

# HFKC/HFKC-T

## AUTOMOTIVE RELAY



### Typical Applications

Central door lock, Anti-theft lock, Power doors & windows, Lighting, flashlight & indicator lamp control, Wiper control, Instrument control, Rear window and seat heating control

### Features

- Subminiature automotive relay
- The weight is only 4g for single relay
- Extended temp. range up to 105°C
- The reflow soldering version (open vent hole) available (HFKC-T)
- RoHS & ELV compliant

## CHARACTERISTICS

|                                      |                                                                            |
|--------------------------------------|----------------------------------------------------------------------------|
| Contact arrangement                  | 1A, 1C                                                                     |
| Voltage drop (initial) <sup>1)</sup> | Typ.: 50mV (at 10A)<br>Max.: 250mV (at 10A)                                |
| Max. continuous current              | NO: 30A (at 23°C, 1h) <sup>2)</sup><br>NC: 25A (at 23°C, 1h) <sup>3)</sup> |
| Max. switching current <sup>4)</sup> | 30A                                                                        |
| Max. switching voltage               | 16VDC                                                                      |
| Min. contact load                    | 1A 6VDC                                                                    |
| Electrical endurance                 | See "CONTACT DATA"                                                         |
| Mechanical endurance                 | 1x10 <sup>7</sup> OPS (300OPS/min)                                         |
| Initial insulation resistance        | 100MΩ (at 500VDC)                                                          |
| Dielectric strength <sup>5)</sup>    | 500VAC                                                                     |
| Operate time                         | Typ.: 4ms (at nomi. vol.)<br>Max.: 10ms (at nomi. vol.)                    |

|                                    |                                    |
|------------------------------------|------------------------------------|
| Release time <sup>6)</sup>         | Typ.: 2ms<br>Max.: 10ms            |
| Ambient temperature                | -40°C to 105°C                     |
| Vibration resistance <sup>7)</sup> | 10Hz to 500Hz 58.8m/s <sup>2</sup> |
| Shock resistance <sup>7)</sup>     | 294m/s <sup>2</sup>                |
| Termination                        | PCB <sup>8)</sup>                  |
| Construction                       | Plastic sealed, Flux proofed       |
| Unit weight                        | 4g                                 |

- 1) Equivalent to the max. initial contact resistance is 100mΩ (at 1A 6VDC).  
 2) For NO contacts, measured when applying 100% rated voltage on coil.  
 3) For NC contacts, measured when applying zero voltage on coil.  
 4) At 23°C, 13.5VDC, on & off rate at 1s:5s, resistive load (100 cycles).  
 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 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.  
 8) 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.

## CONTACT DATA <sup>5)</sup>

at 23°C

| Load voltage | Load type                |       | Load current A   |     | On/Off ratio |       | Electrical endurance OPS | Contact material   | Load wiring diagram <sup>4)</sup> |
|--------------|--------------------------|-------|------------------|-----|--------------|-------|--------------------------|--------------------|-----------------------------------|
|              |                          |       | 1C               |     | On s         | Off s |                          |                    |                                   |
|              |                          |       | NO               | NC  |              |       |                          |                    |                                   |
| 13.5VDC      | Resistive                | Make  | 20               | --- | 1            | 5     | 3×10 <sup>5</sup>        | AgSnO <sub>2</sub> | See diagram 1                     |
|              |                          | Break | 20               | --- |              |       |                          |                    |                                   |
|              | Wiper<br>L=1.0mH         | Make  | 25 <sup>1)</sup> | --- | 0.2          | 2     | 3×10 <sup>5</sup>        | AgSnO <sub>2</sub> | See diagram 2                     |
|              |                          | Break | 5                | --- | 1.8          |       |                          |                    |                                   |
|              | Motor locked<br>L=0.77mH | Make  | 20               | --- | 0.2          | 2     | 1×10 <sup>5</sup>        | AgSnO <sub>2</sub> | See diagram 3                     |
|              |                          | Break | 20               | --- |              |       |                          |                    |                                   |



