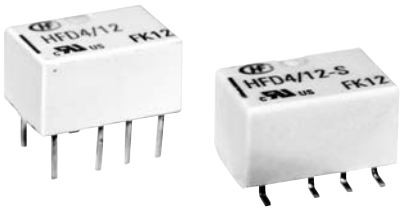
# HFD4 SUBMINIATURE SIGNAL RELAY




c UL us
File No.:E133481

## Features

- Offers excellent board space savings
- Surge withstand voltage up to 2500V, meets FCC Part 68 and Telecordia
- Meets EN60950/EN41003
- SMT and DIP types available
- High contact capacity 2A 30VDC
- Low power consumption
- Single side stable and latching type available
- Environmental friendly product (RoHS compliant)
- Outline Dimensions: (10.0 x 6.5 x 5.4) mm

## CONTACT DATA

| | |
|---|---|
| Contact arrangement | 2C |
| Contact resistance | 100mΩ max. (at 10mA 30mVDC) |
| Contact material | AgNi + Au plated |
| Contact rating (Res. load) | 2A 30VDC<br>0.5A 125VAC |
| Max. switching current | 2A |
| Max. switching voltage | 250VAC / 220VDC |
| Max. switching power | 62.5VA / 60W |
| Min. applicable load 1) | 10mV 10μA |
| Mechanical endurance | 1 x $10^8$OPS |
| Electrical endurance 2) | 1 x $10^5$OPS, 0.5A 125VAC, Resistive load, at 40°C, 1s on 9s off |

**Notes:** 1) 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.
2) Electric endurance data are collected in one pair CO contact test.

## COIL

| | | |
|---|---|---|
| Coil power | Single side stable | See "COIL DATA" |
| | 1 coil latching | See "COIL DATA" |
| Temperature rise | 50K max.(At 1A load, 85°C environment) | |

## CHARACTERISTICS

| | | |
|---|---|---|
| Insulation resistance | | 1000MΩ (at 500VDC) |
| Dielectric strength | Between coil & contacts | 1600VAC 1min |
| | Between open contacts | 1000VAC 1min |
| | Between contact sets | 1800VAC 1min |
| Surge withstand voltage<br>Between open contacts (10/160μs)<br>Between coil & contacts (2/10μs) | | <br>1500VAC (FCC part 68)<br>2500VAC (Telecordia) |
| Operate time (Set time) | | 3ms max. |
| Release time (Reset time) | | 3ms max. |
| Ambient temperature | | -40°C to 85°C |
| Humidity | | 5% to 85% RH |
| Vibration resistance | | 10Hz to 55Hz 3.3mm DA |
| Shock resistance | Functional | 735m/s$^2$ |
| | Destructive | 980m/s$^2$ |
| 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.
2) UL insulation system: Class A

## SAFETY APPROVAL RATINGS

| | |
|---|---|
| **UL/CUL** | 1A 30VDC at 85°C<br>2A 30VDC at 40°C<br>0.5A 125VAC at 40°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.

## COIL DATA

at 23˚C

**Single side stable**

| Coil Code | Nominal Voltage VDC | Pick-up Voltage VDC max. | Drop-out Voltage VDC min. | Coil Resistance Ω | Nominal Power mW approx. | Max. Voltage VDC |
|---|---|---|---|---|---|---|
| HFD4/1.5 | 1.5 | 1.13 | 0.15 | 16 x (1±10%) | 140 | 2.2 |
| HFD4/2.4 | 2.4 | 1.8 | 0.24 | 41 x (1±10%) | 140 | 3.6 |
| HFD4/3 | 3 | 2.25 | 0.3 | 64.3 x (1±10%) | 140 | 4.5 |
| HFD4/4.5 | 4.5 | 3.38 | 0.45 | 145 x (1±10%) | 140 | 6.7 |
| HFD4/5 | 5 | 3.75 | 0.5 | 178 x (1±10%) | 140 | 7.5 |
| HFD4/6 | 6 | 4.5 | 0.6 | 257 x (1±10%) | 140 | 9.0 |
| HFD4/9 | 9 | 6.75 | 0.9 | 579 x (1±10%) | 140 | 13.5 |
| HFD4/12 | 12 | 9 | 1.2 | 1028 x (1±10%) | 140 | 18.0 |
| HFD4/24 | 24 | 18 | 2.4 | 2880 x (1±10%) | 200 | 36.0 |

