

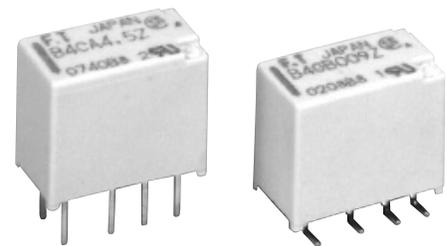
# ULTRA MINIATURE RELAY

## 2 POLES - 2 A (Slim Profile Signal Relay)

### FTR-B4 Series

#### ■ FEATURES

- DPDT 2C
- Ultra miniature slim type relay for surface mounting  
Height: 9.3 mm maximum (THT)  
10 mm maximum (SMT)  
Weight: Approximately 1.0 g
- UL, CSA recognized
- Conforms to Telcordia/FCC Part 68 spacing and high breakdown voltage  
Creepage: 1.6mm  
Dielectric strength 1.5kV (coil-contact)  
Surge strength 2.5kV
- High reliable bifurcated gold overlay silver contact
- Low power consumption 140 mW (standard), 100 mW (latching)
- RoHS compliant. Please see page 9 for more information
- Plastic sealed



#### ■ PARTNUMBER INFORMATION

[Example]     FTR-B4   C   A   4.5   Z - B05  
                   (a)    (b)   (c)   (d)   (e)   (f)

|     |                    |             |  |
|-----|--------------------|-------------|--|
| (a) | Relay type         | FTR-B4      | : FTR-B4-Series  |
| (b) | Terminal type      | C<br>G<br>S | : Through hole<br>: Surface mount<br>: Surface mount, space saving         |
| (c) | Coil type          | A<br>B      | : Standard type<br>: Latching type (1 coil)                                |
| (d) | Coil rated voltage | 4.5         | : 1.5.....24 VDC<br>Coil rating table at page 3                            |
| (e) | Contact material   | Z<br>P      | : Gold overlay silver nickel (standard)<br>: Gold overlay silver palladium |
| (f) | Packaging          | Nil:<br>B05 | : Tube packaging<br>: Tape&Peel packaging (only for surface mount type)    |

Remarks: Actual marking on relay would not carry code FTR and be as below:  
 Ordering code: FTR-B4CA4.5Z                      Actual marking: B4CA4.5Z

