

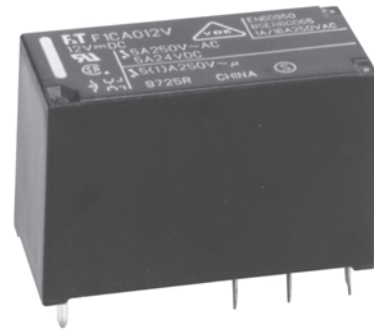
# POWER RELAY

## 2 POLES - 5A LOW PROFILE TYPE

### FTR-F1 Series

#### ■ FEATURES

- Low profile (height: 16.5mm)
  - DPST/DPDT 5A, TV-3 rating available
  - High insulation  
(due to its reinforced insulation construction)  
Insulation Distance (between coil and contacts): 8mm min.  
Dielectric strength: 5KV  
Surge strength: 10KV
  - Pin configuration compatible to VB
  - UL, CSA, VDE, SEMKO, CQC recognized
  - Plastic sealed, RT III
  - RoHS Compliant
- Please see page 6 for more information



#### ■ PARTNUMBER INFORMATION

[Example]       $\frac{\text{FTR-F1}}{\text{(a)}} \quad \frac{\text{A}}{\text{(b)}} \quad \frac{\text{A}}{\text{(c)}} \quad \frac{\text{005}}{\text{(d)}} \quad \frac{\text{V}}{\text{(e)}} - \frac{\text{RG}}{\text{(f)}}$

|     |                            |  |
|-----|----------------------------|--|
| (a) | Relay type                 | FTR-F1 : FTR-F1 Series   |
| (b) | Contact configuration      | A : 2 form A (SPST-NO)<br>C : 2 form C   |
| (c) | Coil type / enclosure      | A : Standard type (530mW)<br>D : High sensitivity type (400mW)   |
| (d) | Coil rated voltage         | 005 : 5...110VDC<br>Coil rating table at page 3  |
| (e) | Contact material / TV type | V : Gold plate silver tin oxide (standard type)<br>T : Gold plate silver tin oxide<br>(TV-3 rating type, only for 2 form A standard coil type) |
| (f) | Special type               | Nil : Standard type<br>RG : Transparent cover type   |

Actual marking does not carry the type name : "FTR"

