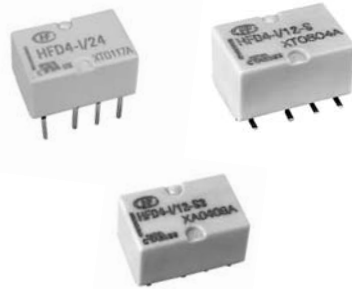# HFD4-I

SUBMINIATURE HIGH LOAD RELAY

c **RU** US

File No.:E133481

File No.:R50333270

Features

● Surge withstand current up to 3.5A(Valid value)
● Available in accordance with IEC 60335-1
● Low power consumption
● Single side stable and latching type available

RoHS compliant

CONTACT DATA

Contact arrangement	2C
Contact resistance	100mΩ max. (10mA 30mVDC)
Contact material	Silver alloy + Au plated
Contact rating (Res. load)	2A 30VDC 3A 30VDC 0.3A 125VAC 1A 125VAC
Max. switching voltage	250VAC / 220VDC
Max. switching current	3.5A(30VAC) (Valid value ,Two sets of normally open contacts in parallel)
Max. switching power	125VA/90W
Min. applicable load	5V 1mA
Mechanical endurance	1×10^7OPS
Electrical endurance	Resistive load	1×10^5ops (85℃，1s on 9s off，2A 30VDC) 5×10^4ops (40℃，1s on 9s off，3A 30VDC) 1×10^5ops (85℃，1s on 9s off，0.3A 125VDC) 5×10^4ops (85℃，1s on 9s off，1A 125VDC) 1×10^5ops (85℃，1s on 9s off，1A 250VDC，Two sets of NO contacts in series connection)
	Inductive load[3]	1×10^5 OPS [Inrush current 3.5A (250ms) / steady state current 1A 30VAC cos Ø=0.4] [Room temperature, 1s: 9s, two sets of normally open contacts in parallel and connected to the load, Contact plus TVS protection]

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) Two sets of normally open contacts in parallel wiring diagram.
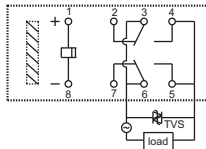
COIL

Coil power	Single side stable	See "COIL DATA"
	1 coil latching	See "COIL DATA"
Temperature rise	70K max.(At 2A load 85℃ environment)	

CHARACTERISTICS

Insulation resistance		1000MΩ (500VDC)
Dielectric strength	Between coil &contacts	1500VAC 1min
	Between open contacts	750VAC 1min
	Between contacts sets	1800VAC 1min
Surge withstand woltage Between open contacts (10/160µs) Between coil &contacts (2/10µs)		1500VAC (FCC part 68) 2500V(Telecordia)
Operate time (set time)		3ms max.
Release time (Reset time)		3ms max.
Ambient temperature		-40℃ to 85℃
Humidity		5% to 85% RH
Shock resistance	Functional	735m/s^2
	Destructive	980m/s^2
Vibration resistance	Functional	10Hz ~ 55Hz 3.3mm DA
	Destructive	10Hz ~ 55Hz 5.0mm DA
Termination		DIP, SMT
Unit weight		Approx. 0.8g
Moisture sensitivity levels(only for SMT type,JEDEC-STD-020)		MSL-3
Construction		Plastic sealed

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

SAFETY APPROVAL RATINGS

UL/CUL	AgNi+ Au plated	2A 30VDC (at 85℃) 3A 30VDC (at 40℃) 1A 125VAC (at 85℃) 1A 250VAC (at 85℃)
	AgSnO2+ Au plated	TV-1 125VAC(at 40℃)
TUV	AgNi+ Au plated	2A 30VDC (at 85℃) 3A 30VDC (at 40℃) 1A 125VAC (at 85℃)
	AgSnO2+ Au plated	1(1)A 125VAC(at 70℃)

Notes:1) Only typical loads are listed above. Other load specifications can be available upon request.And different loads could have different wiring methods.