# FTR-B4 SERIES

## ■ SPECIFICATION

| Item              |   |                   | Standard type  | Latching type                        |
|-------------------|---|-------------------|--|--------------------------------------|
|                   |   |                   | FTR-B4 ( ) A   | FTR-B4 ( ) B                         |
| Contact Data      | Configuration                           |                   | 2 form C   |                                      |
|                   | Construction                            |                   | Bifurcated contacts  |                                      |
|                   | Material                                |                   | Z: Gold overlay silver nickel / P: Gold overlay silver palladium |                                      |
|                   | Resistance (Initial)                    |                   | Max. 100 mΩ at 1 A, 6 VDC  |                                      |
|                   | Contact rating (resistive)              |                   | 30VDC, 1A / 125VAC, 0.3A   |                                      |
|                   | Max. carrying current                   |                   | 2A   |                                      |
|                   | Max. switching voltage                  |                   | 250 VAC / 220VDC   |                                      |
|                   | Max. switching power                    |                   | 62.5VA / 30W   |                                      |
|                   | Min. switching load *                   |                   | 0.01mA, 10mVDC   |                                      |
| Life              | Mechanical                              |                   | Min. 50 x 10 <sup>6</sup> operations                             | Min. 20 x 10 <sup>6</sup> operations |
|                   | Electrical                              | DC load           | Min. 100 x 10 <sup>3</sup> operations at 1A, 30VDC               |                                      |
|                   |   | AC load           | Min. 100 x 10 <sup>3</sup> operations at 0.3A, 125VAC            |                                      |
| Coil Data         | Rated power                             |                   | 140mW - 230mW  | 100mW - 130mW                        |
|                   | Applied pulse width                     |                   | -  | Min. 10ms                            |
|                   | Operate power                           |                   | 80mW - 130mW   | 57mW - 68mW                          |
|                   | Operating temperature range             |                   | -40 °C to +85 °C (no frost)                                      |                                      |
|                   | Storage temperature / humidity          |                   | -40 °C to +85 °C / 5% to 85% RH (no frost)                       |                                      |
| Timing Data       | Operate (at nominal voltage, no bounce) |                   | Max. 3 ms  | Max. 3 ms (set)                      |
|                   | Release (at nominal voltage, no bounce) |                   | Max. 3 ms  | Max. 3 ms (reset)                    |
| Insulation        | Resistance (initial)                    |                   | Min. 1,000MΩ at 500VDC   |                                      |
|                   | Dielectric strength                     | Open contacts     | 1,000VAC (50/60Hz) 1min  |                                      |
|                   |   | Contacts to coil  | 1,500VAC (50/60Hz) 1min  |                                      |
|                   |   | Adjacent contacts | 1,000VAC (50/60Hz) 1min.   |                                      |
|                   | Surge strength                          | Coil to contacts  | 2,500V, 2 x 10μs standard wave                                   |                                      |
|                   |   | Adjacent contacts | 1.0 mm   |                                      |
|                   | Clearance                               | Open contacts     | 0.28 mm  |                                      |
|                   |   | Coil and contacts | 1.0 mm   |                                      |
|                   |   | Adjacent contacts | 1.0 mm   |                                      |
|                   | Creepage                                | Open contacts     | 0.28 mm  |                                      |
| Coil and contacts |   | 1.60 mm           |  |                                      |
| Adjacent contacts |   | 1.0 mm            |  |                                      |
| Other             | Vibration resistance                    | Misoperation      | 10 to 55 to 10Hz at single amplitude 1.65 mm                     |                                      |
|                   |   | Endurance         | 10 to 55 to 10Hz at single amplitude 2.5 mm                      |                                      |
|                   | Shock                                   | Misoperation      | 750m/s <sup>2</sup> (11 ±1ms)                                    |                                      |
|                   |   | Endurance         | 1,000m/s <sup>2</sup> (6 ±1ms)                                   |                                      |
|                   | Weight                                  |                   | Approximately 1 g  |                                      |
|                   | Sealing                                 |                   | RT III (plastic sealed)  |                                      |

\* 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) * | Rated Power (mW) |
|-----------|--------------------------|-------------------------------|------------------------------|------------------------------|------------------|
| 1.5       | 1.5                      | 16.1                          | 1.13                         | 0.15                         | 140              |
| 003       | 3                        | 64.3                          | 2.25                         | 0.3                          |                  |
| 4.5       | 4.5                      | 145                           | 3.38                         | 0.45                         |                  |
| 006       | 6                        | 257                           | 4.5                          | 0.6                          |                  |
| 009       | 9                        | 579                           | 6.75                         | 0.9                          |                  |
| 012       | 12                       | 1,028                         | 9.0                          | 1.2                          | 230              |
| 024       | 24                       | 2,504                         | 18.0                         | 2.4                          |                  |

Latching type (1 coil)

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Set Voltage (VDC) * | Reset Voltage (VDC) * | Set/Reset current (mA) | Rated Power (mW) |
|-----------|--------------------------|-------------------------------|---------------------|-----------------------|------------------------|------------------|
| 1.5       | 1.5                      | 22.5                          | +1.13               | -1.13                 | 50                     | 100              |
| 003       | 3                        | 90                            | +2.25               | -2.25                 | 25                     |                  |
| 4.5       | 4.5                      | 203                           | +3.38               | -3.38                 | 17                     |                  |
| 006       | 6                        | 360                           | +4.5                | -4.5                  | 13                     |                  |
| 009       | 9                        | 810                           | +6.75               | -6.75                 | 8                      |                  |
| 012       | 12                       | 1,440                         | +9.0                | -9.0                  | 6                      | 120              |
| 024       | 24                       | 4,800                         | +18.0               | -18.0                 | 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..

