HR1-V HIGH-VOLTAGE REED RELAY

File No.：R 50637175

File No.：E133481



Features

- High-voltage & High-insulation Reed Relay
- High insulation with 1500V reinforced insulation level
- Dielectric strength between open contacts≥4000VDC
- Dielectric strength between coil & contacts≥7000VDC
- High switching voltage at 1500VDC/1000VAC
- Combined injection molding structure for high vibration resistance
- SMT type available forconvenient installation
- Meet the IEC 62477-1:2022 standard for energy storage systems

RoHS compliant

CONTACT DATA

Contact arrangement	1A
Contact resistance	100mΩ max.(10mA 30mVDC)
Contact material	Rhodium alloy
Contact rating(Res. load)	10mA 1500VDC 15mA 1000VDC 1mA 2000VDC 1A 30VDC
Max. switching voltage	2000VDC/1500VAC
Max. switching current	1.5A
Maximum making current	2.5A
Max. switching power	100W
Min. applicable load[3]	10mV 10μA
Mechanical endurance	1×10^8OPS
Electrical endurance	15mA 1000VDC (1×10^5OPS, 105℃,1s on/9s off) 10mA 1500VDC (1×10^5OPS, 105℃, 1s on/9s off) 10mA 1000VAC (1×10^5OPS, 105℃, 1s on/9s off) 1mA 2000VDC (1×10^5OPS, 85℃, 1s on/9s off)

Notes: 1) The data shown above are initial values.
2) High voltage specification product characteristic number: AN3
3) 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.

CHARACTERISTICS

Insulation resistance		10000MΩ(500VDC) 1TΩ max.(500VDC) (Typical values)
Dielectric strength	Between open contacts	Standard type： 3000VDC 1min High voltage[2]： 4000VDC 1min
	Between coil & contacts	7000VDC 1min
Impulse voltage	Between open contacts	8000V(1.2/50μs)
	Between coil & contacts	8000V(1.2/50μs)
Operate time (Rated voltage, including bounce)		1.0ms max.
Release time (W/O freewheeling diode)		0.1ms max.
Vibration resistance		10Hz to 2000Hz,20g
Shock resistance	Functional	490m/s²
	Destructive	980m/s²
Ambient temperature		-40℃ to 105℃
Humidity		5% to 85%RH
Termination		THT,SMT
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)		MSL-3
Unit weight		Approx. 5.0g
Construction		Plastic sealed

Notes:1) The data shown above are initial values.
2) High voltage specification product characteristic number: AN3.

COIL

Coil power	Approx. 300mW
Temperature rise	30K max.(1A Load,at 105℃) 50K max.(2.5A Load,at 105℃)

SAFETY APPROVAL RATINGS

UL/CUL	15mA 1000VDC(at 105℃) 10mA 1000VAC(at 105℃) 10mA 1500VDC(at 105℃)
TÜV	15mA 1000VDC(at 105℃) 10mA 1500VDC(at 105℃)

Notes:1) Only typical loads are listed above. Other load specifications can be available upon request.

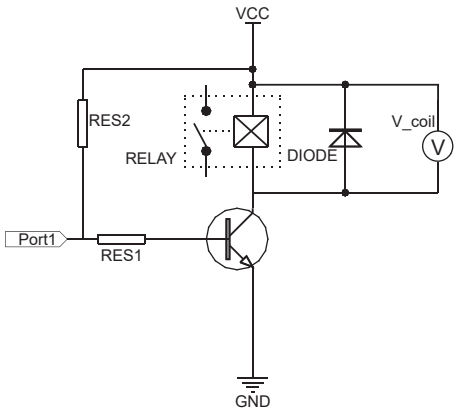
COIL DATA

23°C

Coil Code	Nominal Coil Voltage VDC	Pick-up Voltage VDC max.[2)]	Drop-out Voltage VDC min.	Coil Resistance Ω	Nominal Power mW approx.	Max. Voltage VDC[3)]
HR1-V/3	3	2.4	0.3	65 × (1±10%)	138	4.5
HR1-V/5	5	3.5	0.5	80 × (1±10%)	313	7.5
HR1-V/9	9	6.3	0.9	270 × (1±10%)	300	13.5
HR1-V/12	12	8.4	1.2	475 × (1±10%)	303	18.0
HR1-V/24	24	16.8	2.4	1800 × (1±10%)	320	36.0

