FOR REFERENCE ONLY
NEW PRODUCT PROMOTION
PRELIMINARY SPECIFICATION

HFD35 5GHz SUBMINIATURE HIGH-FREQUENCY RELAY

Features

- Excellent high-frequency characteristics at 5GHz:
  Insertion loss≤0.5dB，VSWR≤1.25
  Isolation：between open contacts≥35dB,
  between contact sets≥30dB
- 2 Form C configuration
- Single-side stable and latching types available
- DIP type and SMT type products are available.
- Small product size

RoHS compliant

CONTACT DATA

Contact arrangement		2C
Contact resistance[1)]		150mΩ max. (10mA 30mVDC)
Contact material		Au plated
Contact rating	Resistive load	10mA 10VDC
	High frequency load	1W 5GHz (V.SWR≤1.25)
Max. switching voltage		30VDC
Max. switching current		0.3A
Max. switching power		1W 5GHz(V.SWR≤1.25)
Max. through power		1W 5GHz(V.SWR≤1.25)
Min. applicable load		10mV 10μA
Mechanical endurance		1 x 10^7OPS
Electrical endurance	Resistive load	1 x 10^6OPS (10mA 10VDC, 85℃, 1s on 9s off, NO or NC)
	High frequency load[3)]	1 x 10^6OPS (1W 5GHz[3)], 85℃, 1s on 9s off, NO or NC)

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) These values are for a V.SWR of 1.25 max. at the load.

COIL

Coil power	Single-side stable	See "COIL DATA"
	2 coil latching	See "COIL DATA"
Temperature rise		70K max. (0.3A load, ambient temperature 85℃)

HIGH-FREQUENCY CHARACTERISTICS

frequency		5GHz
Isolation	between open contacts	≥35dB
	between contact sets	≥30dB
Insertion loss		≤0.5dB
V.SWR		≤1.25
Max. through power		1W 5GHz（V.SWR≤1.25)

Notes: 1) The characteristic impedance of the measuring system is 50Ω;
2) The data shown above are initial values.
3) Please contact us if the relay will be used in an application that requires radio repeatability in high-frequency characteristics for the microload area (such as test and measurement equipment and ATE,etc.)
4) These values are for a V.SWR of 1.25 max. at the load.

CHARACTERISTICS

Insulation resistance		1000MΩ (500VDC)
Dielectric strength	Between coil & contacts	500VAC 1min
	Between open contacts	500VAC 1min
	Between contact sets	500VAC 1min
	Between coil, contact and grounding	500VAC 1min
Operate time (Set time)		4ms max.
Release time (Reset time)		4ms max.
Ambient temperature		-40℃ to 85℃
Humidity		5% to 85% RH
Vibration resistance	Functional	490m/s²
	Destructive	735m/s²
Shock resistance	Functional	10Hz to 55Hz 3.0mm DA
	Destructive	10Hz to 55Hz 5.0mm DA
Termination		DIP,SMT
Unit weight		Approx .3g
Construction		Plastic sealed

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

COIL DATA

23°C

Single side stable

Coil Code	Nominal Voltage VDC	Initial Pick-up Voltage VDC max.	Initial Drop-out Voltage VDC max.	Coil Resistance Ω	Nominal current mA	Nominal Power mW approx.	Max.[4] Voltage VDC
HFD35/1.5	1.5	1.13	0.15	11.3 x (1±10%)	200	200	2.2
HFD35/2.4	2.4	1.8	0.24	28.9 x (1±10%)	200		3.6
HFD35/3	3	2.25	0.3	45 x (1±10%)	200		4.5
HFD35/4.5	4.5	3.38	0.45	101.3 x (1±10%)	200		6.7
HFD35/5	5	3.75	0.5	125 x (1±10%)	200		7.5
HFD35/6	6	4.5	0.6	180 x (1±10%)	200		9
HFD35/9	9	6.75	0.9	405 x (1±10%)	200		13.5
HFD35/12	12	9	1.2	720 x (1±10%)	200		18
HFD35/24	24	18	2.4	2880 x (1±10%)	200		36

2 coil latching

Coil Code	Nominal Voltage VDC	Initial Pick-up Voltage VDC max.	Initial Reset Voltage VDC max.	Coil Resistance Ω	Nominal current mA	Nominal Power mW approx.	Max.[4] Voltage VDC
HFD35/1.5-L	1.5	1.13	1.13	15 x (1±10%)	200	200	3
HFD35/2.4-L	2.4	1.8	1.8	38.4 x (1±10%)	200		4.8
HFD35/3-L	3	2.25	2.25	60 x (1±10%)	200		6
HFD35/4.5-L	4.5	3.38	3.38	135 x (1±10%)	200		9
HFD35/5-L	5	3.75	3.75	166.7 x (1±10%)	200		10
HFD35/6-L	6	4.5	4.5	240 x (1±10%)	200		12
HFD35/9-L	9	6.75	6.75	540 x (1±10%)	200		18
HFD35/12-L	12	9	9	960 x (1±10%)	200		24
HFD35/24-L	24	18	18	3840 x (1±10%)	200		48