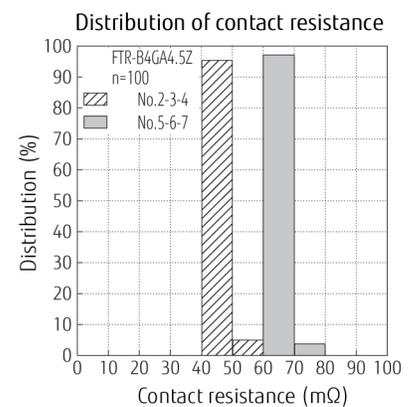
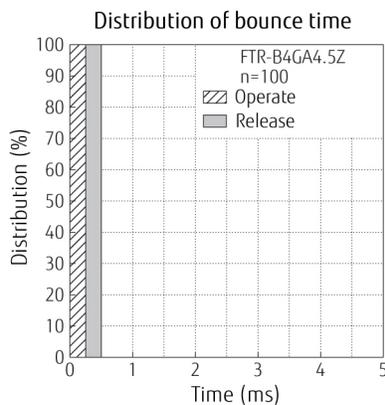
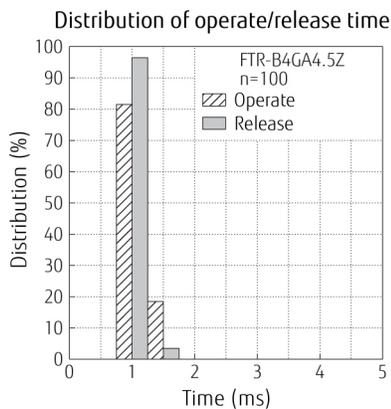
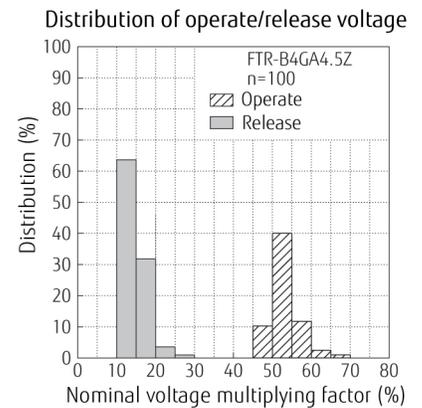
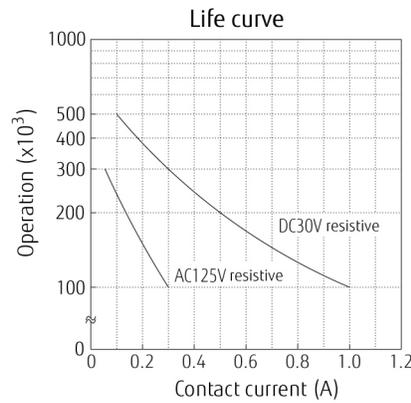
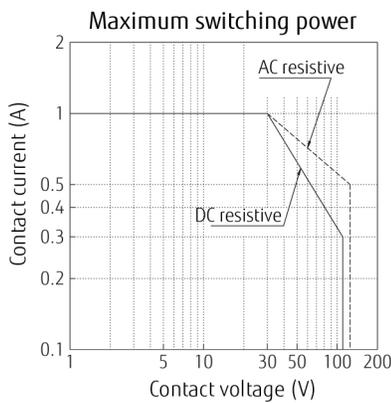
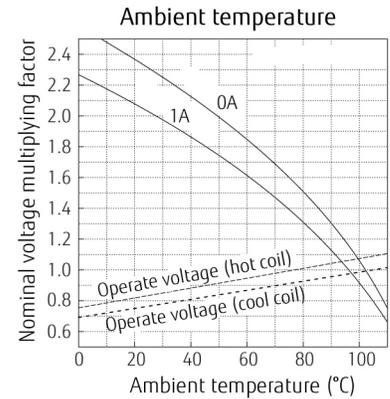
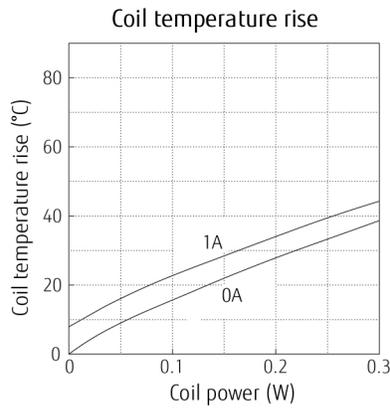
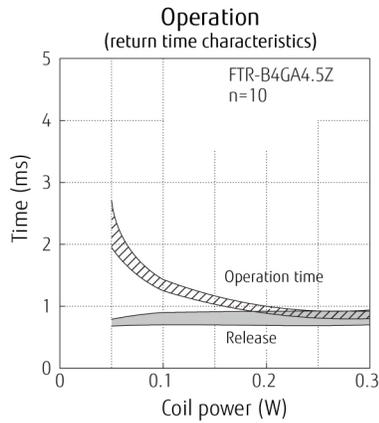
## ■ SAFETY STANDARDS

