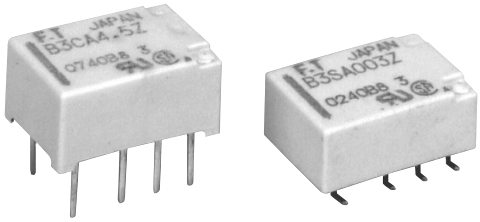
ULTRA MINIATURE RELAY
2 POLES - 2 A Low Profile Signal Relay
FTR-B3 Series

■ FEATURES

- DPDT 2C
- Ultra miniature low profile relay with high heat resistant material
- Height: 5.25mm, Weight: 0.85g, Mounting space: 87mm^2
- Adopted superior contact spring for high frequency characteristic
- Comply with Telcordia / FCC part 68
  - Isolation distance: min. 1.6mm
  - Dielectric strength between coil and contact: 1500VAC
  - Surge strength: 2500V
- Low power: Non-latching: 140mW (230mW at 24V)
  Latching: 100mW (120mW at 24V)
- High reliable bifurcated gold overlay silver contact
- UL, CSA recognized. Conforms to BSI, IEC60950-1
- RoHS compliant. Please see page 9 for more information
- Plastic sealed



■ PARTNUMBER INFORMATION

[Example] FTR-B3 (a) G (b) B (c) 012 (d) Z (e) - B10 (f)

(a)	Relay type	FTR-B3	: FTR-B3-Series
(b)	Terminal type	C G S	: Through hole : Surface mount : Surface mount, space saving
(c)	Coil type	A B	: Standard type : Latching type (1 coil)
(d)	Coil rated voltage	012	: 1.5.....24 VDC Coil rating table at page 3
(e)	Contact material	Z P	: Gold overlay silver nickel : Gold overlay silver palladium
(f)	Packaging	Nil B10	: Tube packaging : 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-B3GB012Z-B10 Actual marking: B3GB012Z

■ SPECIFICATION

Item			Standard type	Latching type
			FTR-B3 ( ) A	FTR-B3 ( ) B
Contact Data	Configuration		2 form C	
	Construction		Bifurcated contacts	
	Material		Z: Gold overlay silver nickel / P: Gold overlay silver palladium	
	Resistance (initial)		Max. 75 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 (rated load)		Min. 100 x 10^3 operations at 1A 30VDC Min. 100 x 10^3 operations at 0.3A 125VAC	
Coil Data	Rated power (at 20 °C)		140mW - 230mW	100mW - 120mW
	Applied pulse width		-	Min. 10ms
	Operate power (at 20 °C)		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	
		Adjacent contacts	1,000VAC (50/60Hz) 1min.	
		Contacts to coil	1,500VAC (50/60Hz) 1min	
	Surge strength	Contacts to coil	2,500V, 2 x 10μs standard wave	
	Clearance	Open contacts	0.28 mm	
		Adjacent contacts	1.0 mm	
		Contacts to coil	1.0 mm	
	Creepage	Open contacts	0.28 mm	
		Adjacent contacts	1.0 mm	
		Contacts to coil	1.60 mm	
Other	Vibration resistance	Misoperation	10 to 55 to 10Hz single amplitude 1.65mm	
		Endurance	10 to 55 to 10Hz single amplitude 2.5mm	
	Shock	Misoperation	750m/s² (11 ±1ms)	
		Endurance	1,000m/s² (6 ±1ms)	
	Weight		Approximately 0.85 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

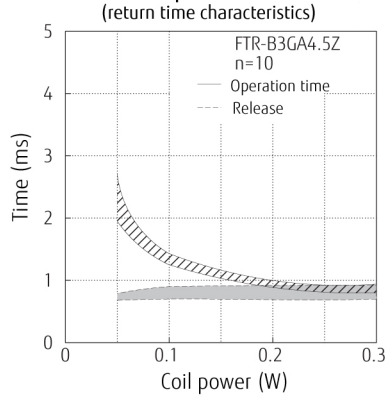
Type	Compliance	Contact rating
UL	UL 508 E 63615	Flammability: UL 94-V0 (plastics) 0.5A, 125VAC (resistive) 0.3A, 110VDC (General use) 2A, 30VDC (General use)
CSA	C22.2 No. 14 LR 40304-58	

Comply with Telcordia specifications and FCC part 68 and meet BSI, IEC60950-1: Marking only for UL, CSA

