

# POWER RELAY

## 2 POLE 5A / TV-3 Rated Compact Type Relay

### FTR-F4 Series

#### ■ FEATURES

- Small high density type relay 288mm<sup>2</sup> save 24% compared to VB
- UL, CSA, VDE, CQC approved
- Insulation distance: minimum 6 mm between coil and contacts  
IEC60065 Dielectric strength: 4 KV  
Surge strength: 10 KV
- Card separation system for high noise resistance between coil and contacts
- Flux proof type, RTII
- RoHS compliant  
Please see page 6 for more information



#### ■ APPLICATIONS

- CRT monitor EMI protection
- Audio system speaker protection

#### ■ Part Numbers

[Example]    FTR-F4    A    K    012    T  
                   (a)        (b)        (c)        (d)        (e)

|     |                            |   |
|-----|----------------------------|---|
| (a) | Relay type                 | FTR-F4 : FTR-F4 series                            |
| (b) | Contact configuration      | A : 2 form A (DPST)                               |
| (c) | Coil type (power)          | K : Standard type (530mW)                         |
| (d) | Coil rated voltage         | 012 : 5..... 48VDC<br>Coil rating table at page 3 |
| (e) | Contact material / TV Type | T : Silver plating AgSnO <sup>2</sup> (TV-3)      |

Actual marking does not carry the type name: "FTR"  
 E.g.: Ordering code: FTR-F4AK012T Actual marking: F4AK012T

# FTR-F4 Series

## ■ Specifications

| Item           |                             |                                    | FTR-F4  | Remarks / conditions                             |
|----------------|-----------------------------|------------------------------------|---|--|
| Contact data   | Configuration               |                                    | 2 form A (DPST-NO)                            |  |
|                | Construction                |                                    | Single  |  |
|                | Material                    |                                    | Silver plating AgSnO <sub>2</sub> (TV-3)      |  |
|                | Resistance                  |                                    | Max. 100mOhm                                  | Initial at 1A, 6VDC                              |
|                | Contact rating              |                                    | 5A, 250VAC, 30VDC                             | Resistive  |
|                | Max. carrying current       |                                    | 5A  |  |
|                | Max. switching voltage      |                                    | 400 VAC / 300VDC                              |  |
|                | Max. switching power        |                                    | 1,250VA / 150W                                |  |
|                | Max. switching current      |                                    | 5A  |  |
|                | Min. switching load *1      |                                    | 100mA, 5VDC                                   |  |
|                | Max. inrush current         |                                    | 120VAC, 51A (TV-3)                            |  |
| Coil           | Rated power (20°C)          |                                    | 530mW   |  |
|                | Operate power (20°C)        |                                    | 300mW   |  |
|                | Operating temperature range |                                    | -40°C ~ +70°C                                 | No frost   |
| Timing data    | Operate                     |                                    | Max. 15ms                                     | without bounce                                   |
|                | Release                     |                                    | Max. 5ms                                      | no diode   |
| Life           | Mechanical                  |                                    | Min. 2 x 10 <sup>6</sup> operations           |  |
|                | Electrical                  | Contact rating                     | Min. 100 x 10 <sup>3</sup> ops.               | At rated load                                    |
|                |                             | Lamp load (TV-3)                   | Min. 25 x 10 <sup>3</sup> ops.                |  |
| Insulation     | Insulation resistance       |                                    | Min. 1000MΩ                                   | Initial at 500VDC                                |
|                | Dielectric strength         | Open contacts                      | 1000VAC (50/60Hz), 1 minute                   |  |
|                |                             | Coil contact                       | 3000VAC (50/60Hz), 1 minute                   |  |
|                |                             | Adjacent contacts                  | 4000VAC (50/60Hz), 1 minute                   |  |
| Surge strength | Coil to contacts            | 10,000V / 1.2 x 50μs standard wave |   |  |
| Other          | Vibration resistance        | Misoperation ≥1us                  | 10Hz ~ 55Hz ~ 10Hz single amplitude<br>0.75mm | Direction X, Y, Z, contact ON/OFF total 6 cycles |
|                |                             | Endurance                          | 10Hz ~ 55Hz ~ 10Hz single amplitude<br>0.75mm | Direction X, Y, Z, contact OFF total 6 hours     |
|                | Shock resistance            | Misoperation ≥1us                  | Min. 200m/s <sup>2</sup> (11 ± 1ms)           | Direction X, Y, Z, contact ON/OFF total 36 times |
|                |                             | Endurance                          | Min. 1,000m/s <sup>2</sup> (6 ± 1ms)          | Direction X, Y, Z, contact OFF total 18 times    |
|                | Dimensions / weight         |                                    | 12.0 x 24.0 x 25.0 mm / approx. 12g           |  |
|                | Sealing                     |                                    | Flux proof, RTII                              |  |

