

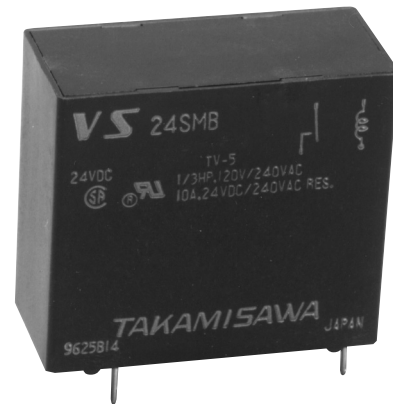
# POWER RELAY

## 1 POLE - 10A

### VS Series

#### ■ FEATURES

- UL, CSA, VDE, SEV, CQC recognized
- TV-5 is available
- Working class: C
- UL class B (130°C) coil wire insulation
- Type of service: continuous duty
- Heavy duty miniature slim type power relay
- High isolation in small package
  - Insulation distance: 8 mm
  - Dielectric strength: 5,000 VAC (between coil and contacts)
  - Surge strength: 10,000 V
- Standard and high sensitivity types available
- Flux proof type and plastic sealed type available
- Cadmium free is available
- RoHS compliant. Please see page 8 for more information



#### ■ PARTNUMBER INFORMATION

**[Example]**      VS - 12 S M B U - N - UC  
                   (a) (\*) (b) (c) (d) (e) (f) (g) (h)

|     |                       |                           |  |
|-----|-----------------------|---------------------------|--|
| (a) | Relay type            | VS                        | : VS-Series  |
| (b) | Coil rated voltage    | 12                        | : 3.....100 VDC<br>Coil rating table at page 3   |
| (c) | Coil type             | Nil<br>S                  | : Standard type (700-750mW)<br>: High sensitive type (530mW)   |
| (d) | Contact configuration | T<br>M                    | : 1 form C (SPDT)<br>: 1 form A (SPST-NO)  |
| (e) | Enclosure             | B<br>C<br>K               | : Flux proof type, RTII<br>: Plastic sealed type (with type), RTIII<br>: Plastic sealed type, RTIII  |
| (f) | TV type               | Nil<br>U                  | : TV rating type<br>: Non TV rating type (standard type)   |
| (g) | Contact material      | N<br>Nil<br>S<br>Nil<br>E | : Silver alloy (10A) (AgSnO <sub>2</sub> )<br>: Silver-cadmium oxide (TV-5 rating) (AgCdO)<br>: Silver-cadmium oxide (non TV rating) (AgCdO)<br>: Gold overlay silver-nickel (non TV rating) (AgNi+Au)<br>: Silver-nickel (non TV rating) (AgNi) |
| (h) | Safety standard       | UC<br>SM2<br>IM2          | : UL, CSA<br>: UL, CSA, VDE<br>: UL, CSA, VDE, SEV   |

