HFKM/HFKS — 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
- Two terminals size for HFKM & HFKS
- Unenclosed and wash tight types available
- RoHS & ELV compliant

CHARACTERISTICS

Contact arrangement	1A, 1B, 1C, 1U, 1V, 1W
Voltage drop (initial) [1]	Typ.: 50mV (at 10A) Max.: 250mV (at 10A)
Max. make current [2]	1A:60A 1B:12A 1C(NO/NC): 60/12A 1U: 2×40A 1V:2×8A 1W(NO/NC):2×30A/2×5A
Max. break current [2]	1A: 20A 1B: 10A 1C(NO/NC): 20A/10A 1U: 2×20A 1V: 2×7A 1W (NO/NC): 2×15A/2×5A
Max. switching voltage	See "Load Limit curve"
Min. contact load	1A 6VDC
Electrical endurance	See "CONTACT DATA"
Mechanical endurance	1×10^7 OPS (300 OPS/min)

Initial insulation resistance	100MΩ (at 500VDC)
Dielectric strength	500VAC (1min, leakage current less than 1mA)
Operate time	Typ.: 3ms Max.: 10ms (at nomi. vol.)
Release time	Typ.: 1.5ms Max.: 10ms [3]
Ambient temperature	-40°C to 85°C
Vibration resistance [3]	10Hz to 55Hz 1.5mm DA
Shock resistance [3]	98m/s²
Termination	PCB [4]
Construction	Wash tight, Unenclosed
Unit weight	Unenclosed: Approx. 8g Wash tight: Approx.12g

1) Equivalent to the max. initial contact resistance is 100mΩ (at 1A 6VDC).
2) At 23°C, 13.5VDC, resistive load (100 cycles).
3) When energized, release time of NO contacts shall not exceed 100μs, when non-energized, release time of NC contacts shall not exceed 100μs, meantime, NO contacts shall not be closed.
4) Since it is an environmental friendly product, please select lead-free solder when welding. The recommended soldering temperature and time is 240°C to 260°C, 2s to 5s.

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	$2×10^5$	AgSnO₂	See diagram 1
		Break	15	10	15	10	2	2			
	Lamp	Make	3×21W	---	3×21W	---	2	2	$1.5×10^5$	AgSnO₂	See diagram 2
		Break									
	Motor locked L=0.5mH		26	---	---	---	0.2	2	$1×10^5$	AgSnO₂	See diagram 3
			26	---	---	---					

CONTACT DATA [3]

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) x2	---	(4x21W) x2	---	0.375	0.375	2×10^6	Special AgSnO$_2$	See diagram 5
		Break									
	Lamp	Make	(2x21W +1x5W) x2	---	(2x21W +1x5W) x2	---	0.2	3	1×10^5	AgSnO$_2$	See diagram 6
		Break									

1) When it is utilized in flasher, a special AgSnO$_2$ 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.
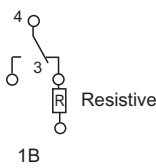
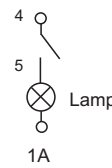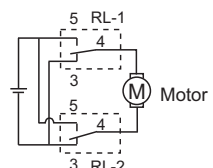2) The load wiring diagrams are listed below.
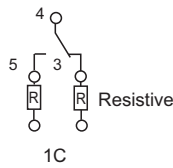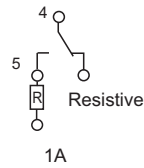
diagram 1

diagram 2

diagram 3
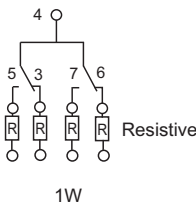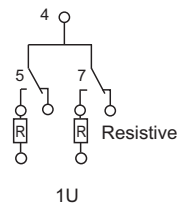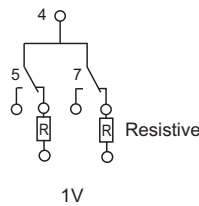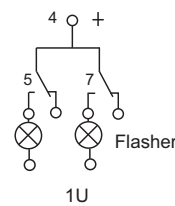
diagram 4
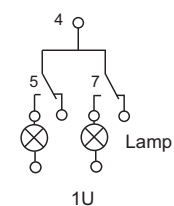
diagram 5

diagram 6

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		Drop-out voltage VDC		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
24	15	18.0	1.4	2.8	520	1.1	39.3

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

ORDERING INFORMATION

	HFKM / HFKS /	012	1H	S	T	(XXX)

Type

Coil voltage   **006**: 6VDC, **012**: 12VDC, **024**: 24VDC

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**: Wash tight   **Nil**: Unenclosed

