

# HFD3-I

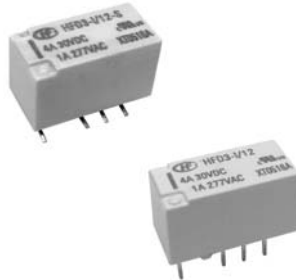
# MINIATURE SIGNAL RELAY



File No.:E133481



File No.:R 50433438



## Features

- Third generation Signal relay
- High contact switching capacity
- Withstand inrush current at 7.5A(Effective value)
- SMT and DIP types available
- Single side stable and latching type available

RoHS compliant

## CONTACT DATA

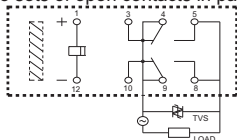
Contact arrangement	2C
Contact resistance <sup>1)</sup>	≤100mΩ (10mA 30mVDC)
Contact material	Ag Alloy + Au plated
Contact rating (Res. load)	4A 30VDC 2A 30VDC 1A 277VAC
Max. switching voltage	277VAC / 220VDC
Max. switching current	4A (Single contact) 7.5A(Two sets of open contacts in parallel,Valid value)
Max. switching power	277VA / 120W
Min. applicable load <sup>2)</sup>	5V 1mA
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance <sup>3)</sup>	1 x 10 <sup>5</sup> OPS (Resistive load,40°C 4A 30VDC) 1 x 10 <sup>5</sup> OPS (Resistive load,85°C 2A 30VDC) 1 x 10 <sup>5</sup> OPS(Resistive load,85°C 1A 277VAC) 2 x 10 <sup>5</sup> OPS (Inductive load,Room temp. 250ms Inrush current 7.5A(effective value)/ Stable current 1.5A(effective value) 30VAC(COSØ=0.4)(ON:OFF=1s:9s), TVS protection for contacts (two sets of open contacts in parallel)

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.

3) The electrical endurance of resistive load is from the tests of one set of open contacts or one sets of close contacts.The electrical endurance of inductive load is from the test with two sets of open contacts in parallel.

Two sets of open contacts in parallel:



It is in released status are in the diagram(single side stable type)

## COIL

Coil power	Single side stable	Approx. 140mW
	1 coil latching	Approx. 100mW
	2 coils latching	Approx. 200mW
Temperature rise	60K max(2A Resistive load 85°C environment)	

## CHARACTERISTICS

Insulation resistance	1000MΩ (500VDC)	
Dielectric strength	Between open contacts	1000VAC 1min
	Between contact sets	1500VAC 1min
	Between coil&contact	2000VAC 1min
Surge withstand voltage	1500VAC (FCC part 68)	
Between open contacts (10/160μs)	2500VAC (Telecordia)	
Between coil & contacts (2/10μs)		
Operate time (Set time)	≤ 4ms	
Release time (Reset time)	≤ 4ms	
Ambient temperature	-40°C to 85°C	
Humidity	5% to 85% RH	
Shock resistance	Functional	735m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	Functional	10Hz to 55Hz 3.3mm DA
	Destructive	10Hz to 55Hz 5.0mm DA
Termination	DIP、SMT	
Unit weight	Approx.2g	
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)	MSL-3	
Construction	Plastic	

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

## SAFETY APPROVAL RATINGS

UL/CUL	Ag Alloy + Au plated	4A 30VDC, 40°C
TUV		2A 30VDC, 85°C
		1A 277VAC, 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