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

■ SPECIFICATION

|              |                                    | TV-5 Rating Type |  | Standard Type   |                                   |                            |                            |
|--------------|------------------------------------|------------------|--|---|-----------------------------------|----------------------------|----------------------------|
|              |                                    | VS - ( ) M       | VS - ( ) MN  | VS - ( ) U-5  | VS - ( ) U-N                      | VS - ( ) U<br>VS - ( ) U-E |                            |
| Contact Data | Configuration                      |                  | 1 form A (SPST-NO), 1 form C (SPDT)  |   |                                   |                            |                            |
|              | Construction                       |                  | Single   |   |                                   |                            |                            |
|              | Material                           |                  | Silver cadmium-oxide   | Silver alloy  | Silver cadmium-oxide              | Silver alloy               | Gold overlay silver nickel |
|              | Resistance (initial)               |                  | Max. 100mΩ at 6VDC, 1A   |   |                                   |                            |                            |
|              | Contact rating                     |                  | 10A, 240VAC / 24VDC  |   |                                   |                            |                            |
|              | Max. carrying current *1           |                  | 14A  |   |                                   |                            |                            |
|              | Max. switching voltage             |                  | 250VAC, 150 VDC  |   |                                   |                            |                            |
|              | Max. switching power               |                  | 2,400VA, 240W  |   |                                   |                            |                            |
|              | Max. inrush current (at lamp load) |                  | 78A, 120VAC  |   | -                                 |                            |                            |
|              | Min. switching load *2             |                  | 100 mA, 5 VDC (M, 5, E), 10mA 5 VDC (VS-)                                      |   |                                   |                            |                            |
| Life         | Mechanical                         |                  | Min. 20 x 10 <sup>6</sup> operations   |   |                                   |                            |                            |
|              | Electrical                         | Contact rating   |  | Min. 100 x 10 <sup>3</sup> operations   |                                   |                            |                            |
|              |                                    | Motor            |  | Min. 30 x 10 <sup>3</sup> operations  |                                   |                            |                            |
|              |                                    | Lamp             |  | Min. 50 x 10 <sup>3</sup> operations (at 78A, 120VAC, lamp)<br>Min. 15 x 10 <sup>3</sup> operations (high sensitive type) | -                                 |                            |                            |
| Coil Data    | Rated power (at 20 °C)             |                  | 700-750 mW standard type, 530 mW high sensitive type                           |   |                                   |                            |                            |
|              | Operate power (at 20 °C)           |                  | 350-370 mW standard type, 350 mW high sensitive type                           |   |                                   |                            |                            |
|              | Operating temperature range        |                  | -40 °C to +85 °C standard type, 40 °C to +75 °C high sensitive type (no frost) |   |                                   |                            |                            |
| Timing Data  | Operate (at nominal voltage)       |                  | Max. 15 ms (without bounce)  |   |                                   |                            |                            |
|              | Release (at nominal voltage)       |                  | Max. 10 ms (no diode)  |   |                                   |                            |                            |
| Insulation   | Resistance (initial)               |                  | Min. 1,000MΩ at 500VDC   |   |                                   |                            |                            |
|              | Dielectric strength                | Open contacts    |  | 1,000VAC (50/60Hz) 1min., 10mA detection current  |                                   |                            |                            |
|              |                                    | Contacts to coil |  | 5,000VAC (50/60Hz) 1min., 10mA detection current  |                                   |                            |                            |
|              | Surge strength                     |                  | Coil to contacts   |   | 10,000V, 1.2 x 50μs standard wave |                            |                            |
|              | Clearance                          |                  | 8 mm   |   |                                   |                            |                            |
|              | Creepage                           |                  | 8 mm   |   |                                   |                            |                            |
|              | EN61810-1, VDE0435                 |                  | Voltage  |   | 250 V                             |                            |                            |
|              |                                    |                  | Pollution degree   |   | 2                                 |                            |                            |
|              |                                    | Material group   |  | III   |                                   |                            |                            |
| Other        | Vibration resistance               | Misoperation     |  | 10 to 55Hz double amplitude 1.5 mm  |                                   |                            |                            |
|              |                                    | Endurance        |  | 10 to 55Hz double amplitude 1.5 mm  |                                   |                            |                            |
|              | Shock                              | Misoperation     |  | Min. 100m/s <sup>2</sup> (11 ± 1ms)   |                                   |                            |                            |
|              |                                    | Endurance        |  | Min. 1,000m/s <sup>2</sup> (6 ± 1ms)  |                                   |                            |                            |
|              | Weight                             |                  | Approximately 17 g   |   |                                   |                            |                            |

\*1 When max. carrying current is more than 10A, PCB layout needs to be considered.

