

# HFD2

# SUBMINIATURE DIP RELAY



File No.:E133481



### Features

- High sensitive: 150mW
- Matching standard 16 pin IC socket
- High switching capacity: 125VA / 90W
- Bifurcated contacts
- Epoxy sealed for automatic wave soldering and cleaning
- Single side stable and latching type available
- Class A insulation system
- Environmental friendly product (RoHS compliant)
- Outline Dimensions: (20.2 x 10.2 x 10.6) mm

### CONTACT DATA

Contact arrangement	2C
Contact resistance	50mΩ max. (at 0.1A 6VDC)
Contact material	see ordering info.
Contact rating (Res. load)	1A 125VAC, 2A 30VDC 3A 30VDC
Max. switching voltage	250VAC / 220VDC
Max. switching current	3A
Max. switching power	125VA / 90W
Min. applicable load <sup>1)</sup>	10mV 10μA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	5 x 10 <sup>5</sup> OPS (at 1A 30VDC) 1 x 10 <sup>5</sup> OPS (at 2A 30VDC) 5 x 10 <sup>4</sup> OPS (at 3A 30VDC)

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

### COIL

Coil power		Sensitive	Standard
		Single side stable	Approx. 150mW
Temperature rise	1 coil latching	Approx. 75mW	Approx. 100mW
	2 coils latching	Approx. 150mW	Approx. 200mW
		65K max.	

### SAFETY APPROVAL RATINGS

UL/CUL	0.5A 60VDC
	2A 25VDC
	2A 30VDC
	1A 100VAC
	1A 120VAC
	2A 125VAC(Telephone equipment)
	3A 30VDC

**Notes:** Only some typical ratings are listed above. If more details are required, please contact us.

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	1 coil: 1500VAC 1min 2 coils: 1000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at nomi. volt.)	4.5ms max.	
Release time (at nomi. volt.)	3.5ms max.	
Set time (latching)	4.5ms max.	
Reset time (latching)	3.5ms max.	
Bounce time	2ms max.	
Ambient temperature	-40 °C to 85 °C	
Humidity	98% RH, 40 °C	
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Shock resistance	Functional	490m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Capacitance	Contact to contact	2.0pF
	Contact set to contact	1.5pF
	Contact to coil	5.0pF
Termination	PCB (DIP)	
Unit weight	Approx. 4.5g	
Construction	Plastic sealed	

**Notes:** The data shown above are initial values.

### COIL DATA

at 23 °C

#### Single side stable Standard type

Order Number	Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil Resistance x(1±10%) Ω	Max. Allowable Voltage VDC
003-M	3	2.30	0.3	45	6
005-M	5	3.75	0.5	125	10
006-M	6	4.50	0.6	180	12
009-M	9	6.75	0.9	405	18
012-M	12	9.00	1.2	720	24
015-M	15	11.25	1.5	1125	30
024-M	24	18.0	2.4	2880	48
048-M	48	36.0	4.8	11520	96



HONGFA RELAY

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

2011 Rev. 1.00

## COIL DATA

at 23°C

### Single side stable Sensitive type

Order Number	Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil Resistance x(1±10%) Ω	Max. Allowable Voltage VDC
005-S	5	4.0	0.5	167	11.5
006-S	6	4.8	0.6	240	13.8
009-S	9	7.2	0.9	540	20.8
012-S	12	9.6	1.2	960	27.7
015-S	15	12.0	1.5	1500	34.6
024-S	24	19.2	2.4	3840	55.4

### 1 coil latching Standard type

Order Number	Nominal Voltage VDC	Set / Reset Voltage VDC max.	Coil Resistance x(1±10%) Ω	Max. Allowable Voltage VDC
003-M-L1	3	2.25	90	8.4
005-M-L1	5	3.75	250	14
006-M-L1	6	4.5	360	17
009-M-L1	9	6.75	810	25
012-M-L1	12	9.0	1440	34
015-M-L1	15	11.25	2220	42
024-M-L1	24	18.0	4000	56

### 2 coils latching Standard type

Order Number	Nominal Voltage VDC	Set / Reset Voltage VDC max.	Coil Resistance x(1±10%) Ω	Max. Allowable Voltage VDC
003-M-L2	3	2.25	45	6
005-M-L2	5	3.75	125	10
006-M-L2	6	4.5	180	12
009-M-L2	9	6.75	405	18
012-M-L2	12	9.0	720	24
015-M-L2	15	11.25	1125	30
024-M-L2	24	18.0	2040	48