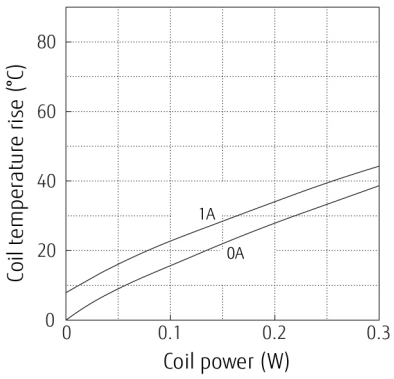
■ CHARACTERISTIC DATA (Reference)

- **Standard type**

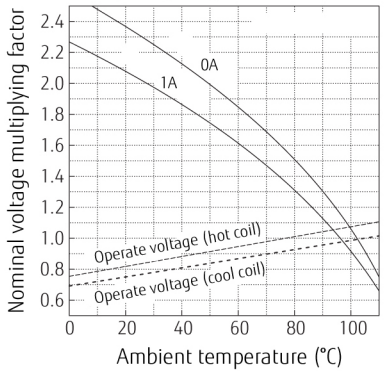
Operation
(return time characteristics)



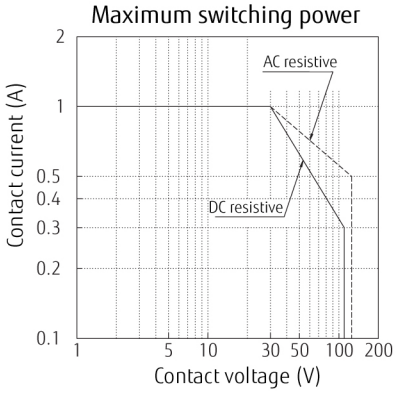
Coil temperature rise



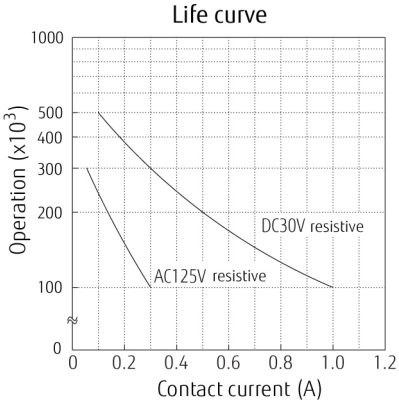
Ambient temperature
(Maximum applied voltage,
operating voltage characteristics)



