

# POWER RELAY

## 1 POLE - 5A Medium Load Control

### VE Series

#### ■ FEATURES

- UL, CSA, VDE, CQC recognized
- 1 form A (SPST-NO) or 1 form C (SPDT) contact
- Low cost, miniature relay with big performance in smal package
  - Higher surge voltage type is available (6,000 V)
  - 2,000 VAC between coil and contacts
- Slim type—meets high density mounting requirements
- Wide operating range
- Easy circuit design with completely separated terminal arrangement (coil and contact terminals)
- Plastic sealed type, RTIII
- Creepage min. 3.2 mm
- RoHS compliant.

Please see page 6 for more information



#### ■ PARTNUMBER INFORMATION

[Example]      VE   -   12   H   M   S   E   -   K   -   HV   -   VD  
                     (a)   (\*)   (b)   (c)   (d)   (e)   (f)   (g)   (h)   (i)

|     |                       |               |                                                                                                                                          |
|-----|-----------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------|
| (a) | Relay type            | VE            | : VE Series                                                                                                                              |
| (b) | Coil rated voltage    | 12            | : 5....48VDC<br>Coil rating table at page 3                                                                                              |
| (c) | Contact rating        | H             | : Heavy duty type                                                                                                                        |
| (d) | Contact configuration | Nil<br>M      | : 1 form C (SPDT)<br>: 1 form A (SPST-NO)                                                                                                |
| (e) | Coil type             | Nil<br>S      | : Standard type (360mW)<br>: High sensitive type (250mW)                                                                                 |
| (f) | Contact material      | Nil<br>E<br>5 | : Gold overlay silver-nickel (N.C.: 3A, N.O.: 5A)<br>: Silver-nickel (N.C.: 3A, N.O.: 5A)<br>: Silver cadmium oxide (N.C.: 5A, N.O.: 5A) |
| (g) | Enclosure             | K             | : Plastic sealed type, RTIII                                                                                                             |
| (h) | Surge strength        | Nil<br>HV     | : Standard type (4,000V)<br>: High dielectric strength type (6,000V)                                                                     |
| (i) | Approvals             | VD            | : UL, CSA, VDE approved type                                                                                                             |

Note: Actual marking omits the hyphen (-) of (\*)

