HFK9-TC AUTOMOTIVE RELAY

Features

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

Typical Applications

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

CHARACTERISTICS

Contact arrangement		1A	
Voltage drop[1]		Typ.:100mV(at 10A) Max.:300mV (at 10A)	
Coil Power		**Low power type**	**standard type**
Rated switching capacity		20A 330VDC	20A 450VDC
Max.continuous current[2]		25A continuous (at 23℃) 15A continuous (at 85℃)	10A continuous (at 23℃) 20A/30min(at 23℃)
Max.swtiching voltage/power		420VDC/8.4kW	500VDC/9.0kW
Withstand voltage[3]	Between normally open contacts[4]	2500VDC	2500VDC
	Between coil & contacts	2800VDC	3000VDC
Min.contact load[5]		1A 12VDC(at 23℃)[5]	
Electrical endurance		See “CONTACT DATA”	
Mechanical endurance		1×10⁶ OPS 300 OPS/min	
Insulation resistance		1000MΩ (at 500VDC)	
Operate time		Typ.:4ms；Max:10ms	
Release time[6]		Typ.:1.5ms；Max:10ms	
Ambient temperature		-40℃ to 85℃	
Vibration resistance	Functional[7]	10Hz to 100Hz,100m/s²	
	Destructive	10Hz to 500Hz,100m/s²	
Shock resistance	Functional[7]	100 m/s²	
	Destructive	1000 m/s²	
Termination		PCB[8]	
Construction		Plastic sealed, Flux Proofed	
Unit weight		Approx. 10g	

1) Initial value；
2) The test under the follow 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 4oz(140μm),the width if 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. Mounting distance:100mm；
   d. It varies by connection conditions. Additionally, reliable performance under repeated power-on cannot be guaranteed. Verify based on actual operating conditions during use.
3) 1 min , leakage current less than 3.5mA；
4) See “Wiring Diagram”,Dielectric strength between 5a and 5b；
5) Lower limit target for on-off operation at low load. This value varies by on-off frequency, environmental conditions and expected reliability level; verify with actual load during use；
6) The value is measured when voltage drops suddenly from nominal voltage to 0VDC and coil is not paralleled with suppression circuit；
7) 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；
8) Since it is an environmental friendly product,please select lead-free solder when welding.The recommended soldering temperature and time is (260±3)℃,(5±0.5)s.

CONTACT DATA [1) 2)]

at 23℃

Coil Power	Load voltage VDC	Load type		Load curren A	On/Off ratio		Electrical endurance ops	Contact material
				1A	On s	Off s		
Low power type	330	Resistive	Make	20	0.6	5.4	3×10⁴	$AgSnO_2$
			Break	0				
	420	Resistive	Make	15	0.6	5.4	3×10³	$AgSnO_2$
			Break	15				
standard type	450	Resistive	Make	20	0.6	5.4	1×10⁵	$AgSnO_2$
			Break	0				
			Make	10	0.6	5.4	3×10⁴	$AgSnO_2$
			Break	10				
			Make	20	0.6	5.4	3×10³	$AgSnO_2$
			Break	20				

CONTACT DATA [1) 2)]

at 23℃

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

Coil Power	Nominal voltage VDC	Set voltage VDC max.			Drop-out Voltage VDC min.			Coil resistance ×(1±10%) Ω			Coil Power W
		-40℃	23℃	85℃	-40℃	23℃	85℃	-40℃	23℃	85℃	23℃
Standard type[1)]	12	6.8	9.0	11.3	0.7	1.0	1.2	37.4	50	62.4	2.88
Low power 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 / -12 -H S L T (XXX)

