

HFKM

AUTOMOTIVE RELAY



Typical Applications

Central door lock, Power doors & windows,
Lighting, flashlight & indicator lamp control, Instrument control,
Sunroof motor control, Immobilizers, Low temperature start

Features

- Switching capability up to 20A
- Six different contact arrangements
- Unenclosed and plastic sealed types available
- RoHS & ELV compliant

CHARACTERISTICS

Contact arrangement	1A, 1B, 1C, 1U, 1V, 1W	Operate time ⁷⁾	Typ.: 3ms (at nomi. vol.) Max.: 10ms (at nomi. vol.)
Voltage drop (initial) ¹⁾	NO:Typ.40mV,250mV max.(at 10A) NC:Typ.50mV,250mV max.(at 10A)	Release time ^{4) 7)}	Typ.: 1.5ms Max.: 10ms
Max. make current ^{2) 7)}	1A:60A 1B:12A 1C(NO/NC): 60/12A 1U: 2×40A 1V:2×8A 1W(NO/NC):2×30A/2×5A	Ambient temperature	-40°C to 85°C
Max. break current ^{2) 7)}	1A: 20A 1B: 10A 1C(NO/NC): 20A/10A 1U: 2×20A 1V: 2×7A 1W (NO/NC): 2×15A/2×5A	Vibration resistance ^{5) 7)}	10Hz to 40Hz 1.27mm DA 40Hz to 70Hz 49m/s ² 70Hz to 100Hz 0.5mm DA 100Hz to 500Hz 98m/s ²
Max. switching voltage	See "Load Limit curve"	Shock resistance ^{5) 7)}	98m/s ²
Min. contact load	1A 6VDC	Termination	PCB ⁶⁾
Electrical endurance	See "CONTACT DATA"	Construction	Plastic sealed, Unenclosed
Mechanical endurance	1 x 10 ⁷ OPS (300OPS/min)	Unit weight	Unenclosed: Approx. 8g Plastic sealed: Approx.12g
Initial insulation resistance	100MΩ (at 500VDC)		
Dielectric strength ³⁾	500VAC		

1) Equivalent to the max. initial contact resistance is 100mΩ (at 1A 6VDC).
2) At 23°C, 13.5VDC, resistive load (100 cycles).
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 100μs, when non-energized, opening time of NC contacts shall not exceed 100μs, meantime, NO contacts shall not be closed.
6) Since it is an environmental friendly product, please select lead-free solder when welding. The recommended soldering temperature and time is (250±3)°C , (5±0.3)s.
7) Only for the 12VDC coil voltage type.

CONTACT DATA ³⁾

at 23°C

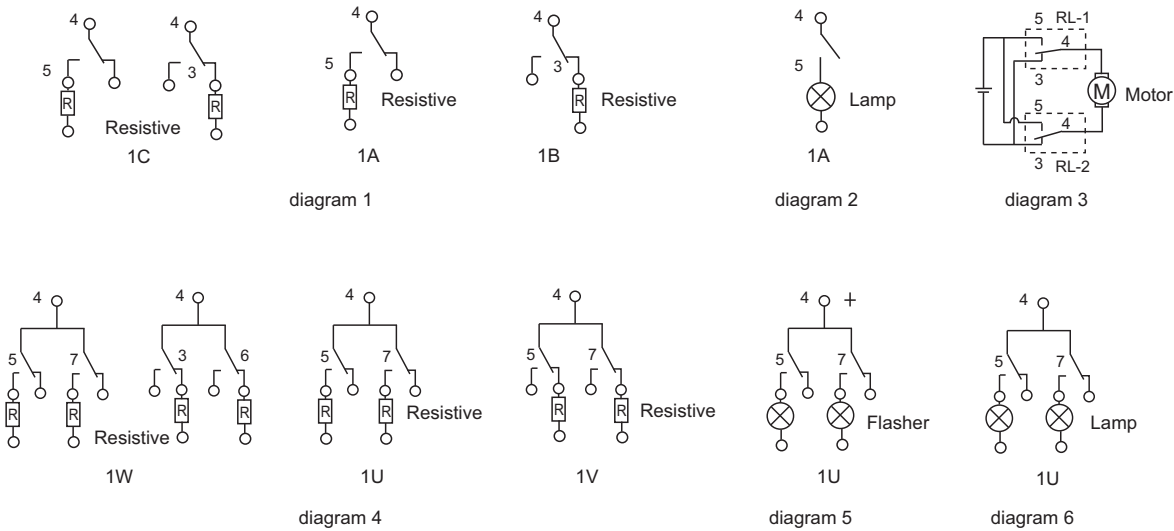
Load voltage	Load type		Load current A				On/Off ratio		Electrical endurance OPS	Contact material	Load wiring diagram ²⁾
			1C		1A	1B	On s	Off s			
			NO	NC	NO	NC					
13.5VDC	Resistive	Make	15	10	15	10	2	2	2×10 ⁵	AgSnO ₂	See diagram 1
		Break	15	10	15	10	2	2			
	Lamp	Make	3×21W	---	3×21W	---	2	2	1.5×10 ⁵	AgSnO ₂	See diagram 2
		Break									
	Motor L=0.5mH		26	---	---	---	0.2	2	1×10 ⁵	AgSnO ₂	See diagram 3
			26	---	---	---					

