

# HFD39

# SUBMINITURE HIGH INSULATION SIGNAL RELAY



File No.: E133481



File No.: R 50588457



## Features

- Dielectric strength:  
≥3000VAC/4300VDC 1min(between open contacts)  
≥4500VAC/7000VDC 1min(between coil & contacts)
- Bifurcated contacts
- High contact switching capability:  
30mA 1000VDC/10mA 1500VDC
- DIP & SMT types available
- Contact gap ≥ 1.5 mm, Meets IEC 62776-1 requirement
- High insulation,  
Meets the requirements of 600V reinforced insulation

RoHS compliant

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	150mΩ max.(at 10mA 30mVDC)
Contact material	Ag Alloy+Au plated
Contact rating (Res. load)	1A 277VAC 1A 110VDC 5mA 2000VDC 10mA 1500VDC 30mA 1000VDC 10mA 1000VDC
Max.switching current	4A
Max.switching voltage	1400VAC/2000VDC
Max.switching power	277VA/110W
Min. applicable load <sup>2)</sup>	10mV 10μA
Mechanical endurance	1×10 <sup>7</sup> OPS
Electrical endurance	1×10 <sup>5</sup> OPS(Ag+Au plated,5mA 2000VDC, Resistive load,105°C,1s on 9s off) 1×10 <sup>5</sup> OPS(Ag+Au plated,30mA 1000VDC, Resistive load,105°C,1s on 9s off) 5×10 <sup>4</sup> OPS(Ag+Au plated,10mA 1500VDC, Resistive load,105°C,1s on 9s off)

Notes: 1) The data shown above are initial values.

2) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.

## CHARACTERISTICS

Insulation resistance	1000MΩ(500VDC)
Dielectric strength	Between open contacts 3000VAC/4300VDC 1min Between coil & contacts 4500VAC/7000VDC 1min
Surge Voltage	Between open contacts 4kV(1.2/50μs) Between coil & contacts 6kV(1.2/50μs)
Operate time(at rated voltage)	6ms max.
Release time(at rated voltage)	6ms max.
Ambient temperature	-40°C to 85°C -40°C to 105°C <sup>2)</sup>
Humidity	5% to 85% RH
Shock resistance	Destructive 735m/s <sup>2</sup> Functional 980m/s <sup>2</sup>
Vibration resistance	Destructive 10Hz to 55Hz 3.3mm DA Functional 10Hz to 55Hz 5.0mm DA
Termination	DIP,SMT
Unit weight	2.5g max
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)	MSL-3
Construction	Plastic sealed

Notes: 1) The data shown above are initial values.

2) For instance: Product with 888 suffix is for application at 105°C.

## COIL

Coil power	Single side stable	See "COIL DATA"
Temperature rise	70K max.(at 1A load)	

## SAFETY APPROVAL RATINGS

UL/CUL	Ag Alloy + Au	30mA 1000VDC 105°C
TUV		1A 277VAC 85°C 1A 110VDC 85°C

Notes: Only some typical rating are listed above.If more details are required,please contact us.



HONGFA RELAY

ISO9001,IATF 16949,ISO14001,ISO45001,IECQ QC 080000,ISO/EC 27001 CERTIFIED

2024 Rev. 2.00

## COIL DATA

23°C

Coil Code	Coil voltage VDC	Pick-up Voltage <sup>1)</sup> VDC max.	Drop-out Voltage <sup>1)</sup> VDC min.	Coil Resistance $\Omega$	Nominal Power mW approx	Max. Voltage VDC <sup>4)</sup>
HFD39/1.5	1.5	1.13	0.15	11.2×(1±10%)	200	2.2
HFD39/2.4	2.4	1.8	0.24	28.8×(1±10%)	200	3.6
HFD39/3	3	2.25	0.3	45×(1±10%)	200	4.5
HFD39/4.5	4.5	3.38	0.45	101×(1±10%)	200	6.7
HFD39/5	5	3.75	0.5	125×(1±10%)	200	7.5
HFD39/6	6	4.5	0.6	180×(1±10%)	200	9
HFD39/9	9	6.75	0.9	405×(1±10%)	200	13.5
HFD39/12	12	9	1.2	720×(1±10%)	200	18
HFD39/24	24	18	2.4	2880×(1±10%)	200	36

Notes: 1) The data shown above are initial values.