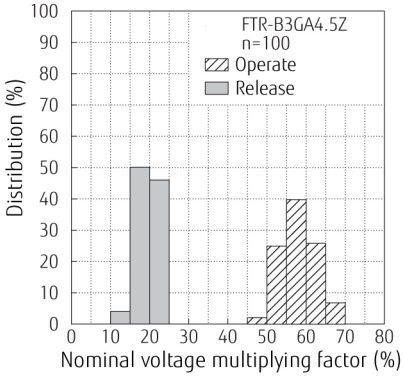
Maximum switching power



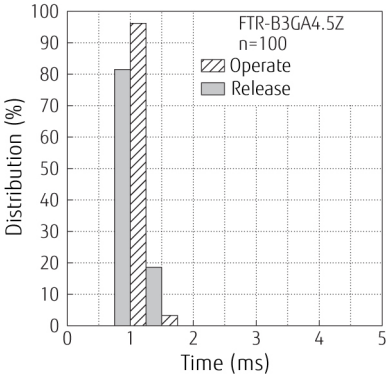
Life curve



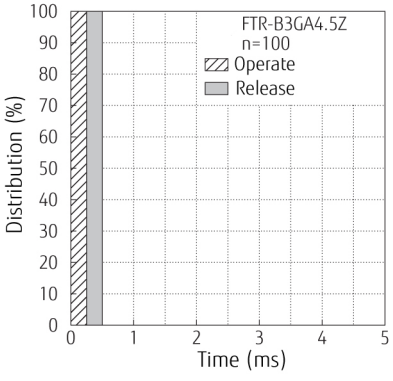
Distribution of operate/release voltage



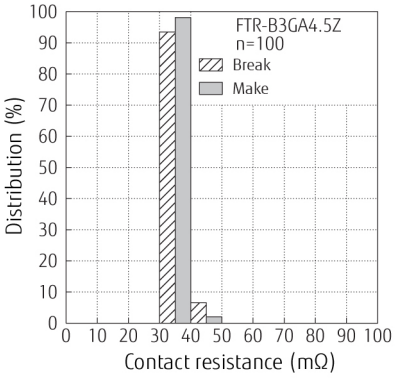
Distribution of operate/release time



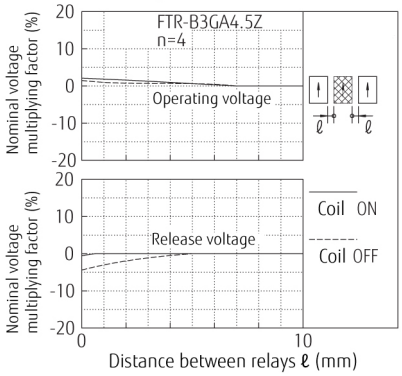
Distribution of bounce time



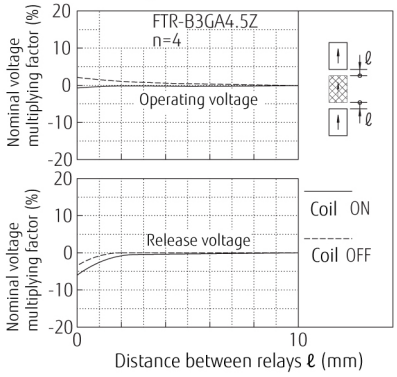
Distribution of contact resistance



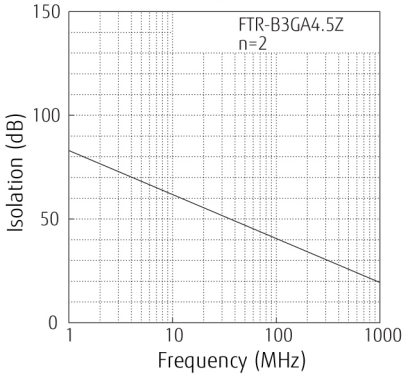
Magnetic interference



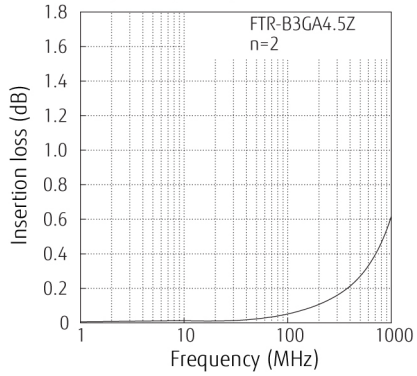
Magnetic interference



High frequency characteristics

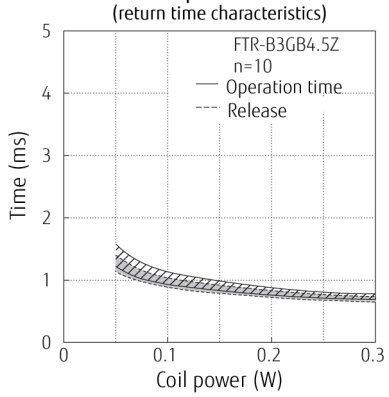


High frequency characteristics

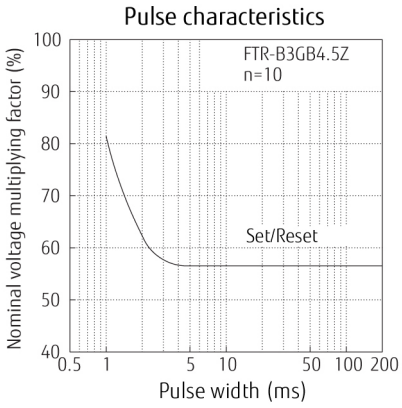


- **Latching type**

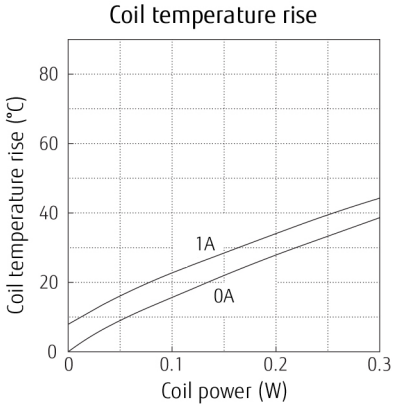
Operation
(return time characteristics)