\*1: 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-F4 Series

## ■ Coil Data

| Coil code | Rated Coil Voltage (VDC) | Coil Resistance +/-10% ( $\Omega$ ) | Must Operate Voltage* (VDC) | Must Release Voltage* (VDC) | Rated Power (mW) |
|-----------|--------------------------|-------------------------------------|-----------------------------|-----------------------------|------------------|
| 005       | 5                        | 47                                  | 3.75                        | 0.25                        | 530              |
| 006       | 6                        | 68                                  | 4.5                         | 0.3                         |                  |
| 009       | 9                        | 155                                 | 6.75                        | 0.45                        |                  |
| 012       | 12                       | 270                                 | 9.0                         | 0.6                         |                  |
| 024       | 24                       | 1,100                               | 18.0                        | 1.2                         |                  |
| 048       | 48                       | 4,400                               | 36.0                        | 2.4                         |                  |

Note: All values in the table are valid at 20°C and zero contact current, unless otherwise specified.

\*: Specified operated values are valid for pulse wave voltage.

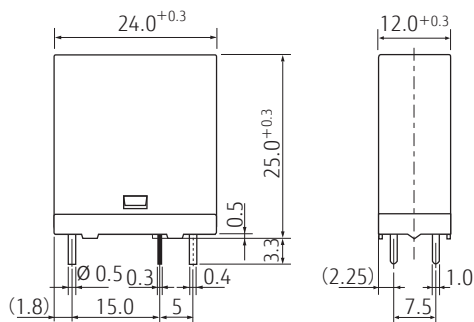
Note: Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use at over voltage.

## ■ Safety Standards

| Type | Compliance                              | Contact rating   |
|------|---|--|
| UL   | UL 508<br>File No. E63614               | 5A, 277VAC/30VDC (resistive)<br>1/6 HP, 125VAC<br>1/4 HP, 277VAC<br>Pilot duty: C300<br>TV-3 120VAC                                    |
| CSA  | C22.2 No. 14<br>File No. LR 40304       |  |
| VDE  | IEC/EN61810-1,<br>EN60065 clause 14.6.1 | 5A, 250VAC ( $\cos \phi$ 1), $50 \times 10^3$<br>2A, 250VAC ( $\cos \phi$ 0.4) $100 \times 10^3$<br>5A, 30VDC (0msec)<br>2/32A, 250VAC |
| CQC  | GB15092.1<br>03001006524                | 5A, 250VAC   |

## ■ Dimensions

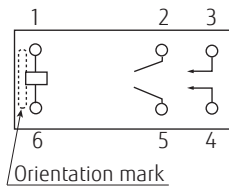
- Dimensions



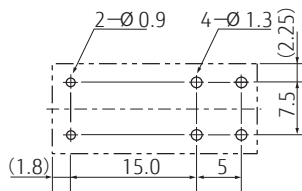
\* Dimensions of the terminals do not include thickness of pre-solder.

# FTR-F4 Series

- Schematics  
(BOTTOM VIEW)



- PC Board Mounting Hole Layout  
(BOTTOM VIEW)

