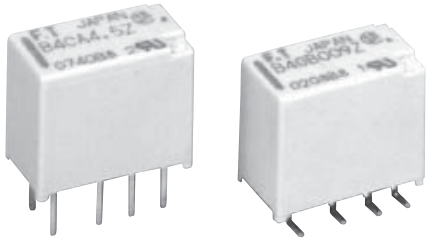
FUJITSU

# 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
- Conforms to Bellcore & FCC part 68, and Telcordia & FCC part 68
- Conforms to UL1950 / CSA 950, IEC 950 / EN60950 spacing and high breakdown voltage
  Clearance: 1.0mm
  Creepage: 1.6mm
  Basic insulation, 150V working voltage, pollution degree 2
- High reliable birfuracted 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

## ■ 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 $10^6$ operations | Min. 20 x $10^6$ operations |
| | Electrical | DC load | Min. 100 x $10^3$ operations at 1A, 30VDC (at 0.5 Hz) | |
| | | AC load | Min. 100 x $10^3$ operations at 0.3A, 125VAC (at 0.5 Hz) | |
| Coil Data | Rated power | | 140mW - 230mW | 100mW - 130mW |
| | Applied pulse width | | - | Min. 10ms |
| | Operate power | | 80mW - 130mW | 57mW - 68mW |
| | Operating temperature range | | -40 ℃ to +85 ℃ (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 | |
| | Clearance | Adjacent contacts | 1.0 mm | |
| | | Open contacts | 0.28 mm | |
| | | Coil and contacts | 1.0 mm | |
| | Creepage | Adjacent contacts | 1.0 mm | |
| | | Open contacts | 0.28 mm | |
| | | Coil and contacts | 1.60 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/s² | |
| | | Endurance | 1,000m/s² | |
| | 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 | |
| 024 | 24 | 2,504 | 18.0 | 2.4 | 230 |

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 | |
| 024 | 24 | 4,800 | +18.0 | -18.0 | 4 | 120 |

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

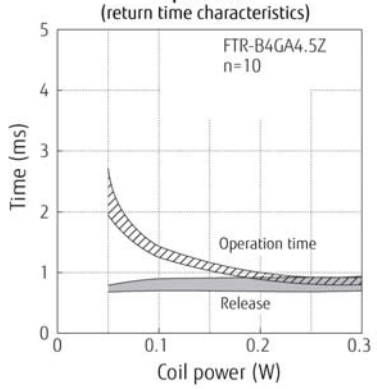
| Type | Compliance | Contact rating |
|---|---|---|
| UL | UL 508<br><br>E 63615 | Flammability: UL 94-V0 (plastics)<br>0.5A, 125VAC (resistive)<br>1A, 30VDC<br>0.3A, 110VDC<br>2A, 30VDC |
| CSA | C22.2 No. 14<br>LR 40304 | |

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

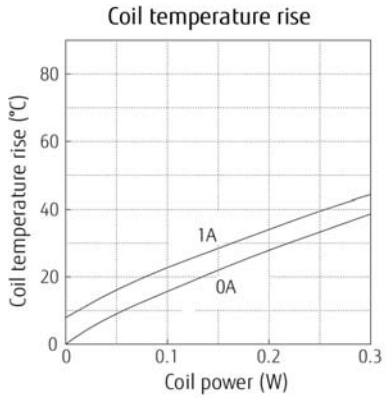
## ■ CHARACTERISTIC DATA (Reference)

- **Standard type**

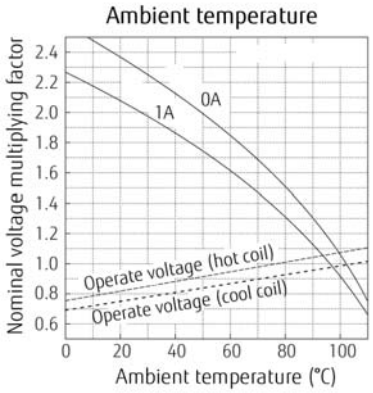
Operation
(return time characteristics)