### 1 coil latching Sensitive type

Order Number	Nominal Voltage VDC	Set / Reset Voltage VDC max.	Coil Resistance x(1±10%) Ω	Max. Allowable Voltage VDC
003-S-L1	3	2.4	60	6.9
005-S-L1	5	4.0	330	16
006-S-L1	6	4.8	480	19
009-S-L1	9	7.2	1080	29
012-S-L1	12	9.6	1920	39
015-S-L1	15	12.0	3000	43
024-S-L1	24	19.2	7680	78

### 2 coils latching Sensitive type

Order Number	Nominal Voltage VDC	Set / Reset Voltage VDC max.	Coil Resistance x(1±10%) Ω	Max. Allowable Voltage VDC
003-S-L2	3	2.4	60	6.9
005-S-L2	5	4.0	167	11.5
006-S-L2	6	4.8	240	13.8
009-S-L2	9	7.2	540	20.8
012-S-L2	12	9.6	960	27.7
015-S-L2	15	12.0	1500	34.6
024-S-L2	24	19.2	3840	55.4

Notes: 1) When user's requirements can't be found in the above table, special order allowed.

2) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## TYPICAL CONTACT LIFE EXPECTANCY

Voltage	Power	Electrical endurance	
		Resistive Load	Inductive Load (For AC cosφ=0.7)
50mVDC	50μW	5 x 10 <sup>7</sup> OPS	5 x 10 <sup>7</sup> OPS
30VDC	20W	3 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
30VDC	30W	1 x 10 <sup>6</sup> OPS	3 x 10 <sup>5</sup> OPS
30VDC	60W	1 x 10 <sup>5</sup> OPS	1.5 x 10 <sup>4</sup> OPS
60VDC	20W	3 x 10 <sup>6</sup> OPS	--
60VDC	30W	5 x 10 <sup>5</sup> OPS	--
60VDC	60W	1 x 10 <sup>5</sup> OPS	--
30VAC	40VA	3 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
30VAC	80VA	1 x 10 <sup>6</sup> OPS	3 x 10 <sup>5</sup> OPS
30VAC	120VA	1 x 10 <sup>5</sup> OPS	1.5 x 10 <sup>4</sup> OPS
60VAC	40VA	3 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
60VAC	80VA	1 x 10 <sup>6</sup> OPS	3 x 10 <sup>5</sup> OPS
60VAC	120VA	1 x 10 <sup>5</sup> OPS	1.5 x 10 <sup>4</sup> OPS
125VAC	40VA	3 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
125VAC	80VA	1 x 10 <sup>6</sup> OPS	3 x 10 <sup>5</sup> OPS
125VAC	125VA	1 x 10 <sup>5</sup> OPS	1.5 x 10 <sup>4</sup> OPS

