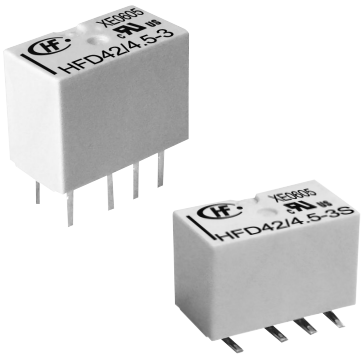
HFD42 SUBMINIATURE SIGNAL RELAY

c UL us
File No.:E133481

File No.:R50317623



Features

- Offers excellent board space savings
- Ultra-narrow width 5.7mm, high density assembly
- Surge withstand voltage up to 2500V, meets FCC Part 68 and Telecordia
- Meets IEC 62368-1
- SMT and THT types available
- The verison of 2A continuous carrying current available
- Strong resistance ability to vibration
- Low power consumption
- Single side stable and latching type available

RoHS compliant

CONTACT DATA

Contact arrangement	2C
Contact resistance	100mΩ max. (at 10mA 30mVDC)
Contact material	AgNi + Au plated
Contact rating (Res. load)	1A 30VDC ,2A 30VDC 1A 60VDC ,0.5A 110VDC 0.5A 125VAC,1A 125VAC
Max. switching current	4A
Max. continuous current	Standard type:1A (85℃) loading current[2]:2A (85℃)
Max. switching voltage	250VAC / 220VDC
Max. switching power	125VA / 120W
Min. applicable load	10mV 10μA
Mechanical endurance	1 x 10^8OPS
Electrical endurance	1 x 10^5OPS(1A 30VDC, Resistive load, at 85℃, 1s on 9s off) 1 x 10^5OPS(0.5A 125VAC, Resistive load, at 85℃, 1s on 9s off)

Notes: 1) The data shown above are initial values;
2) Loading current type's special code:AJ1
3) Min. applicable load refers to a reference value of the min. load for the relay contact to switch under normal temperature and normal humidity environment. The value would be affected by on-off frequency, environmental conditions, desired contact resistance and reliability, etc. Thus, please perform confirmation tests with actual load before use.
4) The electrical endurance is from the tests of one set of open contacts or one sets of close contacts.

COIL

Coil power	Single side stable: 140mW、230mW
	1 coil latching: 100mW、120mW

CHARACTERISTICS

Insulation resistance		1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts	1500VAC 1min
	Between open contacts	750VAC 1min
	Between contact sets	1800VAC 1min
Surge withstand voltage	Between open contacts (10/160μs)	1500V(FCC part 68)
	Between coil & contacts (2/10μs)	2500V (Telecordia)
Operate time (Set time)		3ms max.
Release time (Reset time)		3ms max.
Ambient temperature		-40℃ to 85℃
Humidity		5% to 85% RH
Vibration resistance	Functional	10Hz to 55Hz 3.3mm DA
	Destructive	10Hz to 55Hz 5.0mm DA
Shock resistance	Functional	735m/s^2
	Destructive	980m/s^2
Termination		THT, SMT
Unit weight		Approx. 1.1g
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)		MSL3
Construction		Plastic sealed

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

SAFETY APPROVAL RATINGS

UL/CUL	1A 30VDC 85℃ 2A 30VDC 85℃ 1A 60VDC 105℃ 0.5A 110VDC 85℃ 0.5A 125VAC 85℃ 1A 125VAC 85℃
TÜV	0.5A 125VAC 85℃ 1A 30VDC 85℃ 2A 30VDC 85℃ 1A 125VAC 85℃

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

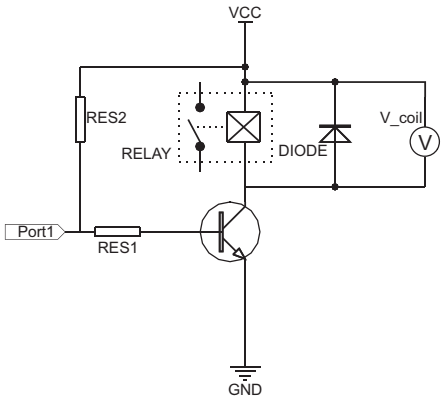
Coil Code	Nominal Voltage[1] VDC	Initial Pick-up Voltage VDC max.	Initial Drop-out Voltage[1] VDC min.	Coil Resistance[1] Ω	Nominal Power mW approx.	Max. Voltage[4] VDC
HFD42/1.5	1.5	1.13	0.15	16 x (1±10%)	140	3.0
HFD42/2.4	2.4	1.8	0.24	41 x (1±10%)	140	4.8
HFD42/3[3]	3	2.25	0.3	64.3 x (1±10%)	140	6.0
HFD42/4.5	4.5	3.38	0.45	145 x (1±10%)	140	9.0
HFD42/5[3]	5	3.75	0.5	178 x (1±10%)	140	10.0
HFD42/6	6	4.5	0.6	257 x (1±10%)	140	12.0
HFD42/9	9	6.75	0.9	579 x (1±10%)	140	18.0
HFD42/12	12	9	1.2	1028 x (1±10%)	140	24.0
HFD42/24	24	18	2.4	2504 x (1±10%)	230	48.0

