10	μA
Output	Repentitive peak OFF-state current		I_{DRM}	$V_D=V_{DRM}$	–	–	1	μA
	ON-state voltage		V_T	I_T=0.05A	–	–	2.5	V
	Holding current		I_H	V_D=6V	0.1	–	3.5	mA
	Critical rate of rise of OFF-state voltage		dV/dt	$V_D=1/\sqrt{2}\cdot V_{DRM}$	100	1 000	–	V/μs
Transfer charac-teristics	Minimum trigger current	No rank	I_{FT}	V_D=6V, R_L=100Ω	–	–	10	mA
		Rank R			–	–	7	
		Rank L			–	–	5	
	Isolation resistance		R_{ISO}	DC500V,40 to 60%RH	5×10^{10}	10^{11}	–	Ω
	Turn-on time		t_{on}	V_D=6V, R_L=100Ω, I_F=20mA	–	–	100	μs

■ Model Line-up

Shipping Package	Sleeve		Taping				I_{FT} rank	I_{FT} [mA] (V_D=6V, R_L=100Ω)
	100pcs/sleeve		3 000pcs/reel		750pcs/reel			
DIN EN60747-5-2	——	Approved	——	Approved	——	Approved		
Model No.	S2S3000F	S2S3Y00F	S2S3A00F	S2S3AY0F	S2S3B00F	S2S3BY0F	No rank	MAX. 10
	S2S3R00F	S2S3RY0F	S2S3RA0F	S2S3RAYF	S2S3RB0F	S2S3RBYF	Rank R	MAX. 7
	S2S3L00F	S2S3LY0F	S2S3LA0F	——	S2S3LB0F	——	Rank L	MAX. 5

Please contact a local SHARP sales representative to inquire about production status.

Fig.1 Forward Current vs. Ambient Temperature

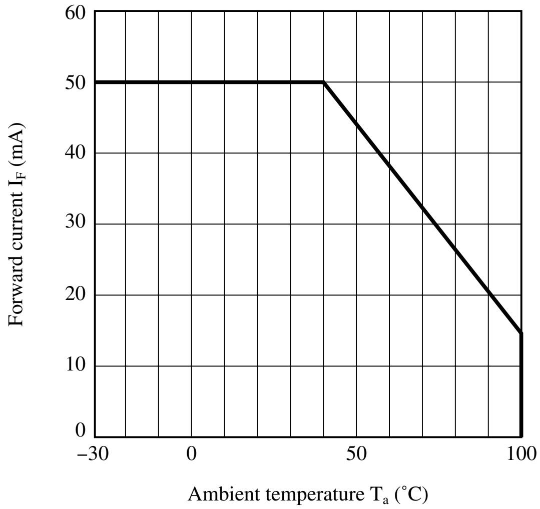


Fig.2 RMS ON-state Current vs. Ambient Temperature

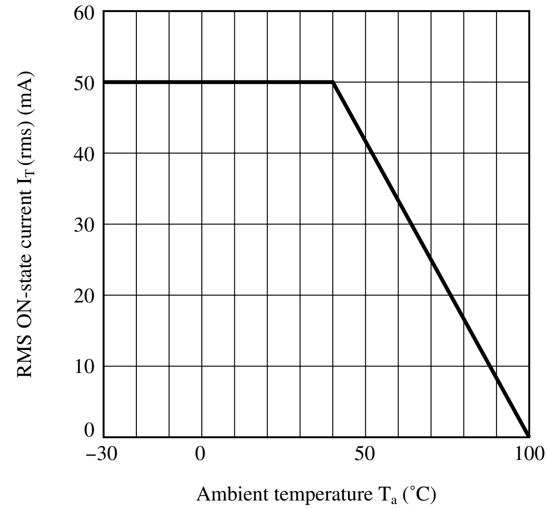


Fig.3-a Forward Current vs. Forward Voltage (No rank, Rank R)