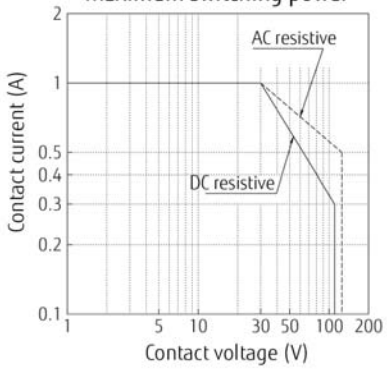

Coil temperature rise



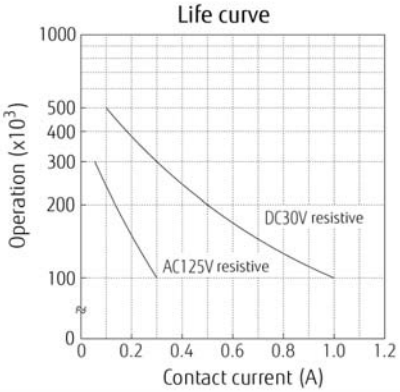

Ambient temperature



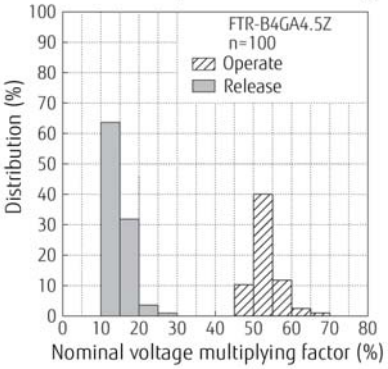

Maximum switching power



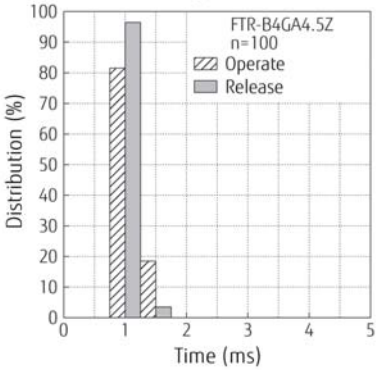

Life curve



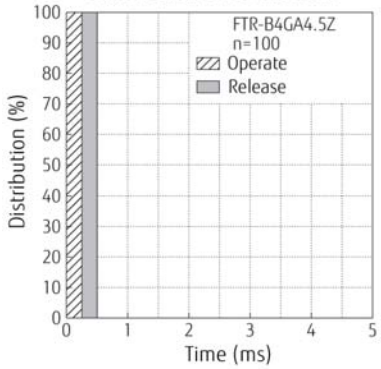

Distribution of operate/release voltage



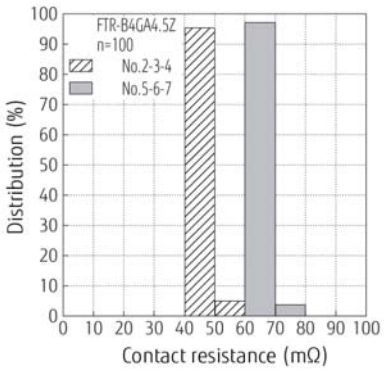

Distribution of operate/release time

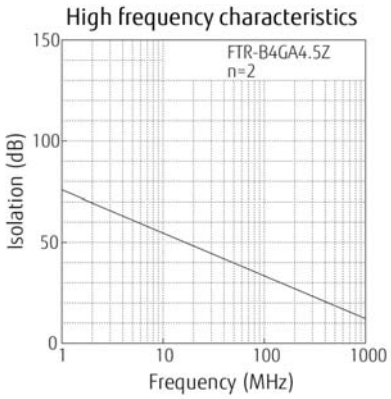


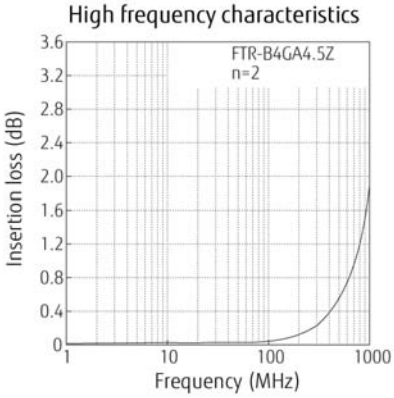

Distribution of bounce time