COIL DATA

Single side stable

Coil Code	Nominal Voltage VDC[1]	Pick-up Voltage VDC[1] max.	Drop-out Voltage VDC min.	Coil Resistance Ω	Nominal Power mW approx.	Max. Voltage VDC[4]
HFD4 -I/1.5	1.5	1.13	0.15	16 x (1±10%)	140	3
HFD4 -I/2.4	2.4	1.8	0.24	41 x (1±10%)	140	4.8
HFD4 -I/3	3	2.25	0.3	64.3 x (1±10%)	140	6
HFD4 -I/4.5	4.5	3.38	0.45	145 x (1±10%)	140	9
HFD4 -I/5	5	3.75	0.5	178 x (1±10%)	140	10
HFD4 -I/6	6	4.5	0.6	257 x (1±10%)	140	12
HFD4 -I/9	9	6.75	0.9	579 x (1±10%)	140	18
HFD4 -I/12	12	9	1.2	1028 x (1±10%)	140	24
HFD4 -I/24	24	18	2.4	2880 x (1±10%)	200	48

1 coil latching

Coil Code	Nominal Voltage VDC[1]	Pick-up Voltage VDC[1] max.	Drop-out Voltage VDC min.[1]	Coil Resistance Ω	Nominal Power mW approx.	Max. Voltage VDC[4]
HFD4 -I/1.5-L	1.5	1.13	1.13	22.5 x (1±10%)	100	3
HFD4 -I/2.4-L	2.4	1.8	1.8	57.6 x (1±10%)	100	4.8
HFD4 -I/3-L	3	2.25	2.25	90 x (1±10%)	100	6
HFD4 -I/4.5-L	4.5	3.38	3.38	202.5 x (1±10%)	100	9
HFD4 -I/5-L	5	3.75	3.75	250 x (1±10%)	100	10
HFD4 -I/6-L	6	4.5	4.5	360 x (1±10%)	100	12
HFD4 -I/9-L	9	6.75	6.75	810 x (1±10%)	100	18
HFD4 -I/12-L	12	9	9	1440 x (1±10%)	100	24
HFD4 -I/24-L	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

HFD4-I/   24   -L   T   S   R   (XXX)

Type	
Coil voltage	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC
Sort	**L:** 1 coil latching **Nil:** Single side stable
Contact material	**T:** AgSnO$_2$ + Au plated **Nil:** AgNi+ Au plated
Terminal type	**S:** Standard SMT **S1:** Short terminal SMT **S3:** J-legs SMT **Nil:** DIP**Nil:** DIP
Packing style	**R:** Tape and reel packing (Only for SMT type) **Nil:** Tube packing(Only for DIP type)
Special code[3]	**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 10 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, pleaes add "-" after coil voltage is selected. For instance, HFD4-I/12-SR.

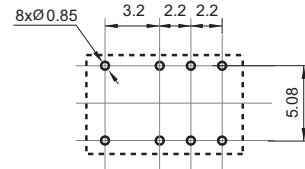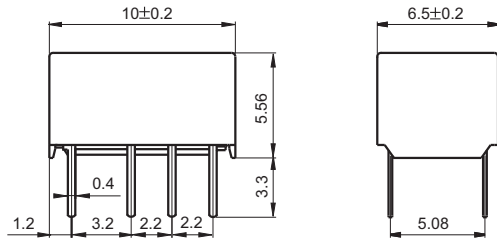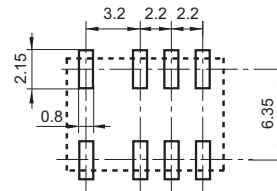 3) The customer special requirement express as special code after evaluating by Hongfa.

Outline Dimensions

PCB Layout
(Bottom view)

DIP type

10±0.2
6.5±0.2
5.56
3.3
0.4
1.2 3.2 2.2 2.2
5.08

8xØ0.85
3.2 2.2 2.2
5.08

Standard SMT type

10±0.2
6.5±0.2
5.56
0.4
1.2 3.2 2.2 2.2
5.08
7.5

3.2 2.2 2.2
2.15
0.8
6.35

Short terminal SMT type

10±0.2
6.5±0.2
5.56
0.4
1.2 3.2 2.2 2.2
5.08
6.6

3.2 2.2 2.2
1.65
0.8
5.85
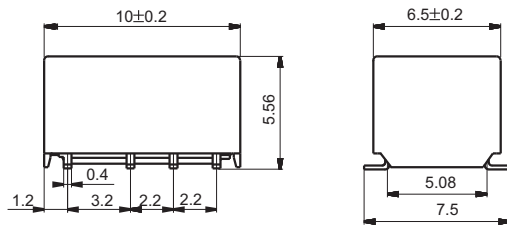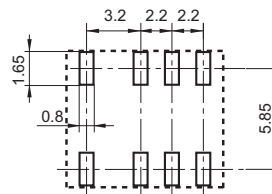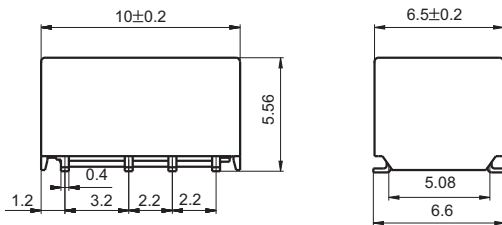
Wiring Diagram
(Bottom view)