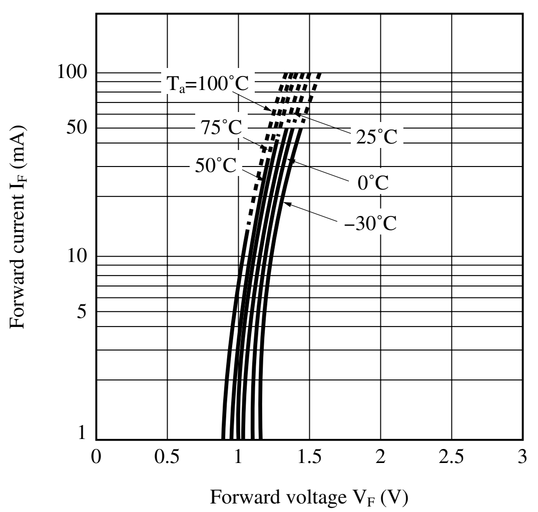


Fig.3-b Forward Current vs. Forward Voltage (Rank L)

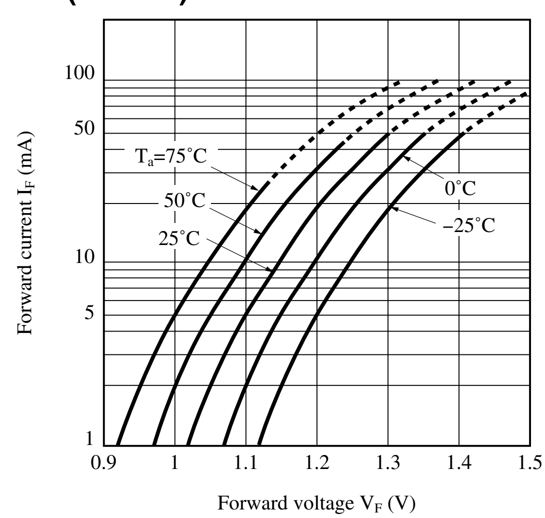


Fig.4 Minimum Trigger Current vs. Ambient Temperature

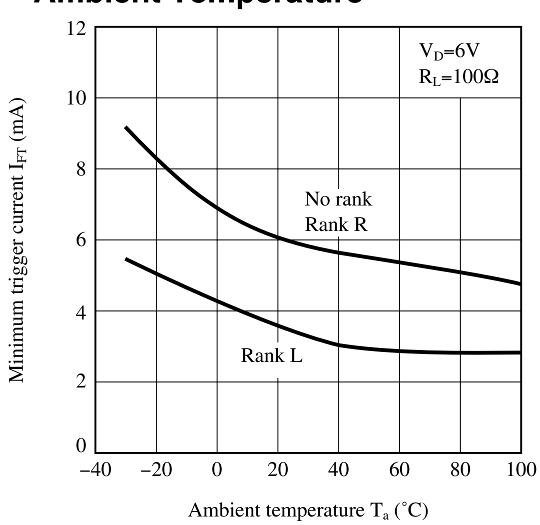


Fig.5 Relative Repetitive Peak OFF-state Voltage vs. Ambient Temperature

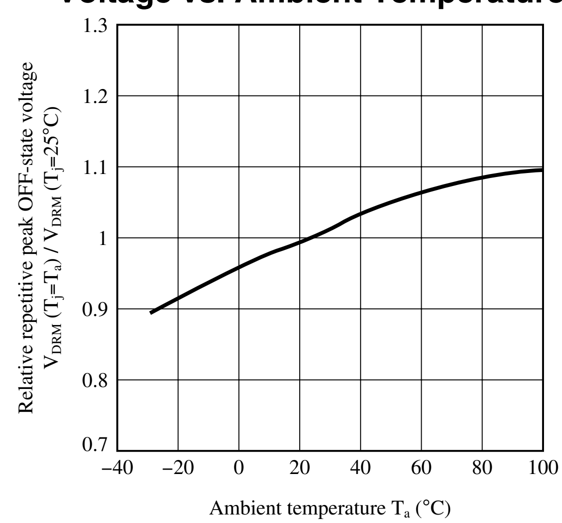


Fig.6 ON-state Voltage vs. Ambient Temperature