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

2)The initial Pick-up Voltage and Reset Voltage refer to the factory-set values of the relay. To supply rated step voltage to the coil is the foundation of proper relay operation. Please make sure the voltage applied across the coil reaches the rated value before use. Please refer to the typical diagram below for single-stable relay. "V_coil" is the rated voltage of the coil:



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

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

5) 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

	HR1-V/	5	-H	S	R	（XXX）
Type						
Coil voltage	3，5，9，12，24					
Contact arrangement	**H:** 1 Form A					
Terminal type	**S:** SMT **Nil:** THT					
Packing style	**R:** Tape and reel packing(Only for SMT type) **Nil:** Tube packing(Only for DIP type)					
Special code	**XXX:** Customer special requirement **Nil:** Standard **AN3:**High voltage (Dielectric strength between open contacts≥4000VDC 1min) **P01:**Tape feeding direction reversed vs. standard.(Only for SMD types; see Tape Dimensions below.)					

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

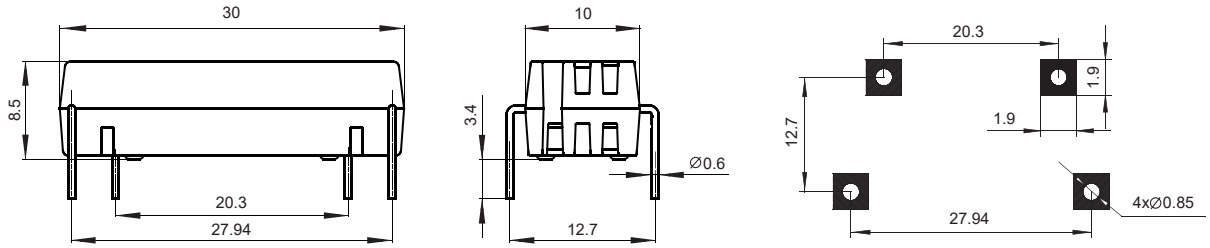
OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

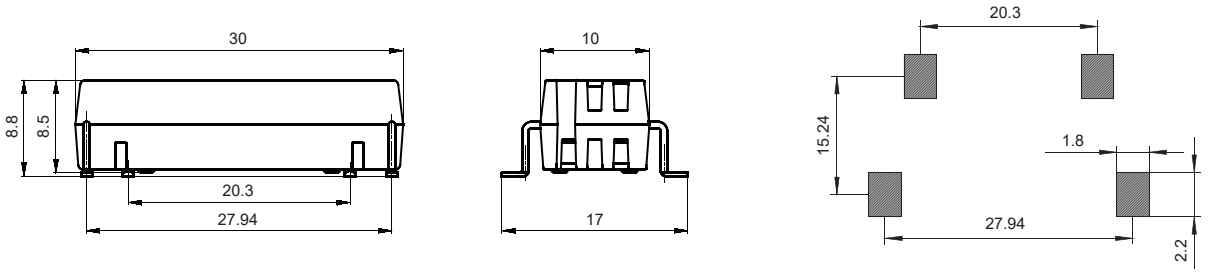
Outline Dimensions

PCB Layout(Top view)

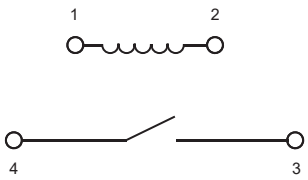
DIP



SMT



Wiring Diagram(Top view)



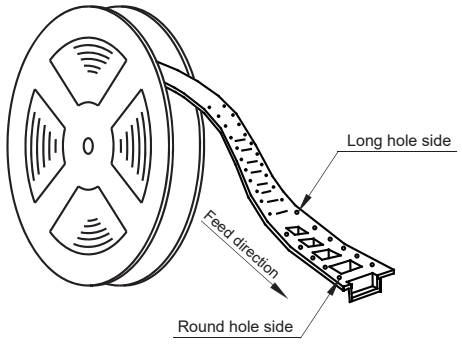
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension ＞1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension ＞5mm, tolerance should be ±0.4mm.
2) The tolerance without indicating for PCB layout is always ±0.1mm.