**1 coil latching**

| Coil Code | Nominal Voltage VDC | Set Voltage VDC max. | Reset Voltage VDC max. | Coil Resistance Ω | Nominal Power mW approx. | Max. Voltage VDC |
|---|---|---|---|---|---|---|
| HFD4/1.5-L | 1.5 | 1.13 | 1.13 | 22.5 x (1±10%) | 100 | 3.0 |
| HFD4/2.4-L | 2.4 | 1.8 | 1.8 | 58 x (1±10%) | 100 | 4.8 |
| HFD4/3-L | 3 | 2.25 | 2.25 | 90 x (1±10%) | 100 | 6.0 |
| HFD4/4.5-L | 4.5 | 3.38 | 3.38 | 203 x (1±10%) | 100 | 9.0 |
| HFD4/5-L | 5 | 3.75 | 3.75 | 250 x (1±10%) | 100 | 10.0 |
| HFD4/6-L | 6 | 4.5 | 4.5 | 360 x (1±10%) | 100 | 12.0 |
| HFD4/9-L | 9 | 6.75 | 6.75 | 810 x (1±10%) | 100 | 18.0 |
| HFD4/12-L | 12 | 9 | 9 | 1440 x (1±10%) | 100 | 24.0 |
| HFD4/24-L | 24 | 18 | 18 | 2880 x (1±10%) | 200 | 36.0 |

**Notes:** 1) When user's requirements can't be found in the above table,special order allowed.
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.

## ORDERING INFORMATION

| | HFD4 / | 24 | -L | 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 | | | | |
| **Terminal type** | **S:** Standard SMT | **S1:** Short terminal SMT | **Nil:** DIP | | | |
| **Packing style** | **R:** Tape and reel packing (Only for SMT type)[1)]<br>**Nil:** Tube packing(Only for DIP type) | | | | | |
| **Special code**[2)] | **XXX:** Customer special requirement | **Nil:** Standard | | | | |

**Notes:** 1) For the R type, the letter "R" will only be printed on packing tag and will not appear on relay cover.
2) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

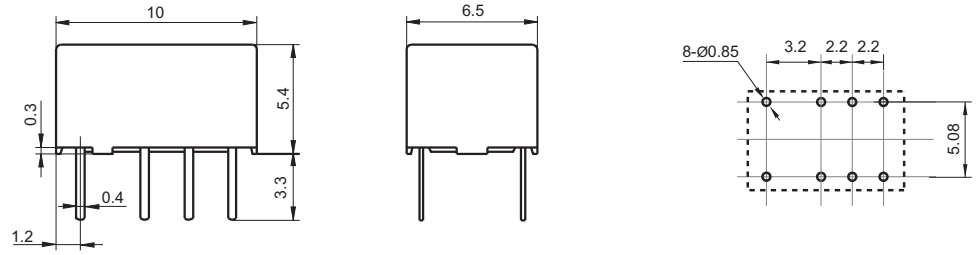
Unit: mm

### Outline Dimensions

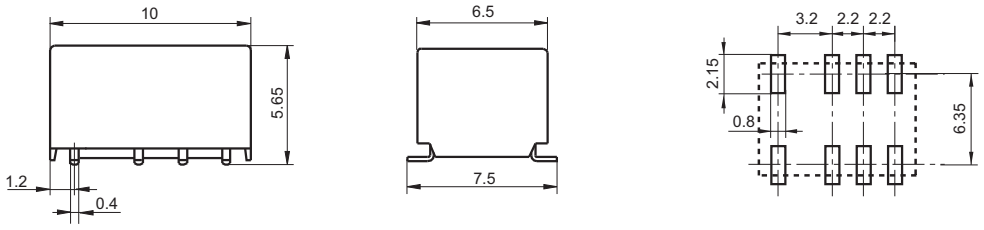
### PCB Layout

(Bottom view)