E.g.: Ordering code: FTR-F1AA005V

Actual marking: F1AA005V

# FTR-F1 SERIES

## ■ SPECIFICATION

| Item         |                              |   | Standard Type<br>F1 (A,C) A ( ) V                                       | TV-3 rating<br>F1 AA ( ) T           | Sensitive Type<br>F1 (A,C) D ( ) V    |
|--------------|------------------------------|---|---|--------------------------------------|---------------------------------------|
| Contact Data | Configuration                |   | 2 form A (DPST-NO)<br>2 form C  | 2 form A (DSDT-NO)                   | 2 form A (DPST-NO)<br>2 form C (DPDT) |
|              | Construction                 |   | Single  |                                      |                                       |
|              | Material                     |   | Gold plate silver tin oxide (AgSnO <sub>2</sub> )                       |                                      |                                       |
|              | Resistance (initial)         |   | Max. 100mOhm at 1A, 6VDC  |                                      |                                       |
|              | Contact rating               |   | 5A, 250VAC / 24VDC  |                                      |                                       |
|              | Max. carrying current *1     |   | 7A  |                                      |                                       |
|              | Max. switching voltage       |   | 400VAC/ 300VDC  |                                      |                                       |
|              | Max. switching power         |   | 1,250VA, 120W   |                                      |                                       |
|              | Min. switching load *2       |   | 10mA, 5VDC  |                                      |                                       |
| Life         | Mechanical                   |   | Min. 20 x 10 <sup>6</sup> operations                                    |                                      |                                       |
|              | Electrical                   | AC load                                 | Min. 100 x 10 <sup>3</sup> operations                                   |                                      |                                       |
|              |                              | DC load                                 | Min. 100 x 10 <sup>3</sup> operations                                   |                                      |                                       |
|              |                              | Lamp load (TV-3)                        | -   | 25 x 10 <sup>3</sup> operations min. | -                                     |
| Coil Data    | Rated Power (at 20 ° C)      |   | 530mW, 110V type: 550mW   |                                      | 400mW                                 |
|              | Operate Power (at 20 ° C)    |   | 260mW, 110V type: 270mW   |                                      | 225mW                                 |
|              | Operating temperature range  |   | -40 to +75 °C (no frost)<br>-40 to +70 °C (transparent cover type, -RG) |                                      |                                       |
| Timing Data  | Operate (at nominal voltage) |   | Max. 15ms (no diode, without bounce)                                    |                                      |                                       |
|              | Release (at nominal voltage) |   | Max. 5ms (no diode, without bounce)                                     |                                      |                                       |
| Insulation   | Resistance (Initial)         |   | Min. 1,000MOhm at 500VDC  |                                      |                                       |
|              | Dielectric strength          | Open contacts                           | 1,000VAC (50/60Hz) 1min.  |                                      |                                       |
|              |                              | Coil and contacts                       | 5,000VAC (50/60Hz) 1min.  |                                      |                                       |
|              |                              | Adjacent contacts                       | 3,000VAC (50/60Hz) 1 min.   |                                      |                                       |
|              | Surge strength               | Coil and contacts                       | 10.000V/ 1.2 x 50µs standard wave                                       |                                      |                                       |
|              | Clearance                    |   | 8 mm  |                                      |                                       |
|              | Creepage                     |   | 8 mm  |                                      |                                       |
|              | EN61810-1, VDE0435           | Voltage                                 | 250V  |                                      |                                       |
|              |                              | Pollution degree                        | 3   |                                      |                                       |
|              | Material group               | IIIa                                    |   |                                      |                                       |
|              | Category                     | C / 250V (reference voltage) (VDE0110b) |   |                                      |                                       |
| Other        | Vibration Resistance         | Misoperation                            | 10 to 55Hz double amplitude 1.65mm                                      |                                      |                                       |
|              |                              | Endurance                               | 10 to 55Hz double amplitude 3.3mm                                       |                                      |                                       |
|              | Shock                        | Misoperation                            | Min. 100m/s <sup>2</sup> (11 ± 1ms)                                     |                                      |                                       |
|              |                              | Endurance                               | Min. 1000m/s <sup>2</sup> (6 ± 1ms)                                     |                                      |                                       |
|              | Weight                       |   | Approximately 13 g  |                                      |                                       |
|              | Sealing                      |   | Sealed RTIII  |                                      |                                       |

\* 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.

# FTR-F1 SERIES

## ■ COIL RATING

530mW 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) |
|-----------|--------------------------|-------------------------------|------------------------------|------------------------------|-------------------------|------------------|
| 005       | 5                        | 47                            | 3.5                          | 0.5                          | 8.5                     | 530              |
| 006       | 6                        | 68                            | 4.2                          | 0.6                          | 10.2                    |                  |
| 009       | 9                        | 155                           | 6.3                          | 0.9                          | 15.3                    |                  |
| 012       | 12                       | 270                           | 8.4                          | 1.2                          | 20.4                    |                  |
| 018       | 18                       | 610                           | 12.6                         | 1.8                          | 30.6                    |                  |
| 024       | 24                       | 1,100                         | 16.8                         | 2.4                          | 40.8                    |                  |
| 048       | 48                       | 4,400                         | 33.6                         | 4.8                          | 81.6                    |                  |
| 060       | 60                       | 6,800                         | 42                           | 6                            | 102                     | 550              |
| 110       | 110                      | 22,000                        | 77                           | 11                           | 187                     |                  |

400mW high sensitive 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) |
|-----------|--------------------------|-------------------------------|------------------------------|------------------------------|-------------------------|------------------|
| 003       | 3                        | 22.5                          | 2.25                         | 0.3                          | 6                       | 400              |
| 005       | 5                        | 62                            | 3.75                         | 0.5                          | 10                      |                  |
| 006       | 6                        | 90                            | 4.5                          | 0.6                          | 12                      |                  |
| 009       | 9                        | 202                           | 6.75                         | 0.9                          | 18                      |                  |
| 012       | 12                       | 360                           | 9                            | 1.2                          | 24                      |                  |
| 024       | 24                       | 1,440                         | 18                           | 2.4                          | 48                      |                  |
| 048       | 48                       | 5,760                         | 36                           | 4.8                          | 96                      |                  |