\*2 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

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) * | Must Release Voltage (VDC) * | Max. Coil Voltage (VDC) | Rated Power (mW) |
|-----------|--------------------------|-------------------------------|------------------------------|------------------------------|-------------------------|------------------|
| 3         | 3                        | 12.5                          | 2.1                          | 0.3                          | 4.95                    | 720              |
| 5         | 5                        | 36                            | 3.5                          | 0.5                          | 8.25                    | 700              |
| 6         | 6                        | 50                            | 4.2                          | 0.6                          | 9.90                    | 720              |
| 9         | 9                        | 115                           | 6.3                          | 0.9                          | 14.85                   | 700              |
| 12        | 12                       | 200                           | 8.4                          | 1.2                          | 19.8                    | 720              |
| 14        | 14                       | 280                           | 9.8                          | 1.4                          | 23.1                    | 700              |
| 18        | 18                       | 460                           | 12.6                         | 1.8                          | 29.7                    |                  |
| 24        | 24                       | 820                           | 16.8                         | 2.4                          | 39.6                    |                  |
| 36        | 36                       | 1,850                         | 25.2                         | 3.6                          | 59.4                    |                  |
| 48        | 48                       | 3,300                         | 33.6                         | 4.8                          | 79.2                    |                  |
| 60        | 60                       | 5,100                         | 42                           | 6                            | 99                      |                  |
| 100       | 100                      | 13,400                        | 70                           | 10                           | 165                     | 750              |

High sensitive type (250 mW)

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) * | Must Release Voltage (VDC) * | Max. Coil Voltage (VDC) | Rated Power (mW) |
|-----------|--------------------------|-------------------------------|------------------------------|------------------------------|-------------------------|------------------|
| 3         | 3                        | 17                            | 2.1                          | 0.3                          | 4.95                    | 530              |
| 5         | 5                        | 47                            | 3.5                          | 0.5                          | 8.25                    |                  |
| 6         | 6                        | 68                            | 4.2                          | 0.6                          | 9.90                    |                  |
| 9         | 9                        | 115                           | 6.3                          | 0.9                          | 14.85                   |                  |
| 12        | 12                       | 270                           | 8.4                          | 1.2                          | 19.8                    |                  |
| 14        | 14                       | 370                           | 9.8                          | 1.4                          | 23.1                    |                  |
| 18        | 18                       | 610                           | 12.6                         | 1.8                          | 29.7                    |                  |
| 24        | 24                       | 1,000                         | 16.8                         | 2.4                          | 39.6                    |                  |
| 36        | 36                       | 2,450                         | 25.2                         | 3.6                          | 59.4                    |                  |
| 48        | 48                       | 4,400                         | 33.6                         | 4.8                          | 79.2                    |                  |
| 60        | 60                       | 6,800                         | 42                           | 6                            | 99                      |                  |
| 100       | 100                      | 18,860                        | 70                           | 10                           | 165                     |                  |

