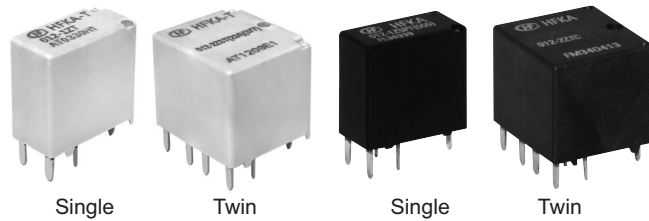


# HFKA/HFKA-T

## AUTOMOTIVE RELAY



### Typical Applications

Central door lock, Power doors and windows,  
Indicator lamp control, Seat adjustment, Sunroof motor control,  
Mirror adjustment, Wiper control

### Features

- 25A motor locked load
- Extremely small relay
- Change-over contact version
- Single and twin version available
- Coil wire insulation class H (180°C)
- HFKA-T (reflow soldering version) available
- RoHS & ELV compliant

## CHARACTERISTICS

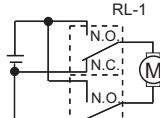
Contact arrangement	1Z (Single), 2Z (Twin) 1H (Single), 2H (Twin)
Voltage drop (initial) <sup>1)</sup>	Typ.: 50mV (at 10A) Typ.: 250mV (at 10A)
Max. continuous current <sup>2)</sup>	33.8A 10min/25A long-term (@23°C) 31A 10min (@ 85°C) HFKA-T:29A 10min (@ 125°C)
Max. switching current <sup>3)</sup>	NO:60A,NC:30A
Max. switching voltage <sup>4)</sup>	16VDC
Min. contact load	1A 6VDC
Electrical endurance	See "CONTACT DATA"
Mechanical endurance	1 x 10 <sup>7</sup> OPS (300OPS/min)
Initial insulation resistance	100MΩ (at 500VDC)
Dielectric strength <sup>5)</sup>	between contacts: 500VAC between coil & contacts: 500VAC
Operate time	Typ.: 2.5ms (at nomi. vol.) Max.: 10ms (at nomi. vol.)

Release time <sup>6)</sup>	Typ.: 1.2ms Max.: 10ms
Ambient temperature	HFKA: -40°C to 85°C HFKA-T: -40°C to 125°C
Vibration resistance <sup>7)</sup>	10Hz to 500Hz 49m/s <sup>2</sup>
Shock resistance <sup>7)</sup>	98m/s <sup>2</sup>
Termination	PCB <sup>8)</sup>
Construction	Plastic sealed Flux proofed
Unit weight	Single relay: Approx. 4g Twin relay: Approx. 8g

- 1)Initial value,Equivalent to the max. initial contact resistance is 100mΩ (at 1A 6VDC).
- 2) Test under the following conditions:
- The relay is mounted on the PCB, the coil is applied with 100% rated voltage;
  - The PCB board is a double layer board. The thickness of the copper foil is 4 oz (140 μm),the width of each copper foil is 3.76×(1±5%)mm, the length of the copper foil is 50 mm±1 mm, and the Tg value of the PCB board is 150 °C.
  - Not suitable for double relay adding load simultaneously.
  - The installation spacing between relay samples is 100mm.
- 3) 23°C, 14VDC (100OPS, Resistive)
- 4) See "Load limit curve" for details.
- 5) 1min, leakage current less than 1mA.
- 6) The value is measured when voltage drops suddenly from nominal voltage to 0 VDC and coil is not paralleled with suppression circuit.
- 7) When non-energized,close time of NO contacts shall not exceed 10μs, When energized, opening time of closed NO contacts shall not exceed 10μs.
- 8) Since it is an environmental friendly product, please select lead-free solder when welding. The recommended soldering temperature and time is (260±3)°C , (5±0.3)s.

## CONTACT DATA <sup>3)</sup>

at 23°C

Load voltage	Load type <sup>2)</sup>		Load current A		On/Off ratio		Electrical endurance OPS	Contact material	Load wiring diagram	
			1Z, 2Z		On s	Off s				
			NO	NC						
13.5VDC	Motor	Make <sup>1)</sup>	25	---	0.5	9.5	1 × 10 <sup>5</sup>	AgSnO <sub>2</sub>		
		Break	25	---						
	Simulate window operation	Make <sup>1)</sup>	25	---	0.2	4	1 × 10 <sup>5</sup>	AgSnO <sub>2</sub>		
		Stable	10	---						2.3
		Break	25	---						
	Simulate motor free operation	Make <sup>1)</sup>	27	---	0.02	1.8	1 × 10 <sup>5</sup>	AgSnO <sub>2</sub>		
		Transient	17	---						0.03
		Break	8	---						



HONGFA RELAY

ISO9001, IATF16949, ISO14001, ISO45001, IECQ QC 080000 CERTIFIED

2023 Rev. 1.00

- 1) Corresponds to the peak inrush current on initial actuation (motor).
- 2) When applied in flasher, a special silver alloy (AgSnO<sub>2</sub>) contact material should be used and the customer special code should be (170) as a suffix. Please heed the anode and cathode's request when wired, common terminal should connect with anode.
- 3) When the load requirement is different from content of the table above, please contact Hongfa for relay application support.