2) To supply rated step voltage to coil is the foundation of relay proper operation.

Please make sure the applied voltage to the coil reach at rated values.

Please refer to the typical diagram right for single side stable relay.

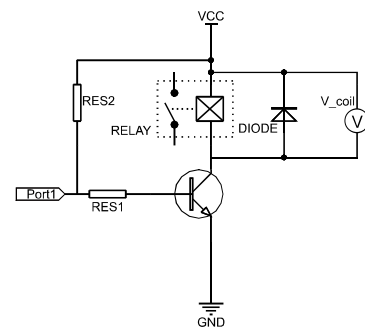
The "V-coil" is the rated voltage;

3) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

4) Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

5) When user's requirements can't be found in the above table, special order allowed.

6) During the relay pick-up or drop-out processes, there are stages of contact pressure change, contact vibration and unstable contact etc. When the voltage applied to coil is gradually changed, it will lengthen the unstable stage and affect relay endurance. To reduce this influence, please apply step voltage (switching circuit) to relay coil.



## ORDERING INFORMATION

Type	HFD39/	12	-S	R	(XXX)
Coil voltage	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC				
Terminal type	S: Standard SMT S1: Short terminal SMT Nil: DIP				
Packing style	R: Tape and reel packing(Only for SMT type) <sup>1)</sup> Nil: Tube packing(Only for DIP type)				
Special code <sup>3)</sup>	XXX: Customer special requirement Nil: Standard type For instance: Product with 888 suffix is for application at 105°C. Product with 921 suffix is for vehicle application.				

Notes: 1) R type (tape and reel) packing is moisture-proof which meets requirement of MSL-3. Please choose R type packing for SMT products.

For R type, the letter "R" will only be printed on packing tag but not on relay cover. Tube packing is normally not available for SMT products unless specially requested by customer. But please note that tube packing is not moisture-proof so please bake the products before use according to description of Notice 9 herewith. In addition, tube packaging will be adopted when the ordering quantity of R type is equal to or less than 100 pieces unless otherwise specified.

2) When coil sort, terminal type or packing style are needed, please add "-" after coil voltage is selected. For instance, HFD39/12-SR.

3) The customer special requirement express as special code after evaluating by Hongfa. Take 888 version as an example, the PN is HFD39/12-SR(888).

4) For products that should meet the explosion-proof requirements of "IEC 60079 series", please note [Ex] after the specification while placing orders. Not all products have explosion-proof certification, so please contact us if necessary, in order to select the suitable products.

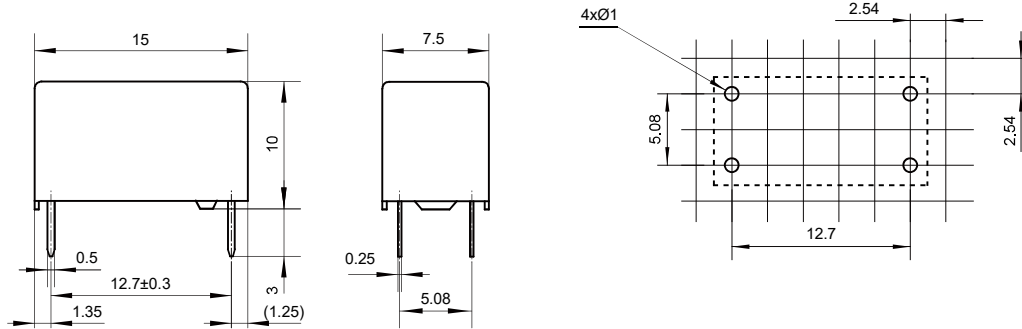
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

