HFV9 AUTOMOTIVE RELAY

Features

- Extended temp. range up to 125°C
- 1 Form A & 1 Form C contact arrangement
- 2.8mm QC terminals
- RoHS & ELV compliant

Typical Applications

Headlight control, Fuel pump control, Horn control, A/C compressor clutch

CHARACTERISTICS

Contact arrangement	1A, 1C
Voltage drop (initial)	NO:Typ.20mV,250mV max.(at 10A) NC:Typ.25mV,250mV max.(at 10A)
Max.continuous current 1) 8)	30A (at 125°C, 1h)
Max.switching current 8)	Make(NO): 100A 2) Break(NO): 30A (Resistive, 13.5VDC)
Max. switching voltage	See "Load limit curve"
Min. contact load	1A 6VDC
Electrical endurance	See "CONTACT DATA"
Mechanical endurance	$1x10^7$ OPS 300OPS/min
Initial insulation resistance	100MΩ (at 500VDC)
Dielectric strength 3)	between contacts: 500VAC between coil & contacts: 500VAC
Operate time 8)	Typ.: 5ms (at nomi. vol.) Max.: 10ms (at nomi. vol.)
Release time 4) 8)	Typ.: 3ms Max.: 10ms
Ambient temperature	-40°C to 125°C
Shock resistance 5) 8)	196m/s²

Vibration resistance 5) 8)	10Hz to 40Hz 1.27mm DA 40Hz to 70Hz 49m/s² 70Hz to 100Hz 0.5mm DA 100Hz to 500Hz 98m/s²
Flammability 6)	UL94-HB or better (meets FMVSS 302)
Termination	2.8mm QC
Construction	Plastic sealed, Dust protected
Unit weight	Approx. 20g
Mechanical data	cover retention (pull & push): 200N min. terminal retention (pull & push): 100N min. terminal resistance to bending (front & side): 10N min. 7)

1) For NO contacts, measured when applying 100% rated votage on coil.
2) Inrush peak current under lamp load, at 13.5VDC.
3) 1min, leakage current less than 1mA.
4) The value is measured when voltage drops suddenly from nominal voltage to 0 VDC and coil is not paralleled with suppression circuit.
5) When energized, opening time of NO contacts shall not exceed 1ms, when non-energized, opening time of NC contacts shall not exceed 1ms, meantime, NO contacts shall not be closed.
6) FMVSS: Federal Motor Vehicle Safety Standard.
7) Test point is at 2mm away from teminal end, and after removing testing force, the terminal transfiguration shall not exceed 0.5mm.
8) Only for the 12VDC coil voltage type.

CONTACT DATA 2)

Load voltage	Load type		Load current A			On/Off ratio		Electrical endurance OPS	Contact material	Load wiring diagram 1)	Ambient temp.
			1C		1A	On s	Off s				
			NO	NC	NO						
13.5VDC	Resistive	Make	20	10	20	2	2	$1×10^5$	$AgSnO_2$	See diagram 1	See Ambient Temp. Curve
		Break	20	10	20						
	Lamp	Make	100	---	100	2	2	$1×10^5$	$AgSnO_2$	See diagram 2	
		Break	20	---	20						
	Inductive	Make	40	20	40	2	4	$1×10^5$	$AgSnO_2$	See diagram 3	
		Break	20	10	20						
27VDC	Resistive	Make	20	10	20	2	2	$1×10^5$	$AgSnO_2$	See diagram 1	
		Break	20	10	20						

1) The load wiring diagrams are listed below (Ratings of NO, NC are tested based on different samples seperately) :

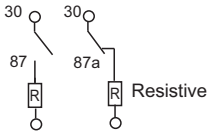


diagram 1

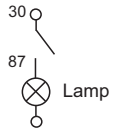


diagram 2

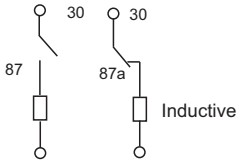


diagram 3

2) 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.