## COIL DATA

	Nominal voltage VDC	Pick-up voltage VDC			Drop-out voltage VDC			Coil resistance x(1±10%)Ω			Power consumption W
		23°C	85°C	125°C	23°C	85°C	125°C	23°C	85°C	125°C	23°C
Standard	12	≤7.2	≤9.0	≤10.2	≥1.0	≥1.2	≥1.4	225	280.8	316.8	0.64
Low pick-up voltage	12	≤6.5	≤8.2	≤9.2	≥1.0	≥1.2	≥1.4	180	224.6	253.4	0.8

1) Max. allowable overdrive voltage is stated with no load applied.

## ORDERING INFORMATION

		HFKA / 012 -1Z S P T C (XXX)						
Type	HFKA: Standard HFKA-T: Reflow soldering version/ High-temperature version							
Coil voltage	012: 12VDC							
Contact arrangement	1H: 1 Form A (Single version) 2H: 2 Form A (Twin version) 1Z: 1 Form C (Single version) 2Z: 2 Form C (Twin version)							
Construction	S: Plastic sealed <sup>1)</sup> Nil: Flux proofed							
Coil power	P: Low pick-up voltage Nil: Standard							
Contact material	T: AgSnO <sub>2</sub>							
Packing style	C: Tape and reel packing Nil: Tube packing							
Special code <sup>2)</sup>	XXX: Customer special requirement Nil: Standard							

**Notes:** 1) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

2) The customer special requirement express as special code after evaluating by Hongfa. e.g. (170) stands for flasher load. The performance parameters of products with characteristic numbers shall be subject to the specific specifications provided by Hongfa.

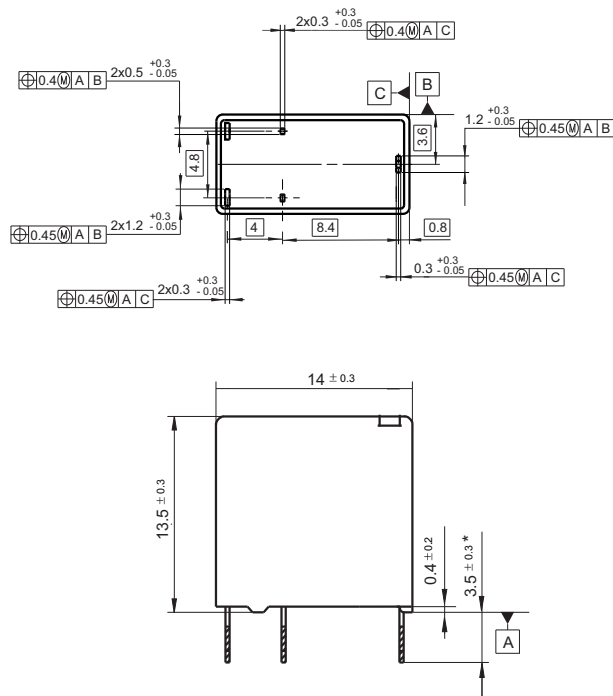
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