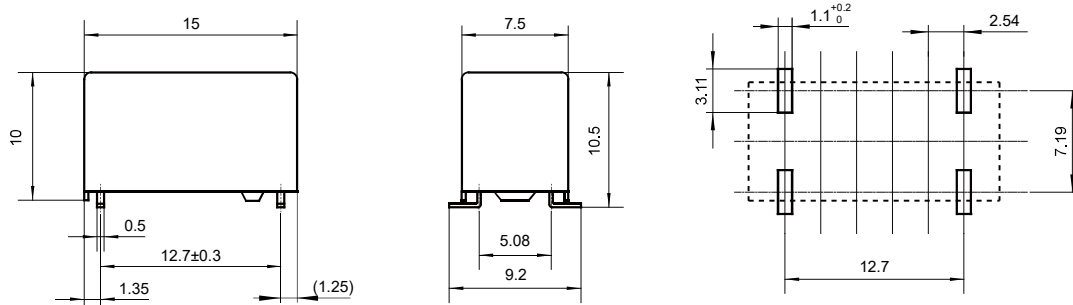
## Outline Dimensions

## PCB Layout (Bottom view)

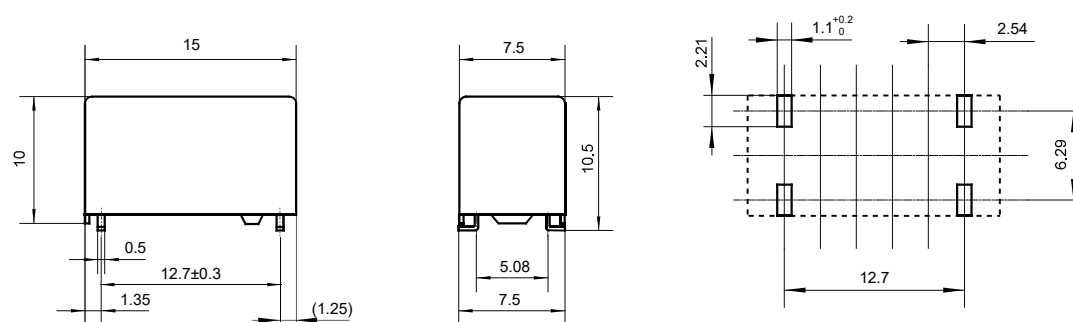
DIP type: Normal pin



Standard(SMT type): Normal pin



Short terminal(SMT type): Normal pin



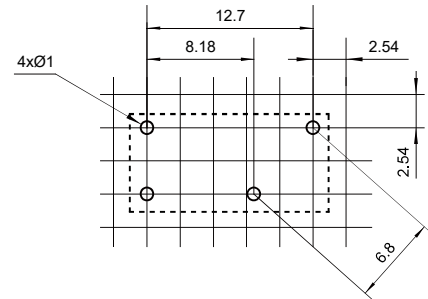
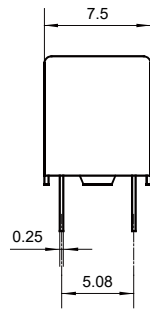
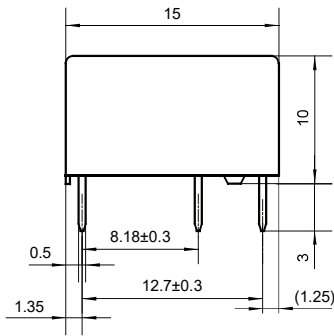
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

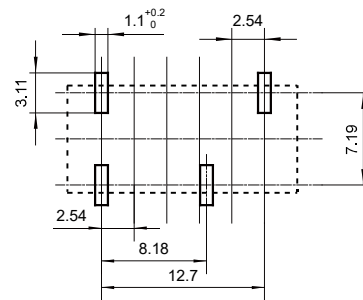
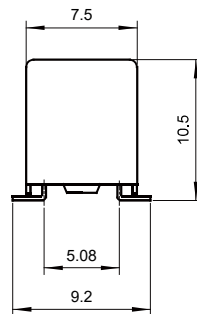
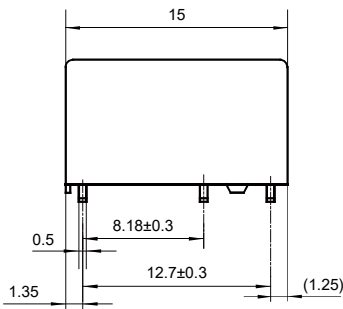
## Outline Dimensions