# VE SERIES

## ■ SPECIFICATION

|              |                                     | VE-( ) HM(S)E-K<br>VE-( ) HM(S)-K | VE-( ) H(S)E-K<br>VE-( ) H(S)-K                                                                  | VE-( ) HM(S)5-K                              | VE-( ) H(S)5-K                                              |                 |
|--------------|-------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------|-----------------|
| Contact Data | Configuration                       |                                   | 1 form A<br>(SPST-NO)                                                                            | 1 form C<br>(SPDT)                           | 1 form A<br>(SPST-NO)                                       | 1 form C (SPDT) |
|              | Construction                        |                                   | Single                                                                                           |                                              |                                                             |                 |
|              | Material                            |                                   | Gold overlay silver nickel, silver nickel, silver-cadmium oxide alloy<br>(AgNi + Au, AgNi, AgCd) |                                              |                                                             |                 |
|              | Resistance (initial) (at 6 VDC, 1A) |                                   | Max. 70mOhm (VE-HM, H)<br>Max. 100mOhm (VE-HME, HE)                                              |                                              | Max. 200mOhm                                                |                 |
|              | Contact rating (resistive)          |                                   | 5A, 250VAC                                                                                       | 5A, 250VAC<br>(N.O.)<br>3A, 250VAC<br>(N.C.) | 5A, 250VAC                                                  |                 |
|              | Max. carrying current               |                                   | 7A                                                                                               |                                              |                                                             |                 |
|              | Max. switching voltage              |                                   | 250VAC, 150 VDC                                                                                  |                                              |                                                             |                 |
|              | Max. switching power                |                                   | 1,250VA                                                                                          | 1,250VA (N.O.)<br>750VA (N.C.)               | 1,250VA                                                     |                 |
|              | Max. switching current              |                                   | 5A                                                                                               | 5A (N.O.)<br>3A (N.C.)                       | 5A                                                          |                 |
|              | Min. switching load *               |                                   | 10 mA, 5 VDC (VE-HM, H), 100 mA 5 VDC (VE-HME, HE, HM5, H5)                                      |                                              |                                                             |                 |
| Life         | Mechanical                          |                                   | Min. 10 x 10 <sup>6</sup> operations                                                             |                                              |                                                             |                 |
|              | Electrical (at rating)              |                                   | Min. 100 x 10 <sup>3</sup> operations<br>Standard type                                           |                                              | Min. 50 x 10 <sup>3</sup> operations<br>High sensitive type |                 |
| Coil Data    | Rated power (at 20 °C)              |                                   | 360 mW standard type, 250 mW high sensitive type                                                 |                                              |                                                             |                 |
|              | Operate power (at 20 °C)            |                                   | 177 mW standard type, 130 mW high sensitive type                                                 |                                              |                                                             |                 |
|              | Operating temperature range         |                                   | Standard: -40 °C to +85 °C<br>High sensitivity: -40 °C to +90 °C (no frost)                      |                                              |                                                             |                 |
| Timing Data  | Operate (at nominal voltage)        |                                   | Max. 10 ms (without bounce)                                                                      |                                              |                                                             |                 |
|              | Release (at nominal voltage)        |                                   | Max. 5 ms (no diode)                                                                             |                                              |                                                             |                 |
| Insulation   | Resistance (initial)                |                                   | Min. 1,000MOhm at 500VDC                                                                         |                                              |                                                             |                 |
|              | Dielectric strength                 | Open contacts                     | 1,000VAC 1min.                                                                                   | 750VAC 1min.                                 | 1,000VAC 1min.                                              | 750VAC 1min.    |
|              |                                     | Contacts to coil                  | 2,000VAC, 1min                                                                                   |                                              |                                                             |                 |
|              | Surge strength                      | Coil to contacts                  | Standard: 4,000V / High sensitive: 6,000V, 1.2 x 50μs standard wave                              |                                              |                                                             |                 |
| Other        | Vibration resistance                | Misoperation                      | 10 to 55Hz double amplitude 3.3 mm                                                               |                                              |                                                             |                 |
|              |                                     | Endurance                         | 10 to 55Hz double amplitude 3.3 mm                                                               |                                              |                                                             |                 |
|              | Shock                               | Misoperation                      | Min. 100m/s² (11 ± 1ms)                                                                          |                                              |                                                             |                 |
|              |                                     | Endurance                         | Min. 500m/s² (6 ± 1ms)                                                                           |                                              |                                                             |                 |
|              | Weight                              |                                   | Approximately 8 g                                                                                |                                              |                                                             |                 |
|              | Sealing                             |                                   | Plastic sealed RTIII                                                                             |                                              |                                                             |                 |

\* Minimum switching loads mentioned above are reference values. Please perform the confirmation test with actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

## ■ COIL RATING

Standard type (360 mW)

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) * | Must Release-Voltage (VDC) * | Rated Power (mW) |
|-----------|--------------------------|-------------------------------|------------------------------|------------------------------|------------------|
| 5         | 5                        | 69                            | 3.5                          | 0.25                         | 360              |
| 6         | 6                        | 100                           | 4.2                          | 0.3                          |                  |
| 9         | 9                        | 225                           | 6.3                          | 0.45                         |                  |
| 12        | 12                       | 400                           | 8.4                          | 0.6                          |                  |
| 18        | 18                       | 900                           | 12.6                         | 0.9                          |                  |
| 24        | 24                       | 1,600                         | 16.8                         | 1.2                          |                  |
| 48        | 48                       | 6,400                         | 33.6                         | 2.4                          |                  |

High sensitive type (250 mW)

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) * | Must Release-Voltage (VDC) * | Rated Power (mW) |
|-----------|--------------------------|-------------------------------|------------------------------|------------------------------|------------------|
| 5         | 5                        | 100                           | 3.6                          | 0.25                         | 250              |
| 6         | 6                        | 145                           | 4.3                          | 0.3                          |                  |
| 9         | 9                        | 325                           | 6.5                          | 0.45                         |                  |
| 12        | 12                       | 575                           | 8.6                          | 0.6                          |                  |
| 18        | 18                       | 1,300                         | 13                           | 0.9                          |                  |
| 24        | 24                       | 2,310                         | 17.3                         | 1.2                          |                  |
| 48        | 48                       | 9,220                         | 34.7                         | 2.4                          |                  |