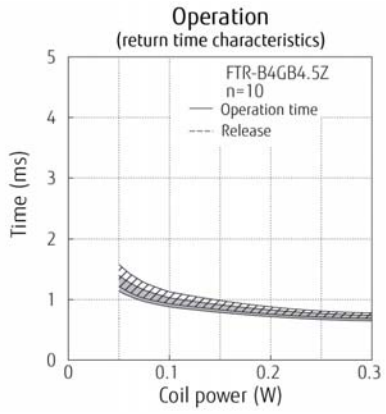

Distribution of contact resistance

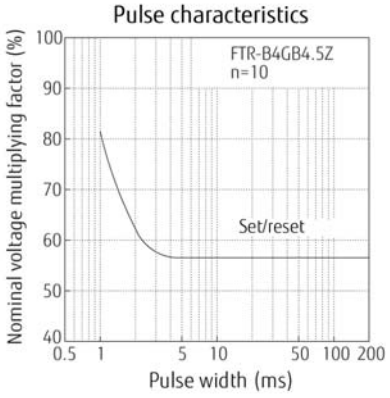


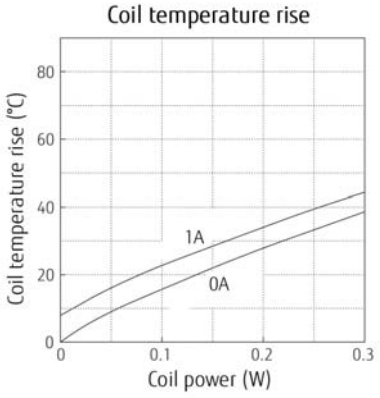


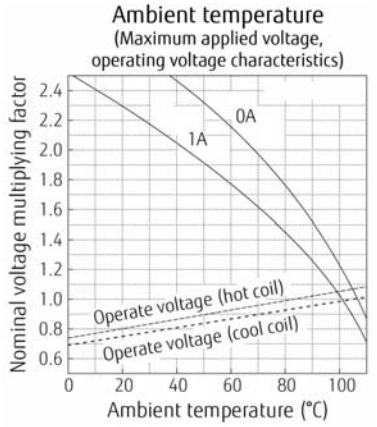



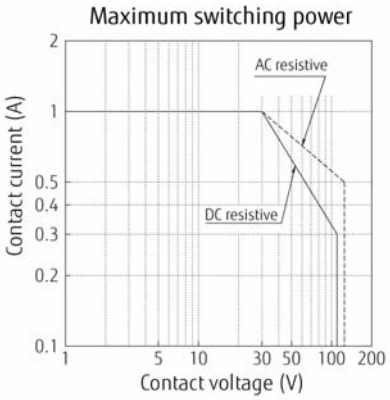

- **Latching type (1coil)**

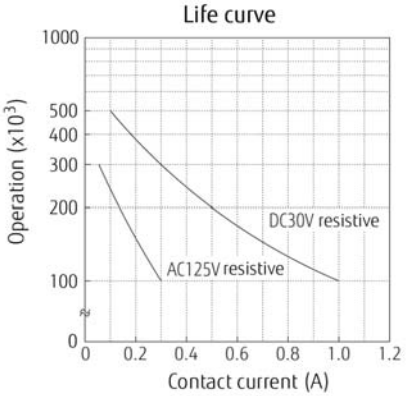


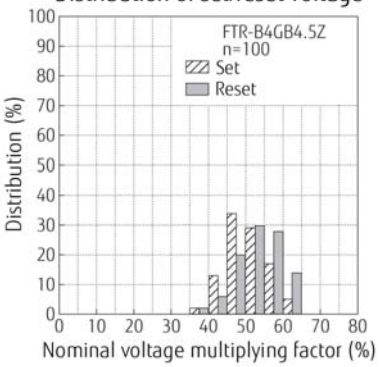



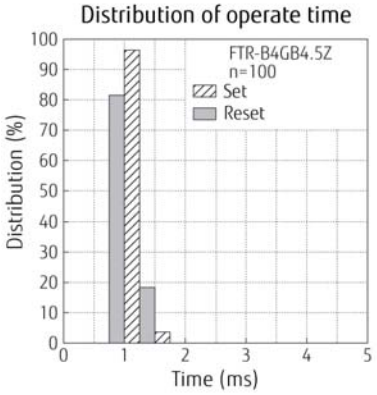



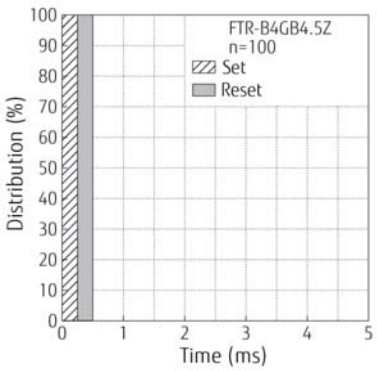
Distribution of set/reset voltage



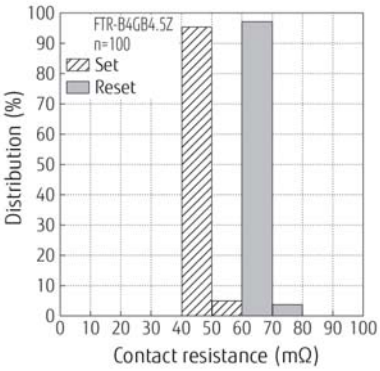

Distribution of operate time