## PCB Layout (Bottom view)

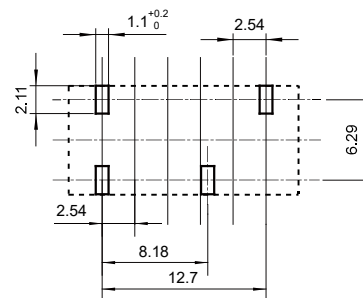
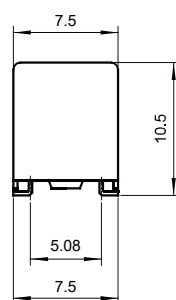
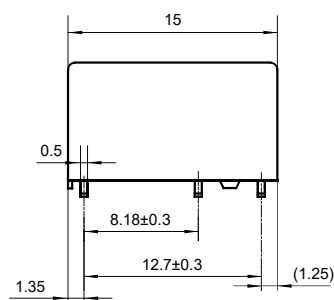
DIP type: (897) pin



Standard(SMT type): (897) pin

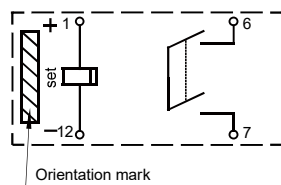


Short terminal(SMT type): (897) pin

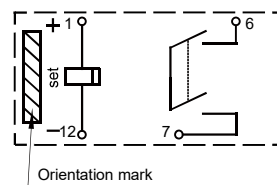


## Wiring Diagram (Bottom view)

Normal pin



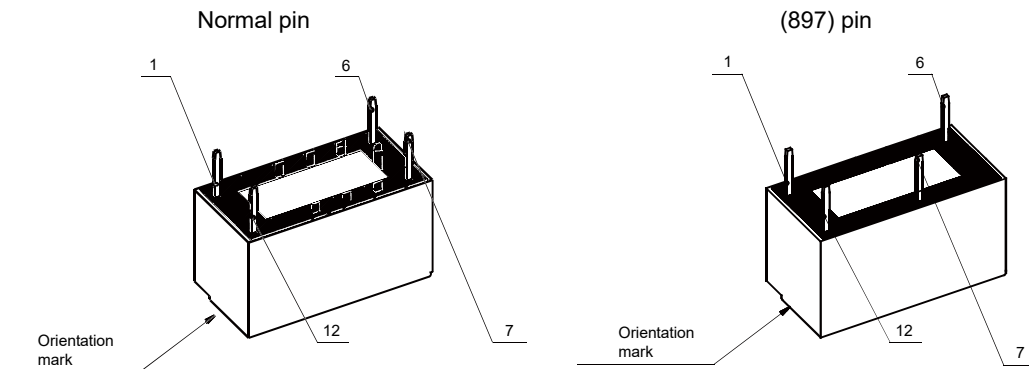
(897) pin



## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Pin Layout

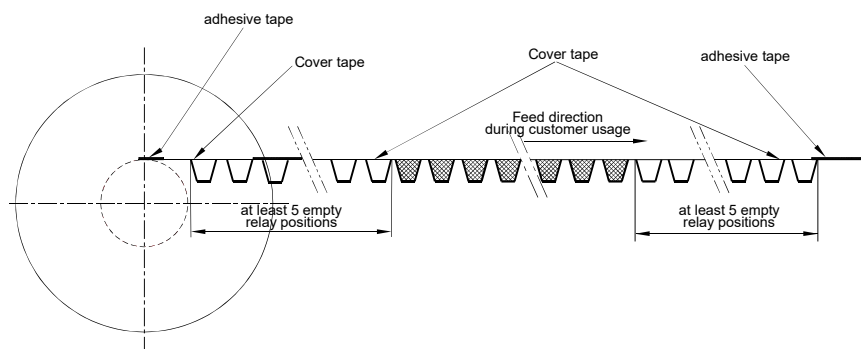
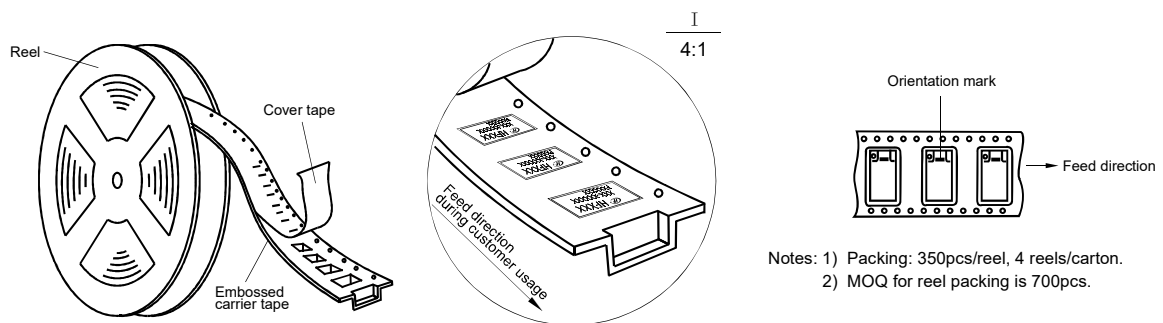