Notes: 1)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.
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

HFD35 / 12 -2Z -L2 S R （XXX）

Type	
Coil voltage	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC
Sort	**2Z:** 2 Form C
Terminal type	**L2:** 2 coil latching **Nil:** Single side stable
Terminal type	**S:** Standard SMT **Nil:** DIP
Packing style	**R:** Tape and reel packing(Only for SMT type)[1] **Nil:** Tube packing(Only for DIP type)
Special code[2]	**XXX:** Customer special requirement **Nil:** Standard

Notes: 1) R type (tape and reel) packing is moisture-proof which meets requirement of MSL-3. For R type, the letter "R" will only be printed on packing tag but not on relay cover.
2) Customer's special requirements will be identified by special codes after evaluation.
3) A hyphen mark "-" should be added between coil voltage and sort/terminal type/packing style if any, for example: HFD35/24-SR.

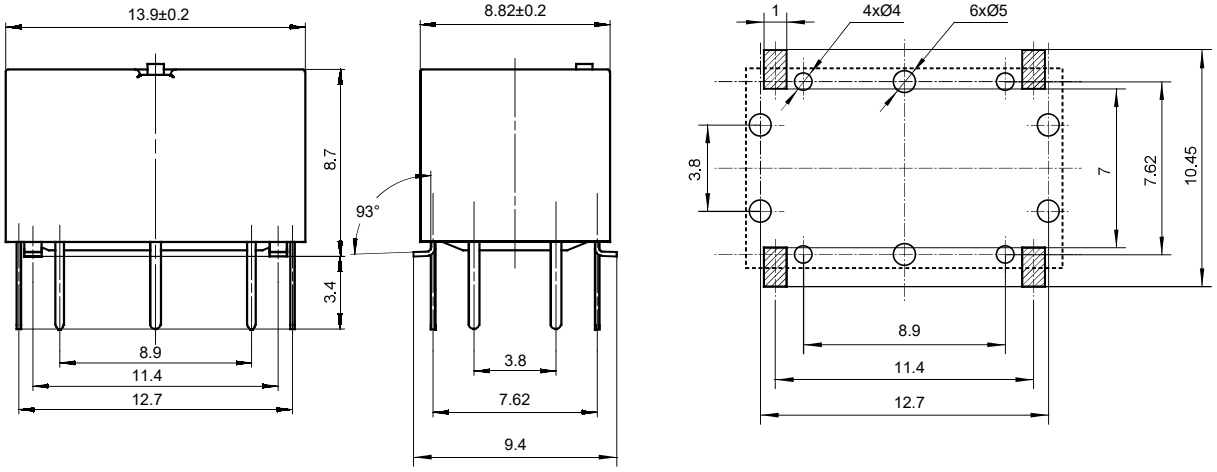
OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

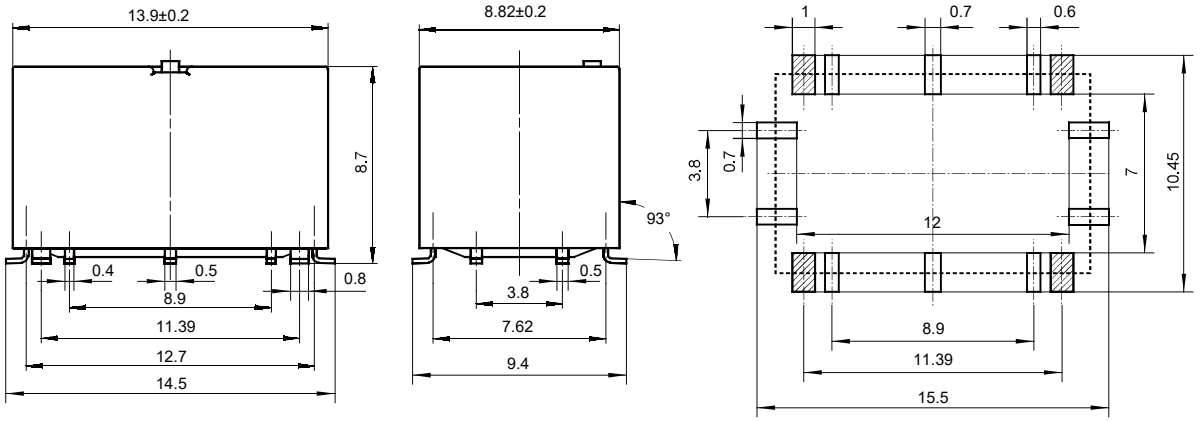
Outline Dimensions

PCB Layout
(Bottom view)

