# HFE60P SUBMINIATURE INTERMEDIATE POWER RELAY

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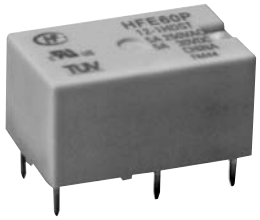
File No.: E134517

TÜV
File No.: B121253286006



## Features

- Low height 10.5mm
- Low coil power
- High switching capacity
  1A: 8A 250VAC
  2A,1A+1B: 5A 250VAC
- 1 Form A, 2 Form A, 1 Form A+1 Form B configuration
- 3kV dielectric strength (between coil and contacts)
- Environmental friendly product (RoHS compliant)

## CONTACT DATA

| | | |
|---|---|---|
| Contact arrangement | 1A | 2A, 1A+1B |
| Contact resistance | No gold plated: 30mΩ (at 1A 6VDC)<br>Gold plated: 20mΩ (at 0.1A 6VDC) | |
| Contact material | $AgSnO_2$ | |
| Contact rating | 8A 250VAC(COSØ=1.0)<br>5A 250VAC(COSØ=0.4)<br>0.3A 240VDC( τ =0ms)<br>0.15A 240VDC( τ =40ms)<br>5A 30VDC( τ =0ms) | 5A 250VAC(COSØ=1.0)<br>3A 250VAC(COSØ=0.4)<br>0.3A 240VDC( τ =0ms)<br>0.15A 240VDC( τ =40ms)<br>5A 30VDC( τ =0ms) |
| Max. switching voltage | 380VAC / 240VDC | |
| Max. switching current | 8A | 5A |
| Max. switching power | 2000VA / 150W | 1250VA / 150W |
| Mechanical endurance | $1 \times 10^7$OPS | |
| Electrical endurance | $1 \times 10^4$OPS(at 40℃, 1.5s on 1.5s off) | |

## CHARACTERISTICS

| | | |
|---|---|---|
| Insulation resistance | | 1000MΩ (at 500VDC) |
| Dielectric strength | Between coil & contacts | 3000VAC 1min |
| | Between open contacts | 1000VAC 1min |
| | Between contact sets | 2000VAC 1min |
| Surge voltage (between coil and contacts) | | 5kV (1.2/50μs) |
| Operate time (single side stable) | | 10ms max. |
| Release time (single side stable) | | 5ms max. |
| Set time (latching) | | 10ms max. |
| Reset time (latching) | | 10ms max. |
| Shock resistance | Functional | 196m/s² |
| | Destructive | 980m/s² |
| Vibration resistance | Functional | 10Hz to 55Hz 2.0mm DA |
| | Destructive | 10Hz to 55Hz 3.5mm DA |
| Humidity | | 5% to 85% RH |
| Ambient temperature | | -40℃ to 85℃ |
| Termination | | PCB |
| Unit weight | | Approx. 4.5g |
| Construction | | Plastic sealed |

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

## COIL

| | |
|---|---|
| Coil power | Single side stable: Approx. 300mW<br>1 coil latching: Approx. 150mW<br>2 coils latching: Approx. 300mW |

## COIL DATA at 23℃

**Single side stable (300mW)**

| Nominal Voltage VDC | Pick-up VDC max. | Drop-out Voltage VDC min. | Max. Allowable Voltage VDC | Coil Resistance |
|---|---|---|---|---|
| 3 | 2.4 | 0.3 | 3.9 | 30 x (1±10%) |
| 5 | 4.0 | 0.5 | 6.5 | 83 x (1±10%) |
| 6 | 4.8 | 0.6 | 7.8 | 120 x (1±10%) |
| 9 | 7.2 | 0.9 | 11.7 | 270 x (1±10%) |
| 12 | 9.6 | 1.2 | 15.6 | 480 x (1±10%) |
| 18 | 14.4 | 1.8 | 23.4 | 1080 x (1±10%) |
| 24 | 19.2 | 2.4 | 31.2 | 1920 x (1±10%) |