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2014 Rev. 1.01

| Load voltage | Load type             |       | Load current A   | On/Off ratio |       | Electrical endurance OPS | Contact material           | Load wiring diagram <sup>4)</sup> |
|--------------|-----------------------|-------|------------------|--------------|-------|--------------------------|----------------------------|-----------------------------------|
|              |                       |       | 1A               | On s         | Off s |                          |                            |                                   |
| 13.5VDC      | Resistive             | Make  | 20               | 1            | 5     | $3 \times 10^5$          | AgSnO <sub>2</sub>         | See diagram 4                     |
|              |                       | Break | 20               |              |       |                          |                            |                                   |
|              | Flasher <sup>3)</sup> | Make  | $3 \times 21W$   | 0.365        | 0.365 | $2 \times 10^6$          | Special AgSnO <sub>2</sub> | See diagram 5                     |
|              |                       | Break |                  |              |       |                          |                            |                                   |
|              | Lamp                  | Make  | 40 <sup>2)</sup> | 2            | 2     | $1 \times 10^5$          | AgSnO <sub>2</sub>         | See diagram 6                     |
|              |                       | Break | 10               |              |       |                          |                            |                                   |

1) Corresponds to the peak inrush current on initial actuation (motor).

2) Corresponds to the peak inrush current on initial actuation (cold filament).

3) When it is utilized in flasher, a special AgSnO<sub>2</sub> 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.

4) The load wiring diagrams are listed below:

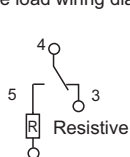


diagram 1

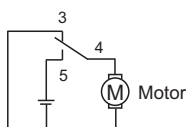


diagram 2

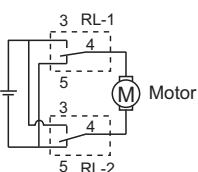


diagram 3

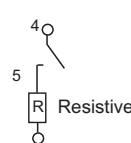


diagram 4

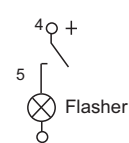


diagram 5

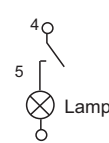


diagram 6

5) 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 <sup>1)</sup><br>VDC | Pick-up voltage<br>VDC<br>max. | Drop-out voltage<br>VDC<br>min. | Coil resistance<br>$\times(1 \pm 10\%) \Omega$ | Power consumption<br>W | Max. allowable overdrive voltage <sup>2)</sup> VDC |         |
|--------------------------------------|--------------------------------|---------------------------------|------------------------------------------------|------------------------|----------------------------------------------------|---------|
|                                      |                                |                                 |                                                |                        | at 23°C                                            | at 85°C |
| 6                                    | 3.5                            | 0.8                             | 63                                             | 0.55                   | 13.2                                               | 7.8     |
| 10                                   | 5.7                            | 1.25                            | 181                                            | 0.55                   | 22                                                 | 13      |
| 12                                   | 6.9                            | 1.5                             | 254                                            | 0.55                   | 26                                                 | 16      |
| 12                                   | 6.9                            | 1.5                             | 181                                            | 0.80                   | 22                                                 | 13      |

1) When requiring some other nominal voltage, special order allowed.

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

## ORDERING INFORMATION

|                       |                                                                  |            |                            |     |    |   |   |   |       |
|-----------------------|------------------------------------------------------------------|------------|----------------------------|-----|----|---|---|---|-------|
|                       |                                                                  | HFKC /     |                            | 012 | -Z | S | P | T | (XXX) |
| Type                  | HFKC: Standard<br>HFKC-T: Reflow soldering version <sup>1)</sup> |            |                            |     |    |   |   |   |       |
| Coil voltage          | 006: 6VDC                                                        | 010: 10VDC | 012: 12VDC                 |     |    |   |   |   |       |
| Contact arrangement   | H: 1 Form A                                                      |            | Z: 1 Form C                |     |    |   |   |   |       |
| Construction          | S: Plastic sealed (HFKC) <sup>2)</sup>                           |            | Nil: Flux proofed (HFKC-T) |     |    |   |   |   |       |
| Coil power            | P: 0.8W (Only for 12VDC type)                                    |            | Nil: 0.55W                 |     |    |   |   |   |       |
| Contact material      | T: AgSnO <sub>2</sub>                                            |            |                            |     |    |   |   |   |       |
| Customer special code | e.g. (170) stands for flasher load                               |            |                            |     |    |   |   |   |       |