ISO9001、ISO/TS16949、ISO14001、OHSAS18001、IECQ QC 080000 CERTIFIED

2020 Rev. 1.01

## COIL DATA

### Single side stable

Coil Code	Nominal Voltage VDC <sup>(1)</sup>	Set Voltage VDC <sup>(1)</sup> max.	Reset Voltage VDC max.	Coil Resistance Ω	Nominal Power mW approx.	Max. Voltage VDC <sup>(4)</sup>
HFD3-I/1.5	1.5	1.13	0.15	16 x (1±10%)	140	3.0
HFD3-I/2.4	2.4	1.8	0.24	41 x (1±10%)	140	4.8
HFD3-I/3	3	2.25	0.3	64.3 x (1±10%)	140	6.0
HFD3-I/4.5	4.5	3.38	0.45	145 x (1±10%)	140	9.0
HFD3-I/5	5	3.75	0.5	178 x (1±10%)	140	10
HFD3-I/6	6	4.5	0.6	257 x (1±10%)	140	12
HFD3-I/9	9	6.75	0.9	579 x (1±10%)	140	18
HFD3-I/12	12	9	1.2	1028 x (1±10%)	140	24
HFD3-I/24	24	18	2.4	4114 x (1±10%)	140	48

### 1 coil latching

Coil Code	Nominal Voltage VDC <sup>(1)</sup>	Set Voltage VDC <sup>(1)</sup> max.	Reset Voltage VDC <sup>(1)</sup> max.	Coil Resistance Ω	Coil Resistance Ω	Max. Voltage VDC <sup>(4)</sup>
HFD3-I/1.5-L1	1.5	1.13	1.13	22.5 x (1±10%)	100	3.0
HFD3-I/2.4-L1	2.4	1.8	1.8	58 x (1±10%)	100	4.8
HFD3-I/3-L1	3	2.25	2.25	90 x (1±10%)	100	6.0
HFD3-I/4.5-L1	4.5	3.38	3.38	203 x (1±10%)	100	9.0
HFD3-I/5-L1	5	3.75	3.75	250 x (1±10%)	100	10
HFD3-I/6-L1	6	4.5	4.5	360 x (1±10%)	100	12
HFD3-I/9-L1	9	6.75	6.75	810 x (1±10%)	100	18
HFD3-I/12-L1	12	9	9	1440 x (1±10%)	100	24
HFD3-I/24-L1	24	18	18	5760 x (1±10%)	100	48

### 2 coils latching

Coil Code	Nominal Voltage VDC <sup>(1)</sup>	Set Voltage VDC <sup>(1)</sup> max.	Reset Voltage VDC <sup>(1)</sup> max.	Coil Resistance Ω	Coil Resistance Ω	Max. Voltage VDC <sup>(4)</sup>
HFD3-I/1.5-L2	1.5	1.13	1.13	11.2 x (1±10%)	200	3.0
HFD3-I/2.4-L2	2.4	1.8	1.8	29 x (1±10%)	200	4.8
HFD3-I/3-L2	3	2.25	2.25	45 x (1±10%)	200	6.0
HFD3-I/4.5-L2	4.5	3.38	3.38	101 x (1±10%)	200	9.0
HFD3-I/5-L2	5	3.75	3.75	125 x (1±10%)	200	10
HFD3-I/6-L2	6	4.5	4.5	180 x (1±10%)	200	12
HFD3-I/9-L2	9	6.75	6.75	405 x (1±10%)	200	18
HFD3-I/12-L2	12	9	9	720 x (1±10%)	200	24
HFD3-I/24-L2	24	18	18	2880 x (1±10%)	200	48

**Notes:** (1) 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.

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

(3) For monostable relays, if you need to drop down voltage and hold mode after reliably operating, make sure that the effective value of holding voltage is not less than 60% of the rated voltage.

(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.

## ORDERING INFORMATION

Type	HFD3-I / 24 -L1 S R (XXX)
Coil voltage	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC
Sort	L1: 1 coil latching Nil: Single side stable L2: 2 coils latching
Terminal type	S: Standard SMT S1: Short terminal SMT Nil: DIP
Packing style	R: Tape and reel packing (Only for SMT type) 1) Nil: Tube packing(Only for DIP type)
Special code <sup>3)</sup>	XXX: Customer special requirement Nil: Standard