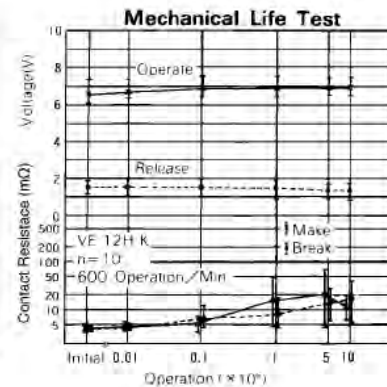
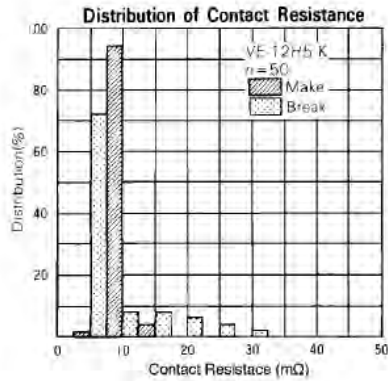
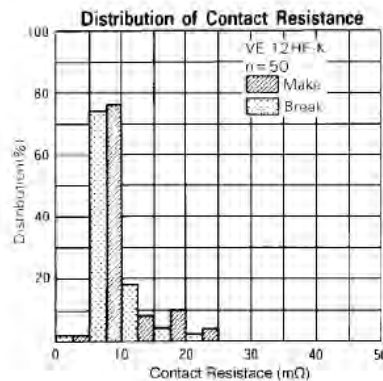
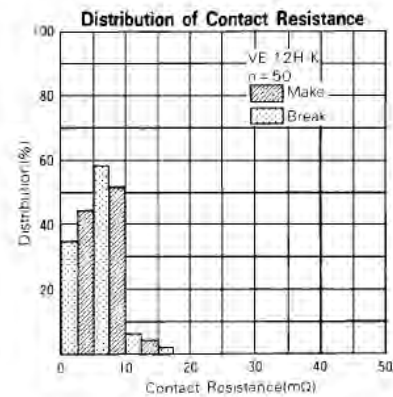
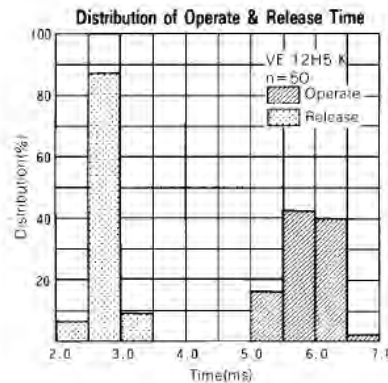
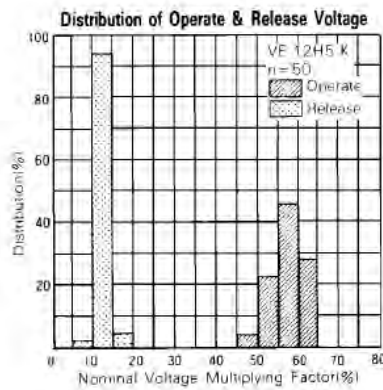
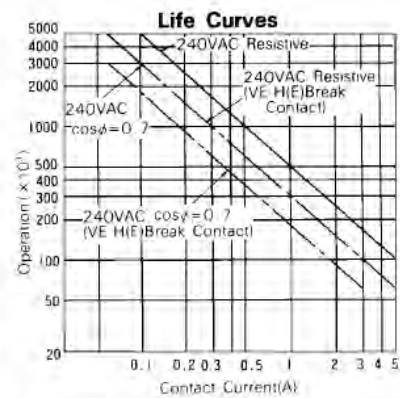
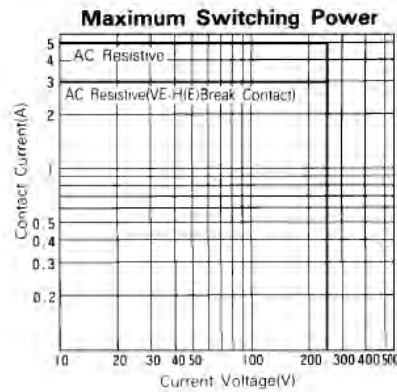
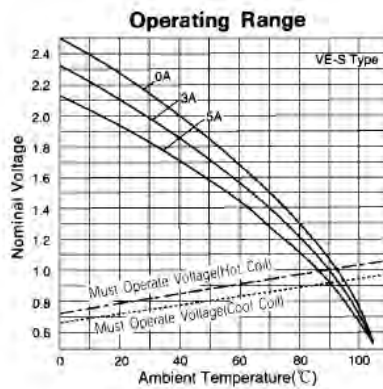
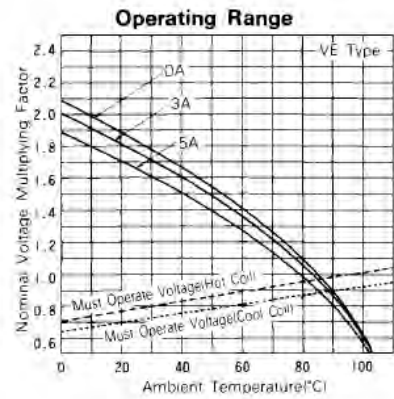
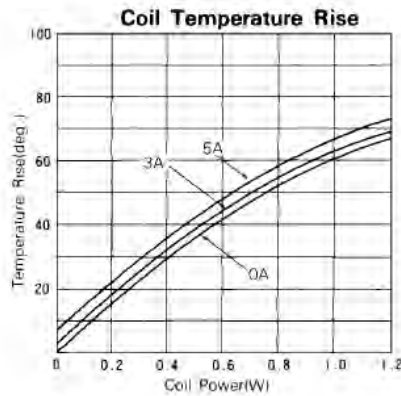
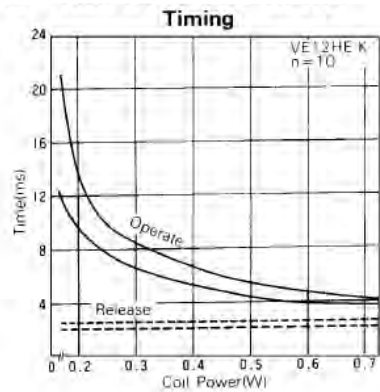
Note: All values in the table are valid for 20°C and zero contact current.