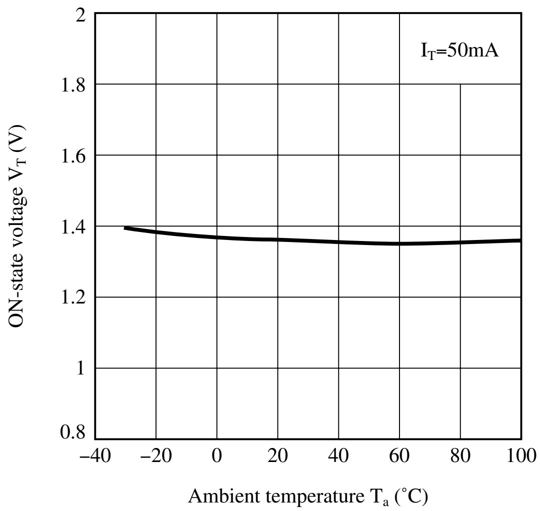


Fig.7 Holding Current vs. Ambient Temperature

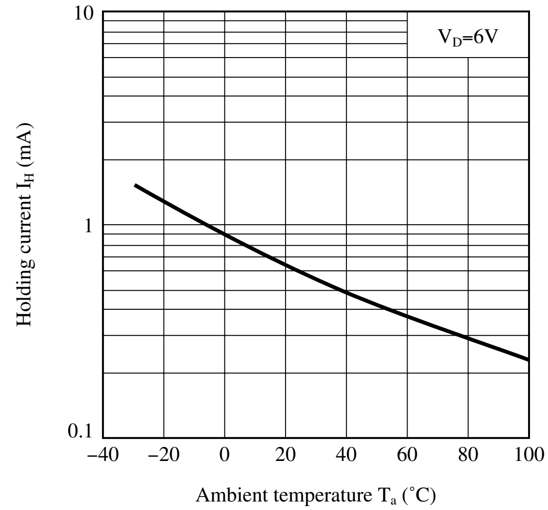


Fig.8 Repetitive Peak OFF-state Current vs. OFF-state Voltage

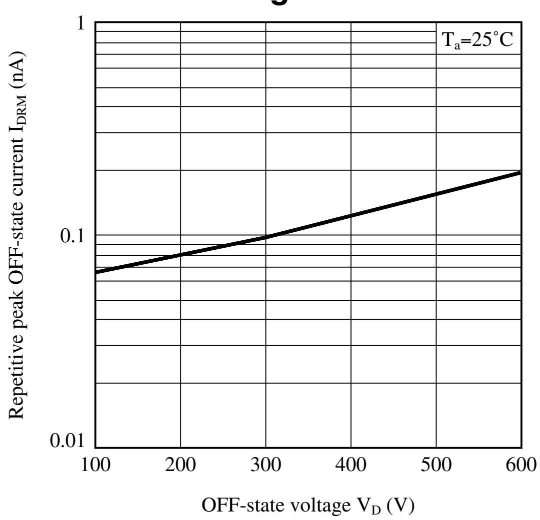


Fig.9 Relative Repetitive Peak OFF-state Current vs. Ambient Temperature

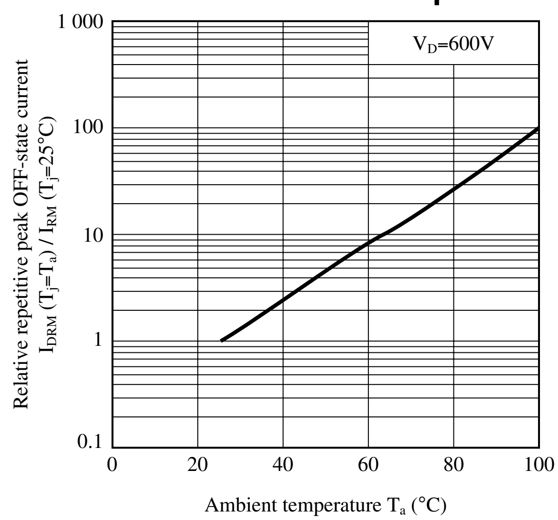


Fig.10-a Turn-on Time vs. Forward Current (No Rank, Rank R)