**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 11 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.

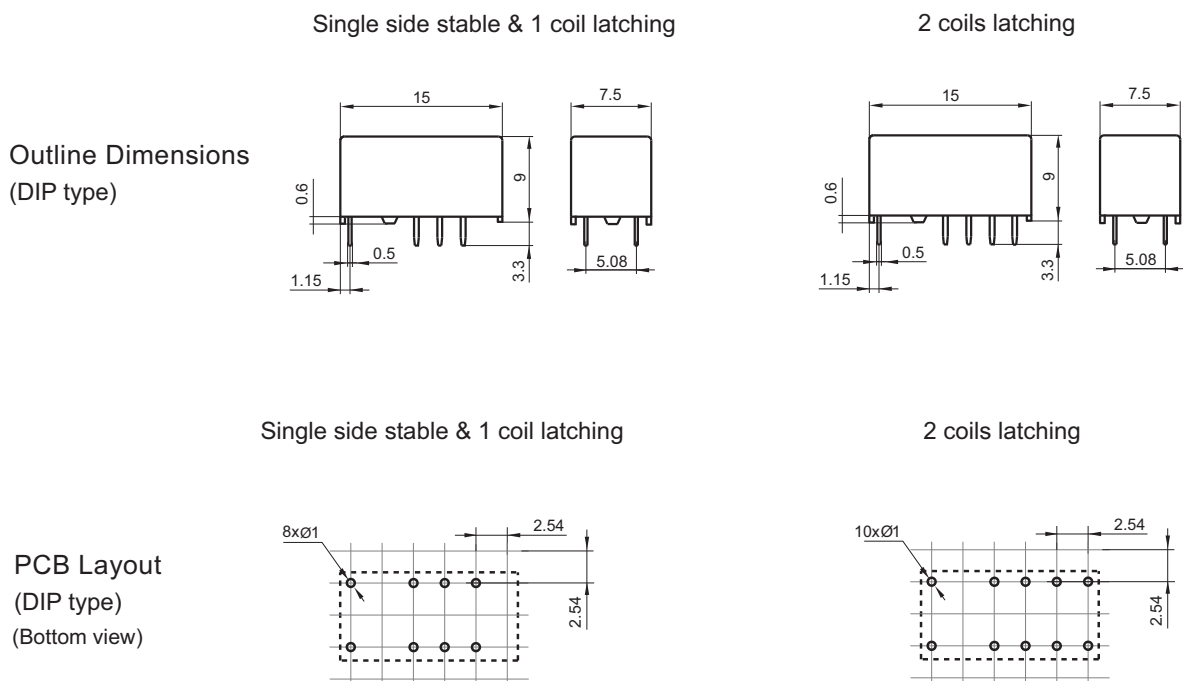
2) When coil sort,contact material,terminal type or packing style are needed,please add "-" after coil voltage is selected.For instance, HFD3-I/12-SR.

3) The customer special requirement express as special code after evaluating by Hongfa.

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

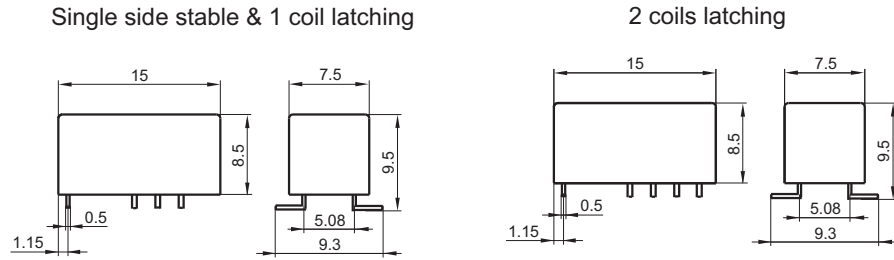
Unit: mm



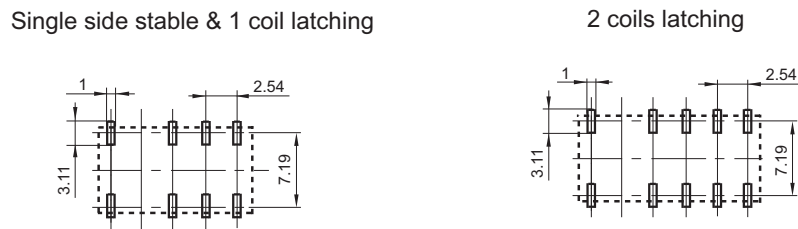
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