**1 coil latching (150mW)**

| Nominal Voltage VDC | Set Voltage VDC max. | Reset Voltage VDC max. | Max. Allowable Voltage VDC | Coil Resistance |
|---|---|---|---|---|
| 3 | 2.4 | 2.4 | 3.9 | 60 x (1±10%) |
| 5 | 4.0 | 4.0 | 6.5 | 167 x (1±10%) |
| 6 | 4.8 | 4.8 | 7.8 | 240 x (1±10%) |
| 9 | 7.2 | 7.2 | 11.7 | 540 x (1±10%) |
| 12 | 9.6 | 9.6 | 15.6 | 960 x (1±10%) |
| 18 | 14.4 | 14.4 | 23.4 | 2160 x (1±10%) |
| 24 | 19.2 | 19.2 | 31.2 | 3840 x (1±10%) |

**2 coils latching (300mW)**

| Nominal Voltage VDC | Set Voltage VDC max. | Reset Voltage VDC max. | Max. Allowable Voltage VDC | Coil Resistance |
|---|---|---|---|---|
| 3 | 2.4 | 2.4 | 3.9 | 30 x (1±10%) |
| 5 | 4.0 | 4.0 | 6.5 | 83 x (1±10%) |
| 6 | 4.8 | 4.8 | 7.8 | 120 x (1±10%) |
| 9 | 7.2 | 7.2 | 11.7 | 270 x (1±10%) |
| 12 | 9.6 | 9.6 | 15.6 | 480 x (1±10%) |
| 18 | 14.4 | 14.4 | 23.4 | 1080 x (1±10%) |
| 24 | 19.2 | 19.2 | 31.2 | 1920 x (1±10%) |

## SAFETY APPROVAL RATINGS

| | | |
|---|---|---|
| **UL/CUL** | 1 Form A:<br>8A 250VAC<br>5A 30VDC<br>B300<br>R150<br>1/6HP 125VAC/250VAC | 2 Form A / 1 Form A+1 Form B:<br>5A 250VAC<br>5A 30VDC<br>B300<br>R150<br>1/6HP 125VAC/250VAC(For 1HD)<br>1/10HP 125VAC/250VAC(For 2H) |
| **TÜV** | 1 Form A:<br>8A 250VAC<br>5A 250VAC (COSØ=0.4)<br>5A 30VDC | 2 Form A / 1 Form A+1 Form B:<br>5A 250VAC<br>3A 250VAC (COSØ=0.4)<br>5A 30VDC |

**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

HFE60P/ 12 -1HD S T G -L2 -R (XXX)

| | |
|---|---|
| **Type** | |
| **Coil voltage** | 3, 5, 6, 9, 12, 18, 24VDC |
| **Contact form** | **1H:** 1 Form A **2H:** 2 Form A<br>**1HD:** 1 Form A +1 Form B |
| **Construction** | **S:** Plastic sealed |
| **Contact material** | **T:** $AgSnO_2$ |
| **Contact plating** | **G:** Gold plated **Nil**: No gold plated |
| **Sort** | **L1:** 1 coil latching **L2:** 2 coils latching **Nil:** Single side stable |
| **Polarity** | **R:** Reverse polarity **Nil:** Standard polarity |
| **Special code**[1)] | **XXX:** Customer special requirement **Nil:** Standard |

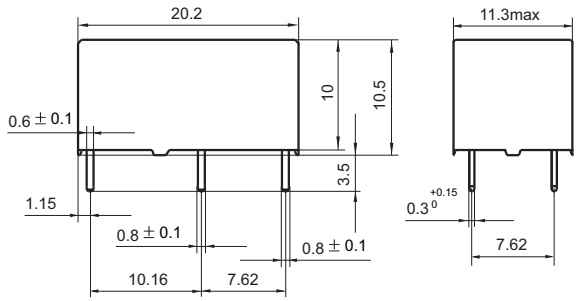
**Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like $H_2S$, $SO_2$, $NO_2$, dust, etc.).
We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like $H_2S$, $SO_2$, $NO_2$, dust, etc.).
2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
3) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

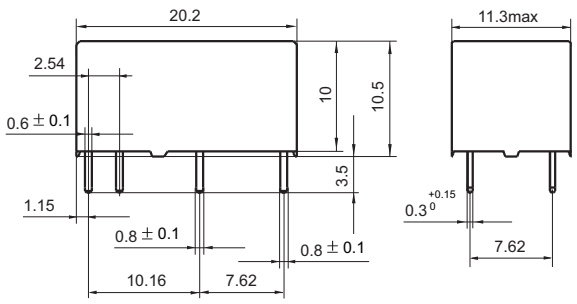
Unit: mm

Outline Dimensions

**Single side stable/1 coil latching**




**2 coils latching**



## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

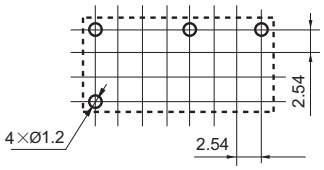
Unit: mm

### PCB Layout

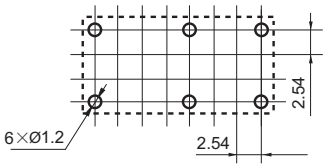
(Bottom view)