1 coil latching

Coil Code	Nominal Voltage[1] VDC	Initial Pick-up Voltage VDC max.	Initial Drop-out Voltage[1] VDC min.	Coil Resistance[1] Ω	Nominal Power mW approx.	Max. Voltage[4] VDC
HFD42/1.5-L	1.5	1.13	1.13	22.5 x (1±10%)	100	3.0
HFD42/2.4-L	2.4	1.8	1.8	58x (1±10%)	100	4.8
HFD42/3-L[3]	3	2.25	2.25	90 x (1±10%)	100	6.0
HFD42/4.5-L	4.5	3.38	3.38	203 x (1±10%)	100	9.0
HFD42/5-L[3]	5	3.75	3.75	250 x (1±10%)	100	10.0
HFD42/6-L	6	4.5	4.5	360 x (1±10%)	100	12.0
HFD42/9-L	9	6.75	6.75	810 x (1±10%)	100	18.0
HFD42/12-L	12	9	9	1440 x (1±10%)	100	24.0
HFD42/24-L	24	18	18	4800 x (1±10%)	120	48.0

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 below 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) 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.

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

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

7) 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

	HFD42 /	24	-L1	3	S	R	(XXX)
Type							
Coil voltage	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC						
Sort	**L1:** 1 coil latching	**Nil:** Single side stable					
Contact material	**3:** AgNi+Gold plated						
Terminal type	**S:** Standard SMT	**S1:** Short terminal SMT	**Nil:** THT				
Packing style	**R:** Tape and reel packing (Only for SMT type) 2) **Nil:** Tube packing(Only for THT type)						
Special code 3)	**XXX:** Customer special requirement	**Nil:** Standard					
	AJ1: loading current(The verison of 2A continuous carrying current)						

Notes:1) Please use wave soldering or manual soldering for straight-in relay. If you need reflow welding, please confirm the feasibility with us.
2) 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.
3) The customer special requirement express as special code after evaluating by Hongfa.
4) The standard tube length is 555mm,Any special requirement needed, please contact us for more details.
5) 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.
6) 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.Flux proofed and dust cover type relays are prohibited in environments with water vapor and harmful gases (P, Cl, H_2S, SO_2, NO_2). Plastic sealed relays shall be used with practical test verification.

OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

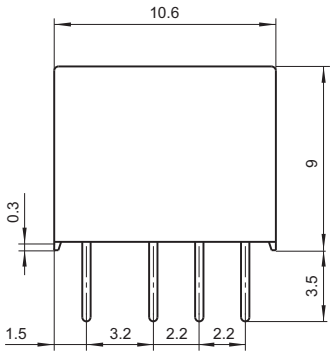
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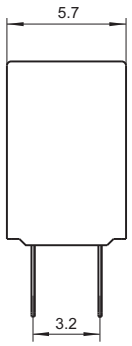
Outline Dimensions

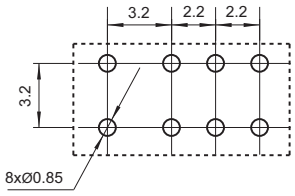
PCB Layout

(Bottom view)

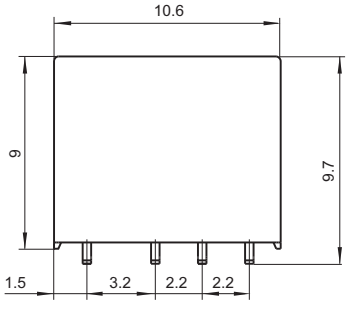
THT type

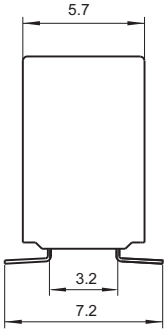


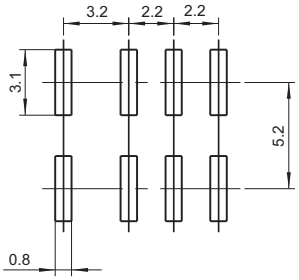




Standard SMT type





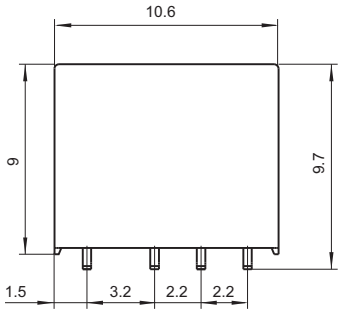


OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

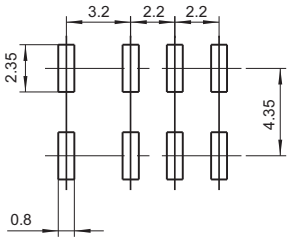
Short terminal
SMT type

Outline Dimensions



PCB Layout

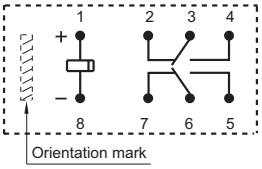
(Bottom view)



