# HF49FD MINIATURE POWER RELAY

c UL us
File No. : E133481

VDE
File No. : 40033644

File No. : R50149334

CQC
File No.:CQC10002049162


## Features

- 5A switching capability
- 3kV dielectric strength (between coil and contacts)
- Slim size (width 5mm, height 12.5mm)
- High sensitive: Min. 120mW
- Meets IEC61131-2 reinforce insulation
- Creepage/clearance distance: Min. 3.5mm
- Sockets available
- UL insulation system: Class F available
- Environmental friendly product (RoHS compliant)
- Outline Dimensions: (20.0 x 5.0 x 12.5) mm

## CONTACT DATA

| | |
|---|---|
| Contact arrangement | 1A |
| Contact Resistance (at 1A 6VDC) | No gold plated: 100mΩ max.<br>Gold plated: 50mΩ max. |
| Contact material | $AgSnO_2$, AgNi |
| Contact rating (Res. load) | 5A 250VAC/30VDC |
| Max. switching voltage | 250VAC /30VDC |
| Max. switching current | 5A |
| Max. switching power | 1250VA / 150W |
| Min. contact load 1) | No gold plated: 5VDC 10mA<br>Gold plated: 5VDC 1mA |
| Mechanical endurance | 2 x $10^7$OPS |
| Electrical endurance | 1 x $10^5$OPS (3A 250VAC/30VDC, Resistive load, AgNi, at 85°C, 1s on 9s off)<br>5 x $10^4$OPS (5A 250VAC/30VDC, Resistive load, AgNi, Room temp., 1s on 9s off) |

**Notes:** 1) Min. contact load is reference value. Please perform the confirmation test with the actual load before usage since reference value may change according to switching frequencies, environmental conditions and expected life cycles.

## CHARACTERISTICS

| | | |
|---|---|---|
| Insulation resistance | | 1000MΩ (at 500VDC) |
| Dielectric strength | Between coil & contacts | 3000VAC 1min |
| | Between open contacts | 1000VAC 1min |
| Surge voltage(between coil & contacts) | | 6kV (1.2 / 50μs) |
| Operate time (at nomi.volt.) | | 10ms max. |
| Release time (at nomi.volt.) | | 5ms max. |
| Shock resistance | Functional | 98m/s² |
| | Destructive | 980m/s² |
| Vibration resistance | | 10Hz to 55Hz 1.5mm DA |
| Humidity | | 5% to 85% RH |
| Ambient temperature | | -40°C to 85°C |
| Termination | | PCB |
| Unit weight | | Approx. 3g |
| Construction | | Plastic sealed |

**Notes:** 1) The data shown above are initial values.
2) Please find coil temperature curve in the characteristic curves below.
3) UL insulation system: Class F, Class B, Class A.

## COIL

| | |
|---|---|
| Coil power | Approx. 120mW (at 5VDC to 18VDC)<br>Approx. 180mW (at 24VDC) |

## COIL DATA at 23°C

| Nominal Voltage VDC | Pick-up Voltage VDC max. | Drop-out Voltage VDC min. | Max. Voltage VDC * | Coil Resistance Ω |
|---|---|---|---|---|
| 5 | 3.50 | 0.25 | 6.0 | 208 x (1±10%) |
| 6 | 4.20 | 0.30 | 7.2 | 300 x (1±10%) |
| 9 | 6.30 | 0.45 | 10.8 | 675 x (1±10%) |
| 12 | 8.40 | 0.60 | 14.4 | 1200 x (1±10%) |
| 18 | 12.6 | 0.90 | 21.6 | 2700 x (1±15%) |
| 24 | 16.8 | 1.20 | 28.8 | 3200 x (1±15%) |

**Notes:** 1) All above data are tested when the relays terminals are downward position. Other positions of the terminals, the pick-up and drop-out voltages will have ±5% tolerance. For example, when the relay terminals are transverse position, the max. pick-up voltage change is 75% of nominal voltage.
2) *Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.
3) 24VDC 120mW type are also available, please see ordering information for more details.