Single side stable

1 2 3 4
+
−
8 7 6 5
Orientation mark
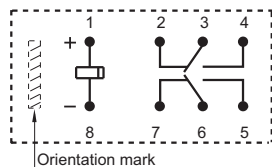
No energized condition

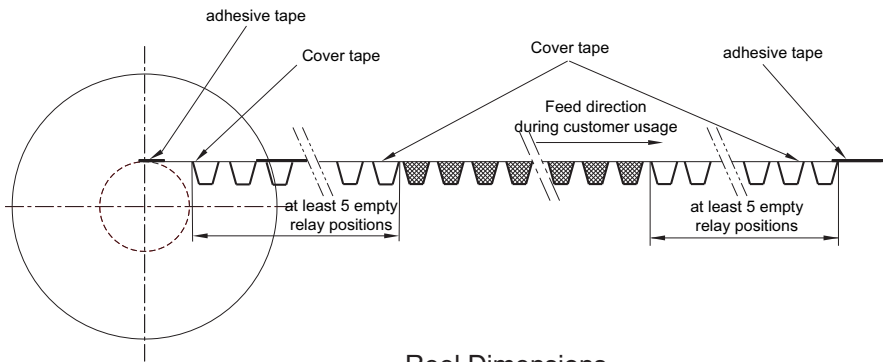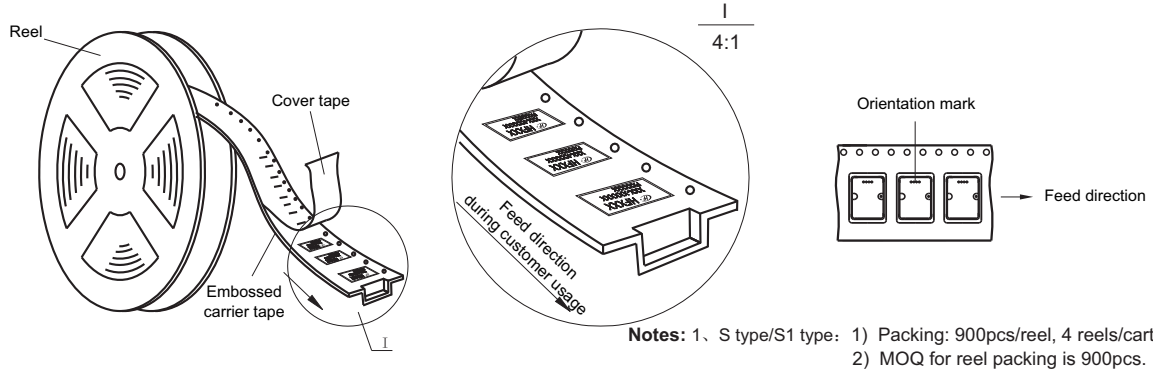**1 coil latching**

set + reset −
1 2 3 4
− +
8 7 6 5
Orientation mark
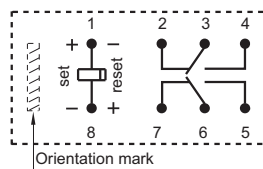
Reset condition
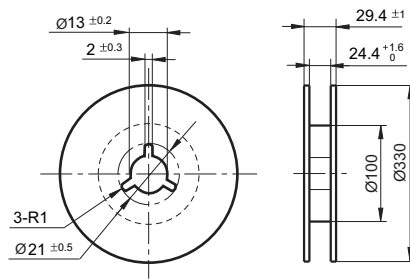
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension>1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.
2) The tolerance without indicating for PCB layout is always ±0.1mm.