| Type | Compliance               | Contact rating                        |
|------|--------------------------|---------------------------------------|
| UL   | UL 508                   | Flammability: UL 94-V0 (plastics)     |
|      | E 63615                  | 0.5A, 125VAC (resistive)<br>1A, 30VDC |
| CSA  | C22.2 No. 14<br>LR 40304 | 0.3A, 110VDC<br>2A, 30VDC             |

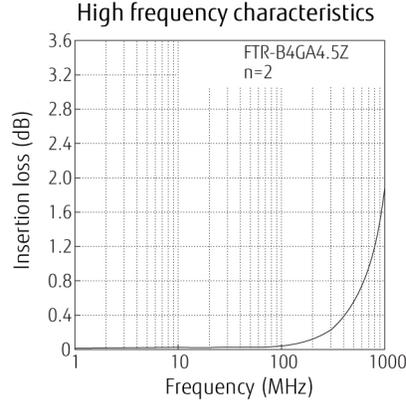
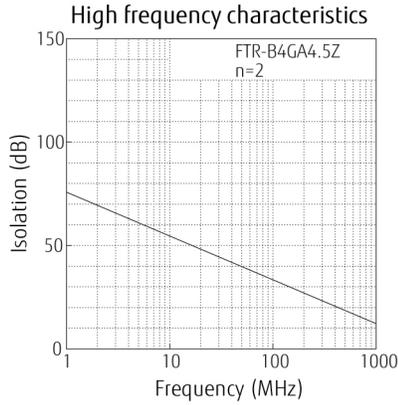
Comply with Telcordia specifications and FCC part 68 and meet BSI EN60950-1:  
Marking only for UL, CSA

