

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. continuous current 50A
- 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	1U
	47.5A 30min/35A continuous (at 23°C)	67.5A 30min/50A continuous (at 23°C)
	44A 30min/25A continuous (at 85°C)	62.5A 30min/35A continuous (at 85°C)
	41A 30min/15A continuous (at 125°C)	58.5A 30min/25A continuous (at 125°C)
Max. switching current	Make: 84A ³⁾ Break: 30A	Make: 200A ³⁾ Break: 50A
Max. switching voltage	16VDC	
Min. contact load	1A 6VDC	
Electrical endurance	See "CONTACT DATA"	
Mechanical endurance	1 x 10 ⁷ OPS	
Initial insulation resistance	100MΩ (at 500VDC)	
Dielectric strength ⁴⁾	500VAC	
Operate time	Typ.: 4ms, Max.: 10ms	

Release time ⁵⁾	Typ.: 1.5ms Max.: 10ms
Ambient temperature	HFK9-T: -40°C to 125°C
Vibration resistance ⁶⁾	10Hz to 100Hz, 44.1 m/s ²
Shock resistance ⁶⁾	100 m/s ²
Termination	PCB ⁷⁾
Construction	Flux proofed
Unit weight	Approx. 10g

Notes: 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 4 oz (140 μm); NO, NC and Com side copper foil width of 7.52x (1+5%)mm; copper foil length (50±1)mm;
SH version: double board, copper foil thickness of 4 oz (140 μm); NO, NC 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.
c. The installation spacing between relay samples is 100mm.
3) Inrush peak current under lamp load, at 14VDC.
4) 1min, leakage current less than 1mA.
5) The value is measured when voltage drops suddenly from nominal voltage to 0 VDC and coil is not paralleled with suppression circuit.
6) When non-energized, close time of NO contacts shall not exceed 100μs. When energized, opening time of closed NO contacts shall not exceed 100μs.
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 ¹⁾

at -40°C to 125°C

Load voltage	Load type		Load current			On/Off ratio		Electrical endurance ¹⁾ OPS	Contact material	Load wiring diagram
			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					

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 different from what mentioned above.



HONGFA RELAY

ISO9001, IATF16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2020 Rev. 1.00

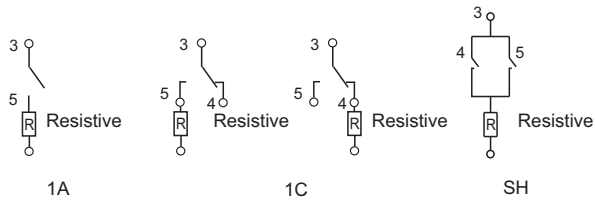


Diagram 1

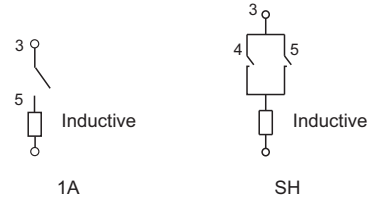


Diagram 2

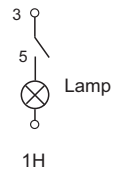


Diagram 3

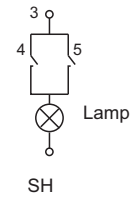


Diagram 4

COIL DATA

Nominal voltage VDC	Pick-up voltage VDC max.			Drop-out voltage VDC min.			Coil resistance $\times(1\pm10\%)\Omega$			Power consumption W
	23°C	85°C	125°C	23°C	85°C	125°C	23°C	85°C	125°C	
12	≤ 7	≤ 8.8	≤ 9.9	≥ 1.0	≥ 1.3	≥ 1.5	160	200	225	0.9
12	≤ 7.5	≤ 9.4	≤ 10.6	≥ 1.0	≥ 1.3	≥ 1.5	225	281	317	0.64

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: 0.64W ²⁾ Nil: 0.9W									
Contact Material	T: AgSnO ₂									
Special code ³⁾	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) For the 1U of contact form products, there is no power consumption of 0.64W specifications.