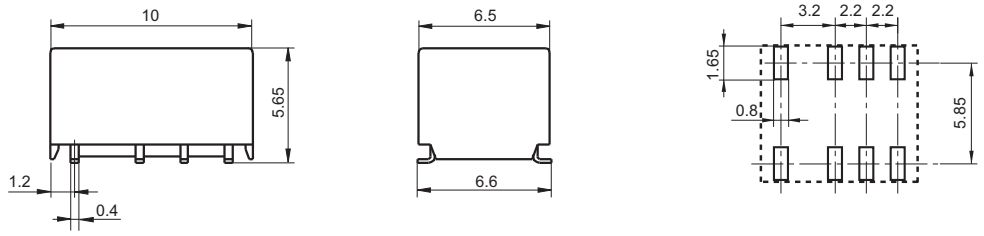
DIP type




Standard SMT type



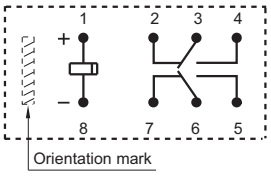

Short terminal SMT type




### Wiring Diagram

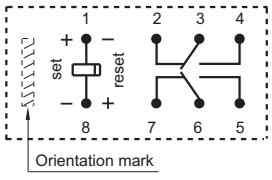
(Bottom view)

Single side stable




No energized condition

1 coil latching




Reset condition

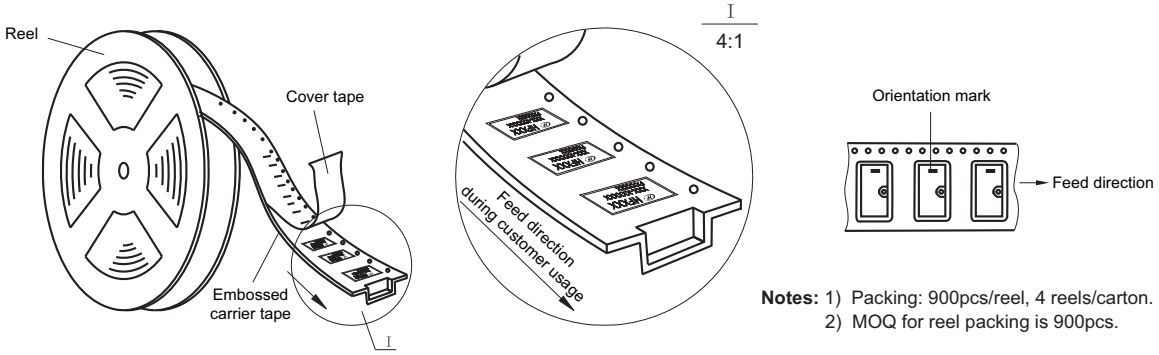
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.

2) The tolerance without indicating for PCB layout is always ±0.1mm.