## CHARACTERISTIC DATA (Reference)

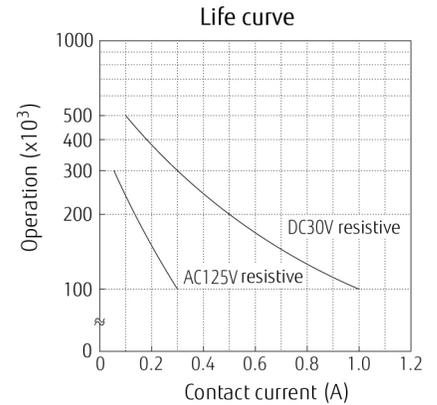
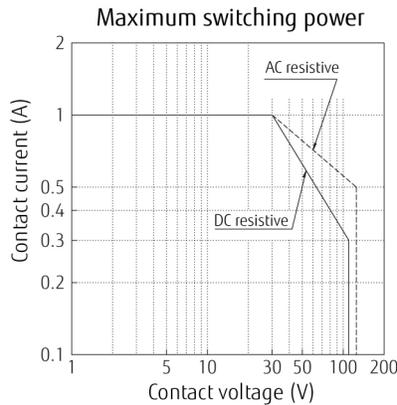
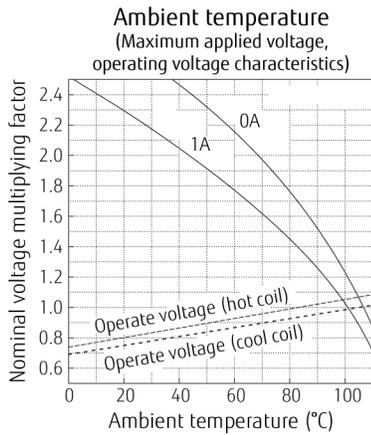
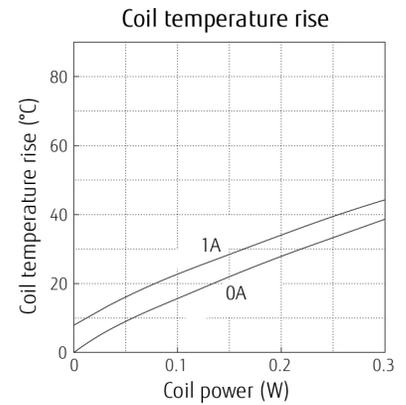
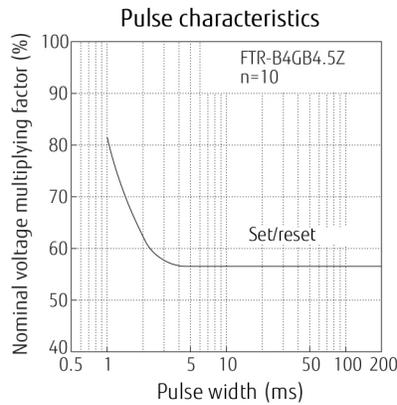
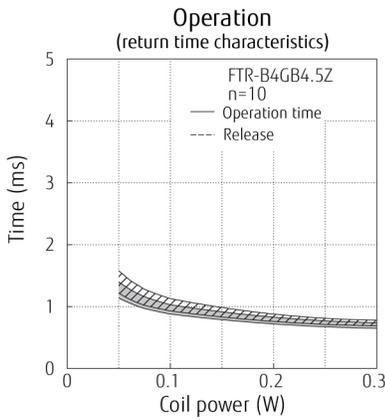
- Standard type