\* Specified operate values are valid for pulse wave voltage.

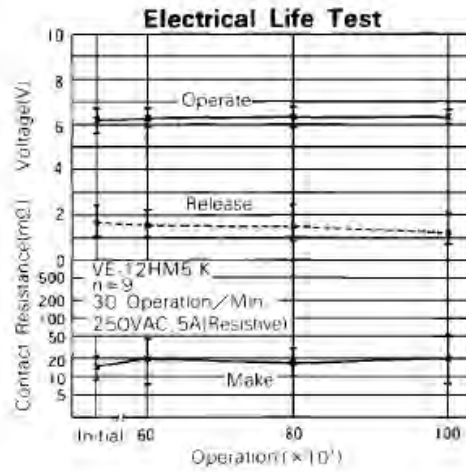
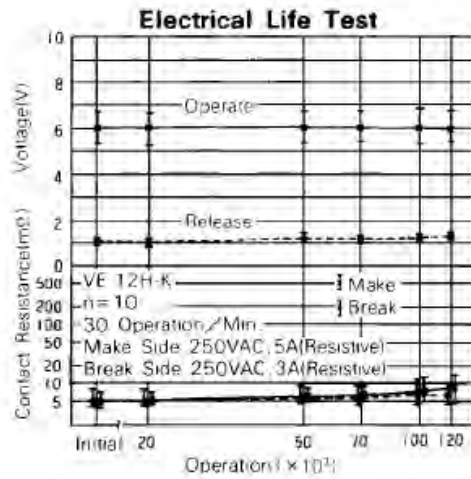
## ■ SAFETY STANDARDS

| Type | Compliance                | Contact rating                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UL   | UL 508                    | Flammability: UL 94-V0 (plastics)                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|      | E 56149, E 45026          | VE-( )-H:<br>5A, 250VA/30VDC (N.O. resistive)<br>3A, 250VAC (N.C. resistive)<br>5A, 30VDC (N.C. resistive)<br>1/14 HP, 250VAC /125VAC<br>VE-( )-HM<br>5A, 250VAC/30VDC (resistive)<br>1/12 HP, 250VAC /125VAC<br>VE-( )-H5<br>5A, 250VAC/30VDC (N.O. resistive)<br>1/10 HP, 250VAC /125VAC (N.O. resistive)<br>5A, 250VAC/30VDC (N.C. resistive)<br>1/14 HP, 250VAC /125VAC (N.C. resistive)<br>VE-( )-HM5<br>5A, 250VAC/30VDC (resistive)<br>1/10 HP, 250VAC /125VAC |
| CSA  | C22.2 No. 14<br>LR 35579  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| VDE  | 0435 part 201<br>40017070 | 5A, 250VAC, cos φ 1<br>3A, 250VAC, cos φ 1                                                                                                                                                                                                                                                                                                                                                                                                                            |