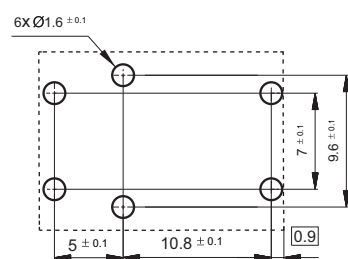
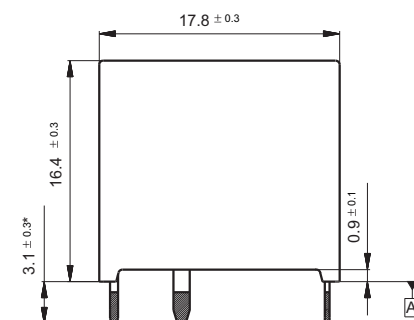
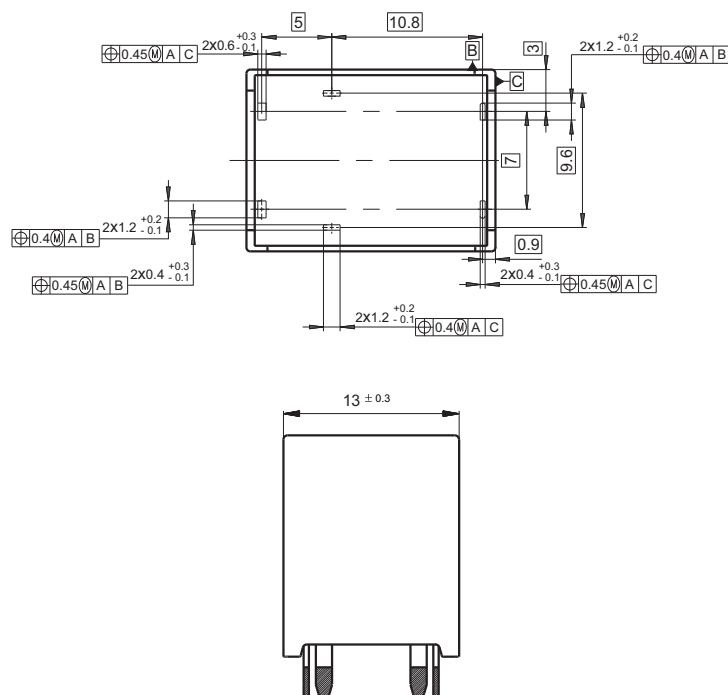
3) The customer special requirement express as special code after evaluating by Hongfa. e.g. (170) stands for flasher load. The performance parameters of products with characteristic numbers shall be subject to the specific specifications provided by Hongfa.

OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

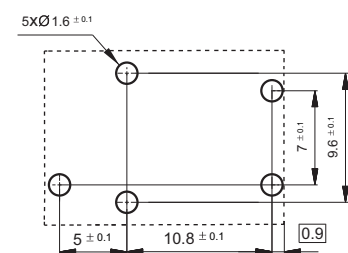
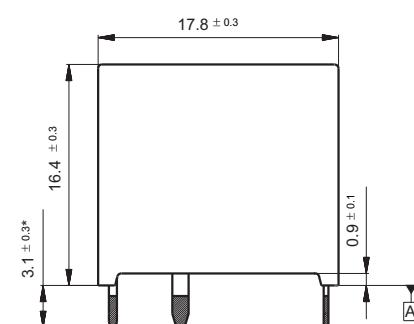
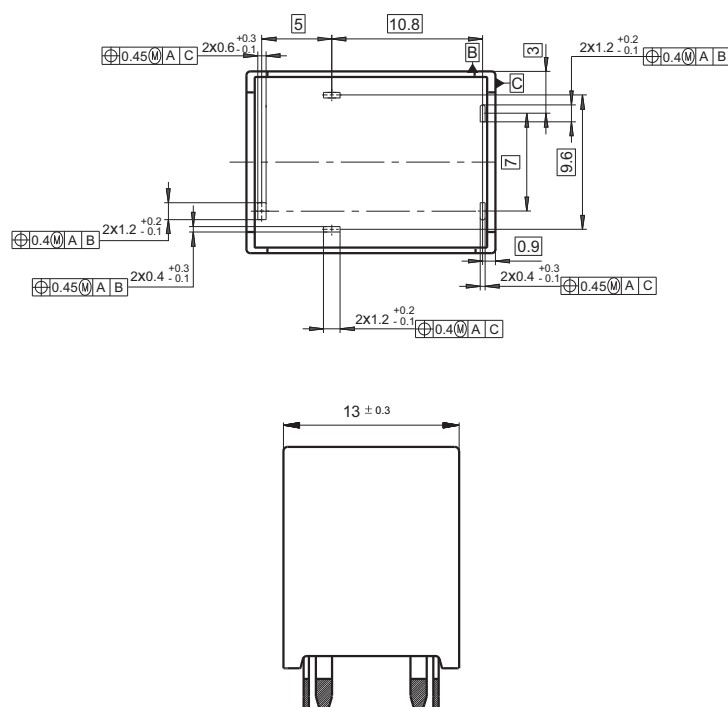
Outline Dimensions