# FTR-B4 SERIES

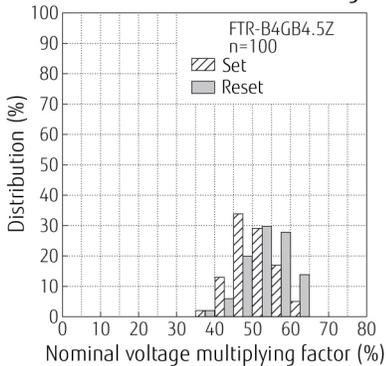


- **Latching type (1coil)**

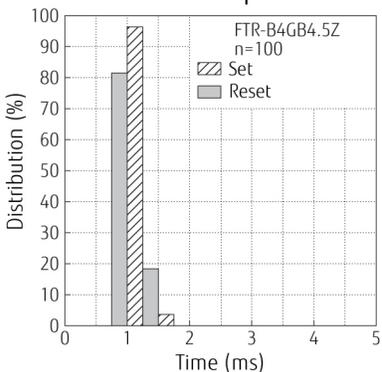


# FTR-B4 SERIES

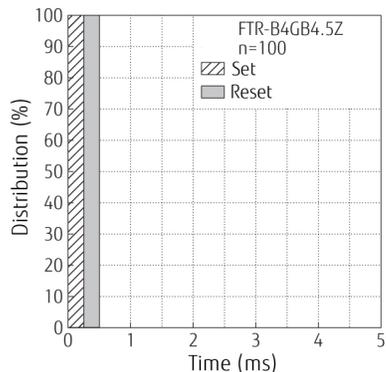
Distribution of set/reset voltage



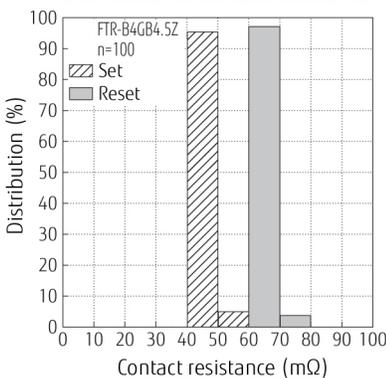
Distribution of operate time



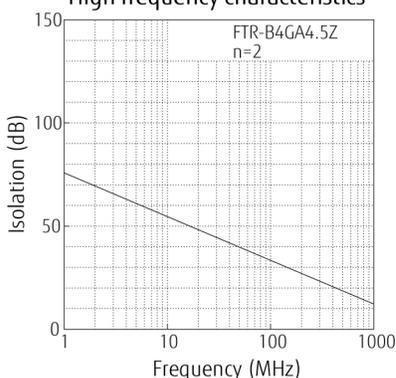
Distribution of bounce time



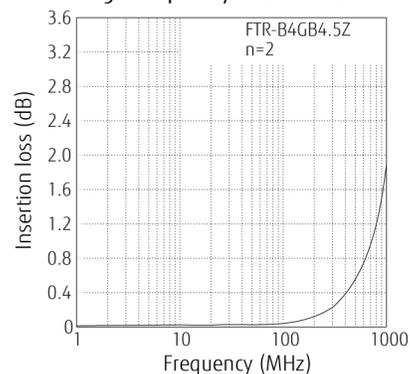
Distribution of contact resistance



High frequency characteristics



High frequency characteristics

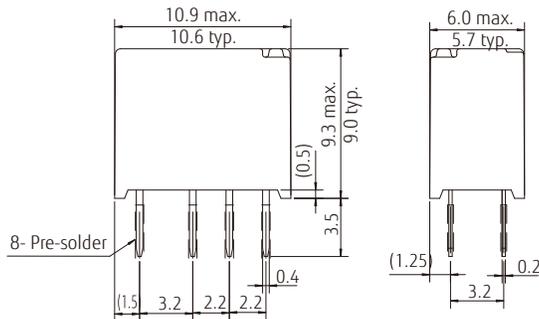


# FTR-B4 SERIES

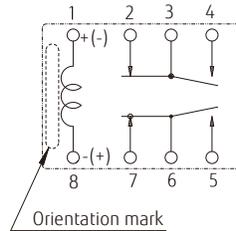
## ■ DIMENSIONS

FTR-B4C - Through hole type

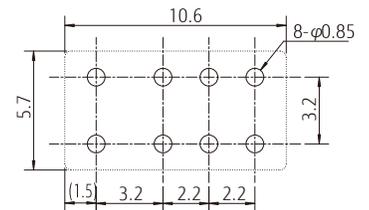
### ● Dimensions



### ● Schematics \* (BOTTOM VIEW)

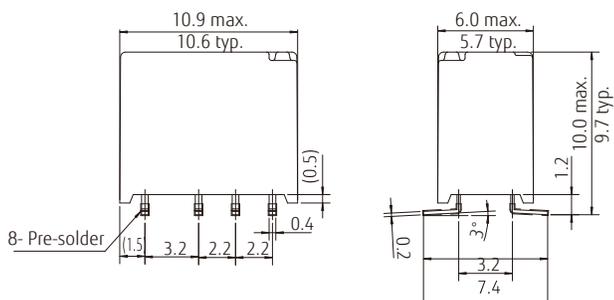


### ● PC board mounting hole layout (BOTTOM VIEW)

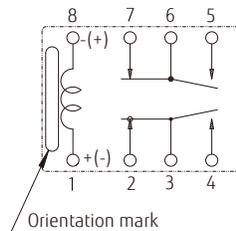


FTR-B4G - Surface mount type

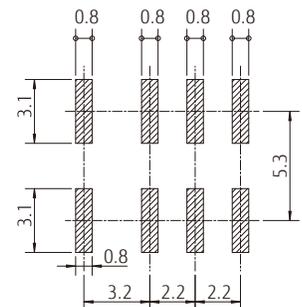
### ● Dimensions



### ● Schematics \* (TOP VIEW)

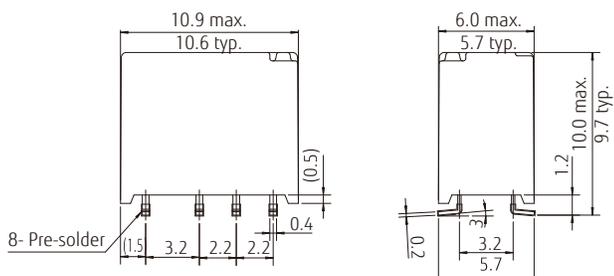


### ● PC board mounting pad layout (TOP VIEW)

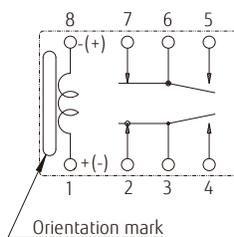


FTR-B4S- Space saving type

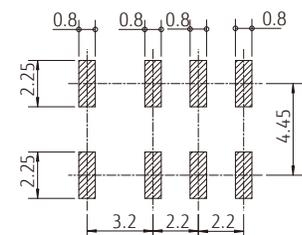
### ● Dimensions



### ● Schematics \* (TOP VIEW)



### ● PC board mounting pad layout (TOP VIEW)



\* Contacts indicates reset state for latching relays (FTR-B4CB, FTR-B4GB and FTR-B4SB versions) and non-operate state for standard relays (FTR-B4CA, FTR-B4GA and FTR-B4SA versions).