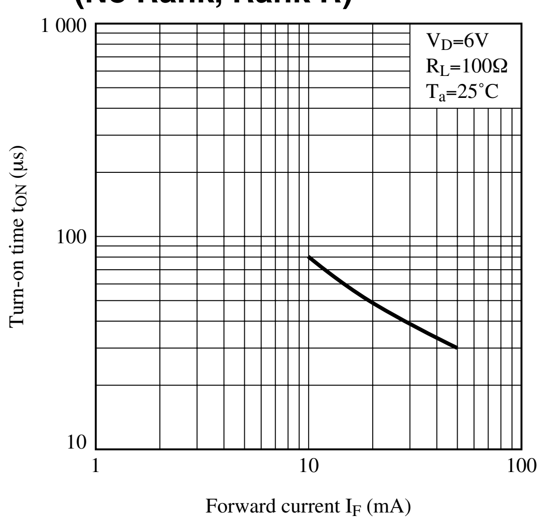


Fig.10-b Turn-on Time vs. Forward Current (Rank L)

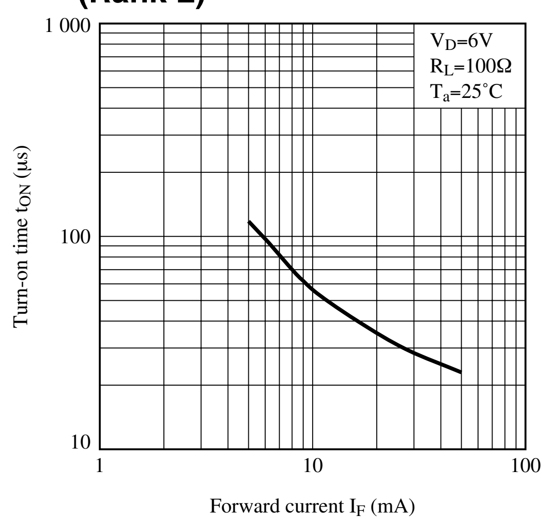
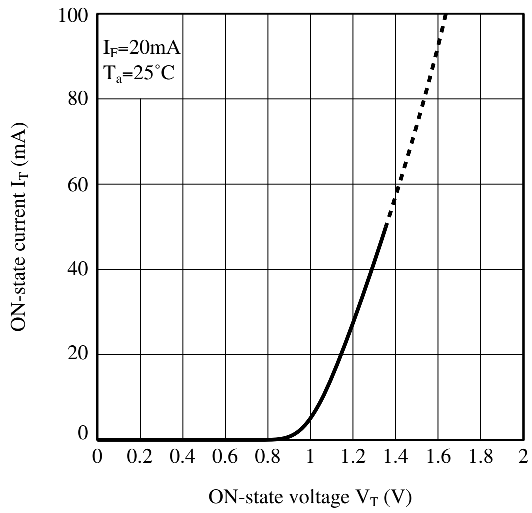


Fig.11 ON-state Current vs. ON-state Voltage



Remarks : Please be aware that all data in the graph are just for reference.

■ Design Considerations

● Design guide

In order for the Phototriac to turn off, the triggering current (I_F), must be 0.1mA or less.

Please refrain from using these devices in a direct drive configuration.
These Phototriac Coupler are intended to be used as triggering device for main Triacs.
Please ensure that the output rating of these devices will be sufficient for triggering the main output Triac of your choice. Failure to do may result in malfunctions.

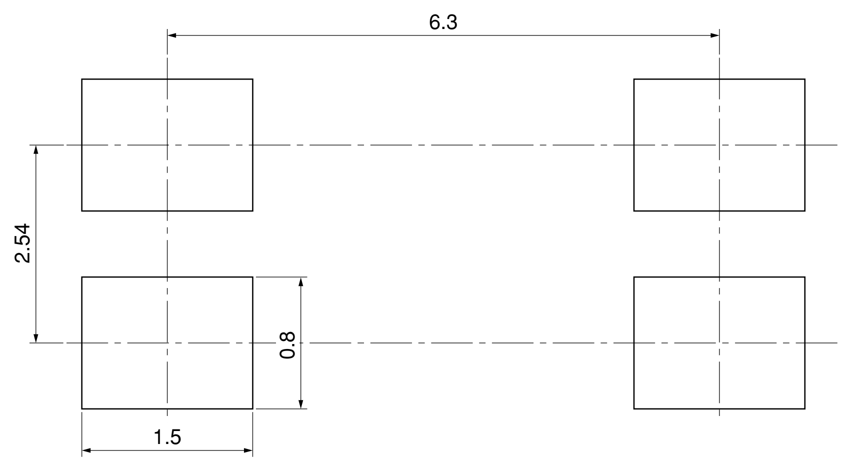
In phase control applications or where the Phototriac Coupler is being by a pulse signal, please ensure that the pulse width is a minimum of 1ms.