HFK9-SH/1Z



PCB Layout (Bottom view)

HFK9-1H



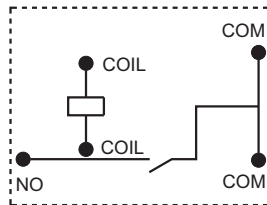
PCB Layout (Bottom view)

Remark: 1) * The additional tin top is max.
2) PC board dimensions hadn't specified tolerance: ±0.1

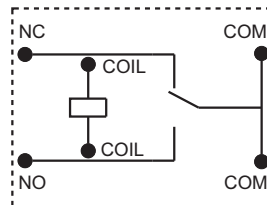
OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

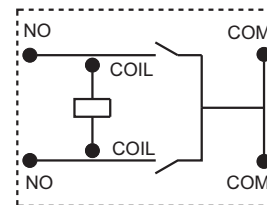
Wiring Diagram(Bottom view)



1H



1Z



SH

CHARACTERISTIC CURVES

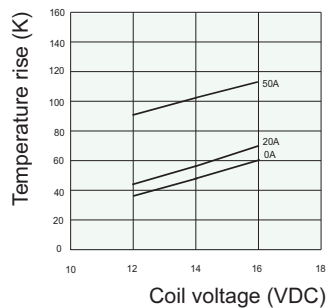
(1) Coil temperature rise (23°C)

Experiment: HFK9-T/12-SHT

Amount: three

Carrying current: 0A, 20A, 50A

Ambient temp.: 23°C



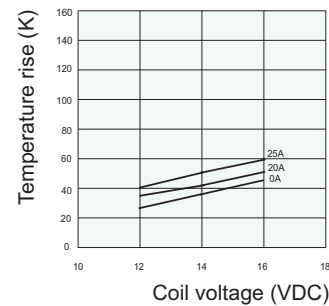
(2) Coil temperature rise (125°C)

Experiment: HFK9-T/12-SHT

Amount: three

Carrying current: 0A, 20A, 25A

Ambient temp.: 125°C



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 10.64 × (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.

CHARACTERISTIC CURVES

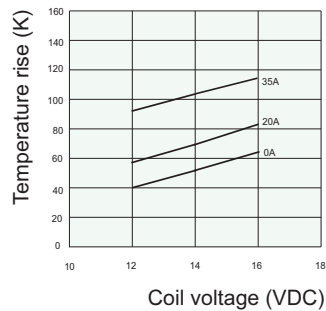
(3) Coil temperature rise (23°C)

Experiment: HFK9-T/12-1HT

Amount: three

Carrying current: 0A, 20A, 35A

Ambient temp.: 23°C



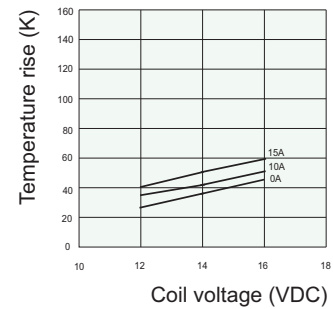
(4) Coil temperature rise (125°C)

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 $7.52 \times (1 \pm 5\%)$ 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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