\* +/-: Apply set voltage for latching relays, operate voltage for standard relays.

(+)/(−): Indicates set state for latching relays, operate state for standard relays.

Note: Tolerance for PC board mounting hole/pad layout: +/-0.1.

Note: Dimensions of the terminals do not include thickness of pre-solder.

Unit: mm  
( ): Reference

## ■ COIL POLARITY LATCHING TYPE

|               |   |   |
|---------------|---|---|
| Coil terminal | 1 | 8 |
| Set           | + | - |
| Reset         | - | + |

## ■ RECOMMENDED SOLDERING CONDITIONS FOR SMT (SEE PAGE 9) (TEMPERATURE PROFILE)

Notes:

1. Temperature profiles on page 9 show the temperature of PC board surface.
2. Please perform soldering test with your actual PC board before mass production, since the temperatures of PC board surfaces vary according to the size of PC board, status of parts mounting and heating method.

## ■ PRECAUTIONS

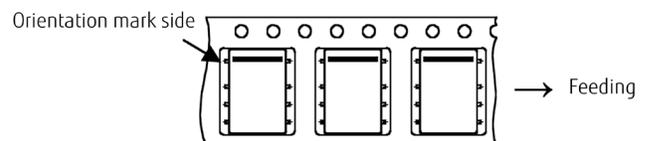
- For details on general precautions, refer to the section on technical descriptions.
- Since this is a polarized relay, follow the instructions of the internal wiring diagram for the  $\pm$  connections of the coil.
- Note that the terminal layout and internal wiring of the surface mount relay are a top view.
- Characteristic data is not guaranteed values but measured values of samples from production line.

