

# HFK9-TC

## AUTOMOTIVE RELAY



### Typical Applications

High voltage pre-charge relay applications for electric vehicles (HEV, PHEV, BEV, FCEV), etc.

### Features

- Automotive pre installed relay
- Max. pre charge current: 20A (at 23°C)
- Max. switching voltage: 500V
- Small size: 20mm×17.8mm×17.6mm
- RoHS compliant

## CHARACTERISTICS

Contact arrangement	1A	
Voltage drop <sup>1)</sup>	Typ.:100mV(at 10A) Max.:300mV (at 10A)	
	330V Type	450V Type
Rated switching capacity	20A 330VDC	20A 450VDC
Max.continuous current <sup>2)</sup>	25A continuous (at 23°C) 15A continuous (at 85°C)	10A continuous (at 23°C) 20A /30min(at 23°C)
Max.switching voltage/power	420VDC/8.4kW	500VDC/9.0kW
Dielectric strength <sup>3)</sup>	Between normally open contacts <sup>4)</sup>	2500VDC
	Between coil & contacts	2800VDC
Min.contact load	1A 12VDC(at 23°C)	
Electrical endurance	See “CONTACT DATA”	
Mechanical endurance	1×10 <sup>6</sup> OPS 300 OPS/min	
Insulation resistance	100MΩ (at 500VDC)	
Operate time	Typ.:4ms; Max:10ms	
Release time <sup>5)</sup>	Typ.:1.5ms; Max:10ms	

Ambient temperature	-40°C to 85°C	
Vibration resistance	Functional <sup>6)</sup>	10Hz to 100Hz, 100m/s <sup>2</sup>
	Destructive	10Hz to 500Hz, 100m/s <sup>2</sup>
Shock resistance	Functional <sup>6)</sup>	100 m/s <sup>2</sup>
	Destructive	1000 m/s <sup>2</sup>
Termination	PCB <sup>7)</sup>	
Construction	Plastic sealed, Flux Proofed	
Unit weight	Approx. 10g	

Notes:1) Initial value;

2) The test under the following conditions:

a. The relay is mounted on the PCB, the coil is applied with 100% rated voltage;

b. The PCB is a double layer board, the thickness of the copper foil is 4 oz(140μm), the width of each copper foil is 3.76×(1±5%)mm, the length of the copper foil is (50±1)mm, and the Tg value of the PCB is 150°C;

c. Mounting distance:100mm;

3) 1 min , leakage current less than 3.5mA;

4) See "Wiring Diagram", Dielectric strength between 5a and 5b;

5) The value is measured when voltage drops suddenly from nominal voltage to 0VDC and coil is not paralleled with suppression circuit;

6) Under the condition of coil excitation and de-excitation, the release time of the closed NO contacts and the close time of NO contacts shall not exceed 1ms;

7) 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>1) 2)</sup>

at 23°C

	Load voltage VDC	Load type		Load curren A	On/Off ratio		Electrical endurance ops	Contact material
				1H	On s	Off s		
330V Type	330	Resistive	Make	20	0.6	5.4	3×10 <sup>4</sup>	AgSnO <sub>2</sub>
			Break	0				
	420		Make	15	0.6	5.4	3×10 <sup>3</sup>	AgSnO <sub>2</sub>
			Break	15				



HONGFA RELAY

ISO9001, IATF16949, ISO14001, ISO45001, IECQ QC 080000, ISO/IEC 27001 CERTIFIED

2025 Rev. 1.00

**CONTACT DATA** <sup>1) 2)</sup>

at 23°C

	Load voltage VDC	Load type		Load current A	On/Off ratio		Electrical endurance ops	Contact material
				1H	On s	Off s		
450V Type	450	Resistive	Make	20	0.6	5.4	1×10 <sup>5</sup>	AgSnO <sub>2</sub>
			Break	0				
			Make	10	0.6	5.4	3×10 <sup>4</sup>	AgSnO <sub>2</sub>
			Break	10				
			Make	20	0.6	5.4	3×10 <sup>3</sup>	AgSnO <sub>2</sub>
			Break	20				

Notes: 1) If the load conditions are not consistent with this table, please provide the corresponding detailed conditions to Hongfa for more support.

2) Loads mentioned in this chart is for relays with no parallel diode or Zener Diode. When relay coils are connected in parallel with diode or Zener Diode, the contact wear will be aggravated and the risk of contact sticking will be increased, that is, the life of the relay will be reduced. For those with parallel diode, Zener Diode or other components, please contact Hongfa for more technical supports.