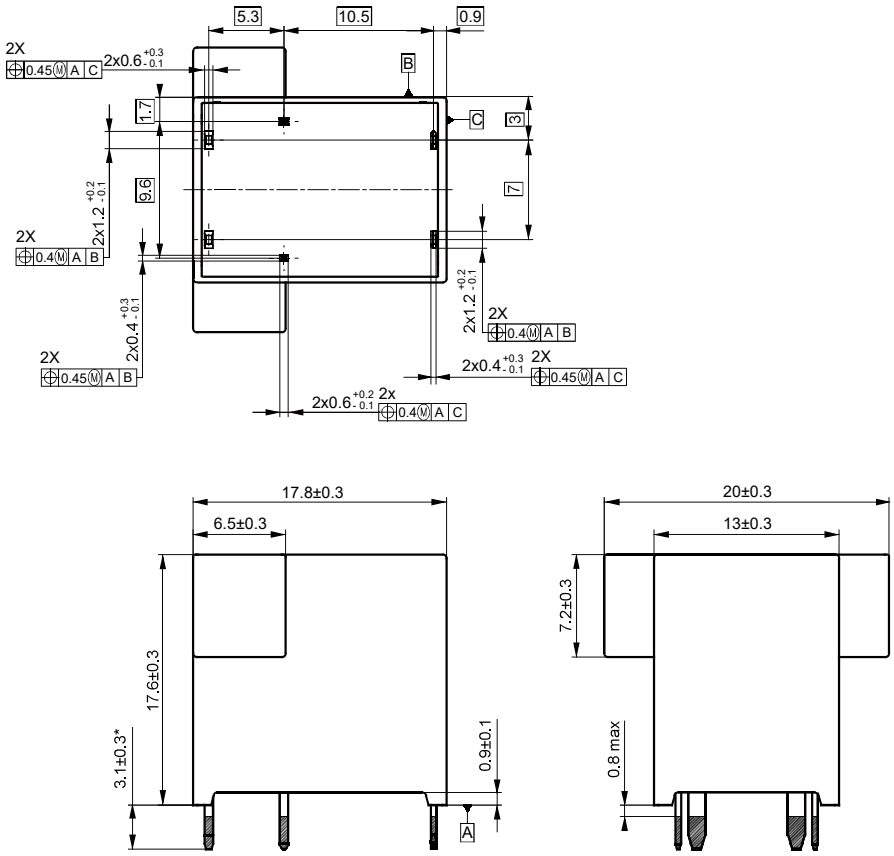
Type	**HFK9-TC**： Reflow soldering version/ High heat-resistant magnetic blowing arc-quenching version	
Coil voltage	**12**：12VDC	
Contact arrangement	**H**：1 Form A	
Construction	**S**：Plastic sealed[1)]	**Nil**：Non-plastic type
Coil Power	**L**：Low power type[1)]	**Nil**：Standard type
Contact material	**T**：$AgSnO_2$	
Special code[2)]	**XXX:** Customer special requirement	**Nil:** Standard

Notes:1) Contact us for suitable soldering conditions and product specifications if post-soldering cleaning or surface treatment is required after the relays are soldered onto the 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

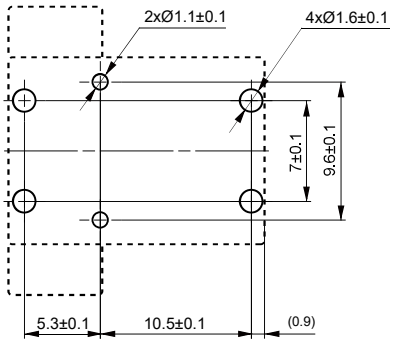
Unit: mm

Outline Dimensions



Notes:∗ The additional tin top is max. 1mm.

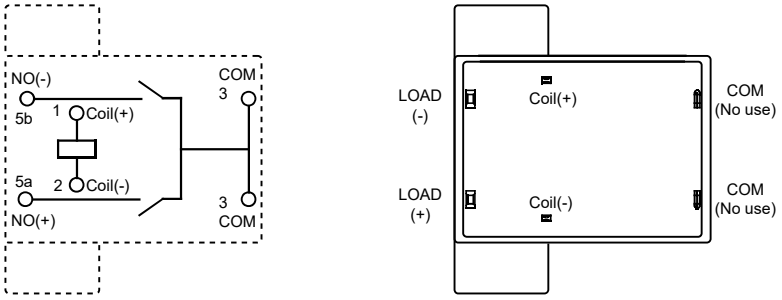
PCB Layout(Bottom view)



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.