For designs that will experience excessive noise or sudden changes in load voltage, please include an appropriate snubber circuit as shown in the below circuit.
Please keep in mind that Sharp Phototriac Couplers incorporate superor dV/dt ratings which can often eliminate the need for a snubber circuit.

● Degradation

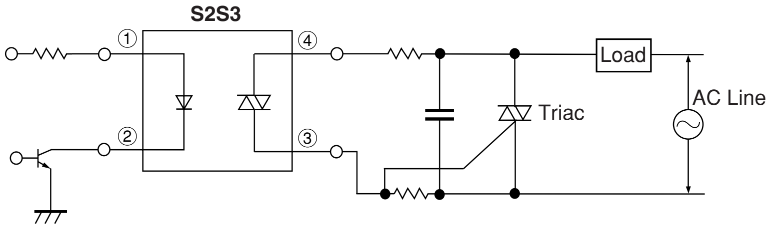
In general, the emission of the IRED used in Phototriac Couplers will degrade over time.
In the case where long term operation and / or constant extreme temperature fluctuations will be applied to the devices, please allow for a worst case scenario of 50% degradation over 5years.
Therefore in order to maintain proper operation, a design implementing these Phototriac Couplers should provide at least twice the minimum required triggering current from initial operation.

● Recommended Foot Print (reference)



(Unit : mm)

● Standard Circuit (Medium/High Power Triac Drive Circuit)



Note) Please add the snubber circuit according to a condition.
Any snubber or varistor used for the above mentioned scenarios should be located as close to the main output triac as possible.

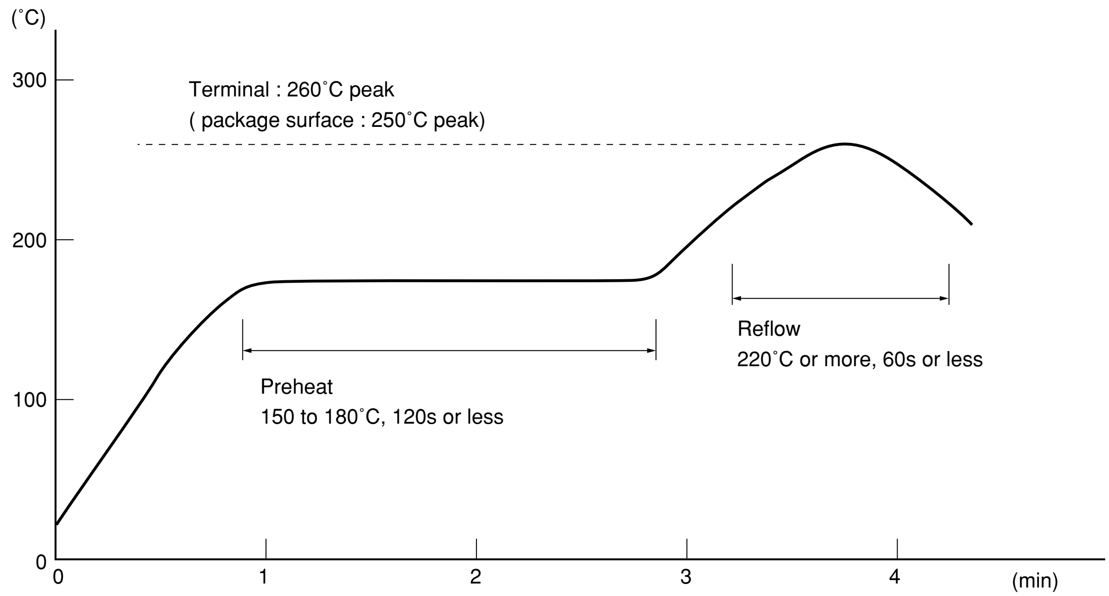
☆ For additional design assistance, please review our corresponding Optoelectronic Application Notes.