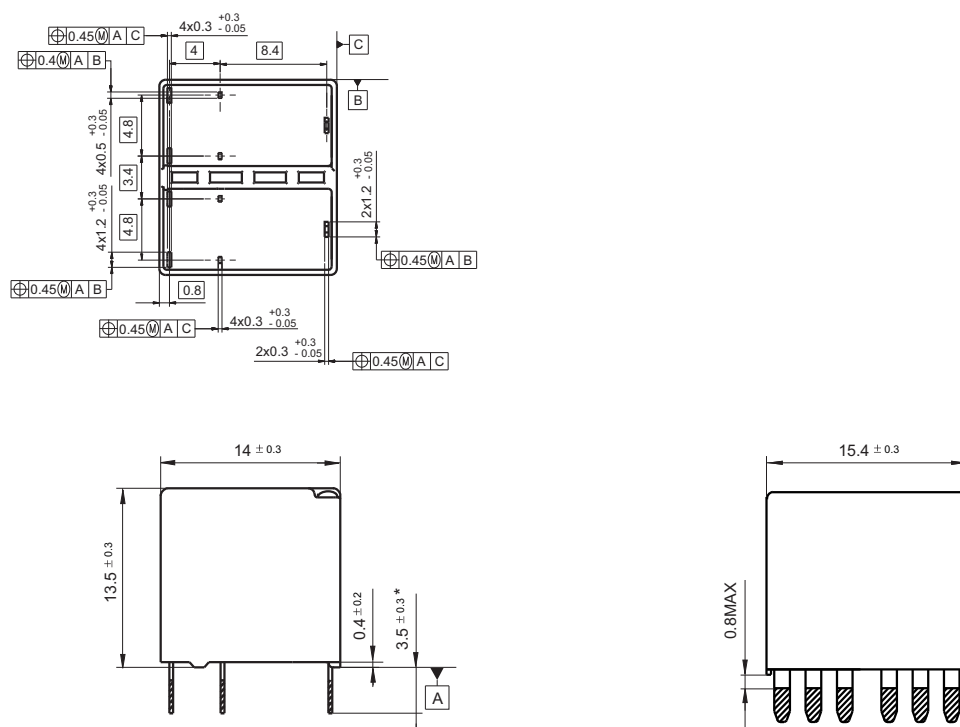
## Outline Dimensions

HFKA (Standard)

1C: 1 Form C (Single version)



2C: 2 Form C (Twin version)



## Unit: mm

Technical drawing of a rectangular plate with dimensions and tolerances. The drawing includes a top view and a side view.

**Top View Dimensions and Tolerances:**

- Overall width:  $14 \pm 0.3$
- Overall height:  $13.5 \pm 0.3$
- Top edge features:
  - Left corner:  $\oplus 0.4(M) A | B$
  - Top center:  $2x0.5 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$
  - Top right corner:  $\oplus 0.4(M) A | C$
- Right edge features:
  - Top right corner:  $\oplus 0.45(M) A | B$
  - Bottom right corner:  $\oplus 0.45(M) A | C$
- Internal dimensions and tolerances:
  - Top edge:  $2x0.3 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$
  - Right edge:  $1.2 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$
  - Bottom edge:  $0.3 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$
  - Left edge:  $1.2 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$
  - Internal width segments:  $4$ ,  $8.4$ ,  $0.8$
  - Internal height segments:  $4.8$ ,  $3.6$

**Side View Dimensions and Tolerances:**

- Overall width:  $14 \pm 0.3$
- Overall height:  $13.5 \pm 0.3$
- Bottom edge features:
  - Bottom center:  $0.4 \pm 0.2$
  - Bottom right corner:  $3.5 \pm 0.3^*$
- Internal dimensions and tolerances:
  - Bottom edge:  $0.3 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$

Technical drawing of a rectangular metal plate with dimensions and tolerances. The drawing includes a top view and a side view.

**Top View Dimensions:**

- Overall width:  $14 \pm 0.3$
- Overall height:  $13.5 \pm 0.3$
- Top edge mounting holes:  $\varnothing 0.45(M) A \ C$  (left),  $\varnothing 0.45(M) A \ B$  (right)
- Bottom edge mounting holes:  $\varnothing 0.45(M) A \ C$  (left),  $\varnothing 0.45(M) A \ B$  (right)
- Left edge mounting holes:  $\varnothing 0.45(M) A \ B$  (top),  $\varnothing 0.45(M) A \ B$  (bottom)
- Right edge mounting holes:  $\varnothing 0.45(M) A \ B$  (top),  $\varnothing 0.45(M) A \ B$  (bottom)
- Top edge hole spacing:  $2x0.3 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$
- Bottom edge hole spacing:  $2x0.3 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$
- Left edge hole spacing:  $2x1.2 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$
- Right edge hole spacing:  $2x1.2 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$
- Internal dimensions:  $4$ ,  $8.4$ ,  $4.8$ ,  $3.4$ ,  $0.8$ ,  $4x0.3 \begin{smallmatrix} +0.3 \\ -0.05 \end{smallmatrix}$

**Side View Dimensions:**

- Overall height:  $13.5 \pm 0.3$
- Top flange thickness:  $0.4 \pm 0.2$
- Bottom flange thickness:  $3.5 \pm 0.3^*$
- Bottom flange mounting holes:  $\varnothing 0.45(M) A \ B$