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

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

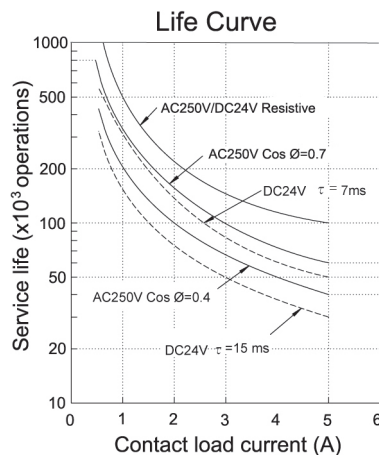
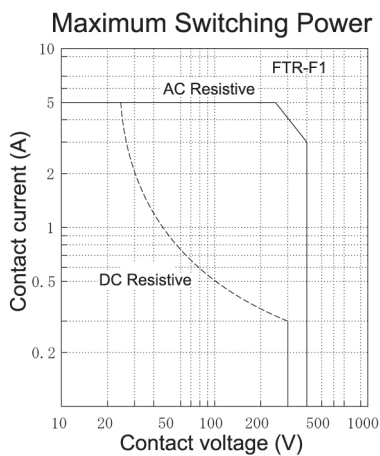
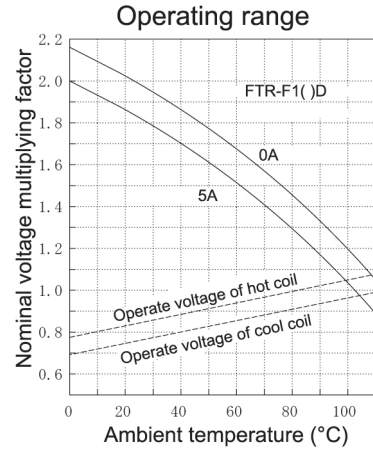
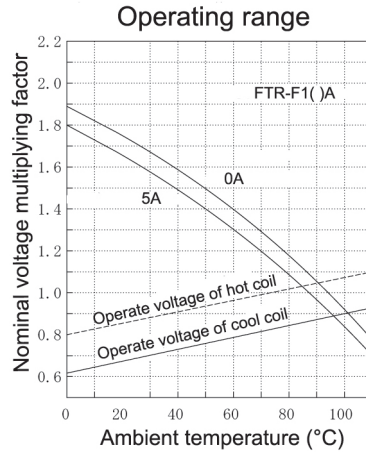
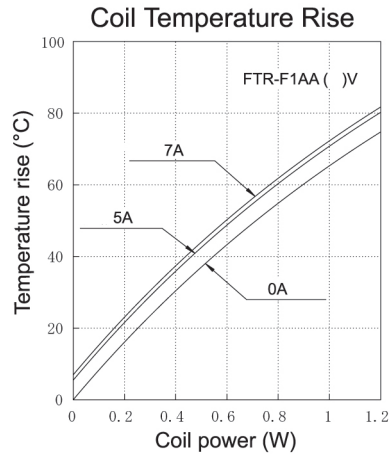
# FTR-F1 SERIES

## SAFETY STANDARDS

| Type       | Compliance   | Contact rating   |
|------------|--|--|
| UL         | UL 508   | Flammability: UL 94-V0 (plastics)  |
|            | E63614   | 5A, 24VDC (resistive)<br>5A, 250 VAC (resistive)   |
| CSA        | C22.2 No. 14                                       | 1/6 HP, 125VAC   |
|            | LR 40304   | 1/4 HP, 250VAC<br>Pilot duty: C300<br>Pilot duty: R300 (F1AA( )T, F1AA( )V)<br>TV-3 (F1AA( )T) |
| VDE        | 0435, 0631, 0700, 0860                             | 5A, 250 VAC ( $\cos\phi=1$ )<br>2A, 250 VAC ( $\cos\phi=0.4$ )<br>5 A 24VDC (0ms), 85°C        |
|            | 40013858   |  |
| SEMKO      | EN 61058-1:1992 and A1<br>EN 61095:1993 and A1+A11 | 250VAC, 5 (1)A   |
| IEC60335-1 | GWFI IEC 60695-2-12                                | >850°C (except for -RG)  |
|            | GWIT IEC 60695-2-13                                | >775°C(except for -RG)   |