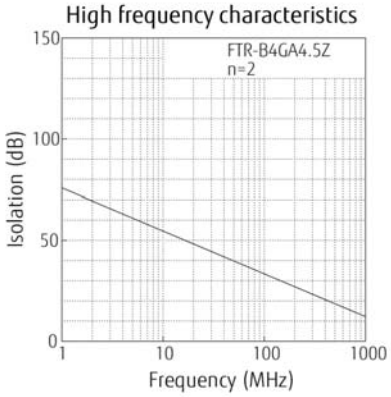

Distribution of bounce time



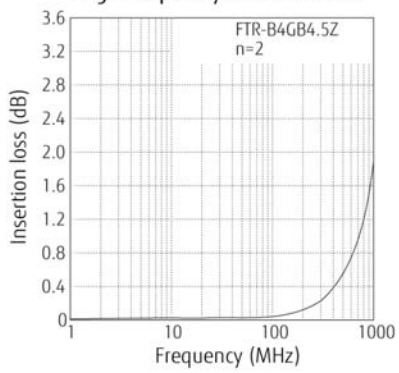

Distribution of contact resistance




High frequency characteristics



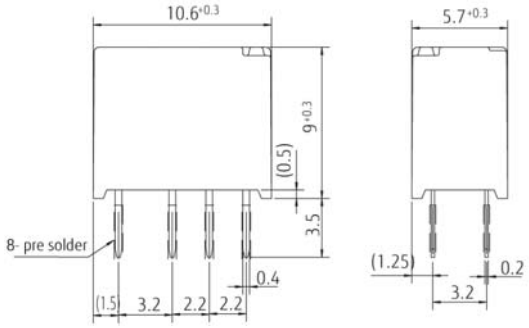

High frequency characteristics



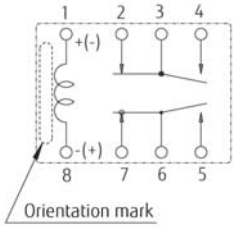
## ■ DIMENSIONS

FTR-B4C - Through hole type

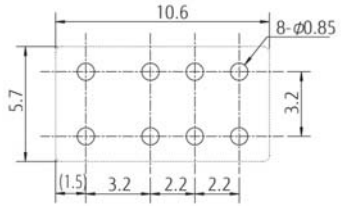
- **Dimensions**




- **Schematics** (BOTTOM VIEW)

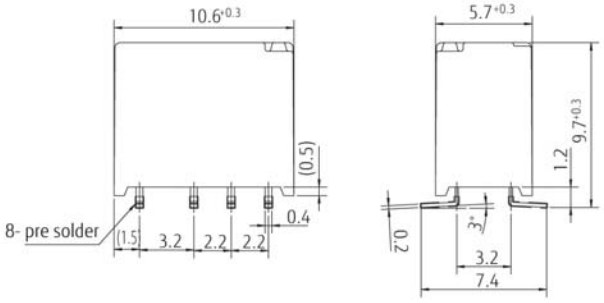



- **PC board mounting hole layout** (BOTTOM VIEW)