双列直插型

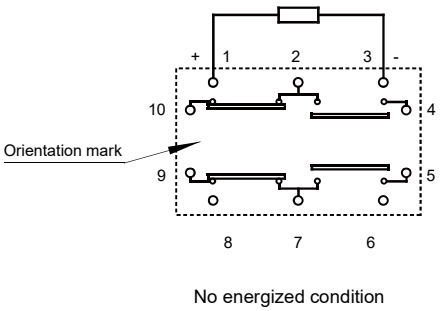


标准表面贴装型(S型)



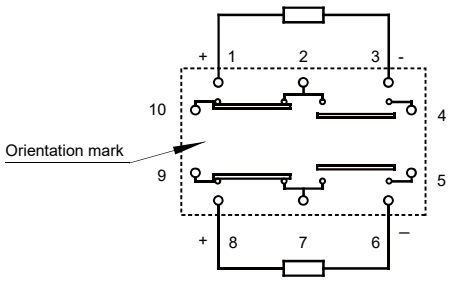
Wiring Diagram

Single side stable(Bottom view)



No energized condition

2 coil latching(Bottom view)



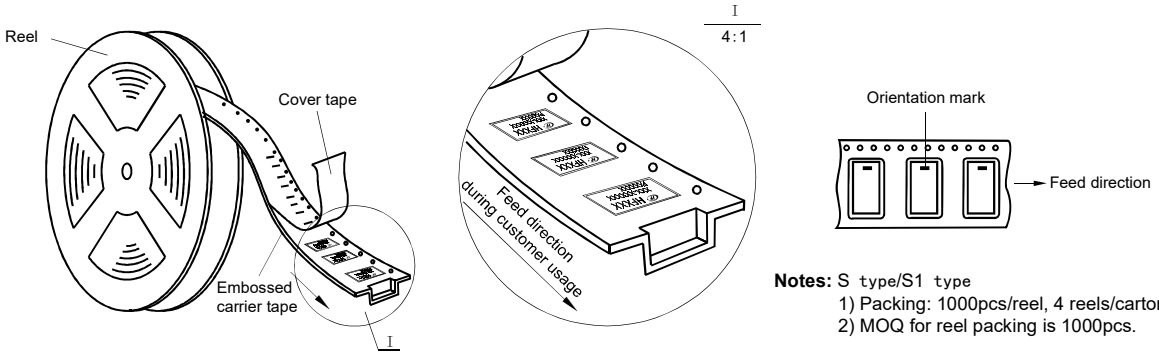
Reset condition

Remark: 1)In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be±2mm; outline dimension >1mm and ≤5mm, tolerance should be±3mm; outline dimension >5mm, tolerance should be±4mm.
2)The tolerance without indicating for PCB layout is always±0.1mm.