- Notes: 1) The pin dimension of the product outline drawing is the size before tinning (it will become larger after tinning), and the mounting hole size is the recommended design size of the PCB board hole. The specific PCB board hole design size can be mapped and adjusted according to the actual product.
- 2) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $\geq 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .
- 3) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .

## TAPE PACKING

Unit: mm

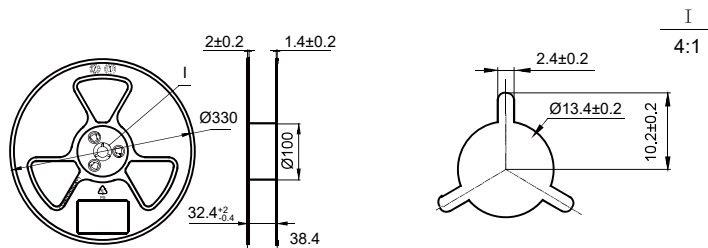
### Direction of Relay Insertion



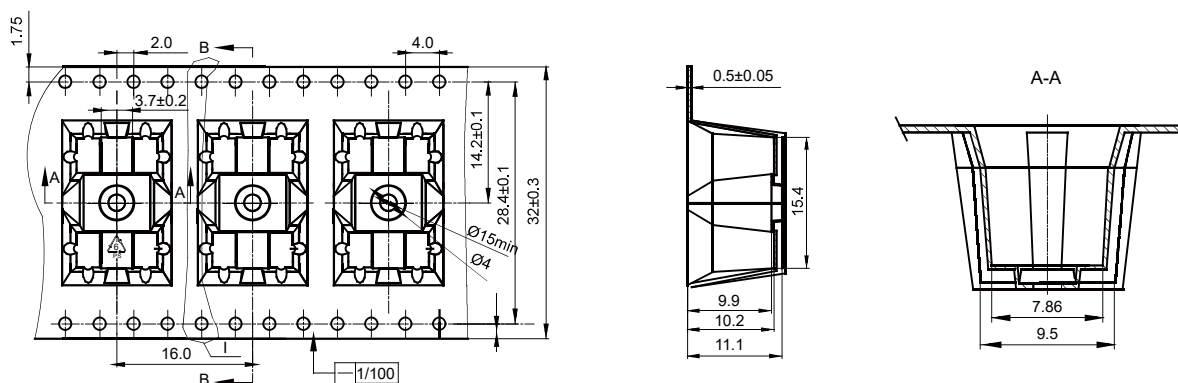
## TAPE PACKING

Unit: mm

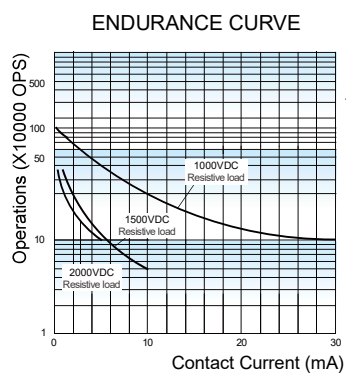
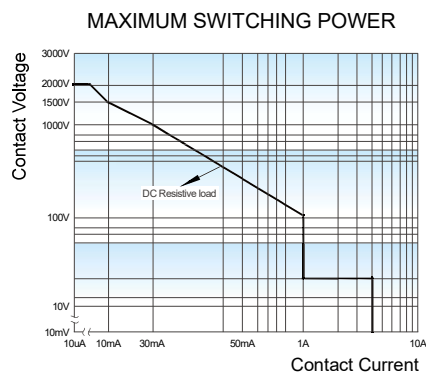
### Reel Dimensions



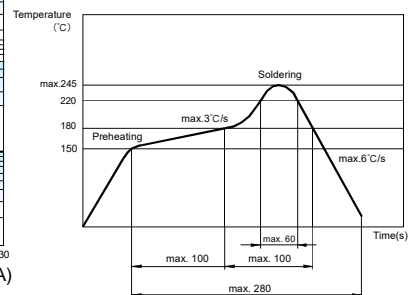
### Tape Dimensions (S type: Standard SMT)



## CHARACTERISTIC CURVES



### REFLOW SOLDERING, TEMPERATURE ON PCB BOARD RECOMMENDED SOLDERING TEMPERATURE



#### Test conditions:

1 Form A Resistive load, at 105°C,  
1s on 9s off.

## CHARACTERISTIC CURVES

### Notice

- 1) This relay is highly sensitive polarized relay, if correct polarity is not applied to the coil terminals, the relay does not operate properly.
- 2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 3) Energizing coil with rated voltage is basic for normal operation of a relay, please make sure the energized voltage to relay coil have reached the rated voltage. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 4) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 5) For SMT products, validation with real application should be done before your series production, if the reflow-soldering temperature curve is out of our recommendation. Generally, two-time reflow-soldering is not recommended for the relay. However, if two-time reflow-soldering is required, a 60-min. interval should be guaranteed and a validation should be done before production.
- 6) Please use wave soldering or manual soldering for straight-in relay. If you need reflow welding, please confirm the feasibility with us.
- 7) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 8) Regarding the plastic sealed relay, we should leave it cooling naturally until below 40°C after welding, then clean it and deal with coating, remarkably the temperature of solvents should also be controlled below 40°C. Please avoid cleaning the relay by ultrasonic, avoid using the solvents like gasoline, Freon, and so on, which would affect the configuration of relay or influence the environment.
