HFK9-T AUTOMOTIVE RELAY

Typical Applications

Rear window defogger, Lamp control,Trumpet control, Seat heater,Wiper control,Cooling fan, EPS, Start/Stop control,etc.

Features

- Max.continous current 60A
- Max.making current 200A
- Extended temp. range up to 125˚C
- With highly established reliability
- Strong resistance ability to shock & vibration
- RoHS & ELV compliant

CHARACTERISTICS

Contact arrangement	1A, 1C, 1U	
Voltage drop(initial)[1]	Typ.: 40mV(at 10A) Max.: 250mV(at 10A)	
Max. continuous current[2]	1A, 1C 47.5A 30min/35A continuous (at 23˚C) 44A 30min/25A continuous (at 85˚C) 41A 30min/15A continuous (at 125˚C)	1U **Standard Type:** 67.5A 30min/50A continuous (at 23˚C) 62.5A 30min/35A continuous (at 85˚C) 58.5A 30min/25A continuous (at 125˚C) **Low-Power Type:** 81A 30min/60A continuous (at 23˚C) 45A continuous(at 85˚C) 30A continuous(at 125˚C)
Max. switching current	Make: 84A[3] Break: 30A	Make: 200A[3] Break: 50A
Max. switching voltage	16VDC	
Min. contact load[4]	1A 12VDC	
Electrical endurance	See "CONTACT DATA"	
Mechanical endurance	1 x 10^7 OPS	
Initial insulation resistance	100MΩ (at 500VDC)	
Withstand voltage[5]	500VAC	
Operate time	Typ.: 4ms, Max.: 10ms	
Release time[6]	Typ.: 1.5ms, Max.: 10ms	
Ambient temperature	HFK9-T: -40˚C to 125˚C	
Vibration resistance[7]	10Hz to 100Hz, 44.1 m/s^2	
Shock resistance[7]	100 m/s^2,	
Termination	PCB [8]	
Construction	Flux proofed	
Unit weight	Approx. 10g	

1) Initial value,Equivalent to the max. initial contact resistance is 100mΩ (at 1A 6VDC).
2) Test under the following conditions:
   a. The relay is mounted on the PCB, the coil is applied with 100% rated voltage;
   b. **1H and 1Z version**: double board, copper foil thickness of 4oz(140 μm); NO, NC and Com side copper foil width of 7.52x(1±5%)mm,copper foil length (50±1)mm;
   SH Standard version: double board, copper foil thickness of 4 oz (140μm);NO and Com side copper foil width of 10.64x(1±5%)mm,copper foil length (50±1)mm; The Tg value of the PCB board is 150˚C.
   SH Low-Power version: double board, copper foil thickness of 4 oz (140μm);NO and Com side copper foil width of 13.15x(1±5%)mm, copper foil length (50±1)mm; The Tg value of the PCB board is 150˚C.
   c.The installation spacing between relay samples is 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) Inrush peak current under lamp load, at 14VDC.
4) 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.
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 100μs,When energized, opening time of closed NO contacts shall not exceed 100μs.
8) Since it is an environmentally friendly product, please select lead - free solder when welding. The recommended soldering temperature and time is(260±3)˚C , (5±0.5)s.

CONTACT DATA[1]

at -40˚C to 125˚C

Load voltage	Load type		Load current A			On/Off ratio		Electrical endurance [1] OPS	Contact material	Load wiring diagram[2]
			1A, 1C		1U	On s	Off s			
			NO	NC						
14VDC	Resistive	Make	30	15	50	2	2	1×10^5	$AgSnO_2$	See diagram 1
		Break	30	15	50					
	Inductive L=0.5mH	Make	30	—	80	2	2	1×10^5	$AgSnO_2$	See diagram 2
		Break	30	—	33					
	Lamp	Make	84	—	—	2	2	2×10^5	$AgSnO_2$	See diagram 3
		Break	12	—	—					
		Make	—	—	200	2	2	1×10^5	$AgSnO_2$	See diagram 4
		Break	—	—	20					

Notes:1) Loads mentioned in this chart is for relays with no parallel diode or Zener Diode. For those with parallel diode, Zener Diode or other components, please contact Hongfa for more technical supports.
Please also contact Hongfa if the actual application load is diffrent from what mentioned aboved.