COIL DATA

at 23˚C

Nominal voltage VDC	Pick-up voltage VDC max.	Drop-out voltage VDC min.	Coil resistance x(1±10%)Ω	Parallel resistance x(1±5%)Ω	Equivalent resistance Ω	Power consumption W	Max. allowable overdrive voltage 1) VDC	
							at 23˚C	at 85˚C
12	7.2	1.2	109	---	---	1.3	20.4	14.9
12	7.2	1.2	109	680	93.9	1.5	20.4	14.9
24	14.4	2.4	360	---	---	1.6	36	28
24	14.4	2.4	360	2700	317.6	1.8	36	28

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

ORDERING INFORMATION

HFV9 / 012 -1H S R (XXX)

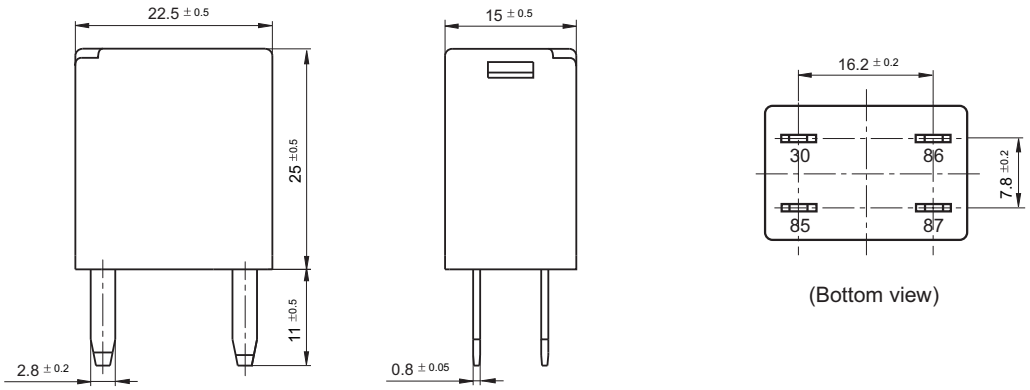
Type	
Coil voltage	**012**: 12VDC **024**: 24VDC
Contact arrangement	**1H**: 1 Form A **1Z**: 1 Form C
Construction	**S**: Plastic sealed **Nil**: Dust protected
Parallel coil components	**R**: Parallel transient supression resistors **Nil**: Without parallel components
Customer special code	

OUTLINE DIMENSIONS AND WIRING DIAGRAM

Unit: mm

Outline Dimensions

HFV9/□□□-1H□□(XXX)



(Bottom view)

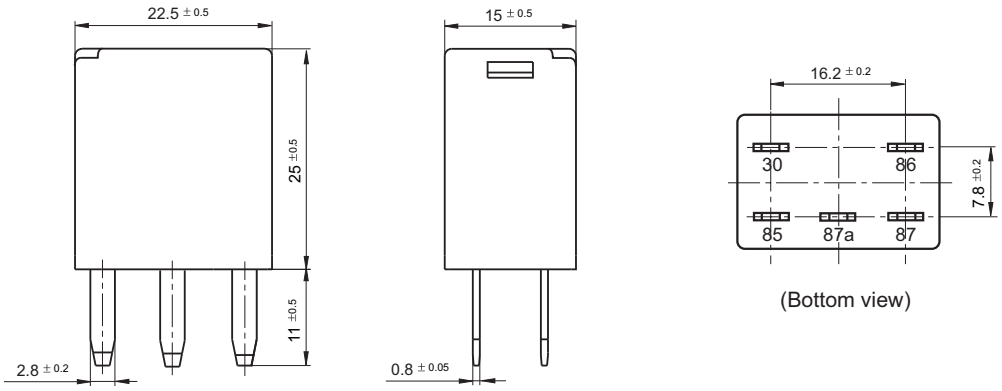
Remark: Terminal vertical deviation tolerance is 0.3mm.

OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

Outline Dimensions

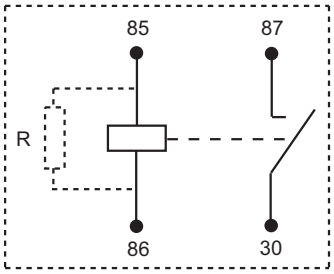
HFV9/□□□-1Z□□(XXX)



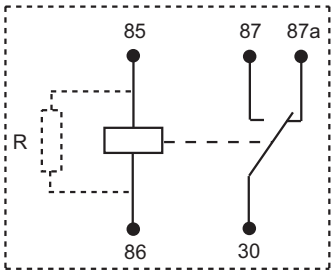
Remark: Terminal vertical deviation tolerance is 0.3mm.

Wiring Diagram

HFV9/□□□-1H□□(XXX)

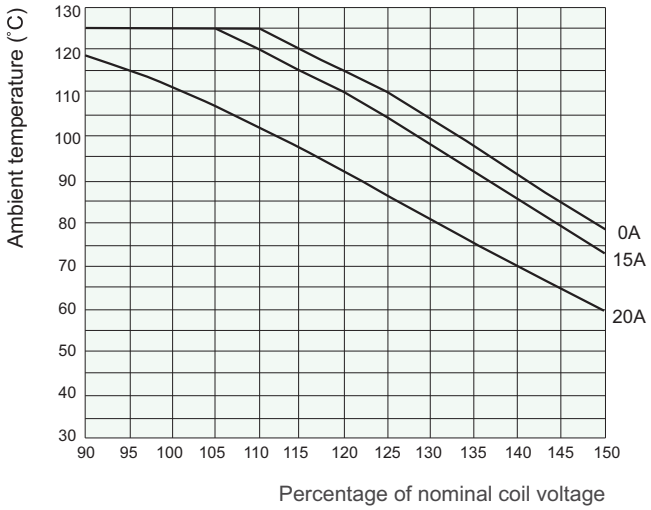


HFV9/□□□-1Z□□(XXX)



CHARACTERISTIC CURVES

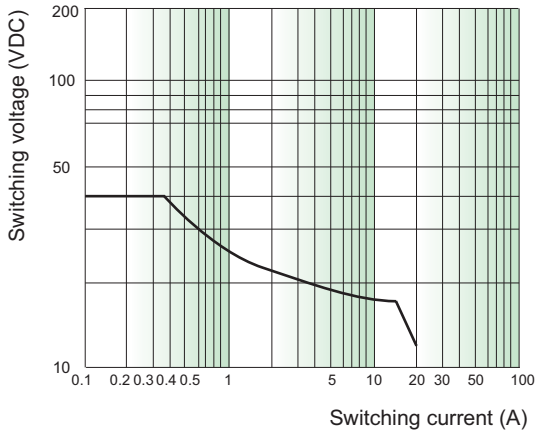
1. Coil operating voltage range



1) There should be no contact load applied when maximum continuous operation voltage is applied on coil.
2) This chart takes 12VDC coil voltage version as example.
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.

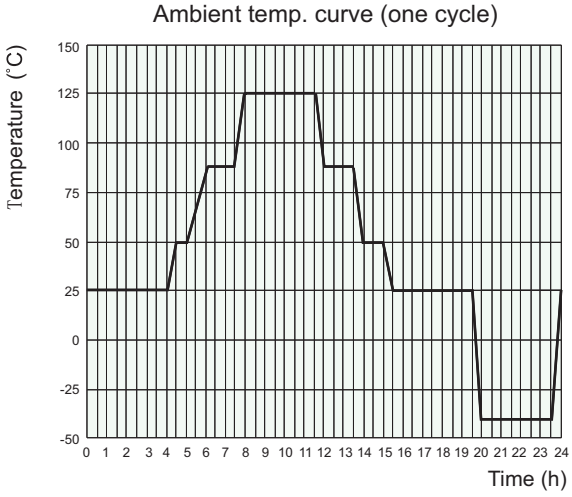
CHARACTERISTIC CURVES

2. Load limit curve (at 23˚C)



1) This chart takes 12VDC, NO contact, resistive load as example.
2) 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. Ambient temperature curve of the electrical endurance test



1) The minimum temperature is -40˚C.
2) The maximum temperature is 125˚C.