**Single side stable/1 coil latching**

1 Form A

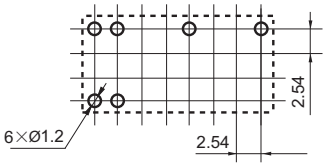



2 Form A or 1 Form A +1 Form B

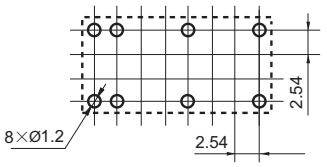



**2 coils latching**

1 Form A



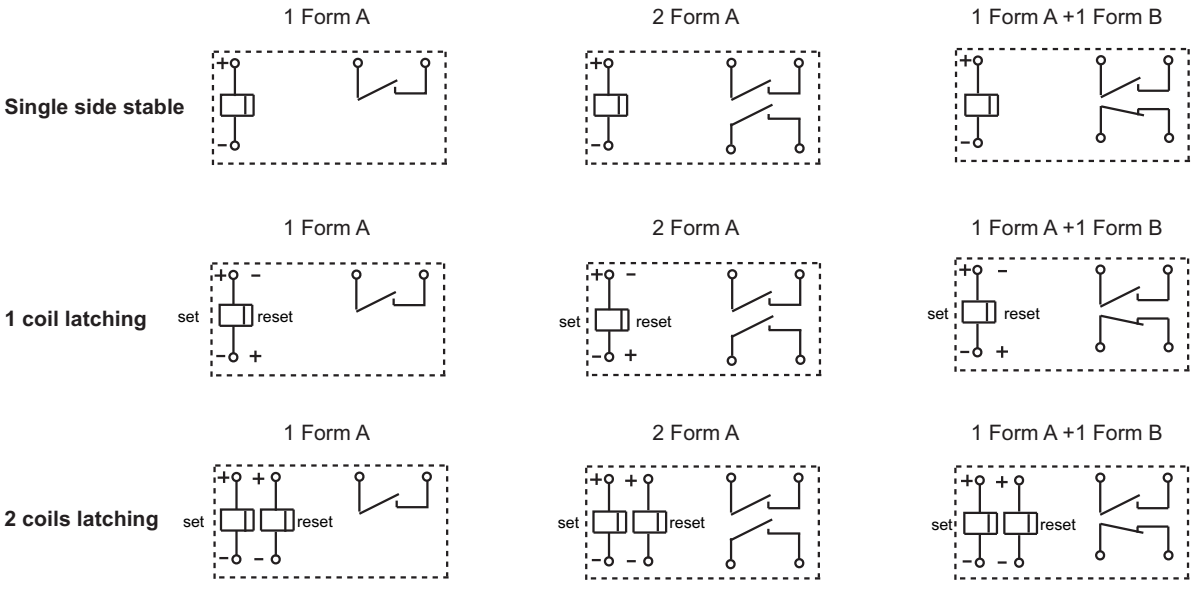

2 Form A or 1 Form A +1 Form B




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.

### Wiring Diagram

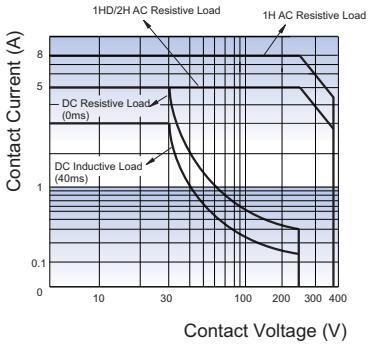
(Bottom view)



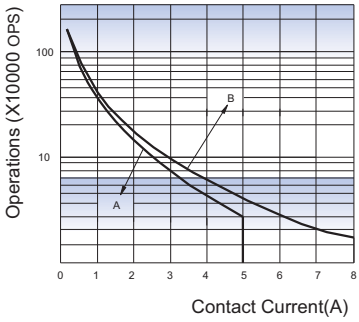

Remark: The above is wiring diagram for product with standard polarity, the coil polarity of reverse polarity and standard polarity is opposite.