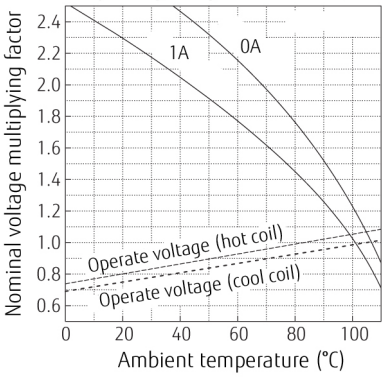
Pulse characteristics



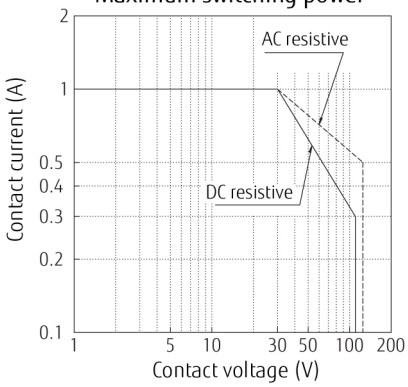
Coil temperature rise



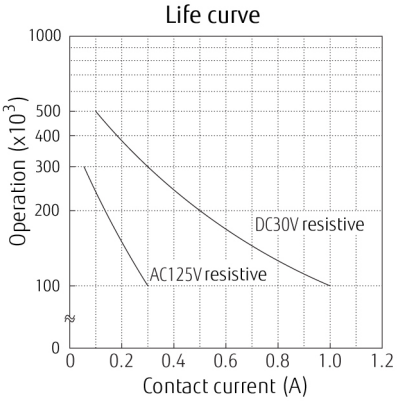
Ambient temperature
(maximum applied voltage, operating voltage characteristics)