## ■ PACKAGING SPECIFICATIONS

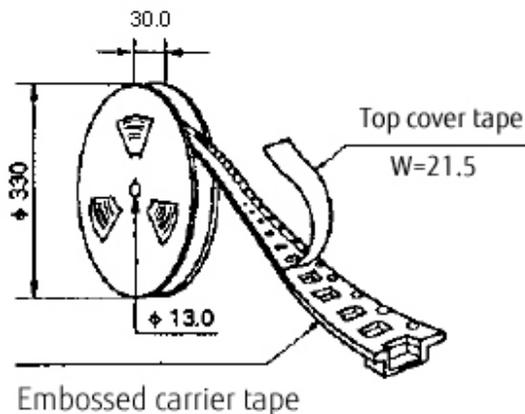
### ● Packaging method

- Packaging standard: JIS C 0806
- Taping type: TB 2412
- Reel type: R24D
- Quantity of 1 reel: 500 pieces

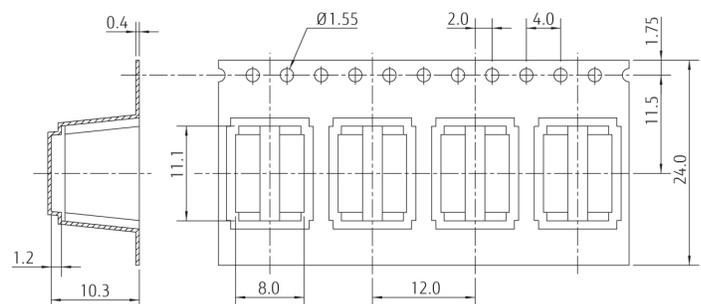
### ● Packaging orientation code: B



### ● Reel dimensions



### ● Tape dimensions



Note:

Relays are sold in 500 pieces per box. Minimum order quantity is 1000 pieces for tube packing and 500 pieces for tape & reel packing.

## 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>

### 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 Sn-3.0Ag-0.5Cu.

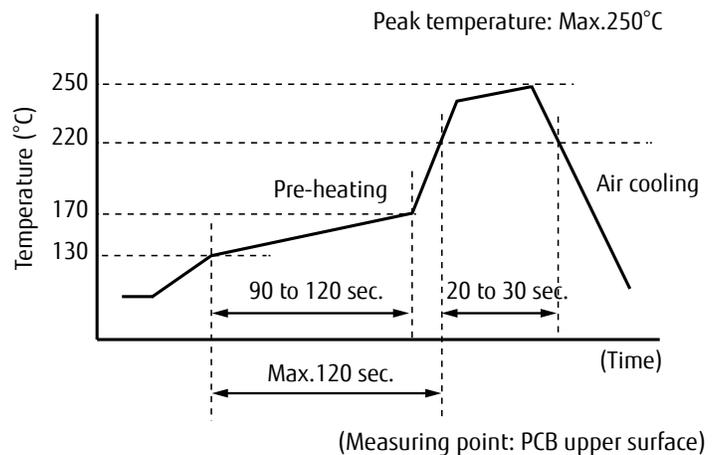
#### Flow Solder Condition:

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 340-360 °C  
 Duration: maximum 3 sec.

#### Reflow Solder Condition for SMT



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

### 3. Moisture Sensitivity

- SMT versions of FTR-B4 relays in Tape & Reel package will be shipped in Moisture Barrier Bag (MBB).
- Moisture Sensitivity Level (MSL) of FTR-B4 relay is indicated on the packing caution label.
- Relays must be stored in the unopened MBB at storage conditions <40C/90%RH for a maximum 1 year
- SMT versions of FTR-B4 relays in tube packing will not be shipped in MBB. Therefore, these relays shall be dried by baking before reflow soldering process according to IPC/JEDEC J-STD-033.

### 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.

## Cautions

- All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- Reflow soldering is prohibited for through hole relays.
- Do not use relays in the atmosphere with sulfide gas, chloride gas or nitric oxide. Contact resistance may increase.
- Do not use silicon or silicon-containing product or materials near relays. It may cause contact failure.

## Cautions for latching relays

- Latching relays are shipped in the state set, but state may change due to shock during transportation or mounting. Before using the relays, it is advisable to bring the relays in necessary state (set or reset) and program a circuit sequence. Otherwise, it will or will not operate simultaneously with power activation.
- Please connect relay coils according to specified polarity.
- Do not apply voltage to both set coil and reset coil at a time.

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