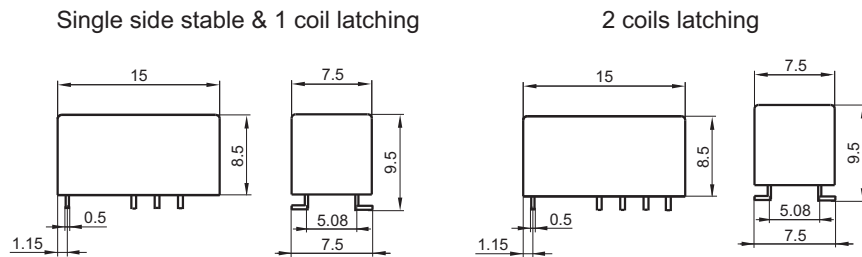
Outline Dimensions  
(S type: Standard SMT)



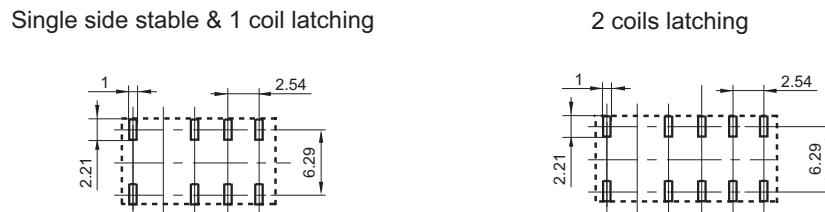
PCB Layout  
(S type: Standard SMT)  
(Bottom view)



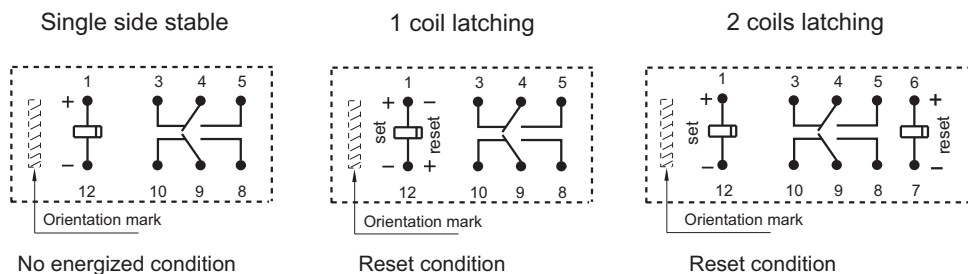
Outline Dimensions  
(S1 type: Standard SMT)



PCB Layout  
(S1 type: Standard SMT)  
(Bottom view)