- 9) Relays packaged in moisture barrier bags meet MSL-3 requirements. The relays should be stored at ambient conditions of  $\leq 30^{\circ}\text{C}$  and  $\leq 60\%$  RH after they are removed from their packaging, and should be used within 168 hours. If the relays cannot be used within 168 hours, please repack them or store them in a drying oven at  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ,  $\leq 10\%$  RH. Otherwise, relays may be subjected to a soldering test to check their performance, or they may be used after keeping them in an oven for 72 hours at with  $50^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ,  $\leq 30\%$  RH.
- 10) When applied with continuous current, the heat from relay coil will age its isolation. Thus, please do not ground connected the coil to reduce electrical erosion if possible. And please provide protection circuit to avoid broken wire and losses.
- 11) Please make sure that there are no silicon-based substances (such as silicon rubber, silicone oil, silicon-based coating agents, silicon fillers, etc.) around the relay, because it will generate silicon-containing volatile gas, which may cause poor contact in case of silicon-containing volatile gas sticking on contact.
- 12) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay."
- 13) During the relay pick-up or drop-out processes, there are stages of contact pressure change, contact vibration and unstable contact etc. When the voltage applied to coil is gradually changed, it will lengthen the unstable stage and affect relay endurance. To reduce this influence please apply step voltage (switching circuit) to relay coil.

### Disclaimer

The specification is for reference only. See to "Terminology and Guidelines" for more information. Specifications subject to change without notice. We could not evaluate all the performance and all the parameters for every possible application. Thus the user should be in a right position to choose the suitable product for their own application. If there is any query, please contact Hongfa for the technical service. However, it is the user's responsibility to determine which product should be used only.

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