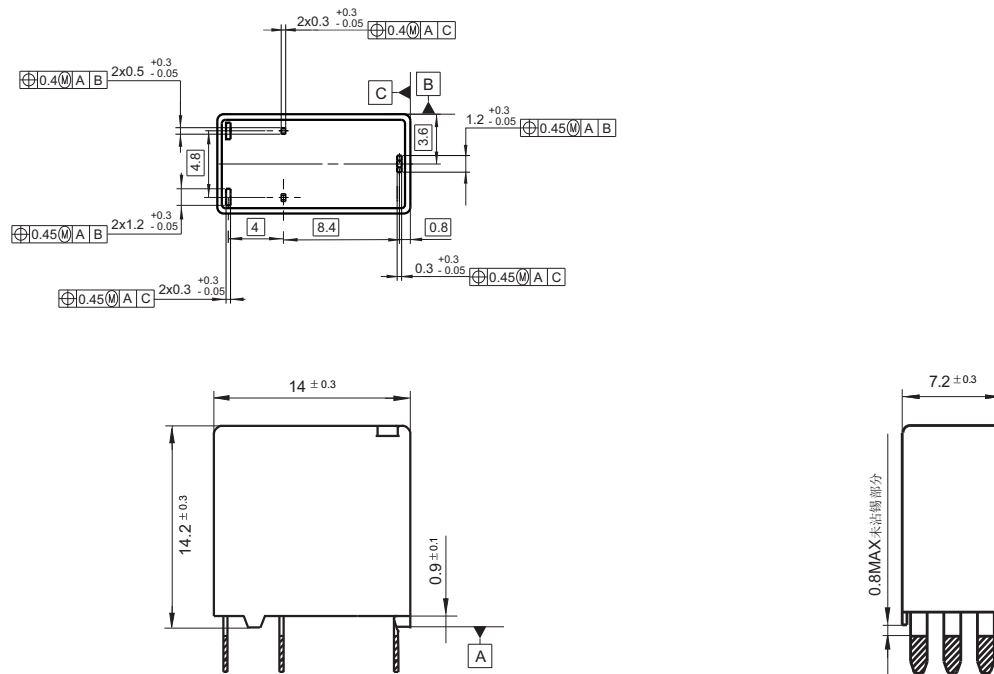
30

# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

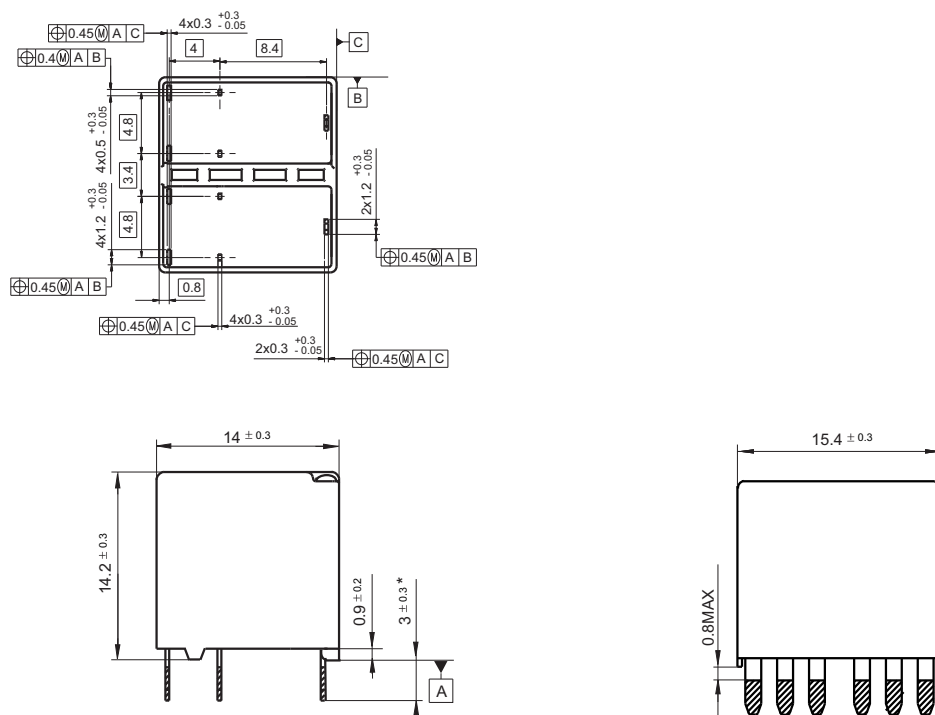
Unit: mm

HFKA-T (Reflow soldering version / High-temperature version)

1Z: 1 Form C (Single version)