Wiring Diagram

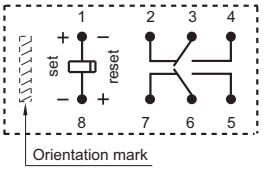
(Bottom view)

Single side stable



No energized condition

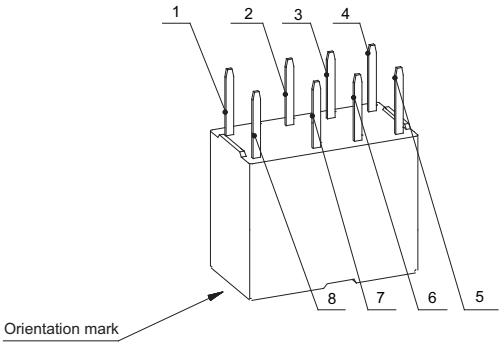
1 coil latching



Reset condition

Pin Layout

Single side stable & 1 coil latching

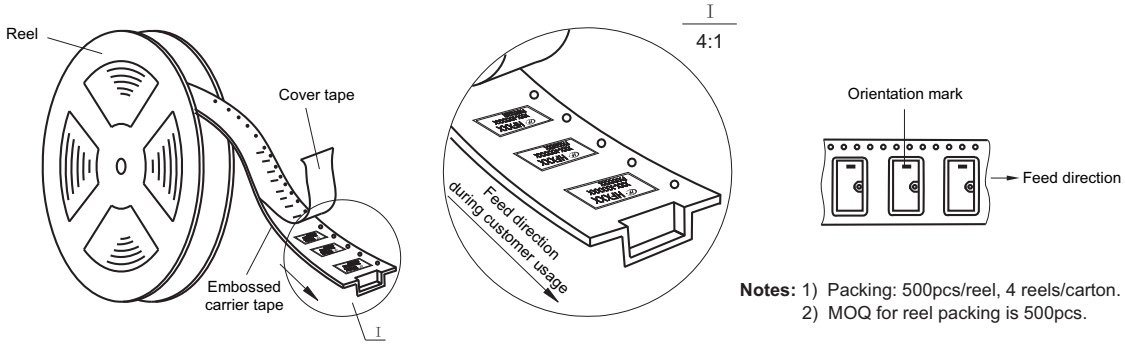


Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.
2) The tolerance without indicating for PCB layout is always ±0.1mm.
3) The width of the gridding is 2.5mm.