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

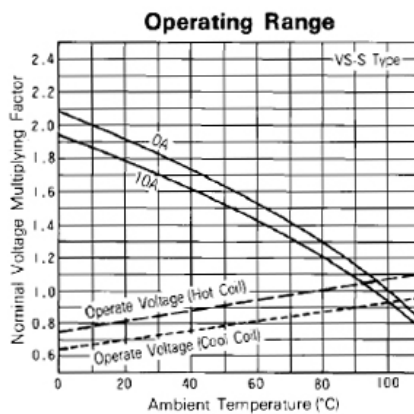
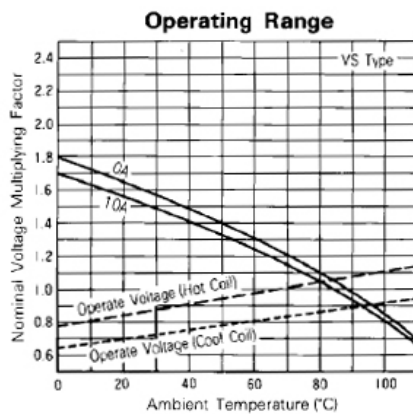
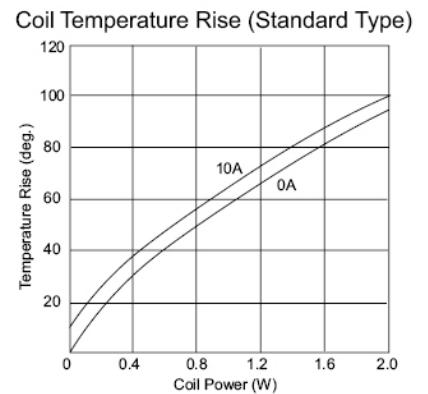
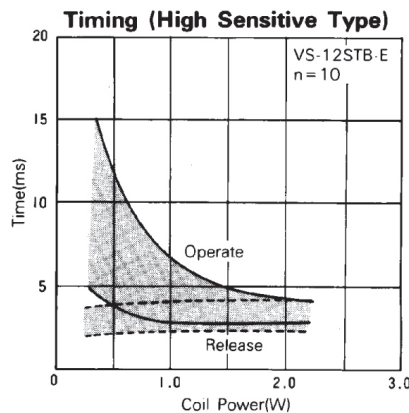
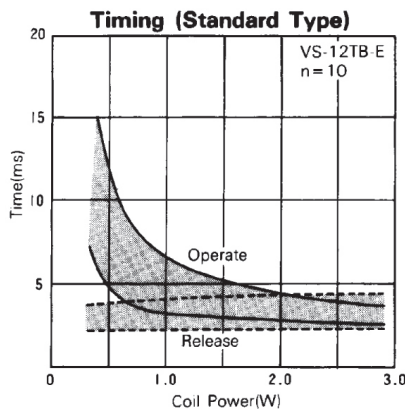
\* Specified operate values are valid for pulse wave voltage.