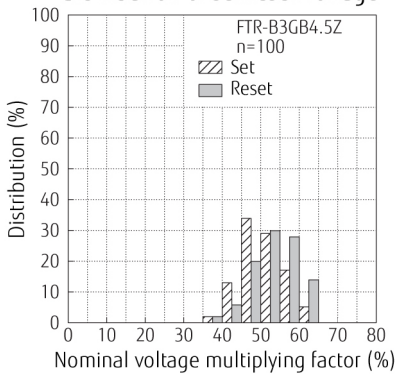
Maximum switching power



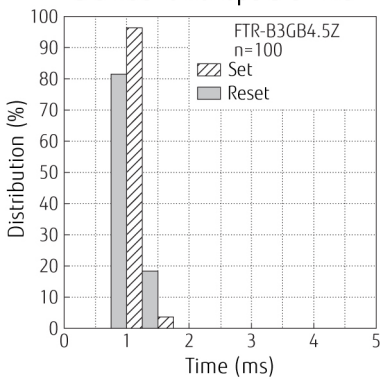
Life curve



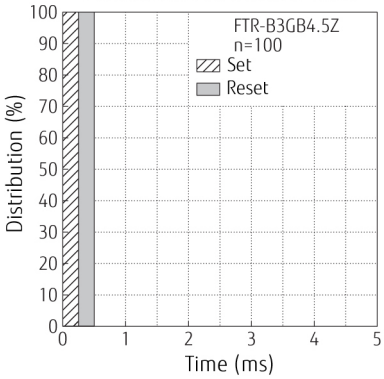
Distribution of set/reset voltage



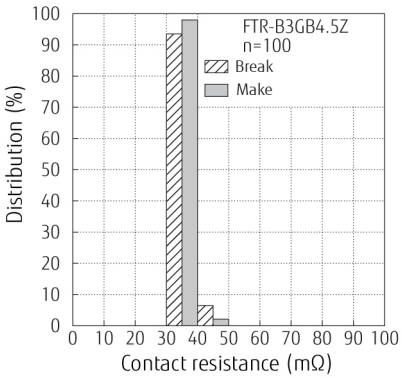
Distribution of operate time



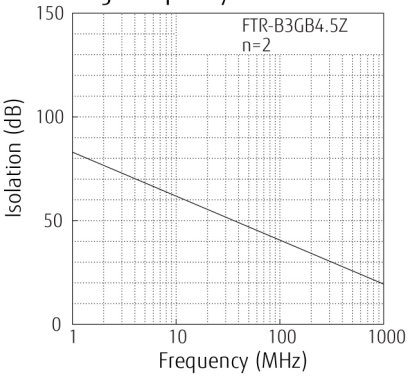
Distribution of bounce time



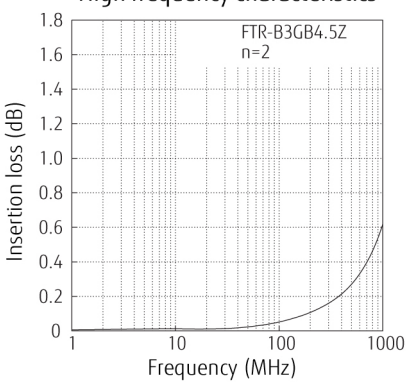
Distribution of contact resistance



High frequency characteristics



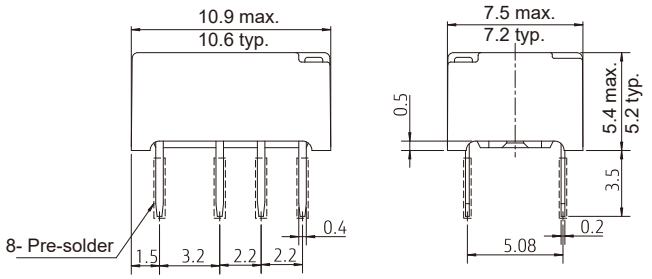
High frequency characteristics



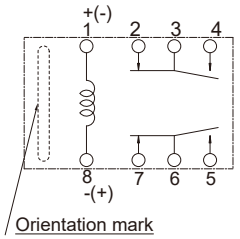
■ DIMENSIONS

FTR-B3C - Through hole type

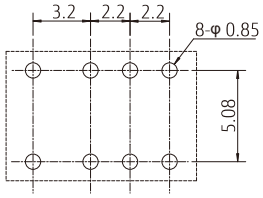
- **Dimensions**



- **Schematics ***
(BOTTOM VIEW)

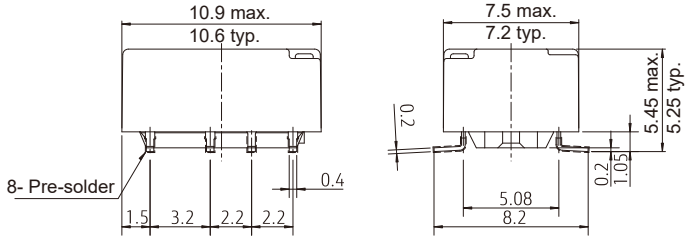


- **PC board mounting hole layout**

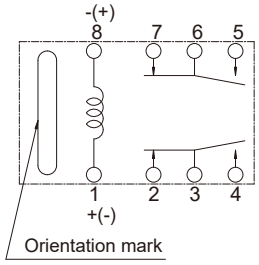


FTR-B3G - Surface mount type

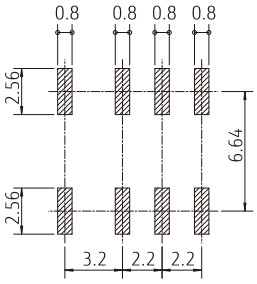
- **Dimensions**



- **Schematics ***
(TOP VIEW)

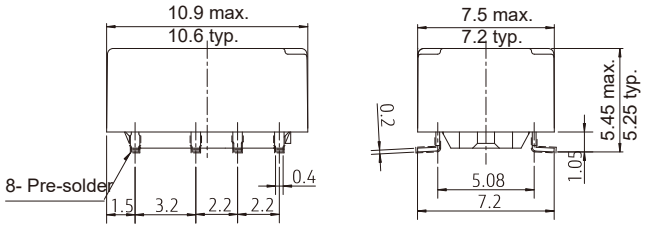


- **PC board mounting pad layout**

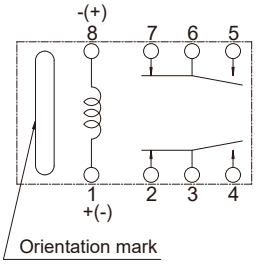


FTR-B3S - Space saving type

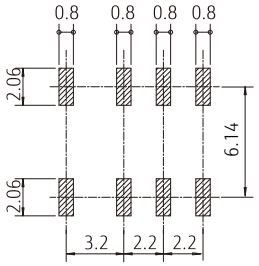
- **Dimensions**



- **Schematics ***
(TOP VIEW)



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



* Contacts indicates reset state for latching relays (FTR-B3CB, FTR-B3GB and FTR-B3SB versions) and non-operate state for standard relays (FTR-B3CA, FTR-B3GA and FTR-B3SA versions).