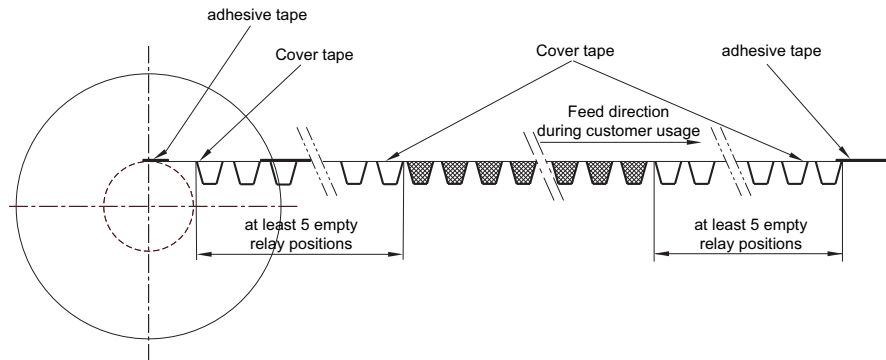
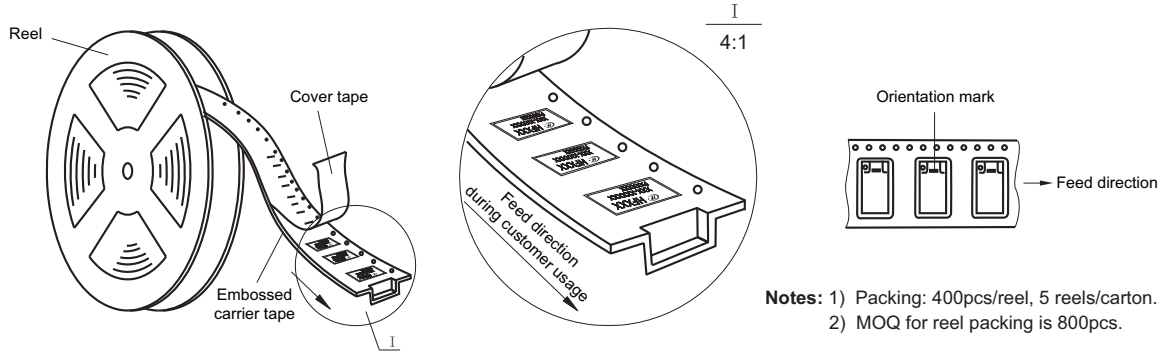


Wiring Diagram  
(Bottom view)

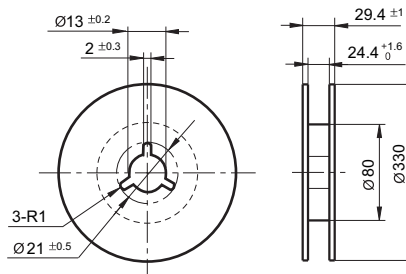


- Remark: 1) The pin dimensions are before tin dipping(it will be larger after tin dipping).The mount hole dimensions are recommended for PCB hole design. The final PCB hole dimensions can be adjusted according to the actual measured values of products.
- 2) In case of no tolerance shown in outline dimension: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .
- 3) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .

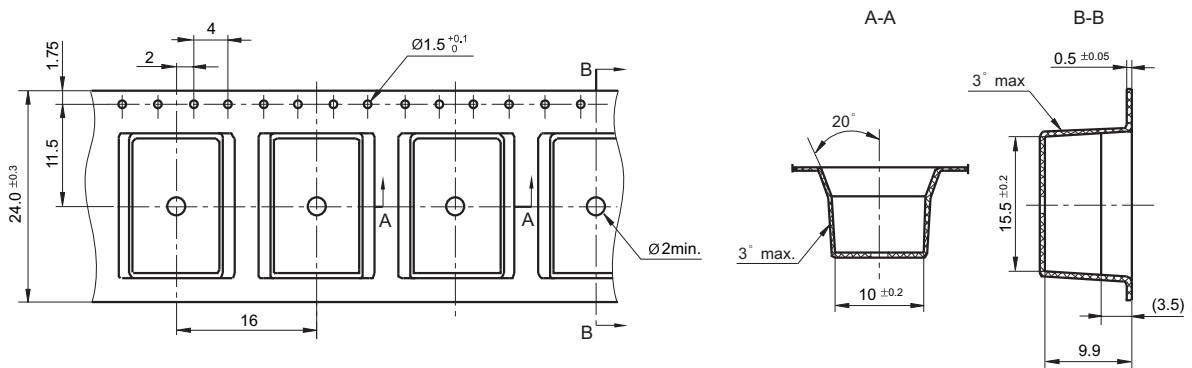
Direction of Relay Insertion



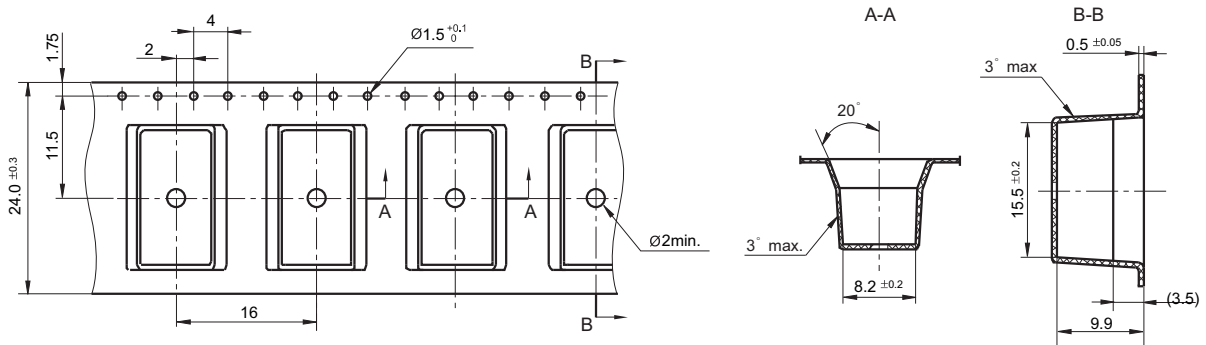
Reel Dimensions



Tape Dimensions (S type: Standard SMT)

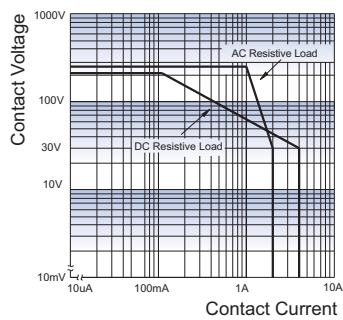


Tape Dimensions (S1 type: Short terminal SMT)

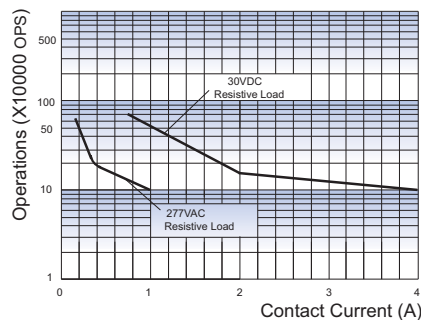


CHARACTERISTIC CURVES

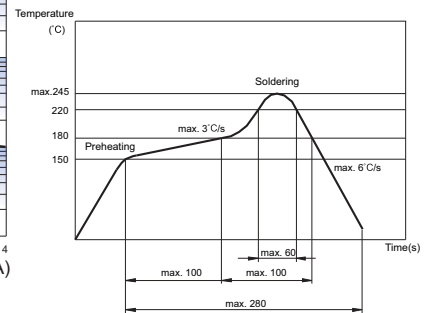
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



REFLOW WELDING, TEMPERATURE ON PCB BOARD  
RECOMMENDED WELDING TEMPERATURE



Test conditions:  
1 Form A, 1 Form B  
Resistive load, at 40°C, 1s on 9s off.

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) Relay is on the "reset" status when being released from stock, with the consideration of shock risen from transit and relay mounting, it should be changed to the "set" status when application(connecting to the power supply). Please reset the relay to "set" or "reset" status on request.
- 4) 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.
- 5) For a monosteady state relay, after the relay is reliably operated, if it needs to be kept under pressure, make sure that the effective value of the voltage is not less than 60 % of the rated voltage;
- 6) For 2 coil latching relay, do not energize voltage to "set" coil and "reset" coil simultaneously.
- 7) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 8) 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.
- 9) Please use wave soldering or manual soldering for straight-in relay. If you need reflow welding, please confirm the feasibility with us.
- 10) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 11) 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.
- 12) Relays packaged in moisture barrier bags meet MSL-3 requirements. The relays should be stored at ambient conditions of ≤30°C and ≤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°C ±5°C, ≤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°C ±5°C, ≤30% RH.
- 13) 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.
- 14) 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
- 15) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay".

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.

© Xiamen Hongfa Electroacoustic Co., Ltd. All rights of Hongfa are reserved.