CONTACT DATA³⁾

at 23°C

Load voltage	Load type		Load current A				On/Off ratio		Electrical life OPS	Contact material	Load wiring diagram ²⁾
			1W		1U	1V	On s	Off s			
			NO	NC	NO	NC					
13.5VDC	Resistive	Make	2×7	2×5	2×7	2×5	2	2	2×10 ⁵	AgSnO ₂	See diagram 4
		Break	2×7	2×5	2×7	2×5	2	2			
	Flasher ¹⁾	Make	(4x21W)	---	(4x21W)	---	0.375	0.375	2×10 ⁶	Special AgSnO ₂	See diagram 5
		Break	x2		x2						
	Lamp	Make	(2x21W +1x5W)	---	(2x21W +1x5W)	---	0.2	3	1×10 ⁵	AgSnO ₂	See diagram 6
		Break	x2		x2						

- 1) When it is utilized in flasher, a special AgSnO₂ contact material should be used and the customer special code should be (170) as a suffix.
Please connect by the polarity according to the diagrams below.
- 2) The load wiring diagrams are listed below.



- 3) When the load voltage is at 24VDC or higher, or the applications conditions are different from the table above, please submit the detailed application conditions to Hongfa to get more support.

COIL DATA

at 23°C

Nominal voltage VDC	Pick-up voltage VDC max.		Drop-out voltage VDC min.			Coil resistance x(1±10%)Ω	Power consumption W	Max. allowable overdrive voltage ¹⁾ VDC
	1A, 1B, 1C, 1U, 1V	1W	1B, 1V	1A,1C, 1U, 1W				
6	3.75	4.5	0.35	0.7		28	1.1	9.0
12	7.5	9.0	0.7	1.4		130	1.1	19.6

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

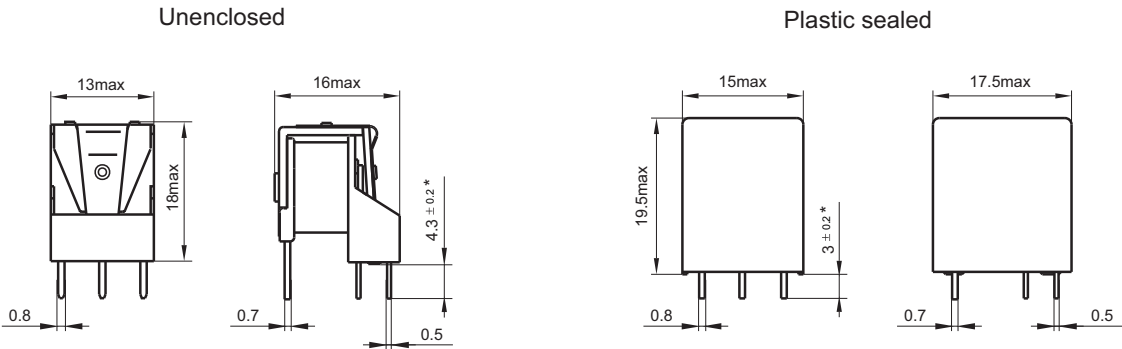
ORDERING INFORMATION					
Type	HFKM / 012 1H S T (XXX)				
Coil voltage	006: 6VDC 012: 12VDC				
Contact arrangement	1H: 1 Form A 1D: 1 Form B 1Z: 1 Form C SH: 1 Form U SD: 1 Form V SZ: 1 Form W				
Construction	S: Plastic sealed ¹⁾ Nil: Unenclosed ²⁾				
Contact material	T: AgSnO ₂				
Customer special code	e.g. (170) stands for flasher load				