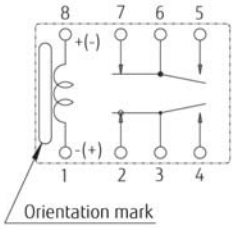



FTR-B4G - Surface mount type

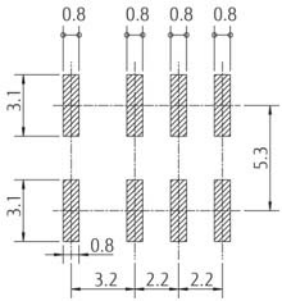
- **Dimensions**




- **Schematics** (TOP VIEW)

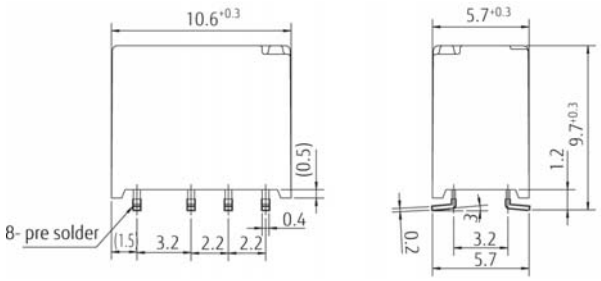



- **PC board mounting pad layout** (TOP VIEW)

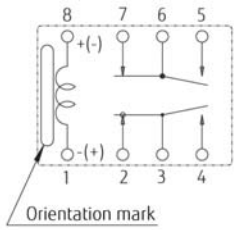



FTR-B4S- Space saving type

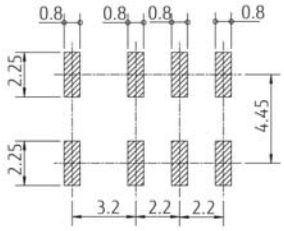
- **Dimensions**




- **Schematics** (TOP VIEW)




- **PC board mounting pad layout** (TOP VIEW)




* +/-: Indicates reset state for latching relays (FTR-B4CB, FTR-B4GB and FTR-B4SB versions)
Indicates non-operate state for standard relays (FTR-B4CA, FTR-B4GA and FTR-B4SA versions)
(+)/(-): Indicates set state for latching relays, operate state for standard relays.
Note: Tolerance for PC board mounting hole/pad layout: +/-0.1.

## ■ 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

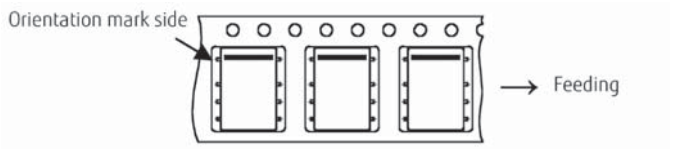
- For details on general precautions, refer to the section on technical descriptions.
- Since this is a polarized relay, follow the instructions of the internal wiring diagram for the ± connections of the coil.
- Note that the terminal layout and internal wiring of the surface mount relay are a top view.
- SMT versions of the FTR-B4 relays will be shipped in "dry pack".
- MSL Moisture Sensitivity Level of the FTR-B4 relay is 2A.