**COIL DATA**

	Nominal voltage VDC	Set voltage VDC			Drop-out Voltage VDC			Coil resistance ×(1±10%) Ω			Coil Power W
		-40°C	23°C	85°C	-40°C	23°C	85°C	-40°C	23°C	85°C	
450V Type <sup>1)</sup>	12	≤6.8	≤9.0	≤11.3	≥0.7	≥1.0	≥1.2	37.4	50	62.4	2.88
330V Type	12	≤6.8	≤9.0	≤11.3	≥0.7	≥1.0	≥1.2	82.3	110	137.3	1.31

Notes: 1) For the 50Ω specification, when the ambient temperature is higher than room temperature, the maximum excitation time of the coil should not exceed 2s.

**ORDERING INFORMATION**

	HFK9-TC /		450	-12	-H	S	T	(XXX)
Type	HFK9-TC: Reflow soldering version/ High heat-resistant magnetic blowing arc-quenching version							
Contact Voltage	450:	450VDC	330:	330VDC				
Coil voltage	12:	12VDC						
Construction	H:	1 Form A						
Sort	S:	Plastic sealed <sup>1)</sup>	Nil:	Non-plastic type				
Contact material	T:	AgSnO <sub>2</sub>						
Special code <sup>2)</sup>	XXX:	Customer special requirement	Nil:	Standard				

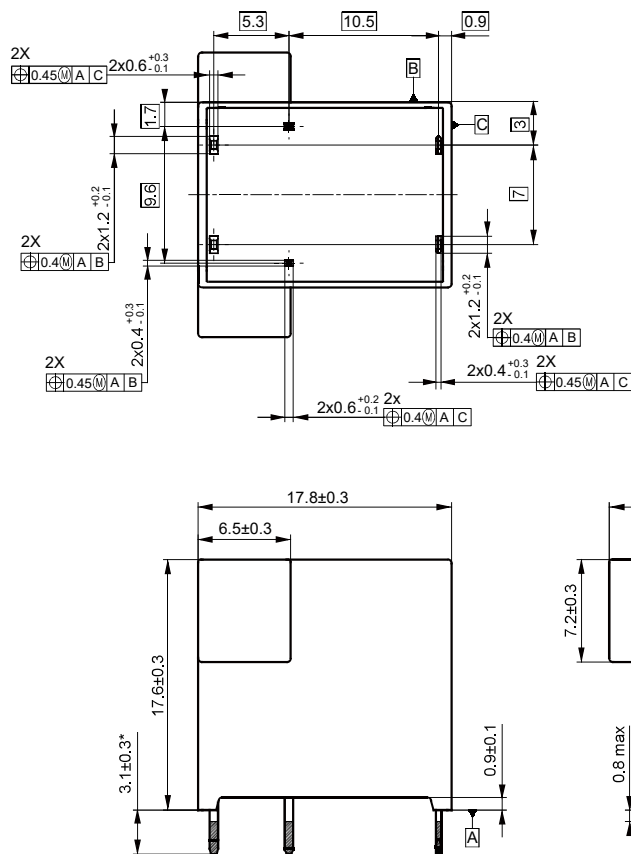
Notes: 1) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

2) The customer special requirement express as special code after evaluating by Hongfa. For example: 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

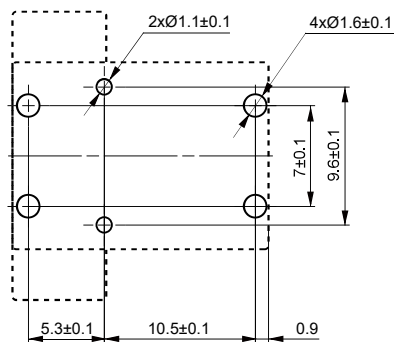
Unit: mm

## Outline Dimensions



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

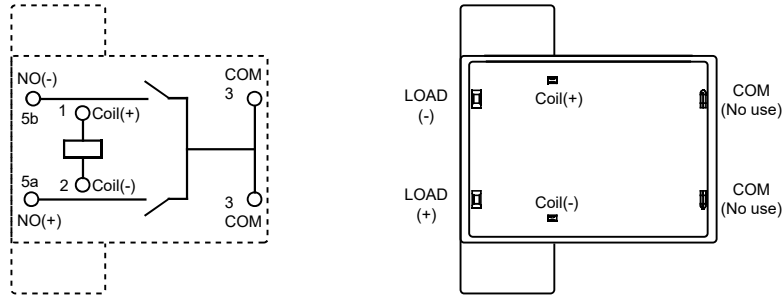
## PCB Layout(Bottom view)



## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

Wiring Diagram(Bottom view)



- Notes:
- 1) COM terminal is at HV potential only when the relay is closed. This terminal must not be connected electrically.
  - 2) Polarity option on the loads and coil. If the loading polarity is connected reversedly, it will reduce loading switch performance and the electricity duration cannot meet the requirement.

### Precautions for use:

Magnetic steel arc extinction relays should avoid to use in the environment of strong magnetic field, which will affect the arc extinction performance of the product.

### 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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