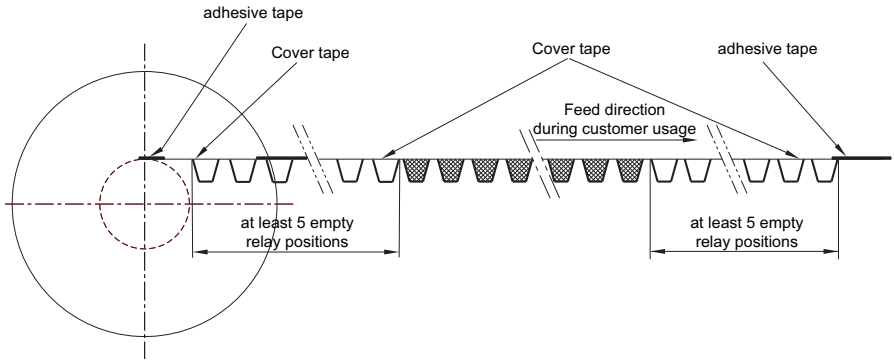
## TAPE PACKING

Unit: mm

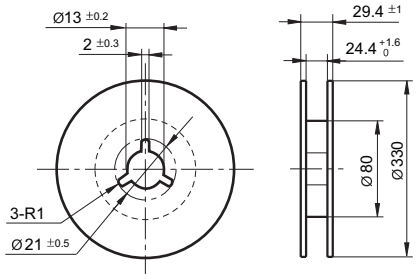
### Direction of Relay Insertion



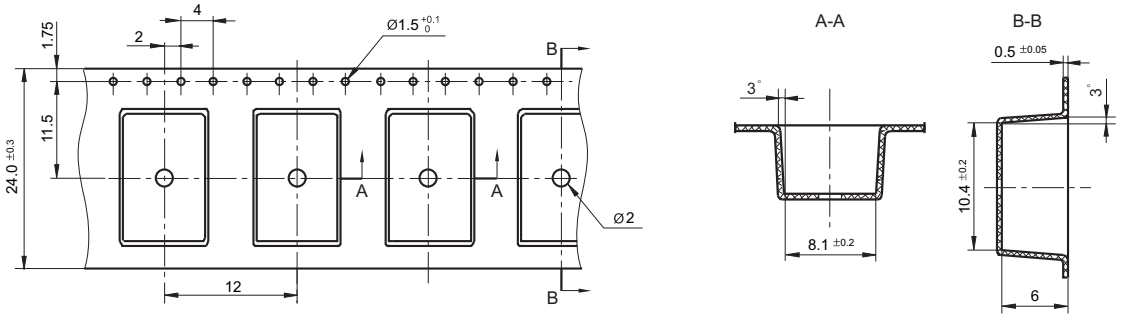

**Notes:** 1) Packing: 900pcs/reel, 4 reels/carton.
2) MOQ for reel packing is 900pcs.




### Reel Dimensions



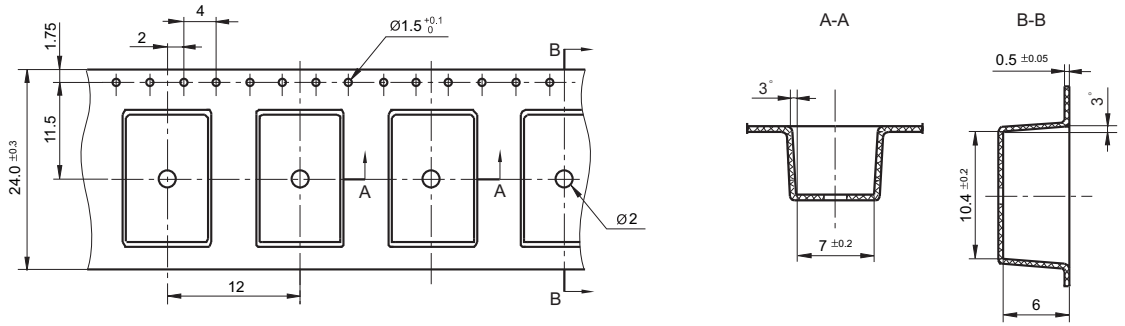

### Tape Dimensions (S type: Standard SMT)



## TAPE PACKING

Unit: mm

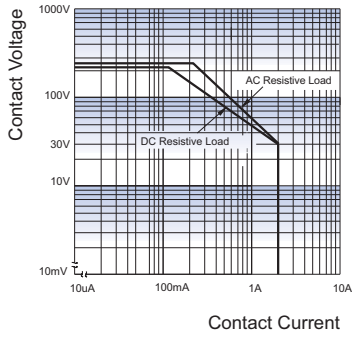
Tape Dimensions (S1 type: Short terminal SMT)



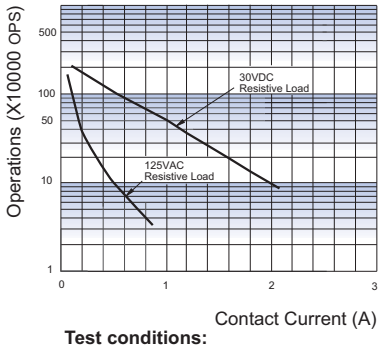

Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.
2) The tolerance without indicating for PCB layout is always ±0.1mm.
3) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



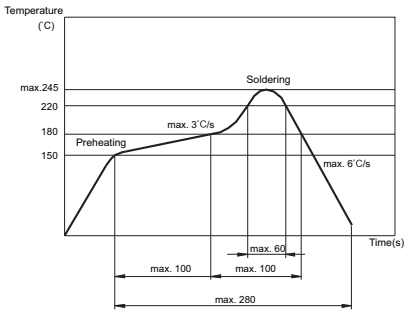

ENDURANCE CURVE




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

REFLOW WELDING,TEMPERATURE ON PCB BOARD

RECOMMENDED WELDING TEMPERATURE




**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) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
6) 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.
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 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.
9) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidetines 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.