## CHARACTERISTIC CURVES

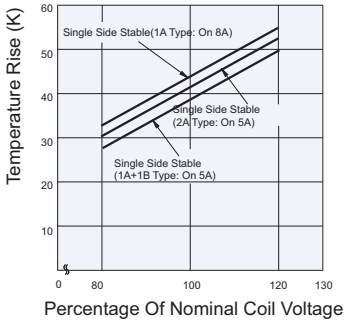
MAXIMUM SWITCHING POWER




ENDURANCE CURVE




COIL TEMPERATURE RISE

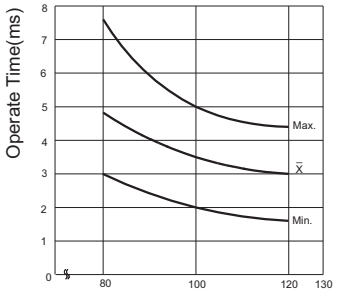



**Test conditions:**

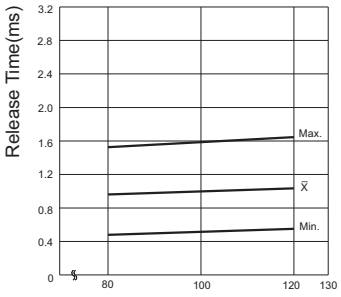
1) Curve A: 1A+1B type (or 2A type)
   Curve B: 1A type
2) Test conditions:
   Resistive load, 120VAC~250VAC, 40℃.

### Operate & Release Time

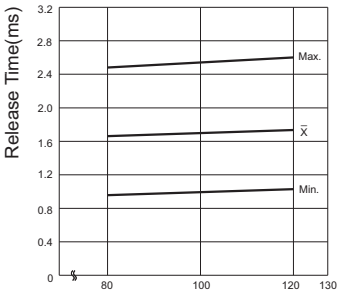
Single Side Stable
(1A/2A/1A+1B Type)




Single Side Stable(1A/2A Type)

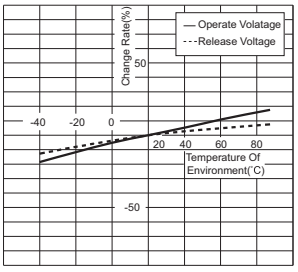



Single Side Stable(1A+1B Type)

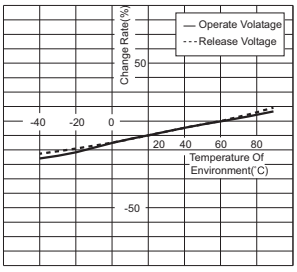



### Operate & Release Voltage

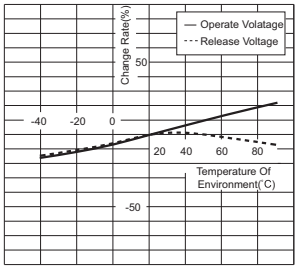
Single Side Stable(1A Type)




Single Side Stable(2A Type)




Single Side Stable(1A+1B Type)



## CHARACTERISTIC CURVES

**Notice:**

1. Latching relay is on the “reset” or "set" status when being released from stock, with the consideration of shock risen from transit and relay mounting, relay would be changed to “set” or "reset" status, therefore, when application ( connecting the power supply), please reset the relay to “set” or “reset” status on request.
2. In order to maintain “set” or “reset” status, energized voltage to coil should reach the rated voltage, impulse width should be 5 times more than “set” or “reset” time. Do not energize voltage to “set” coil and “reset” coil simultaneously. And also long energized time (more than 1 min) should be avoided.
3. When choose the relay with PCB termination, the recommended welding temperature range and duration is 240°C to 260°C, 2s to 5s; Please do not use the reflow welding method, if the reflow is really required, please contact our technicals; the normal recommeded wave soldering temperature is 250°C within 2s; the below chart is the wave soldering temperature distribution chart we recommended for your reference.
4. Keep the product away from strong magnetic field during transportation, storage and application, to avoid change of set/reset voltage.
5. This is a polarized relay. Please pay attention to the coil polarity according to the datasheet when using it.

Wave soldering temperature distribution chart