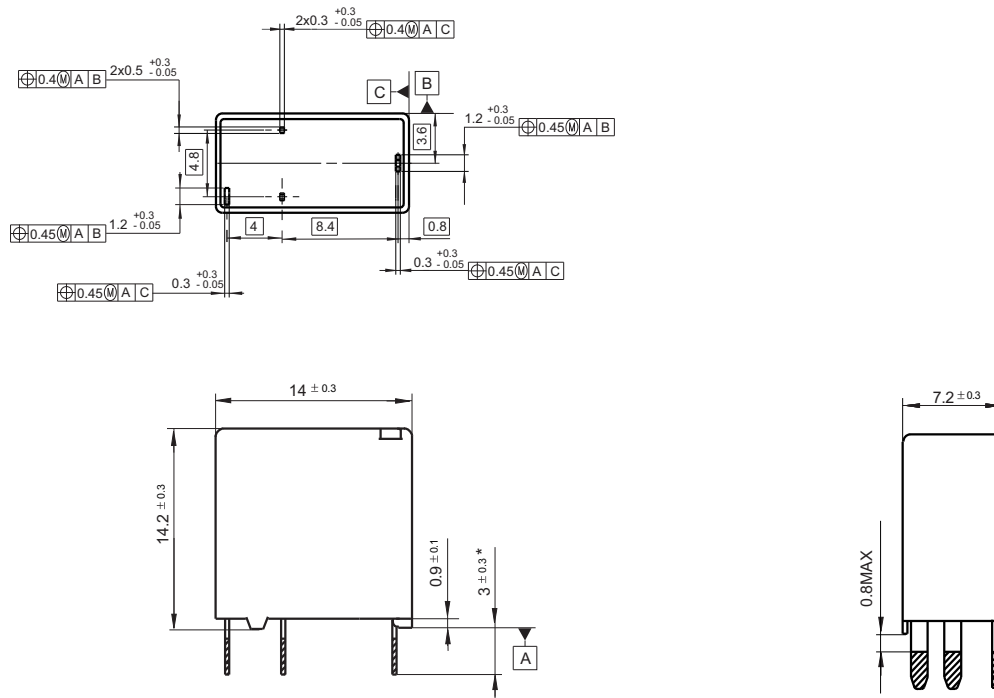
2Z: 2 Form C (Twin version)



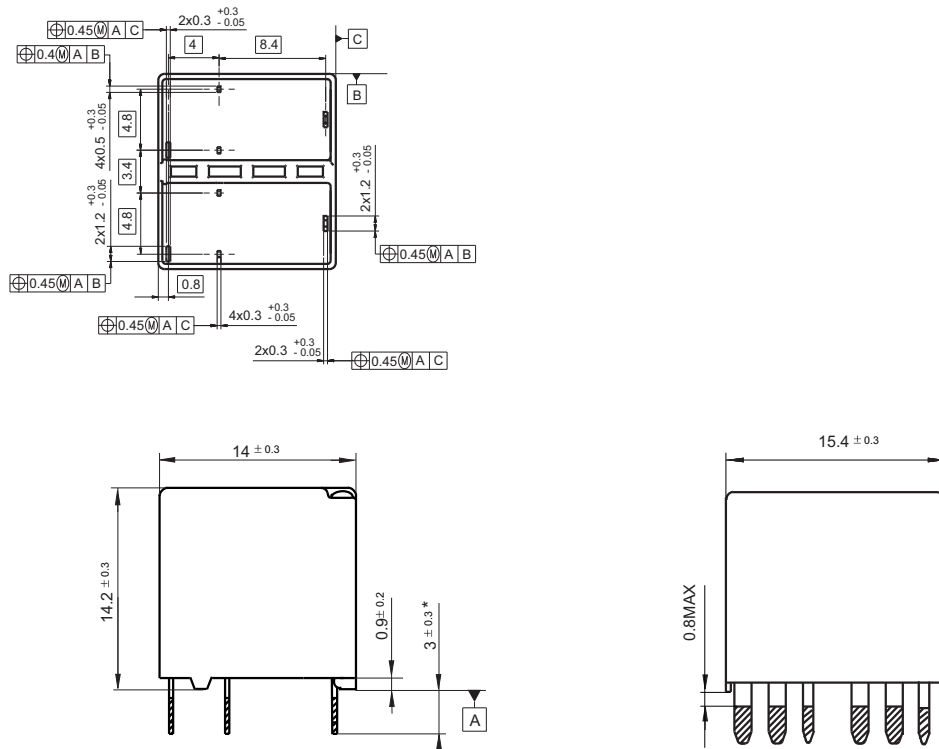
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

1H: 1 Form A (Single version)



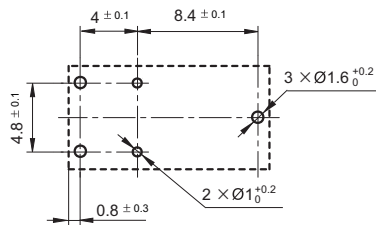
2H: 2 Form A (Twin version)



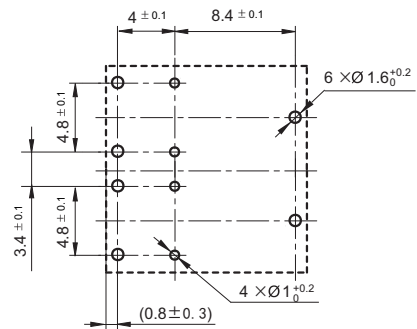
Remark: \* The additional tin top is max. 1mm.