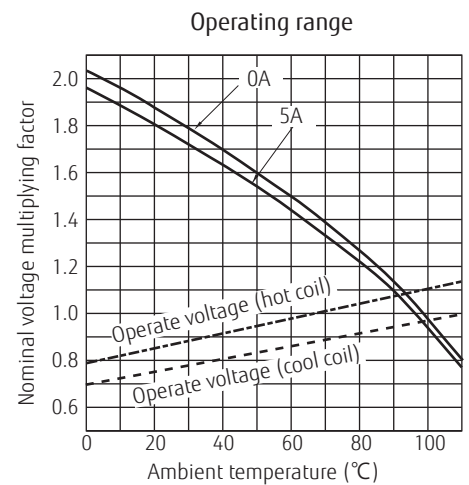
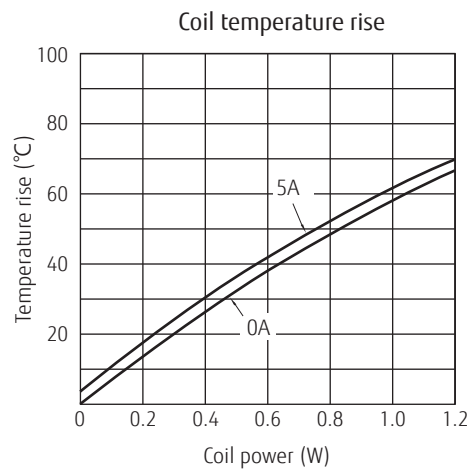
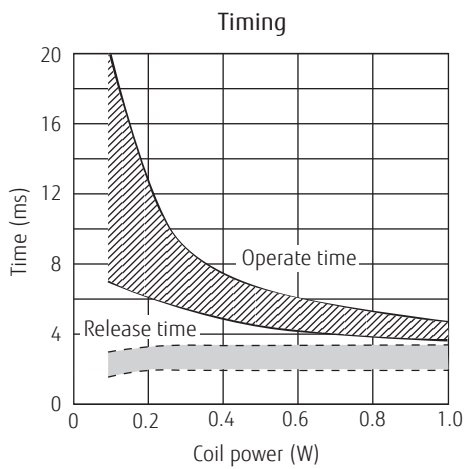


( ): Reference value  
Unit: mm

\* Tolerance of PC board mounting hole layout :  $\pm 0.1$  unless otherwise specified.

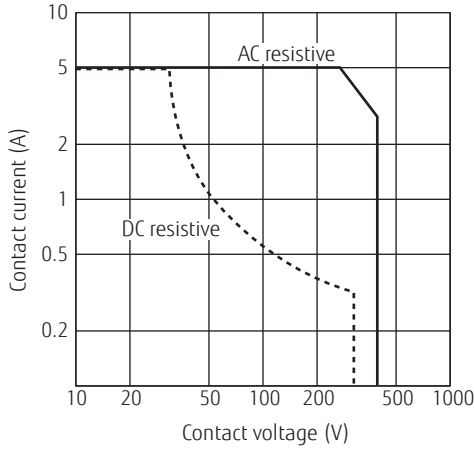
## ■ Characteristic Data (Reference)

\* Characteristic data is not guaranteed value but measured values of samples from production line.