Direction of Relay Insertion
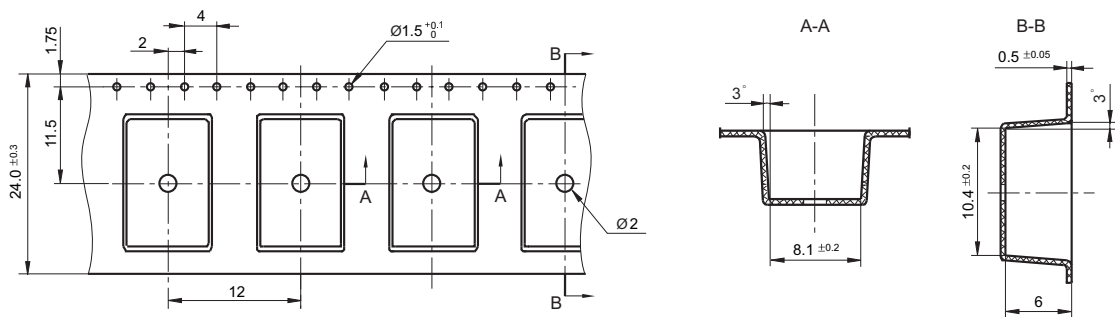
Reel

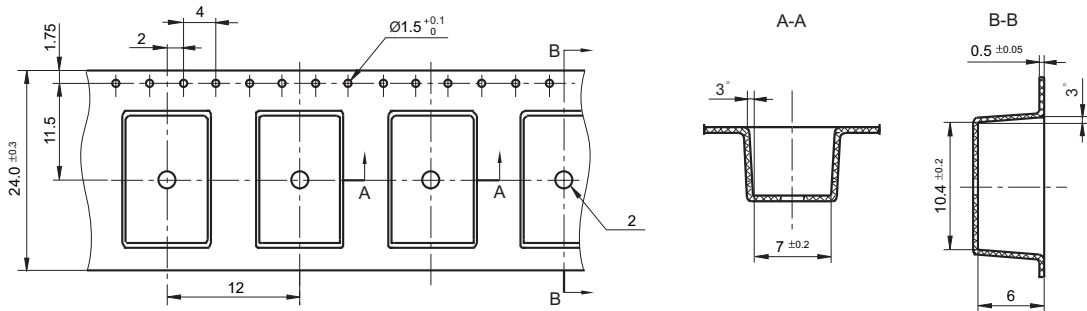Cover tape

$\frac{I}{4:1}$

Embossed
carrier tape

Feed direction
during customer usage

Orientation mark

Feed direction

I

Notes: 1、S type/S1 type：1) Packing: 900pcs/reel, 4 reels/carton.
2) MOQ for reel packing is 900pcs.

adhesive tape

Cover tape

Cover tape

adhesive tape

Feed direction
during customer usage

at least 5 empty
relay positions

at least 5 empty
relay positions

Reel Dimensions

Ø13 ±0.2

2 ±0.3

29.4 ±1

24.4 $^{+1.6}_{0}$

Ø100

Ø330

3-R1

Ø21 ±0.5

Tape Dimensions (S type: Standard SMT)

1.75

4

2

Ø1.5 $^{+0.1}_{0}$

B

11.5

24.0 ±0.3

A

A

Ø2

12

B

A-A

3°

8.1 ±0.2

B-B

0.5 ±0.05

3°

10.4 ±0.2

6

TAPE PACKING

Unit: mm

Tape Dimensions (S1 type: Short terminal SMT)

CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER

Contact Voltage

500V
100V
30V
10V
5V

AC Resistive Load
DC Resistive Load

1mA   0.1A   1A   10A

Contact Current

ENDURANCE CURVE

Operations (X10000 OPS)

500
100
50
10
5

30VDC Resistive Load
125VAC Resistive Load

0   0.5   1   1.5   2   2.5   3

Contact Current (A)

Test conditions:
Energized with rated voltage
Resistive load, 1s on 9s off.
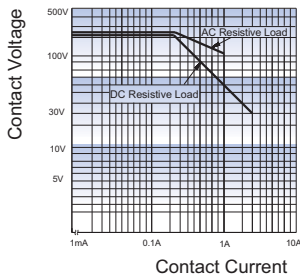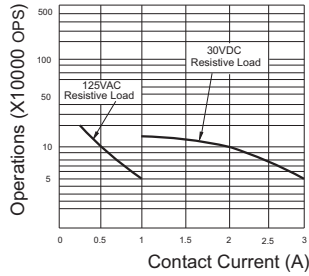
REFLOW WELDING,TEMPERATURE ON PCB BOARD
RECOMMENDED WELDING TEMPERATURE

Temperature (°C)

max.245
220
180
150

Preheating
max. 3°C/s
Soldering
max. 6°C/s

max. 100   max. 60   max. 100
max. 280

Time(s)

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
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) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
7) 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.
8) Please use wave soldering or manual soldering for straight-in relay. If you need reflow welding, please confirm the feasibility with us.
9) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
10) Regarding the plastic sealed relay, we should leave it cooling naturally untill 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.
11) 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.
12) 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 errosion if possible. And please provide protection circuit to avoid broken wire and losses.
13) 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
14) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidetines of relay".

Disclaimer