## SAFETY APPROVAL RATINGS

| | | | |
|---|---|---|---|
| UL/CUL | 1H1 type | $AgSnO_2$ | 3A 250VAC COSØ=1 at 85°C<br>3A 30VDC L/R =0ms at 85°C |
| | | AgNi | 5A 250VAC COSØ=1<br>5A 30VDC L/R =0ms |
| | 1H2 type | AgNi | 3A 250VAC COSØ=1 at 85°C<br>3A 30VDC L/R =0ms at 85°C<br>5A 250VAC COSØ=1<br>5A 30VDC L/R =0ms |
| VDE | | | 5A 250VAC COSØ=1 at 85°C<br>5A 30VDC L/R =0ms at 85°C |
| TÜV | | | 5A 250VAC COSØ=1 at 70°C<br>5A 30VDC L/R =0ms at 70°C |

**Notes:** 1) All values unspecified are at room temperature.
2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

| HF49FD / | 012 | -1H | 1 | 2 | G | T | F | L | (XXX) |
|---|---|---|---|---|---|---|---|---|---|

**Type**

**Coil voltage** 5, 6, 9, 12,18, 24VDC

**Contact arrangement** **1H:** 1 Form A

**Contact version** **1:** Single contact
**2:** Bifurcated contact(Only for gold plated)

**Space between terminals** (See the following) **1:** 5.08mm **2:** 7.62mm

**Contact plating** **G:** Gold plated **Nil:** No gold plated (Only for single contact)

**Contact material** **T:** $AgSnO_2$ (Only for single contact) **Nil:** AgNi

**Insulation standard** **F:** Class F **B:** Class B **Nil:** Class A

**Coil power** **L:** Sensitive (Only for 24VDC) **Nil:** Standard

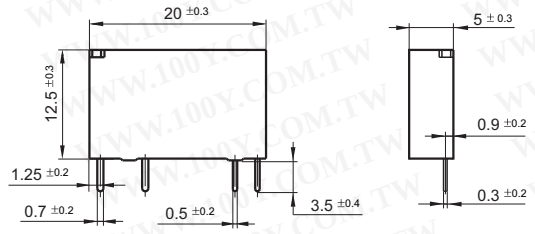
**Special code**[2)] **XXX:** Customer special requirement **Nil:** Standard

**Notes:** 1) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
2) The customer special requirement express as special code after evaluating by Hongfa.
3) If customer need to fix HF49FD in 49F socket (HF49FD+49F socket) in application, please choose HF49FD relay with suffix (009) or suffix (086).

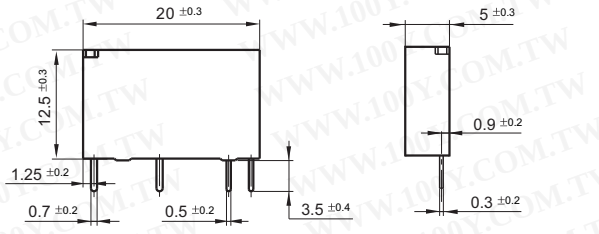
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

### Outline Dimensions

HF49FD/□□□ -1H□1(XXX)

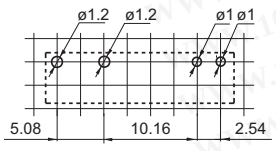



HF49FD/□ □ □ -1H□ 2(XXX)

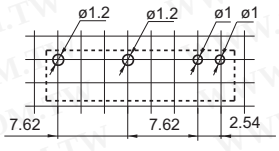



### PCB Layout
(Bottom view)

HF49FD/□□□ -1H□1(XXX)




HF49FD/□□□ -1H□2(XXX)

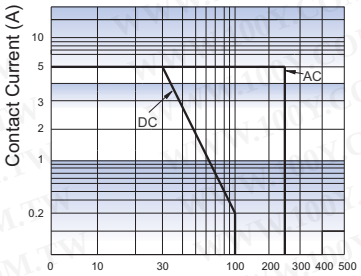



### Wiring Diagram
(Bottom view)

Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.
2) The tolerance without indicating for PCB layout is always ±0.1mm.
3) The width of the gridding is 2.54mm.

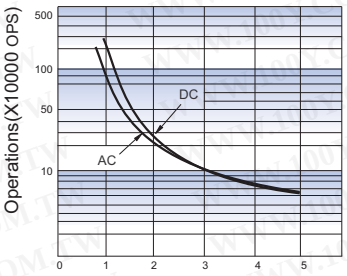
## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER




Contact Voltage (V)

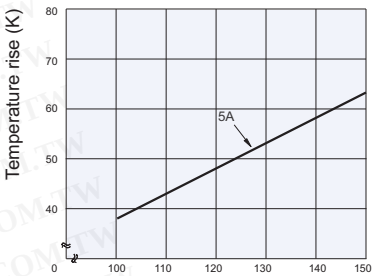
ENDURANCE CURVE




Contact Current (A)

**Test conditions:**
1H1 type: AgNi, Resistive load, 250VAC/30VDC,
Room temp., 1s on 9s off.

COIL TEMPERATURE RISE




Percentage Of Nominal Coil Voltage

**Test conditions:**
5A 85℃
(Typical curve of 24VDC standard type)



### Disclaimer

The specification is for reference only. See to "Terminology and Guidelines" for more information. Specifications 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.