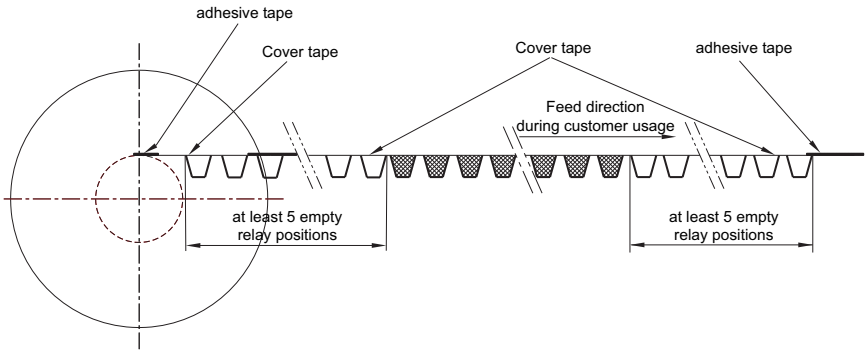
TAPE PACKING

Unit: mm

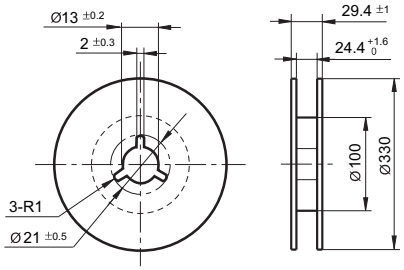
Direction of Relay Insertion



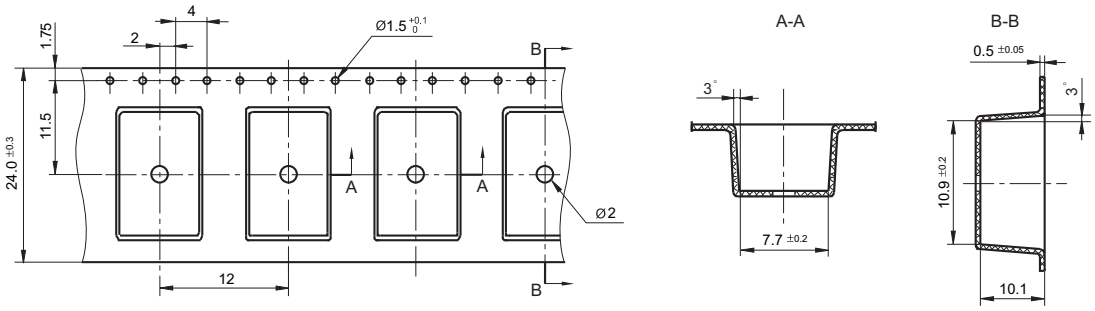
Notes: 1) Packing: 500pcs/reel, 4 reels/carton.
2) MOQ for reel packing is 500pcs.



Reel Dimensions



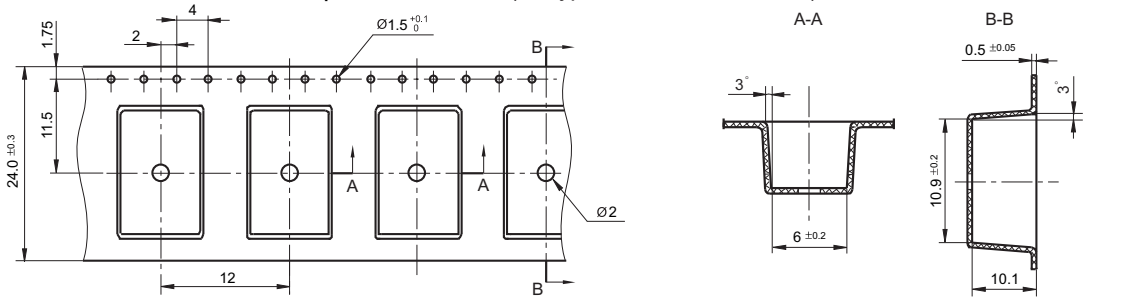
Tape Dimensions



TAPE PACKING

Unit: mm

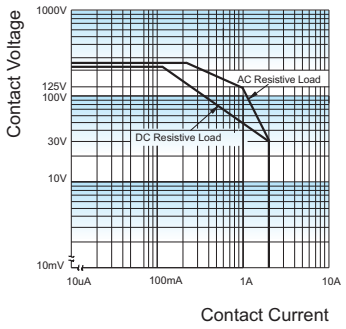
Tape Dimensions (S1 type: Short terminal SMT)



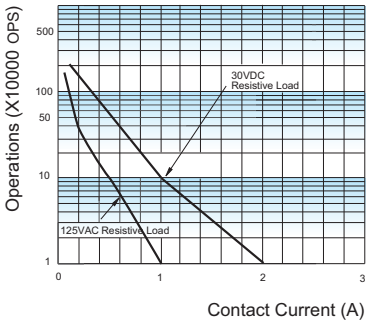
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.
2) The tolerance without indicating for PCB layout is always ±0.1mm.
3) The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

CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER

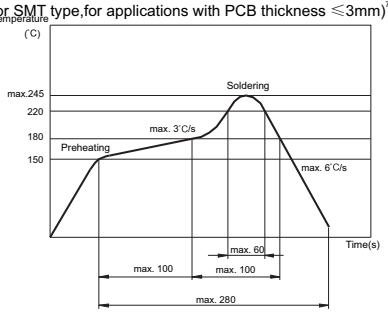


ENDURANCE CURVE



RECOMMENDED REFLOW SOLDERING PROFILE

(For SMT type,for applications with PCB thickness ≤3mm)7)



(Measurement point: PCB surface where the relay is mounted)

Test conditions:
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) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
7) For SMT products, practical validation shall be performed and confirmed acceptable before mass production if the reflow-soldering profile deviates from our recommended profile. In principle, double reflow-soldering of relays is not recommended. If a second reflow-soldering process is required, the relay shall be cooled down to ambient temperature by natural cooling or forced-air cooling after the first reflow, and practical validation shall be completed and confirmed acceptable prior to mass production.
For applications with PCB thickness >3mm, the temperature of the relay body may be significantly higher than the PCB surface temperature. Practical validation shall be performed and confirmed acceptable before use and mass 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℃ 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.Flux proofed and dust cover type relays are prohibited in environments with water vapor and harmful gases (P, Cl, H_2S, SO_2, NO_2). Plastic sealed relays shall be used with practical test verification.
14) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidetines of relay".
15) 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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