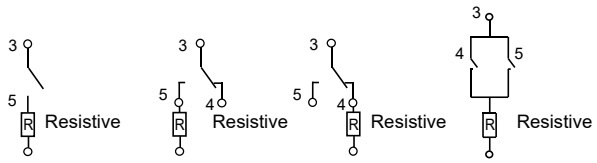


Diagram 1

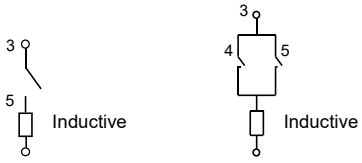


Diagram 2

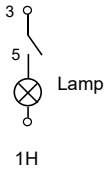


Diagram 3

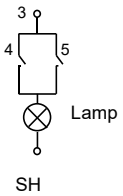


Diagram 4

COIL DATA

Type	Nominal voltage VDC	Pick-up voltage VDC max.			Drop-out voltage VDC min.			Coil resistance x(1±10%)Ω			Coil power consumption W
		23˚C	85˚C	125˚C	23˚C	85˚C	125˚C	23˚C	85˚C	125˚C	23˚C
Standard type	12	7	8.8	9.9	1.0	1.2	1.4	160	200	225	0.9
Low-power type (1C/1A)	12	7.5	9.4	10.6	1.0	1.2	1.4	225	281	317	0.64
Low-power type (1U)	12	7.5	9.4	10.6	1.0	1.2	1.4	200	250	282	0.72

ORDERING INFORMATION

	HFK9-T /	12	-SH	S	L	T	(XXX)

Type **HFK9-T**: Reflow soldering version or high heat-resistant version

Coil voltage **12**: 12VDC

Contact arrangement **SH**: 1 Form U **1H**: 1 Form A **1Z**: 1 Form C

Construction **S**: Plastic sealed [1] **Nil:** Flux proofed

Coil power **L**: low power consumption[2] **Nil:** 0.9W

Contact Material **T**: $AgSnO_2$

Special code [3] **XXX:** Customer special requirement **Nil:** Standard

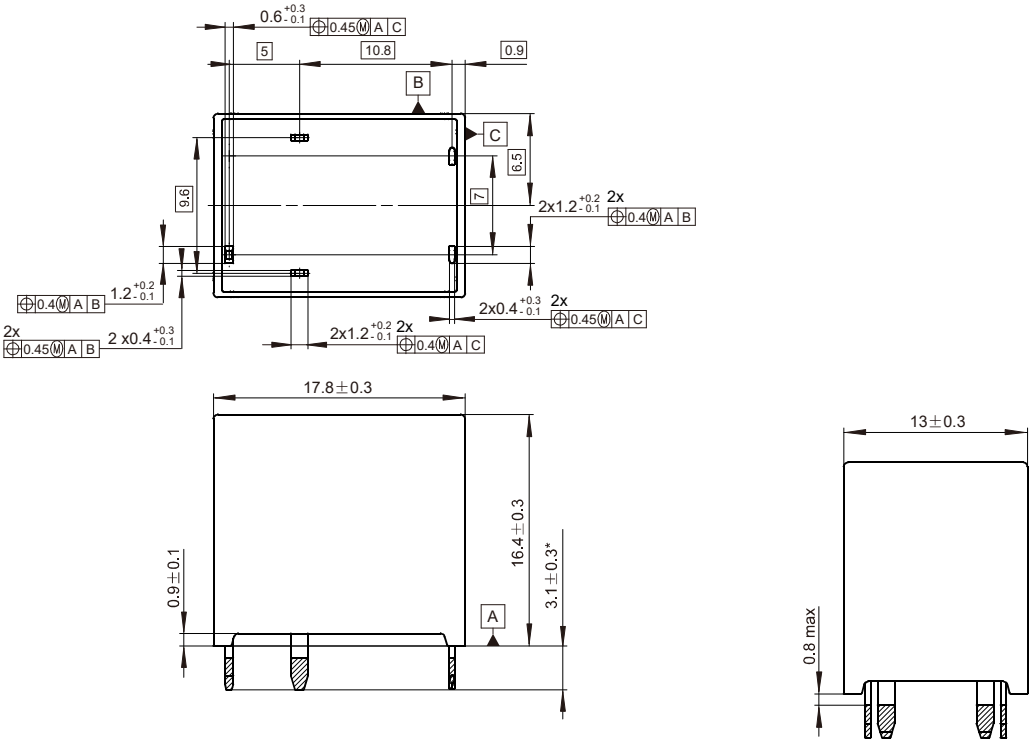
Notes: 1) Contact us for suitable soldering conditions and product specifications if post-soldering cleaning or surface treatment is required after the relays are soldered onto the PCB.
2) The HFK9 - T/1H or 1Z low - power consumption type has a coil power consumption of 0.64W; the HFK9 - T/SH low - power consumption type has a coil power consumption of 0.72W.
3) 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