## PCB Layout (Bottom view)

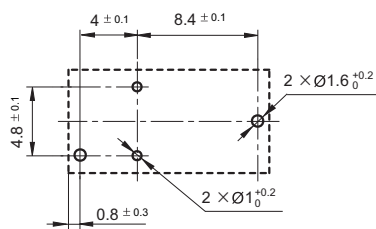
1Z: 1 Form C (Single version)



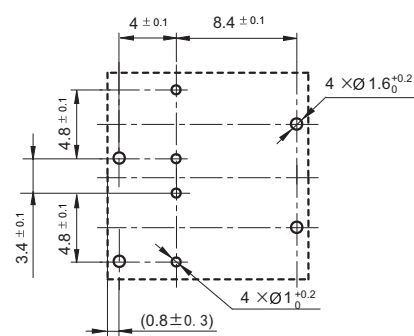
2Z: 2 Form C (Twin version)



1H: 1 Form A (Single version)

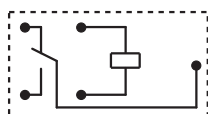


2H: 2 Form A (Twin version)

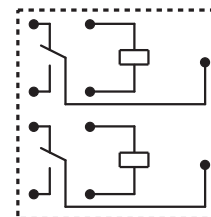


## Wiring Diagram (Bottom view)

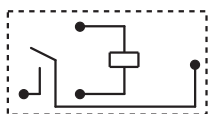
1Z: 1 Form C (Single version)



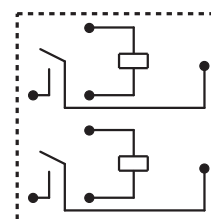
2Z: 2 Form C (Twin version)



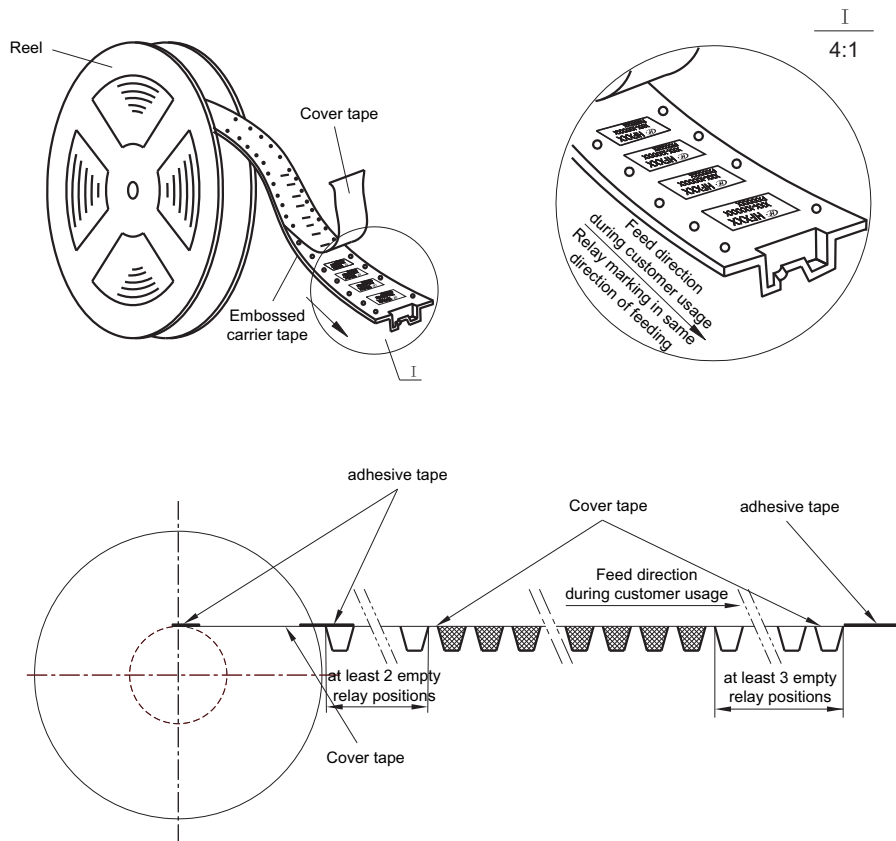
1H: 1 Form A (Single version)