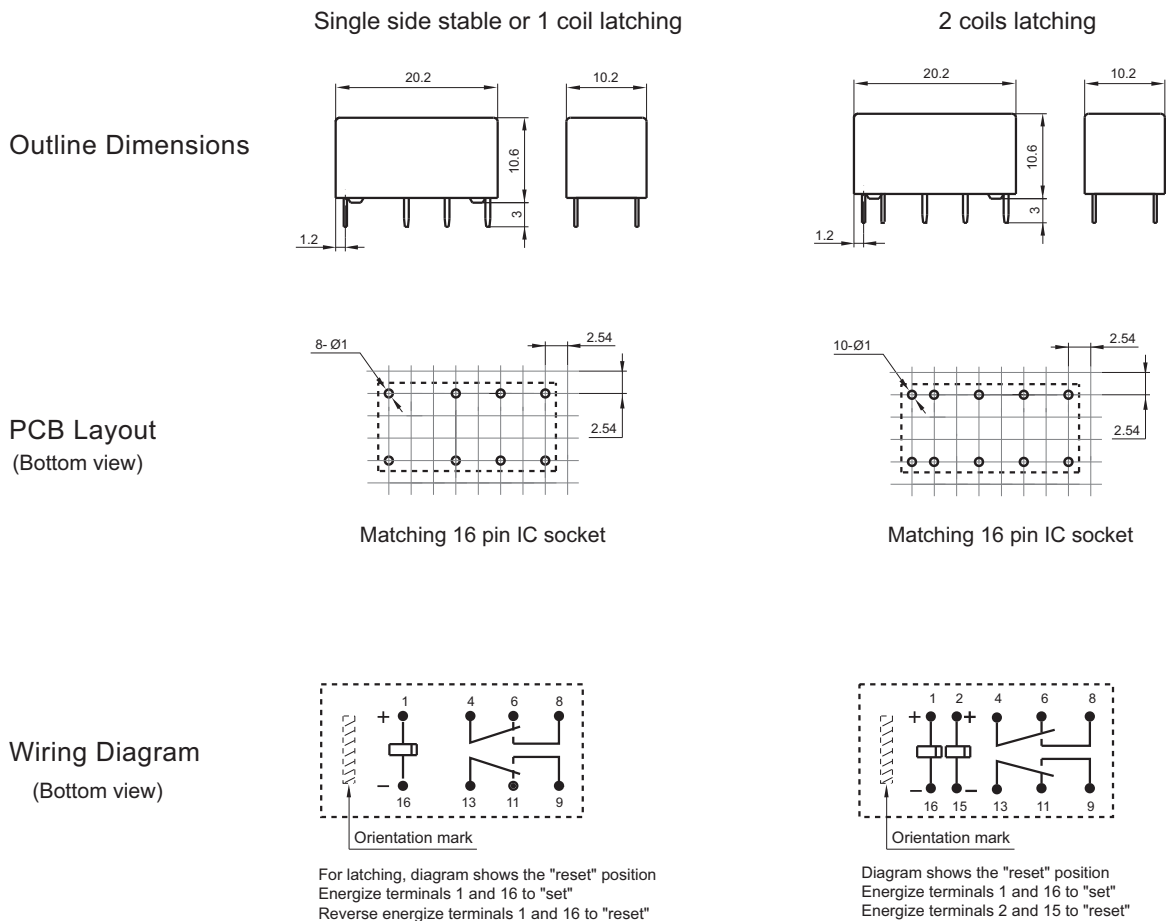
## ORDERING INFORMATION

<b>Type</b>		HFD2 / 012		-S	-L2	D	(XXX)
<b>Coil voltage</b>	3, 5, 6, 9, 12, 15, 24, 48VDC <sup>1)</sup>						
<b>Coil power</b>	M: Standard	S: Sensitive					
<b>Sort</b>	L1: 1 coil latching	L2: 2 coils latching	Nil: Single side stable				
<b>Contact material</b>	D: Ag-AuAg8 / Ag-AuAg8		Nil: AgPd60 / Ag-AuAg8				
<b>Customer special code</b>							

Notes: 1) 48VDC coil voltage is only for single side stable & standard type.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

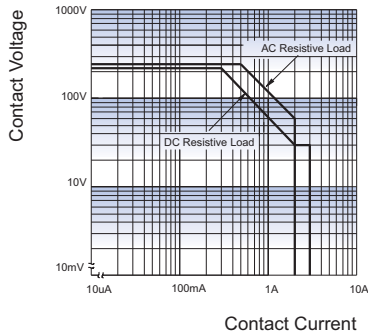
Unit: mm



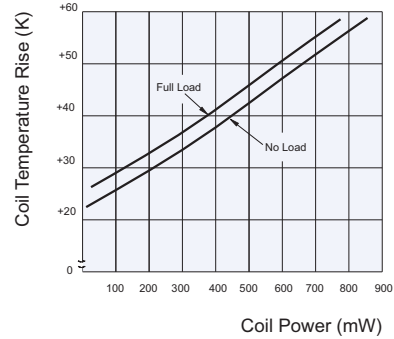
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without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

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



COIL TEMPERATURE RISE



### Notice

- 1) This relay is highly sensitive polarized relay, if correct polarity is not applied to the coil terminals, the relay does not operate properly.
- 2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 3) Relay is on the "reset" status when being released from stock, with the consideration of shock risen from transit and relay mounting, it should be changed to the "set" status when application(connecting to the power supply). Please reset the relay to "set" or "reset" status on request.
- 4) In order to maintain the "set" or "reset" status, energized voltage to coil should reach the rated voltage, impulse width should be more than 5 times of "set" or "reset" time.
- 5) For 2 coil latching relay, do not energize voltage to "set" coil and "reset" coil simultaneously.
- 6) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 7) Regarding the plastic sealed relay, we should leave it cooling naturally until below 40°C after welding, then clean it and deal with coating, remarkably the temperature of solvents should also be controlled below 40°C. Please avoid cleaning the relay by ultrasonic, avoid using the solvents like gasoline, Freon, and so on, which would affect the configuration of relay or influence the environment.
- 8) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay".

### 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.