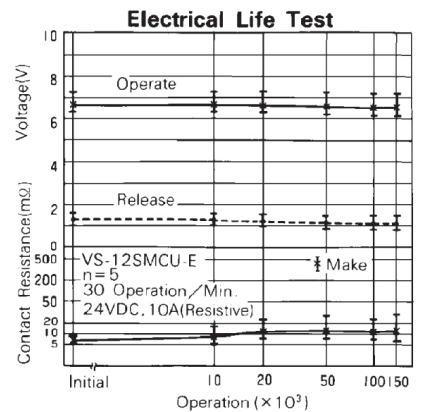
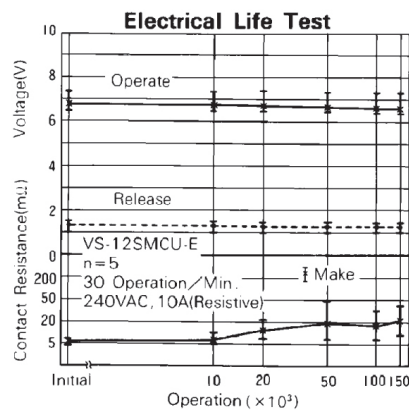
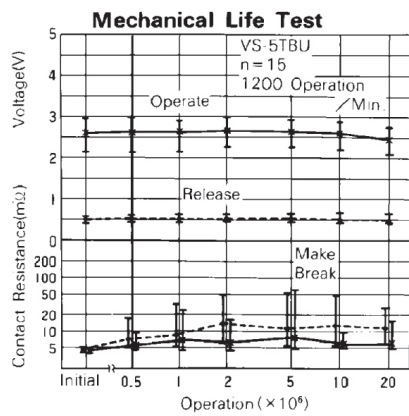
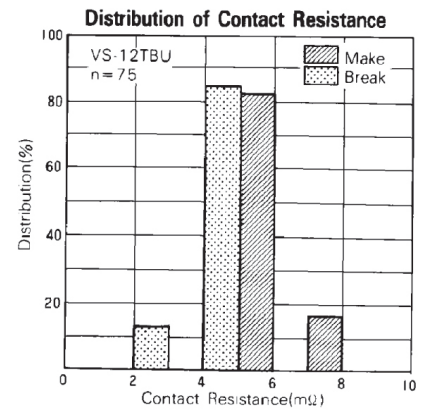
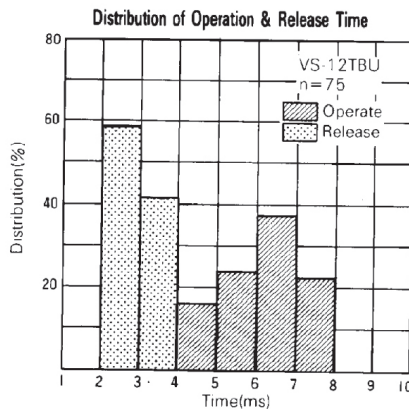
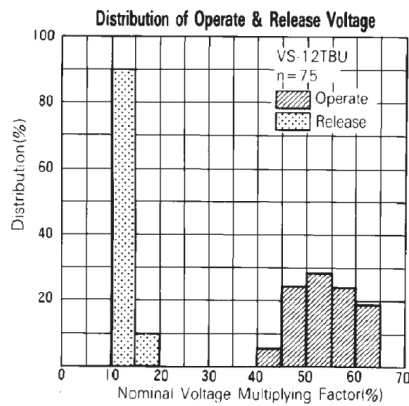
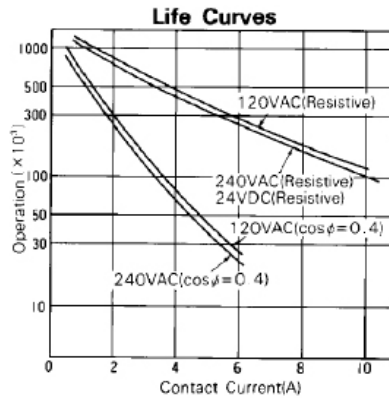
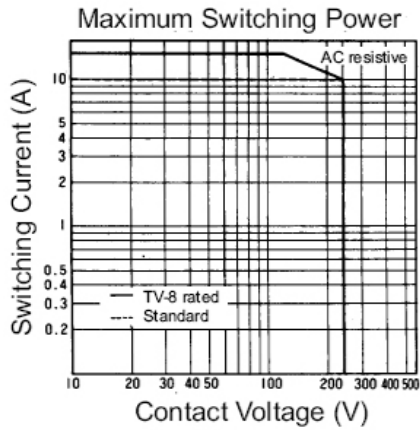
■ SAFETY STANDARDS

| Type | Compliance               | Contact rating   |
|------|--------------------------|--|
| UL   | UL 508                   | Flammability: UL 94-V0 (plastics)  |
|      | E 56140                  | [TV-rating VS-( )M, SM, M-N]<br>10A, 240VAC/24VDC (resistive)<br>1/3 hp, 240VAC/120VAC<br>Pilot duty: C150<br>TV-5 120 VAC   |
| CSA  | C22.2 No. 14<br>LR 35579 | [UN, SU-N]<br>15A, 120VAC/24VDC (resistive)<br>10A, 240VAC (resistive)<br>1/3 hp, 240VAC/120VAC<br>Pilot duty: B150<br>[VS-( ) ( ) U-( ), ( )S( ) U-( )]<br>10A, 240VAC/24VDC (resistive)<br>1/3 hp, 240VAC/120VAC<br>Pilot duty: C150 |
|      |                          |  |
| VDE  | 0435, 0631, 0700, 0860   | 10A, 250VAC, $\cos \phi 1$<br>2.9A, 250VAC, $\cos \phi 0.4$  |
|      | 40014665                 | 10A, 24VDC, 0msec  |