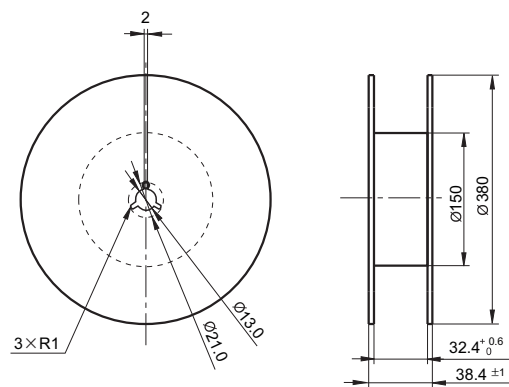
2H: 2 Form A (Twin version)



## Direction of Relay Insertion

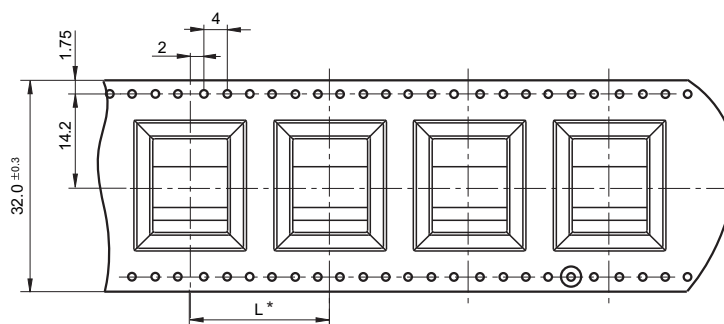


## Reel Dimensions





## Tape Dimensions

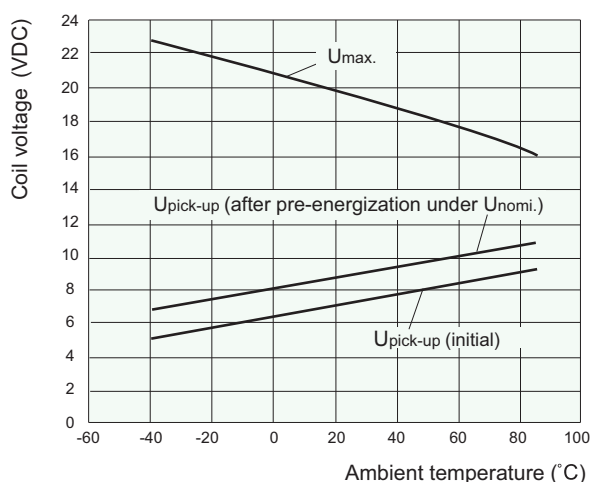


Remark: \* For Single relay, L is 20mm; for Twin relay, L is 28mm.

## CHARACTERISTIC CURVES

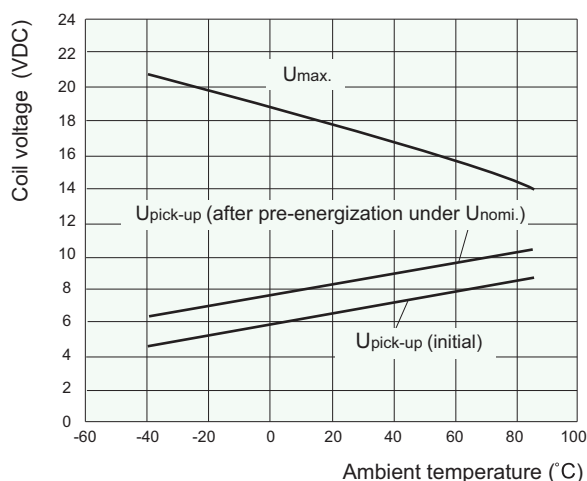
### 1. Coil operating voltage range

#### 225Ω coil resistance



- 1) There should be no contact load applied when maximum continuous operation voltage is applied on coil.
- 2) The operating voltage is connected with coil pre-energized time and voltage. After pre-energized, the operating voltage will increase.
- 3) The maximum allowable coil temperature is 180°C. For the coil temperature rise which is measured by resistance is average value, we recommend the coil temperature should be below 170°C under the different application ambient, different coil voltage and different load etc.
- 4) If the actual operating coil voltage is out of the specified range, please contact Hongfa for further details.