* +/- : Apply set voltage for latching relays, operate voltage for standard relays.
(+)/(-): Apply reset voltage for latching 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

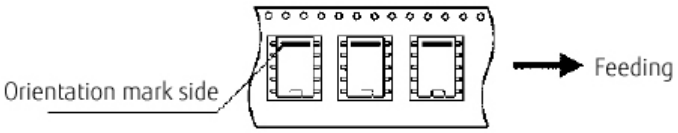
- For details on general precautions, refer to the section on technical descriptions.
- Since this is a polarized relay, follow the instructions of the internal wiring diagram for the ± connections of the coil.
- Note that the terminal layout and internal wiring of the surface mount relay are a top view.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

■ PACKAGING SPECIFICATIONS

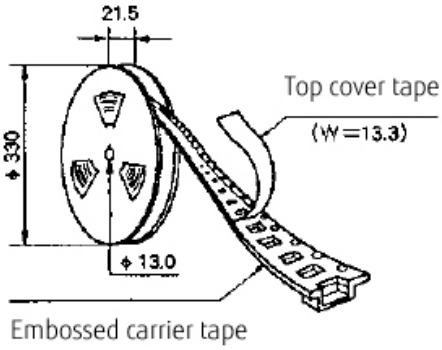
● Packaging method

- Packaging standard: JIS C 0806
- Taping type: TB 1612
- Reel type: R16D
- Quantity of 1 reel: 1000 pieces

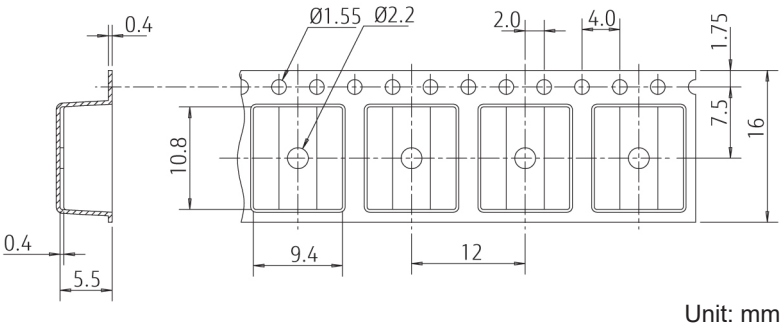
● Packaging orientation code: B



● Reel dimensions



● Tape dimensions



Unit: mm

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

CAUTIONS

- All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- Reflow soldering is not available with standard type.
- 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.

Notes for latching relays

- Latching relays are shipped in the state reset, 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.

GENERAL INFORMATION

1. RoHS Compliance

- All relays produced by FCL Components are compliant with RoHS directive 2011/65/EU, including commission delegated directive 2015/863.

2. Recommended lead free solder condition

Flow Solder Condition:

Pre-Heating:	Maximum 120˚C within 90 sec.
Soldering:	Dip within 5 sec. at 255°C±5°C solder bath

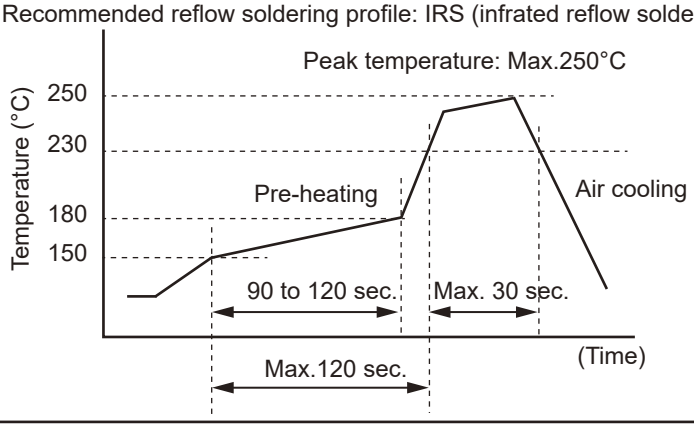
Relay must be cooled by air immediately after soldering

Solder by Soldering Iron:

Soldering Iron:	30-60W
Temperature:	Maximum 350-360˚C
Duration:	Maximum 3 sec.

Reflow Solder Condition:
(Applicable only for reflow capable type)

Recommended reflow soldering profile: IRS (infrated reflow soldering)



Important notes for reflow soldering

- Temperature shall be measured at PC board upper surface.
- Temperature at PC board upper surface may be changed depending on size of PC board, components mounted on the PC board and/or heating method. Please perform the confirmation test wtih actual PC board.
- This reflow condition is applicable only for reflow-capable relays. Do not reflow reflow-incapable relays.
- Recommended solder for assembley: Sn-3.0 Ag -0.5 Cu.

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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