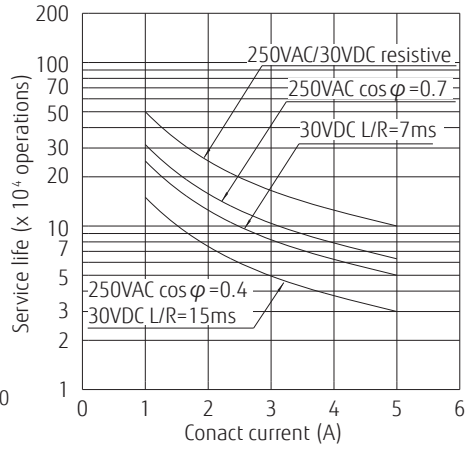


# FTR-F4 Series

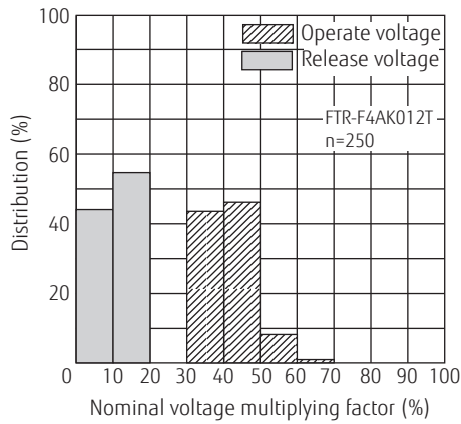
Maximum switching power



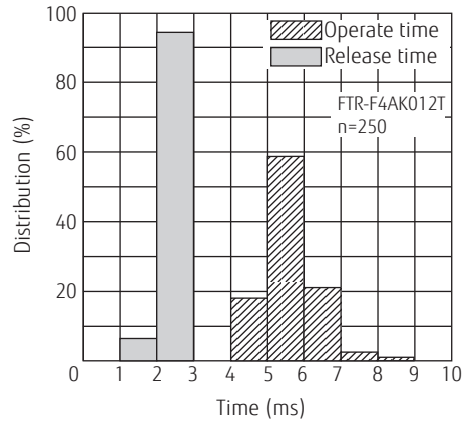
Life curve



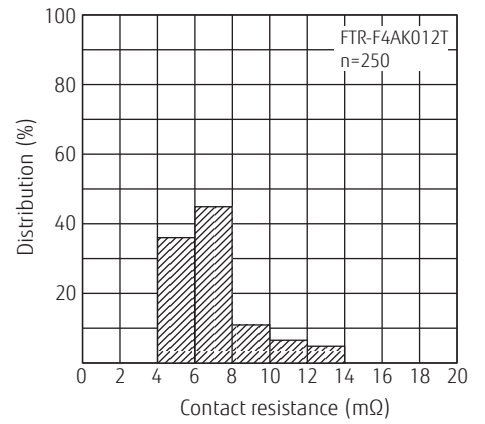
Distribution of operate/release voltage



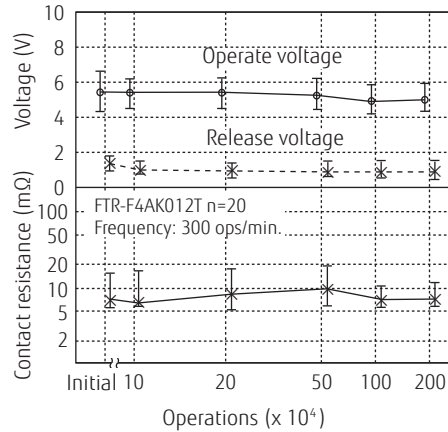
Distribution of operate/release time



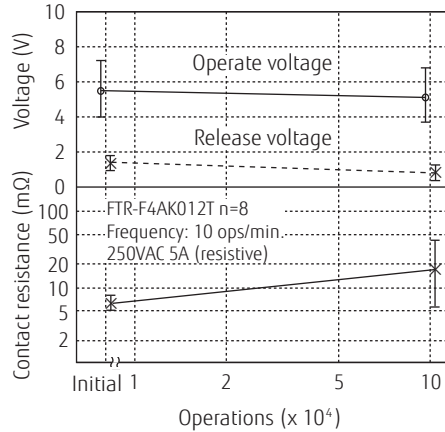
Distribution of contact resistance



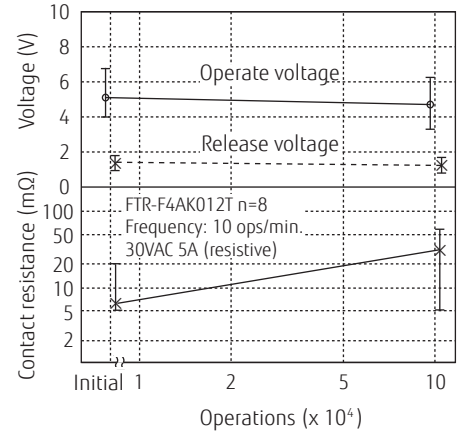
Mechanical life test



Electrical life test



Electrical life test



# FTR-F4 Series

## GENERAL INFORMATION

### 1. ROHS Compliance

- All relays produced by Fujitsu Components are compliant with RoHS directive 2011/65/EU including amendments.
- Use of Cadmium in electrical contacts is exempted as per Annex III of the RoHS directive 2011/65/EU. Please consider expiry date of exemption. Relays with Cadmium containing contacts are not to be used for new designs.
- 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>
- Characteristic data is not guaranteed values, but measured values of samples from production line.

### 2. Recommended lead free solder condition

- 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.
- Recommended solder for assembly: 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.