## ■ PACKAGING SPECIFICATIONS

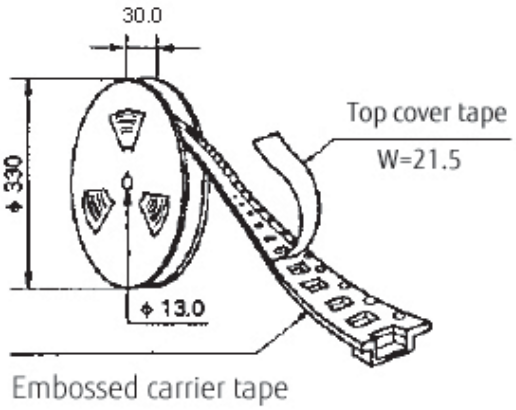
### ● Packaging method

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

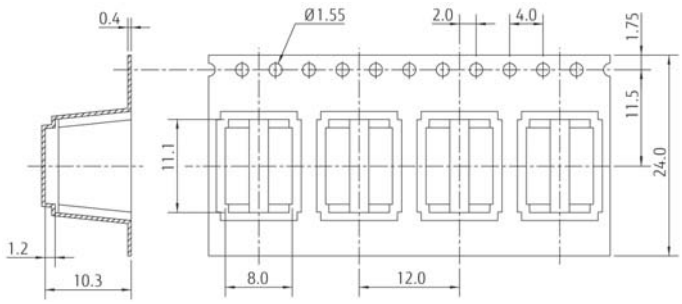
### ● Packaging orientation code: B




### ● 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.

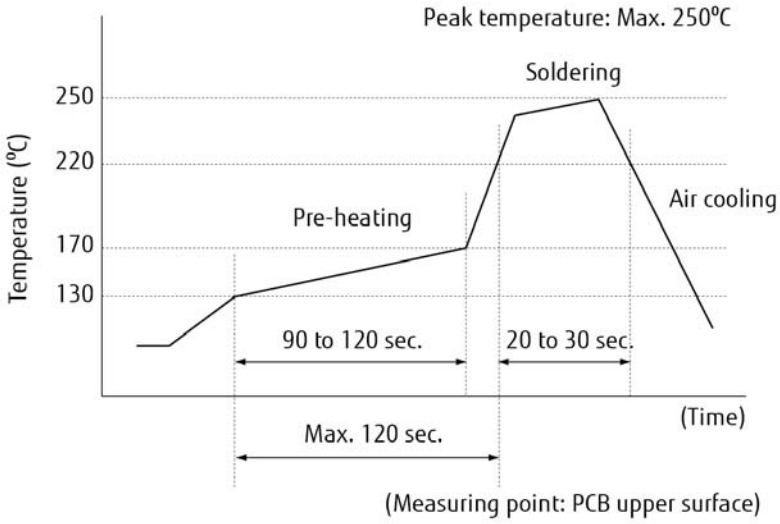
**Flow Solder Condition:**

| | |
|---|---|
| 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 Temperature: | 30-60W maximum 350-360˚C |
| Duration: | maximum 3 sec. |




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

## 3. Moisture Sensitivity

- See soldering precautions on page 8

## 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.

## Fujitsu Components International Headquarter Offices

**Japan**
FUJITSU COMPONENT LIMITED
Shinagawa Seaside Park Tower 19F,
12-4, Higashi-shinagawa 4-chome, Shinagawa-ku,
Tokyo,140-0002, Japan
Tel: (81-3) 3450-1682
Fax: (81-3) 3474-2385
Email: fcl-contact@cs.jp.fujitsu.com
Web: www.fujitsu.com/jp/fcl/

**Europe**
FUJITSU COMPONENTS EUROPE B.V.
Diamantlaan 25
2132 WV Hoofddorp
Netherlands
Tel: (31-23) 5560910
Fax: (31-23) 5560950
Email: info@fceu.fujitsu.com
Web: www.fujitsu.com/uk/components

**China**
FUJITSU ELECTRONIC COMPONENTS (SHANGHAI) CO., LTD.
Unit 4306, InterContinental Center
100 Yu Tong Road, Shanghai 200070,
China
Tel: (86-21) 3253 0998
Fax: (86-21) 3253 0997
Email: fcal@sg.fujitsu.com
Web: www.fujitsu.com/sg/products/devices/components

**North and South America**
FUJITSU COMPONENTS AMERICA, INC
2290 North First Street, Suite 212
San Jose, CA 95131, USA
Tel: (1-408) 745-4900
Fax: (1-408) 745-4970
Email: components@us.fujitsu.com
Web: us.fujitsu.com/components

**Asia Pacific**
FUJITSU COMPONENTS ASIA, LTD.
102E Pasir Panjang Road
#01-01 Citilink Warehouse Complex
Singapore 118529
Tel: (65) 6375-8560
Fax: (65) 6273-3021
Email: fcal@sg.fujitsu.com
Web: www.fujitsu.com/sg/products/devices/components

**Hong Kong**
FUJITSU COMPONENTS HONG KONG CO., LTD
Unit 506, Inter-Continental Plaza
No.94 Granville Road, Tsim Sha Tsui, Kowloon,
Hong Kong
Tel: (852) 2881-8495
Tex: (852) 2894-9512
Email: fcal@sg.fujitsu.com
Web: www.fujitsu.com/sg/products/devices/components/