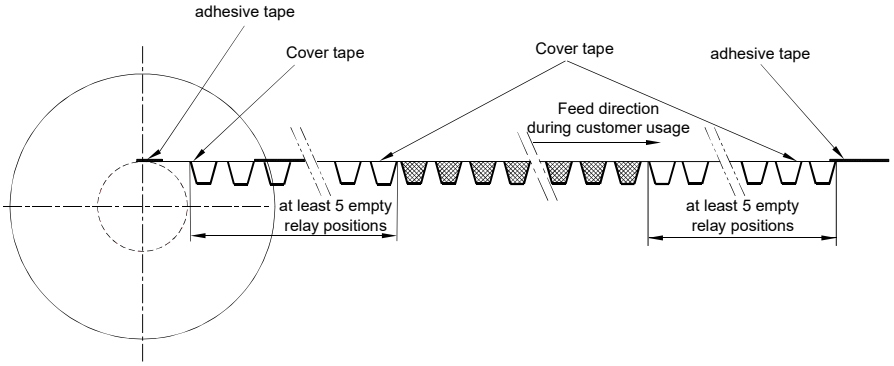
TAPE PACKING

Unit: mm

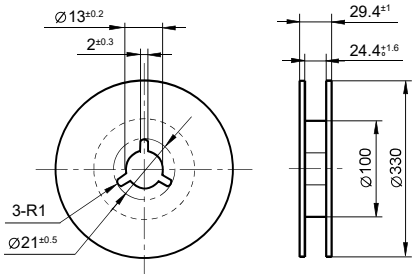
Direction of Relay Insertion



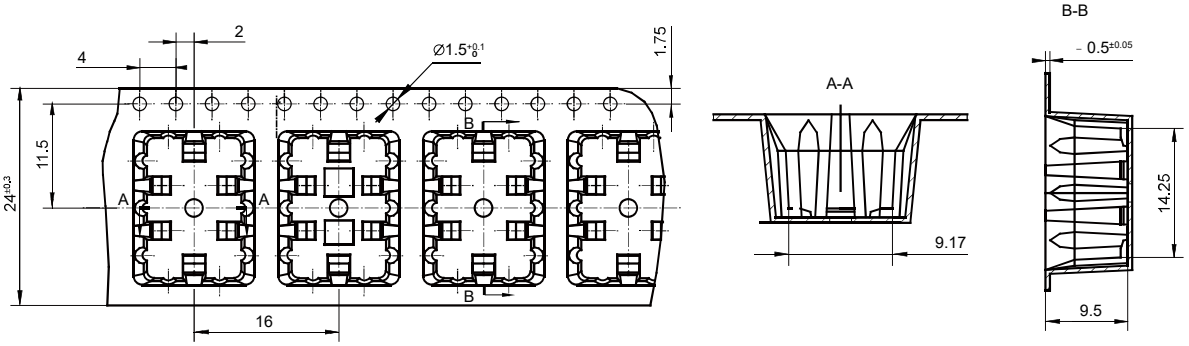
Notes: S type/S1 type
1) Packing: 1000pcs/reel, 4 reels/carton.
2) MOQ for reel packing is 1000pcs.



Reel Dimensions

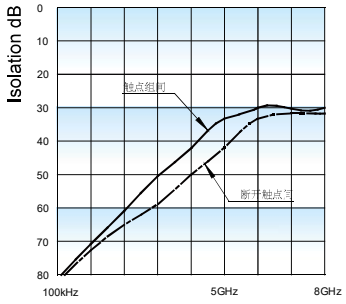


Tape Dimensions

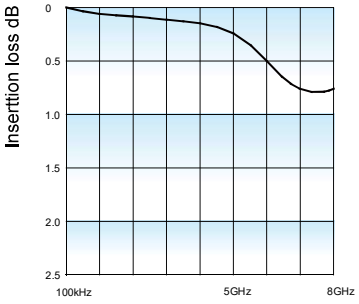


HIGH FREQUENCY CHARACTERISTICS CURVES

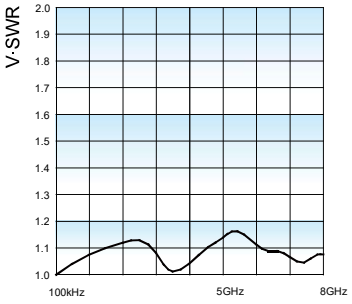
Isolation



Inserttion loss



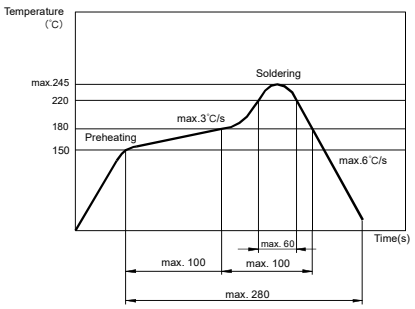
Voltage standing wave ratio



Remark: 1) Ambient temperature conditions is 23˚C；
2) The data shown above are initial values.
3) The high-frequency characteristics will vary depending on the PCB board.Please be sure to check performance parameters including durability in actual equipment before use.
4) Test model and specification: HFD35/4.5-2Z-L2SR, test instrument: Keysight E5071C network analyzer, the characteristic impedance of the measurement system is 50Ω.

CHARACTERISTIC CURVES

REFLOW SOLDERING,TEMPERATURE
ON PCB BOARD
RECOMMENDED SOLDERING 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) The relay action voltage and release/return voltage are the initial values tested under standard conditions (23 C). 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 single-side stable relays, if voltage drop is needed to maintain the operation of relay after the relay operates reliably, please ensure that the effective value of the holding 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) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
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.

CHARACTERISTIC CURVES

11) For relays with moisture-proof package, the package meets requirements of MSL-3.After opening the package,please store the relays in an environment of ≤30℃, ≤60% RH,and use them within 168 hours.If the relays can't be used up in time it's recommended to repack them with vacuum packaging or store them in a drying oven of 25℃±5℃, ≤10% RH.If the storage conditions exceed the aforementioned conditions please perform actual soldering confirmation or bake the relays at 50℃±5℃, ≤30% RH for 72 hours before use.
12) When the relay is used in a long-term continuous energization circuit, the coil insulation material will age due to the self-heating of the coil; therefore, please try not to ground the relay coil to reduce the risk of electrical corrosion. At the same time, please design an appropriate safety circuit to prevent losses due to disconnection.
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) For other recommended usage, storage and transportation conditions, please refer to "Relay Terminology Explanation and Selection Guide".
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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