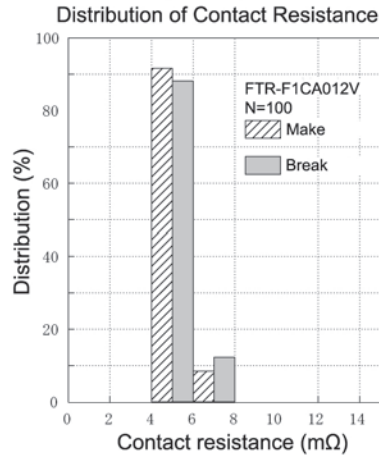
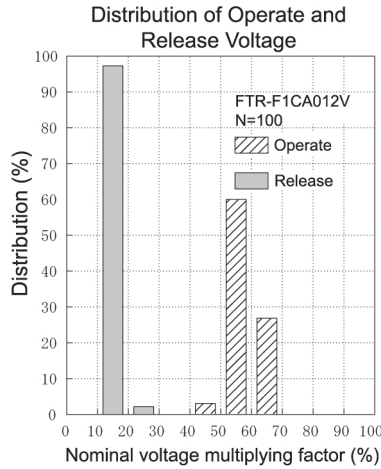
Complies with BSI, IMC, CQC

## CHARACTERISTIC DATA



# FTR-F1 SERIES

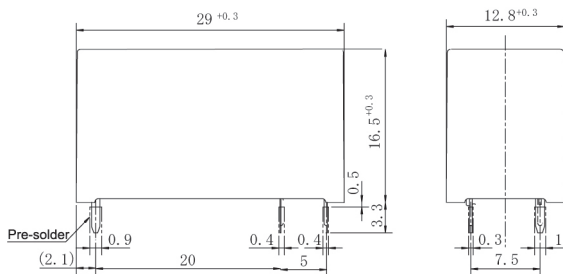
## REFERENCE DATA



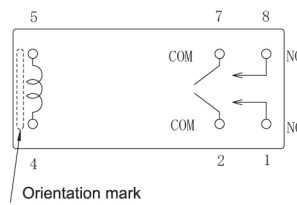
## DIMENSIONS

### Dimensions

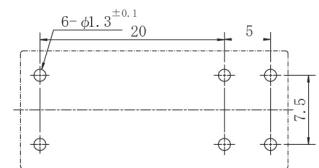
#### FTR-F1A type



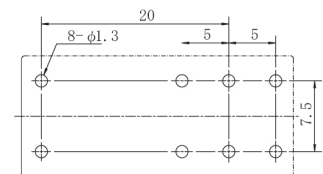
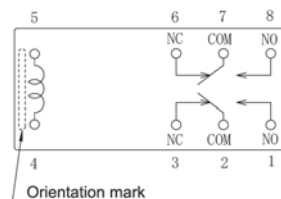
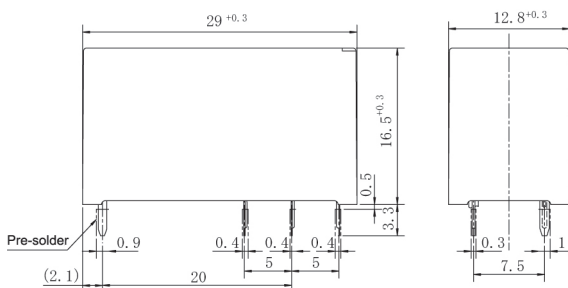
### Schematics (BOTTOM VIEW)



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



#### FTR-F1C 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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