■ 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 260˚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

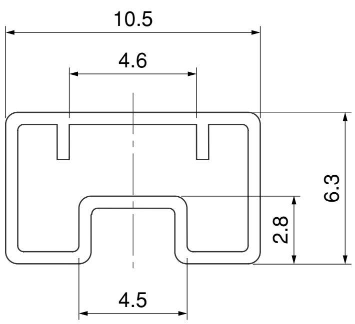
MAX. 100pcs of products shall be packaged in a sleeve.

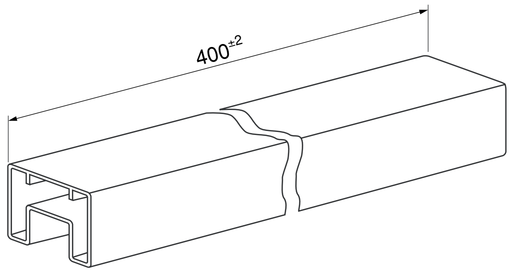
Both ends shall be closed by tabbed and tabless stoppers.

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

MAX. 50 sleeves in one case.

Sleeve outline dimensions





(Unit : mm)

● Tape and Reel package

1. 3 000pcs/reel

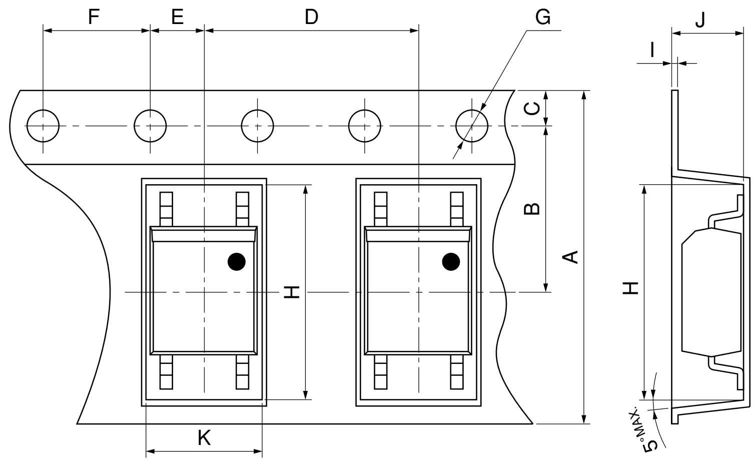
Package materials

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

Cover tape : PET (three layer system)

Reel : PS

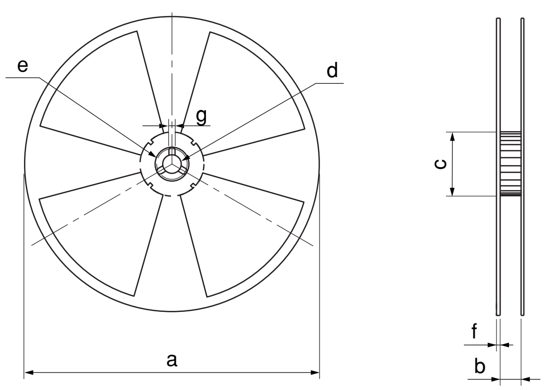
Carrier tape structure and Dimensions



Dimensions List (Unit : mm)

A	B	C	D	E	F	G
$12.0^{\pm0.3}$	$5.5^{\pm0.1}$	$1.75^{\pm0.1}$	$8.0^{\pm0.1}$	$2.0^{\pm0.1}$	$4.0^{\pm0.1}$	$\phi1.5^{+0.1}_{-0}$
H	I	J	K			
$7.4^{\pm0.1}$	$0.3^{\pm0.05}$	$3.1^{\pm0.1}$	$4.0^{\pm0.1}$			

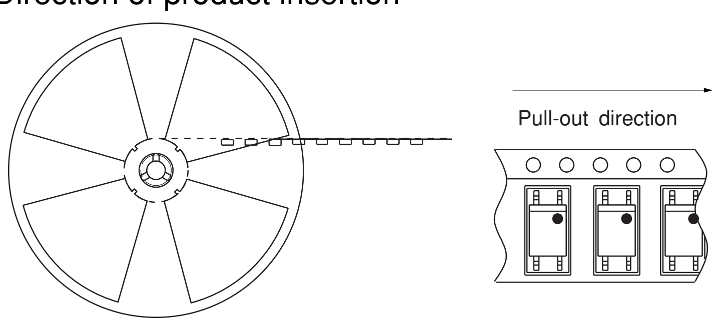
Reel structure and Dimensions



Dimensions List (Unit : mm)

a	b	c	d
370	$13.5^{\pm1.5}$	$80^{\pm1.0}$	$13^{\pm0.5}$
e	f	g	
$21^{\pm1.0}$	$2.0^{\pm0.5}$	$2.0^{\pm0.5}$	