Contact material   **T**: AgSnO$_2$

Customer special code   e.g. (170) stands for flasher load

Outline Dimensions

HFKM Unenclosed

13max
16max
18max
4.3 ± 0.2 *
0.8
0.7
0.5

HFKM Wash tight

15max
17.5max
19.5max
3 ± 0.2 *
0.8
0.7
0.5

HFKS Unenclosed

13max
16max
18max
5.3 ± 0.2 *
0.8
0.7
0.5

HFKS Wash tight

15max
17.5max
19.5max
4 ± 0.2 *
0.8
0.7
0.5
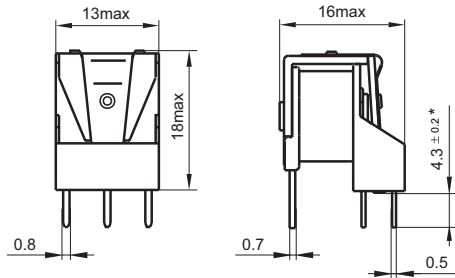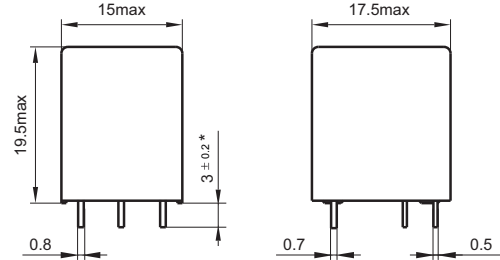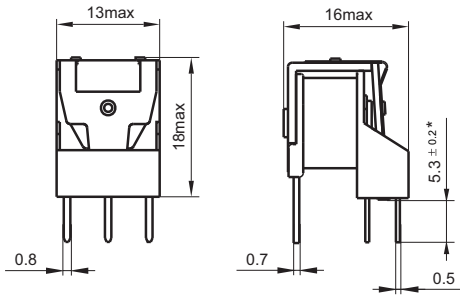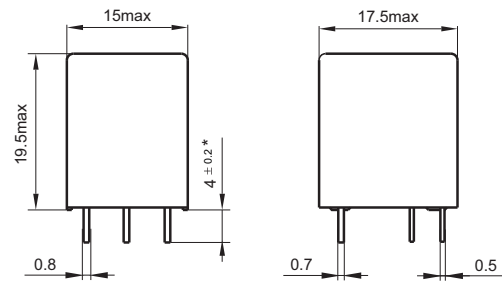
Notes: * The additional tin top is max. 1mm.

PCB Layout (Bottom view)

HFKM/HFKS Unenclosed

7-Ø1.3   (1.4)
10.16
8.89   3.81
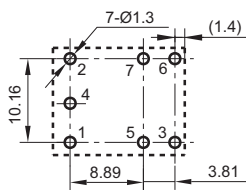
HFKM/HFKS Wash tight

7-Ø1.3   (2)
10.16
8.89   3.81
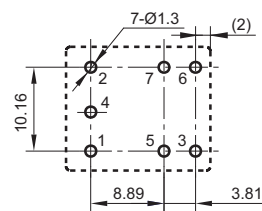
Notes: The tolerance without indicating for PCB layout is always ±0.1mm.

Wiring Diagram (Bottom view)

1 Form A   1 Form B   1 Form C   1 Form U   1 Form V   1 Form W

18
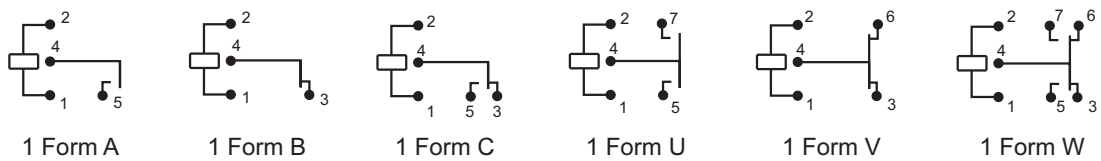
CHARACTERISTIC CURVES

1. Coil operating voltage range
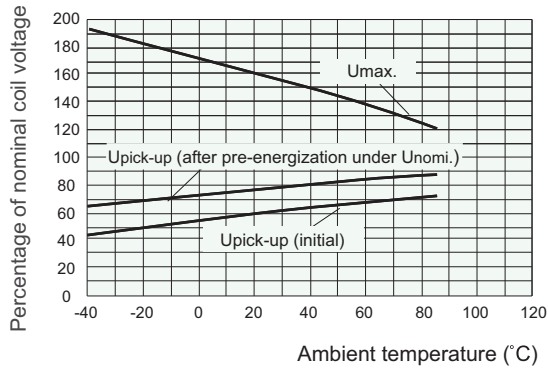
1) There should be no contact load applied when maximum continuous operation voltage is applied on coil.

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
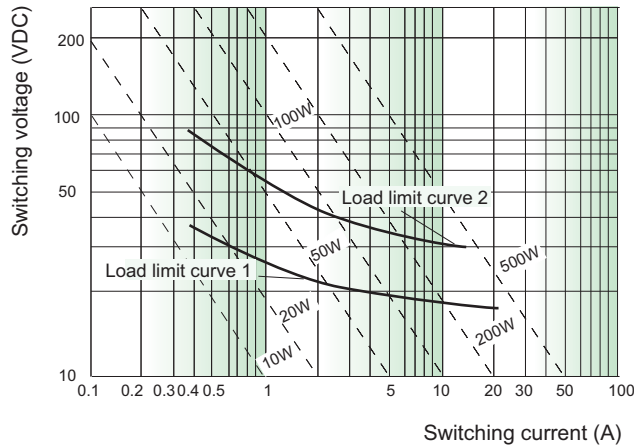
1) The load and electrical endurance tests are made according to "CONTACT DATA" parameters' table. If actual load voltage, current, or operate frequency is different from "CONTACT DATA" table, please arrange corresponding tests for confirmation.

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)

3. Application examples

Symbol	Relay type	Load type	On/Off ratio	Test temperature °C	Test time h
1	HFKM/012-1HST	Lamp: 3×21W	15s : 15s	70 40	80 320
2	HFKM/012-1HST	Lamp: 6×21W	15s : 15s	40	100
3	HFKM/012-SHST	Lamp: (2×10W)×2 Lamp: (3×15W)×2	20s : 2s	40 40	500 500
4	HFKM/012-1ZST	Lamp: 2×21W	30s : 30s	85	850
5	HFKM/012-SHT (170)	Lamp: (2×21W+1×5W)×2	500ms : 500ms	85	450

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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