Notes: 1) If water cleaning is required after the relay is assembled on PCB, please contact us for suggestion about suitable parts.
2) For unenclosed type, because there is no cover protection, the products may be contaminated by particles during transportation, assembly or usage which may cause relay failure. So the products should be effectively protected at customer side. Hongfa suggest to use sealed type if no other special requirements.

OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

Outline Dimensions



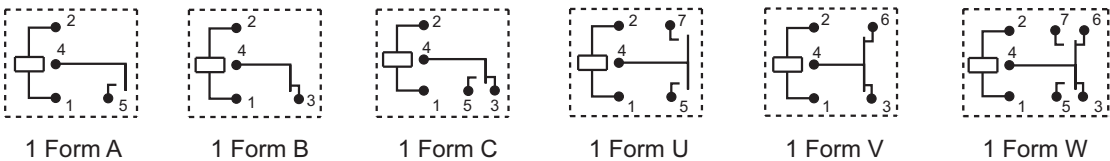
Remark: * The additional tin top is max. 1mm.

PCB Layout (Bottom view)



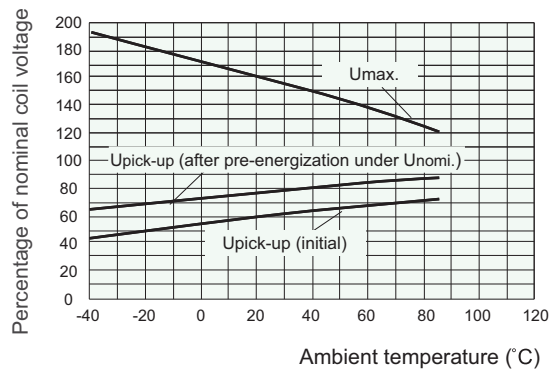
Remark: The tolerance without indicating for PCB layout is always ±0.1mm.

Wiring Diagram (Bottom view)



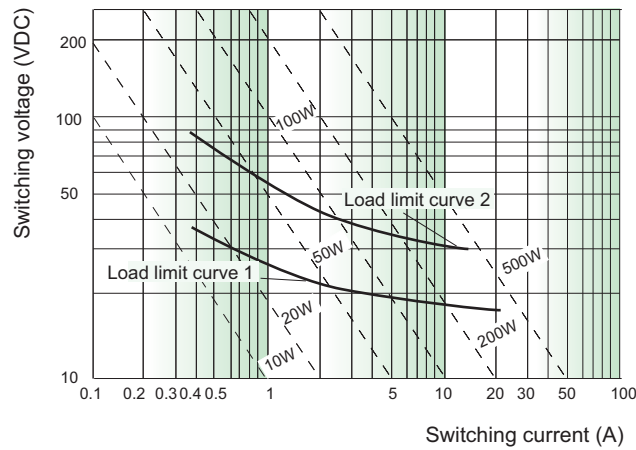
CHARACTERISTIC CURVES

1. Coil operating voltage range



- 1) There should be no contact load applied when maximum continuous operation voltage is applied on coil.
- 2) The operating voltage is connected with coil pre-energized time and voltage. After pre-energized, the operating voltage will increase.
- 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 155°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.

2. Load limit curve



- 1) 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.
- 2) Load limit curve 1: arc extinguishes, during transit time (change over contact).
- 3) Load limit curve 2: safe shutdown, no stationary arc (make contact).

Disclaimer
This datasheet is for the customers' reference. All the specifications are 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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