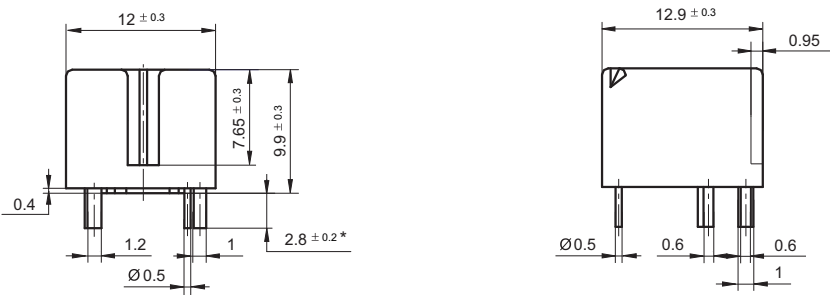
1) The structure of HFKC-T is only flux proof, the open vent hole is on the top of the relay.

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

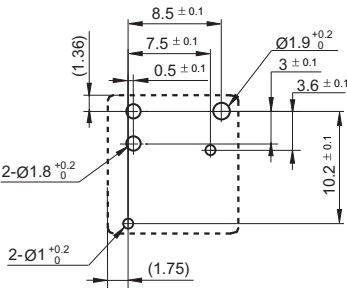
Unit: mm

## Outline Dimensions



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

## PCB Layout (Bottom view)

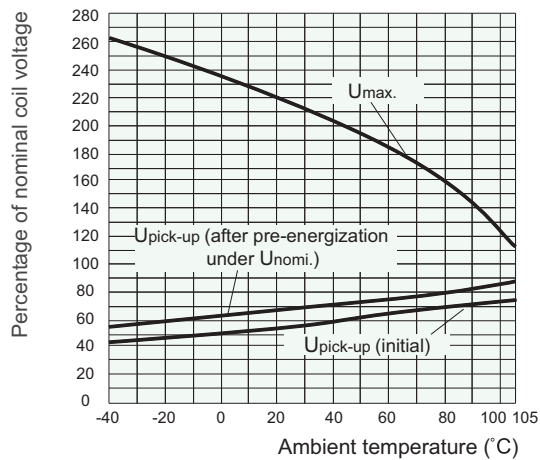


## PCB Layout (Bottom view)



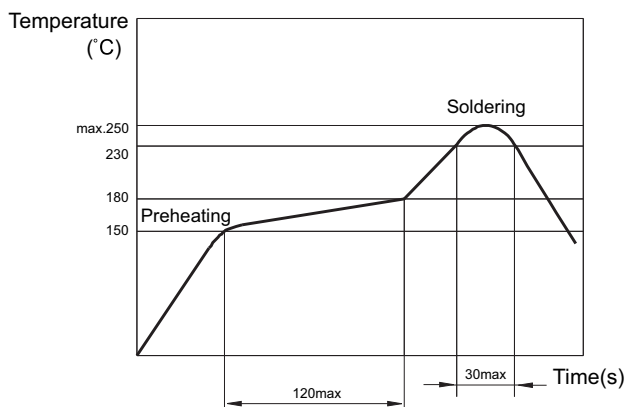
## CHARACTERISTIC CURVES

### 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 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.

### 2. Reflow soldering, temperature on PCB board. (Recommended soldering temperature, only for reflow soldering version)



### 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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