TAPE PACKING

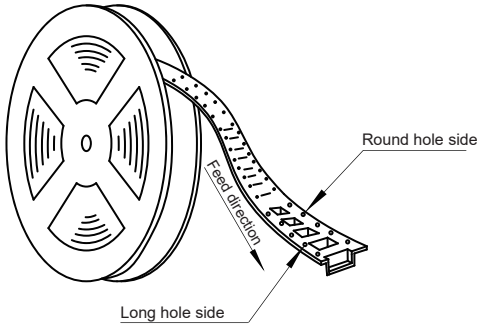
Unit: mm

Direction of Relay Insertion

Standard Type

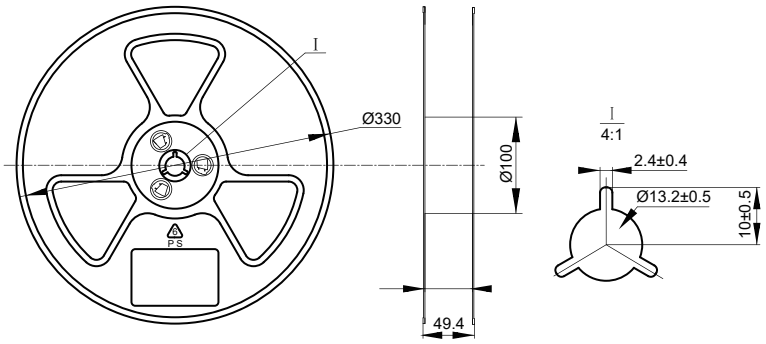


P01 type

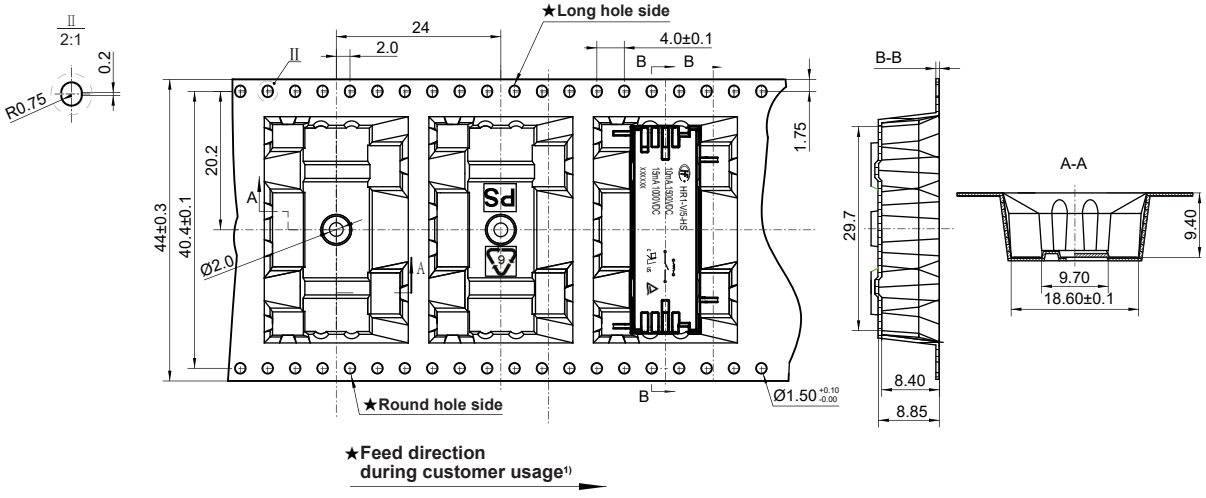


Notes: 1) Packing: 250pcs/reel, 3 reels/carton.
2) MOQ for reel packing is 250pcs.

Reel Dimensions



Tape Dimensions
(Standard Type)