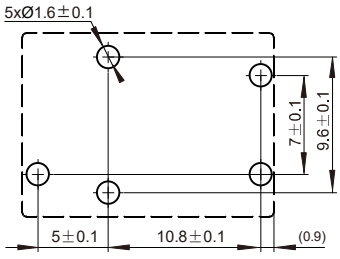
Unit: mm

HFK9/1H

Outline Dimensions



PCB Layout (Bottom view)



Remark: 1）* The additional tin top is max.

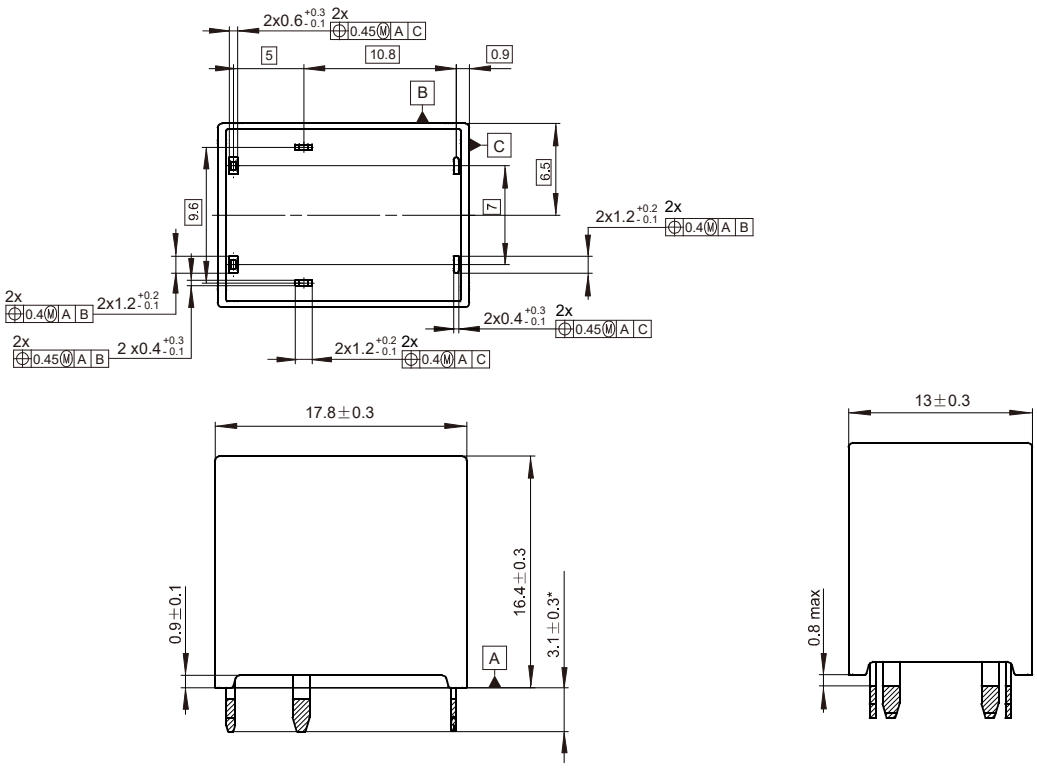
2）PC board dimensions hadn't specified tolerance: ±0.1

OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

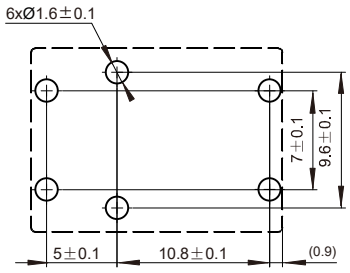
Unit: mm

HFK9-T/SH or 1Z

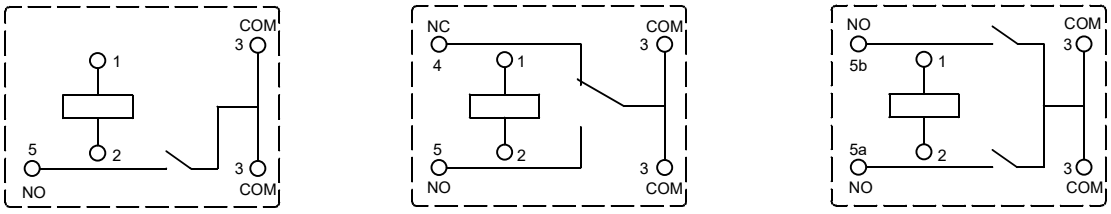
Outline Dimensions



PCB Layout (Bottom view)



Wiring Diagram(Bottom view)

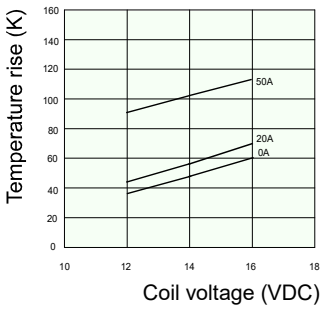


1 Form A　　1 Form C　　1 Form U

CHARACTERISTIC CURVES

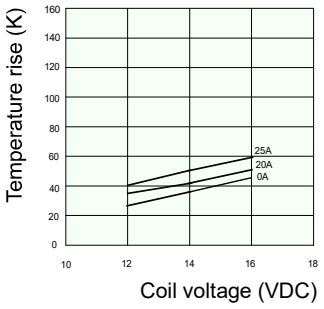
(1) Coil temperature rise (23˚C)

Experiment：HFK9-T/12-SHT
Amount：three
Carrying current：0A,20A,50A
Ambient temp.：23˚C



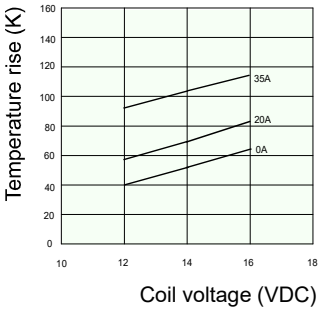
(2) Coil temperature rise (125˚C)

Experiment：HFK9-T/12-SHT
Amount：three
Carrying current：0A,20A,25A
Ambient temp.：125˚C



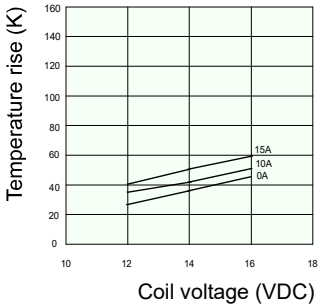
(3) Coil temperature rise (23˚C)

Experiment：HFK9-T/12-1HT
Amount：three
Carrying current：0A,20A,35A
Ambient temp.：23˚C



(4) Coil temperature rise(125˚C)

Experiment：HFK9-T/12-1HT
Amount：three
Carrying current：0A,10A,15A
Ambient temp：125˚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 7.52 × (1 ± 5%) mm, the length of the copper foil is 50mm±1mm, and the Tg value of the PCB board is 150˚C.The installation spacing between relay samples is 100mm.