Direction of product insertion



[Packing : 3 000pcs/reel]

2. 750pcs/reel

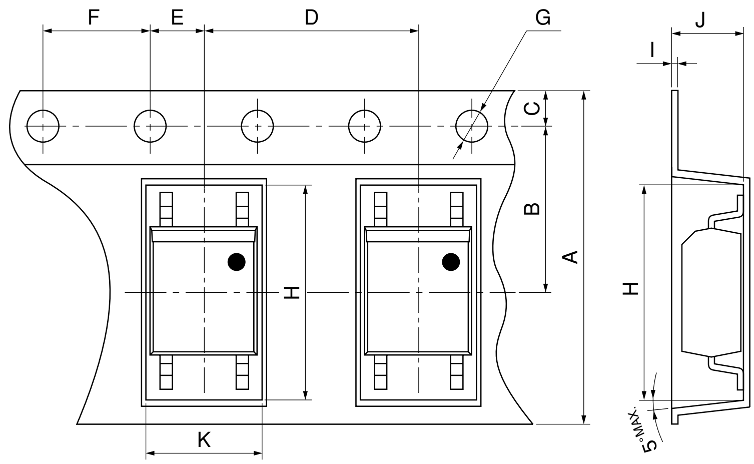
Package materials

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

Cover tape : PET (three layer system)

Reel : PS

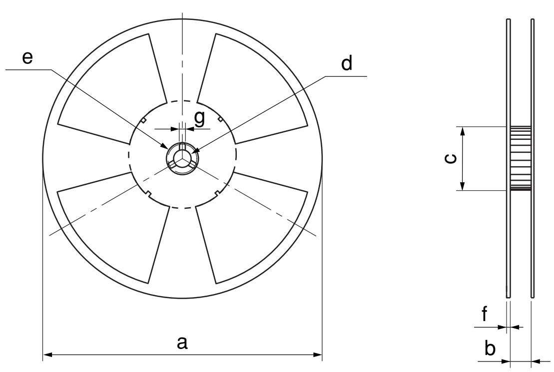
Carrier tape structure and Dimensions



Dimensions List (Unit : mm)

A	B	C	D	E	F	G
$12.0^{\pm0.3}$	$5.5^{\pm0.1}$	$1.75^{\pm0.1}$	$8.0^{\pm0.1}$	$2.0^{\pm0.1}$	$4.0^{\pm0.1}$	$\phi1.5^{+0.1}_{-0}$
H	I	J	K			
$7.4^{\pm0.1}$	$0.3^{\pm0.05}$	$3.1^{\pm0.1}$	$4.0^{\pm0.1}$			

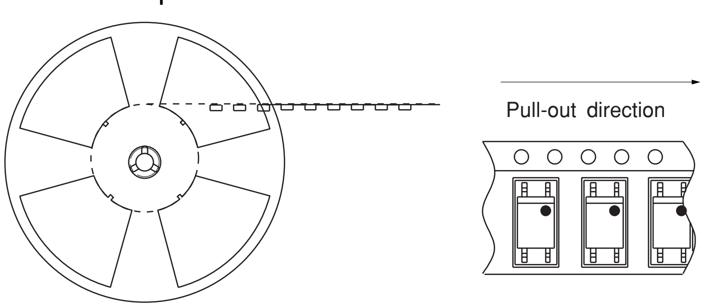
Reel structure and Dimensions



Dimensions List (Unit : mm)

a	b	c	d
180	$13.5^{\pm1.5}$	$80^{\pm1.0}$	$13^{\pm0.5}$
e	f	g	
$21^{\pm1.0}$	$2.0^{\pm0.5}$	$2.0^{\pm0.5}$	

Direction of product insertion



[Packing : 750pcs/reel]

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· 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.

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· 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).

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