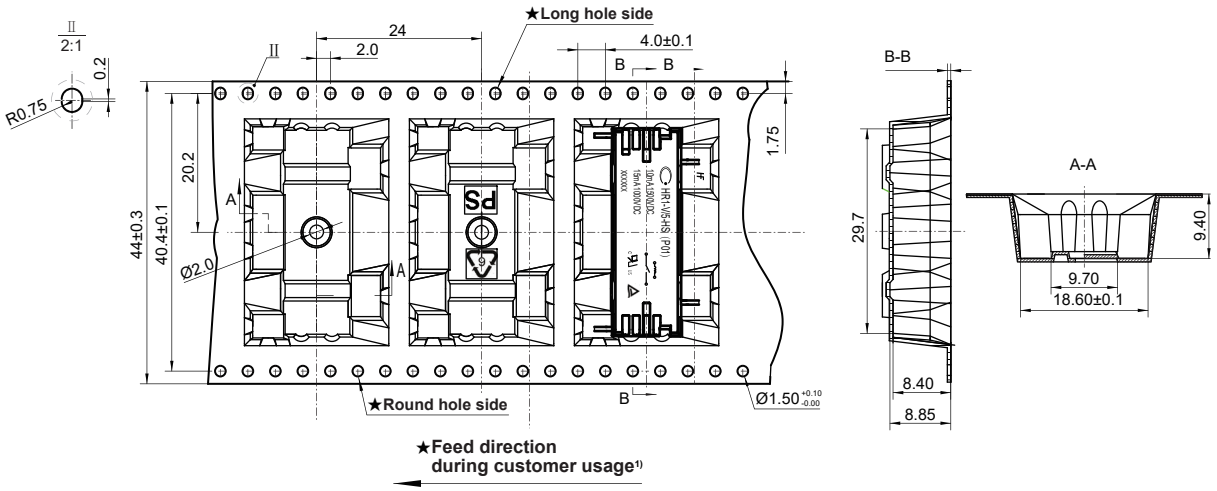


Notes: 1) Select the carrier tape feeding direction as indicated in the figure.

TAPE PACKING

Unit: mm

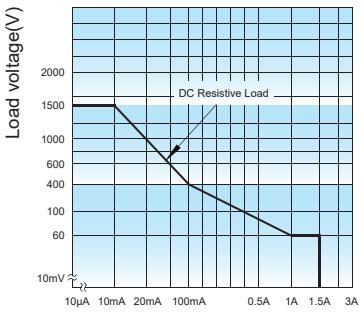
Tape Dimensions
(P01 type)



Notes: 1) Select the carrier tape feeding direction as indicated in the figure.

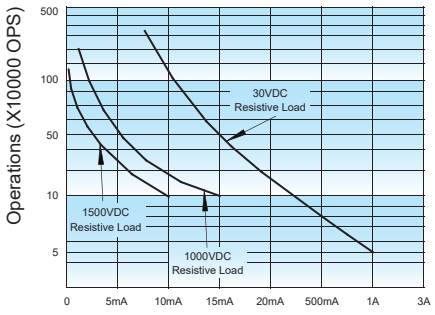
CHARACTERISTIC CURVES

MAX.SWITCHING POWER



Contact rating

ENDURANCE CURVE

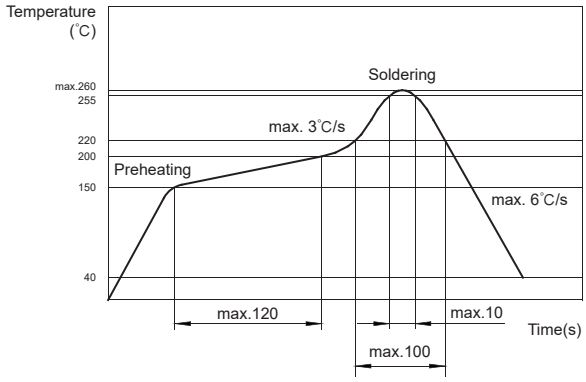


Contact rating

Test conditions: Resistive load, 1s on 9s off.

RECOMMENDED REFLOW SOLDERING PROFILE

(For SMT type,for applications with PCB thickness ⩽3mm)6)



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

Notice

1) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
2) The relay action voltage and release/return voltage are the initial values tested under standard conditions (23℃). Applying rated voltage to both ends of the relay coil is the basis for normal operation of the relay. Considering the influence of environment temperature, coil temperature rise (such as hot start), voltage fluctuation, etc., in order to ensure the safety margin, make sure that the voltage applied to both ends of the relay coil reaches the rated voltage before use.
3) 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.
4) For a monosteady state relay, after the relay is reliably operated, It is not recommended to use it for voltage reduction.
5) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
6) 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.
7) Please use wave soldering or manual soldering for straight-in relay. If you need reflow welding, please confirm the feasibility with us.
8) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
9) Regarding the plastic sealed relay, we should leave it cooling naturally untill below 40℃ after welding, then clean it and deal with coating, remarkably the temperature of solvents should also be controlled below 40℃.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.
10) 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℃±5℃, ≤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℃±5℃, ≤30% RH.
11) 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.
12) 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.

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