Also complies with SEV, CQC

■ CHARACTERISTIC DATA

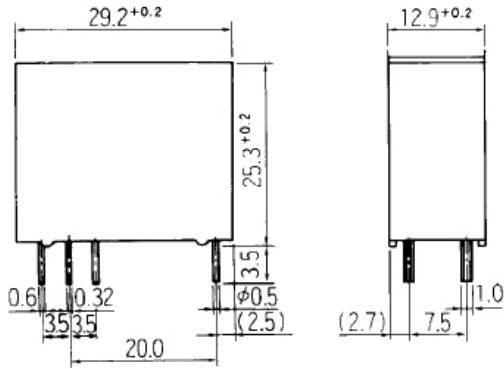




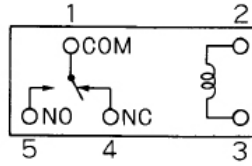


● Dimensions

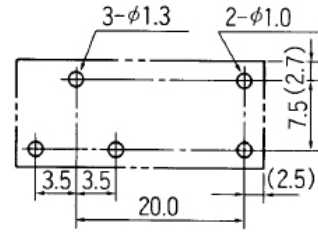
VS-TB type (Flux proof type)



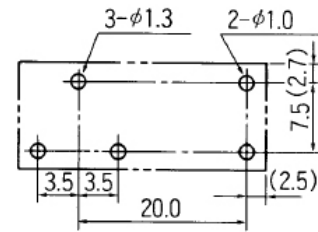
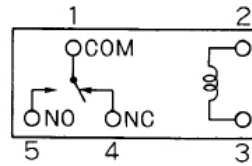
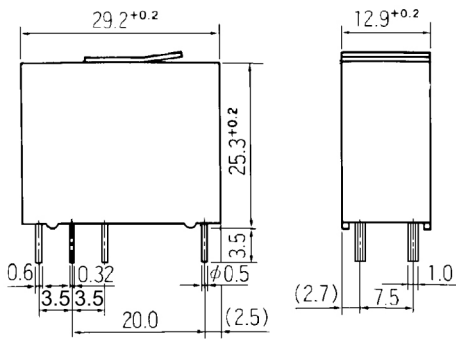
● Schematics (BOTTOM VIEW)



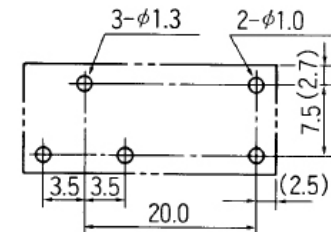
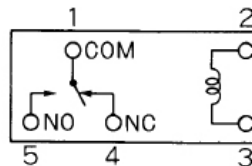
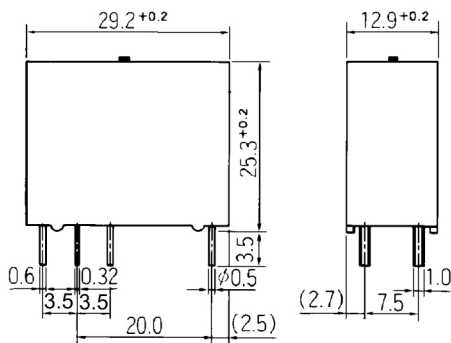
● PC board mounting hole layout (BOTTOM VIEW)



VS-TC type (Plastic sealed type with tape)



VS-TK type (Plastic sealed type)



Unit: mm

Note: This datasheet provide only + tolerance for outer dimensions.

## RoHS Compliance and Lead Free Information

### 1. General Information

- All relays produced by Fujitsu Components are compliant with RoHS directive 2011/65/EU including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives.  
As per Annex III of directive 2011/65/EU.
- All relays are lead-free. Please refer to Lead-Free Status Info for older date codes at:  
<http://www.fujitsu.com/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 Condition

- Recommended solder Sn-3.0Ag-0.5Cu.

#### Flow Solder Condition:

Pre-heating: maximum 120°C  
within 90 sec.  
Soldering: dip within 5 sec. at  
255°C ± 5°C solder bath  
Relay must be cooled by air immediately  
after soldering

#### Solder by Soldering Iron:

Soldering Iron 30-60W  
Temperature: maximum 350-360°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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