## ■ CHARACTERISTIC DATA / REFERENCE DATA



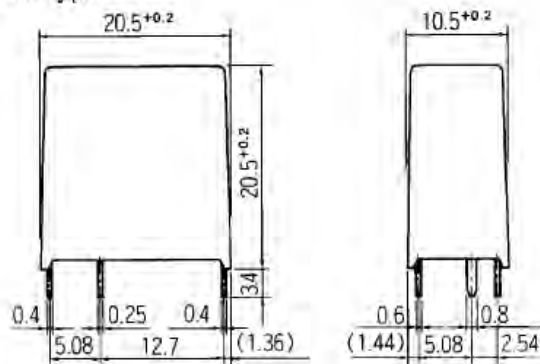
# VE SERIES



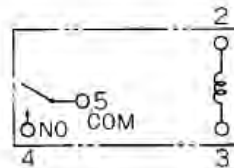
## DIMENSIONS

### Dimensions

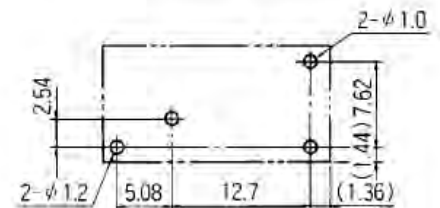
#### VE-M type



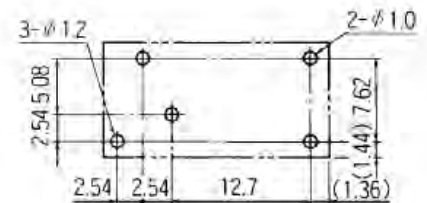
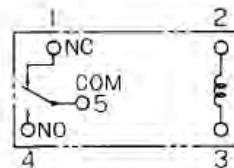
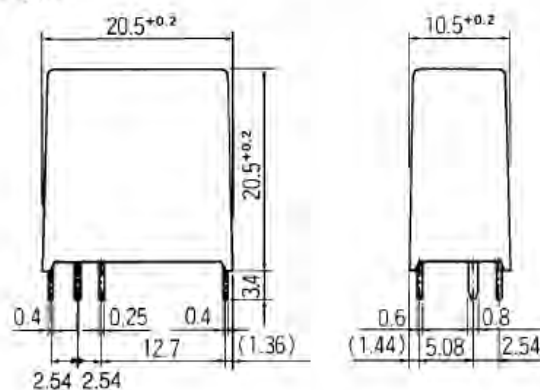
### Schematics (BOTTOM VIEW)



### PC board mounting hole layout (BOTTOM VIEW)



#### VE type



Unit: mm

## RoHS Compliance and Lead Free Information

### 1. General Information

- All signal and power relays produced by Fujitsu Components are compliant with RoHS directive 2002/95/EC including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives on October 21st, 2005. (Amendment to Directive 2002/95/EC)
- All of our signal and power relays are lead-free. Please refer to Lead-Free Status Info for older date codes at: <http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf>
- Lead free solder plating on relay terminals is Sn-3.0Ag-0.5Cu, unless otherwise specified. This material has been verified to be compatible with PbSn assembly process.

### 2. Recommended Lead Free Solder Profile

- Recommended solder Sn-3.0Ag-0.5Cu.

**Flow Solder condition:**

Pre-heating: maximum 120°C  
Soldering: dip within 5 sec. at  
260°C solder bath

**Solder by Soldering Iron:**

Soldering Iron  
Temperature: maximum 360°C  
Duration: maximum 3 sec.

**We highly recommend that you confirm your actual solder conditions**

### 3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays, unless otherwise indicated.

### 4. Tin Whiskers

- Dipped SnAgCu solder is known as presenting a low risk to tin whisker development. No considerable length whisker was found by our in house test.

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