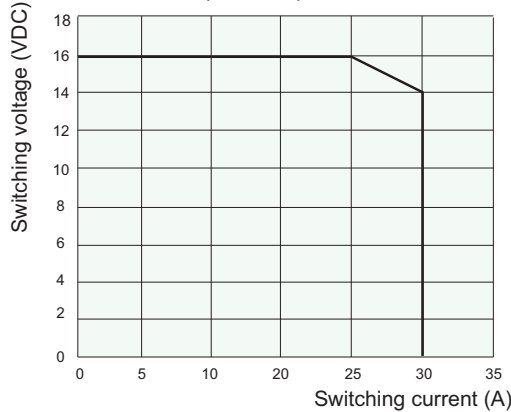
#### 180Ω coil resistance



- 1) There should be no contact load applied when maximum continuous operation voltage is applied on coil.
- 2) The operating voltage is connected with coil pre-energized time and voltage. After pre-energized, the operating voltage will increase.
- 3) The maximum allowable coil temperature is 180°C. For the coil temperature rise which is measured by resistance is average value, we recommend the coil temperature should be below 170°C under the different application ambient, different coil voltage and different load etc.
- 4) If the actual operating coil voltage is out of the specified range, please contact Hongfa for further details.

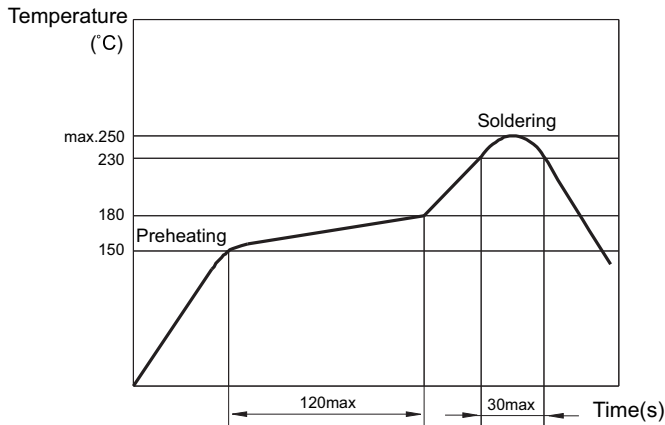
## CHARACTERISTIC CURVES

### 2. Load limit curve (at 23°C)



- 1) This chart takes NO contact, resistive load as example.
- 1) The load and electrical endurance tests are made according to "CONTACT DATA" parameters' table. If actual load voltage, current or operate frequency is different from "CONTACT DATA" table, please arrange corresponding tests for confirmation.

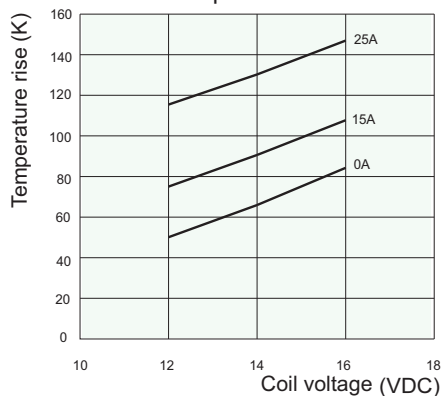
### 3. Reflow soldering, temperature on PCB board. (Recommended soldering temperature, only for reflow soldering version)



### 4. Coil temperature rise

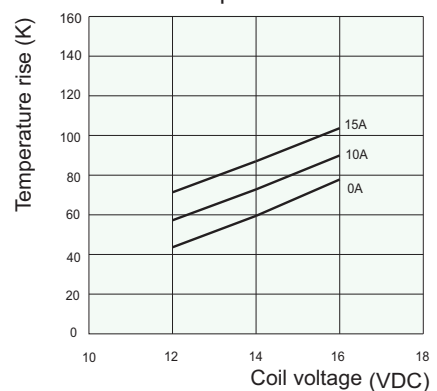
#### (1) Coil temperature rise (23°C)

Experiment: HFKA/012-1ZSPT  
Amount: three  
Carrying current: 0A, 15A, 25A  
Ambient temp: 23°C



#### (2) Coil temperature rise (85°C)

Experiment: HFKA/012-1ZSPT  
Amount: three  
Carrying current: 0A, 15A, 25A  
Ambient temp: 85°C



Remark: The coil temperature rise test requires the relay to be installed on the PCB. The PCB is double-layered. The thickness of the copper foil is 4 oz (140 μm), the width of each copper foil is  $3.76 \times (1 \pm 5\%)$  mm, the length of the copper foil is  $50\text{mm} \pm 1\text{mm}$ , and the Tg value of the PCB board is 150°C. The installation spacing between relay samples is 100mm.

### Disclaimer

The specification is for reference only. See to "Terminology and Guidelines" for more information. Specifications subject to change without notice. In case there is specific criterion (such as mission profile, technical specification, PPAP etc.) checked and agreed by and between customer and Hongfa, this specific criterion should be taken as standard regarding any requirement on Hongfa product.

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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