# FTR-F4 Series

## Fujitsu Components International Headquarter Offices

|  |  |  |
|--|--|--|
| <b>Japan</b><br>FUJITSU COMPONENT LIMITED<br>Shinagawa Seaside Park Tower 19F,<br>12-4, Higashi-shinagawa 4-chome, Shinagawa-ku,<br>Tokyo, 140-0002, Japan<br>Tel: (81-3) 3450-1682<br>Fax: (81-3) 3474-2385<br>Email: fcl-contact@cs.jp.fujitsu.com<br>Web: www.fujitsu.com/jp/fcl/ | <b>Asia Pacific</b><br>FUJITSU COMPONENTS ASIA, LTD.<br>102E Pasir Panjang Road<br>#01-01 Citilink Warehouse Complex<br>Singapore 118529<br>Tel: (65) 6375-8560<br>Fax: (65) 6273-3021<br>Email: fcal@sg.fujitsu.com<br>Web: www.fujitsu.com/sg/products/devices/components                        | <b>Korea</b><br>FUJITSU COMPONENTS KOREA LIMITED<br>Alpha Tower #403, 645 Samsyeong-dong,<br>Bundang-gu, Seongnam-si, Gyeonggi-do,<br>13524 Korea<br>Tel: (82) 31-708-7108<br>Fax: (82) 31-709-7108<br>Email: fcal@sg.fujitsu.com<br>www.fujitsu.com/sg/products/devices/components/ |
| <b>North and South America</b><br>FUJITSU COMPONENTS AMERICA, INC<br>2290 North First Street, Suite 212<br>San Jose, CA 95131, USA<br>Tel: (1-408) 745-4900<br>Fax: (1-408) 745-4970<br>Email: components@us.fujitsu.com<br>Web: us.fujitsu.com/components                           | <b>China</b><br>FUJITSU ELECTRONIC COMPONENTS (SHANGHAI) CO., LTD.<br>Unit 4306, InterContinental Center<br>100 Yu Tong Road, Shanghai 200070,<br>China<br>Tel: (86-21) 3253 0998<br>Fax: (86-21) 3253 0997<br>Email: fcal@sg.fujitsu.com<br>Web: www.fujitsu.com/sg/products/devices/components   |  |
| <b>Europe</b><br>FUJITSU COMPONENTS EUROPE B.V.<br>Diamantlaan 25<br>2132 WV Hoofddorp<br>Netherlands<br>Tel: (31-23) 5560910<br>Fax: (31-23) 5560950<br>Email: info@fceu.fujitsu.com<br>Web: www.fujitsu.com/uk/components  | <b>Hong Kong</b><br>FUJITSU COMPONENTS HONG KONG CO., LTD<br>Unit 506, Inter-Continental Plaza<br>No.94 Granville Road, Tsim Sha Tsui, Kowloon,<br>Hong Kong<br>Tel: (852) 2881-8495<br>Tex: (852) 2894-9512<br>Email: fcal@sg.fujitsu.com<br>Web: www.fujitsu.com/sg/products/devices/components/ |  |

©2017 Fujitsu Components Europe B.V. All rights reserved. All trademarks or registered trademarks are the property of their respective owners.

The contents, data and information in this datasheet are provided by Fujitsu Component Ltd. as a service only to its user and only for general information purposes.

The use of the contents, data and information provided in this datasheet is at the users' own risk.

Fujitsu has assembled this datasheet with care and will endeavor to keep the contents, data and information correct, accurate, comprehensive, complete and up to date.

Fujitsu Components Europe B.V. and affiliated companies do however not accept any responsibility or liability on their behalf, nor on behalf of its employees, for any loss or damage, direct, indirect or consequential, with respect to this datasheet, its contents, data, and information and related graphics and the correctness, reliability, accuracy, comprehensiveness, usefulness, availability and completeness thereof.

Nor do Fujitsu Components Europe B.V. and affiliated companies accept on their behalf, nor on behalf of its employees, any responsibility or liability for any representation or warrant of any kind, express or implied, including warranties of any kind for merchantability or fitness for particular use, with respect to these datasheets, its contents, data, information and related graphics and the correctness, reliability, accuracy, comprehensiveness, usefulness, availability and completeness thereof. Rev. June 28<sup>th</sup>, 2017