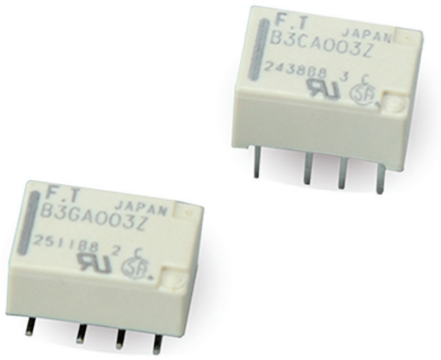
ULTRA MINITURE SIGNAL RELAY FOR AUTOMOTIVE APPLICATIONS
2 POLE - 2A LOW PROFILE RELAY

FTR-B3 Series

RoHS Compliant

■ FEATURES



- Switchable 1mA, 400VDC for EV high voltage
- DPDT 2c
- Ultra miniature low profile relay with high heat resistant material
- Height: 5.25mm, weight: 0.85g, mounting space: 87mm^2
- Compact high-insulation structure (between coil and contact)
  - Isolation distance: min. 1.6mm
  - Dielectric strength between coil and contact: 1,500VAC
  - Surge strength: 2,500V
- 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
- Plastic sealed

■ APPLICATIONS

Switching audio circuit for emergency call

Battery controller (battery monitoring, abnormal detection of overvoltage and overcurrent, low/high voltage leakage detection)

■ PART NUMBERS

[Example] FTR-B3 (a) G (b) B (c) 4.5 (d) Z (e) - B10 (f) - AUT (g)

(a)	Relay type	FTR-B3 series
(b)	Terminal type	C : Through hole G : Surface mount S : Surface mount, space saving
(c)	Coil type	A : Standard type (non-latching) B : Latching type (1 coil)
(d)	Coil rated voltage	12 : 1.5...24 VDC Please refer to coil rating table
(e)	Contact material	Z : Gold overlay silver nickel P : Gold overlay silver palladium
(f)	Packaging	Nil : Tube packaging B10 : Tape & reel packaging (only for surface mount type)
(g)	Special type	AUT : For automotive

Remarks: Actual marking on relay would not carry code “FTR” “B10” and “AUT”. Ordering code: FTR-B3GB012Z-B10-AUT Actual marking: B3GB012Z

■ SPECIFICATIONS

Item			Specifications		Remarks/Conditions
			Standard type FTR-B3( )A	Latching type FTR-B3( )B	
Contact Data	Configuration		2c (2 Form C)		
	Construction		Bifurcated contacts		
	Material		Z: Gold overlay silver nickel P: Gold overlay silver palladium		
	Resistance (initial)		Max. 75 mΩ		At 1A 6VDC
	Contact rating		1A, 30VDC		Resistive
	Max. carrying current		2A		
	Max. switching power		30W (30VDC) 0.4W (400VDC)		
	Min. switching load *1		0.01mA, 10mVDC		Reference
Coil	Rated power		140mW to 230mW	100mW to 120mW	At 20°C
	Applied pulse width		-	Min. 10ms	
	Operate power		80mW to 130mW	57mW to 68mW	At 20°C
	Operating temperature rise		-40 °C to +85 °C		No frost
	Storage temperature / humidity		-40 °C to +85 °C / 5% to 85% RH		No frost
Time	Operate		Max. 3ms	Max. 3ms (set)	At nominal voltage, without bounce
	Release		Max. 3ms	Max. 3ms (reset)	At nominal voltage, without bounce
Life	Mechanical		Min. 50 x 10^6 operations	Min. 20 x 10^6 operations	
	Electrical		Min. 500 x 10^3 operations		At 1mA, 400VDC resistive
			Min. 100 x 10^3 operations		At 1A, 30VDC resistive
Insulation	Insulation resistance (initial)		Min. 1,000MΩ		At 500VDC
	Dielectric withstanding voltage	Open contacs	1,000VAC (50/60Hz) 1 minute		
		Adjacent contacts	1,000VAC (50/60Hz) 1 minute		
		Contact to coil	1,500VAC (50/60Hz) 1 minute		
	Surge strength	Contact to coil	2,500V, 2 x 10μs standard wave		
	Clearance	Open contacts	0.28mm		
		Adjacent contacts	1.0mm		
		Contact to coil	1.0mm		
	Creepage	Open contacts	0.28mm		
		Adjacent contacts	1.0mm		
		Contact to coil	1.6mm		
Others	Vibration resistance	Misoperation	10 to 55 to 10Hz single amplitude 1.65mm		Coil ON/OFF, 3 axis, total 6 cycles
		Endurance	10 to 55 to 10Hz single amplitude 2.5mm		Coil OFF, 3 axis, total 6 hours
	Shock resistance	Misoperation	750m/s^2 (11 ±1ms)		Coil ON/OFF, 3 axis, total 36 operations
		Endurance	1,000m/s^2 (6 ±1ms)		Coil OFF, 3 axis, total 18 operations
	Dimensions / Weight		7.2 x 10.6 x 5.25mm / Approx. 0.85g		
	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 DATA

Standard type

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance (Ω) ±10%	Must Operate Voltage*1 (VDC)	Must Release Voltage*1 (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 (Ω) ±10%	Set Voltage*1 (VDC)	Reset Voltage*1 (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 at 20°C and zero contact.

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

■ SAFETY STANDARDS

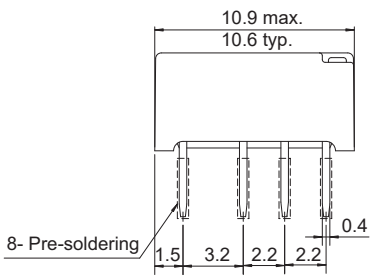
Type	Compliance	Contact Rating
UL	Flammability: UL 94-V0 (plastics)	
	UL508 File No.E63615	0.5A, 125VAC (resistive) 0.3A, 110VDC (General Use) 2A, 30VDC (General Use)
CSA	C22.2 No.14 File No.LR40304-58	

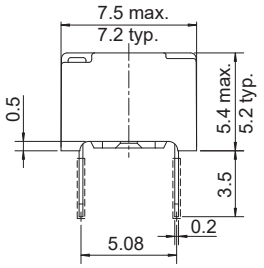
Comply with Telcordia specifications and FCC part 68 and meet BSI, IEC60950-1: Marking only for UL, CSA

■ DIMENSIONS

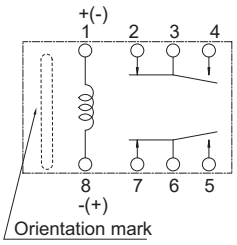
FTR-B3C - Through hole type

● Dimensions

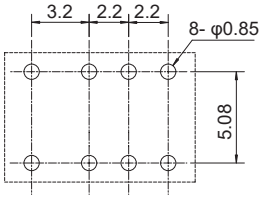




● Schematics*
(BOTTOM VIEW)

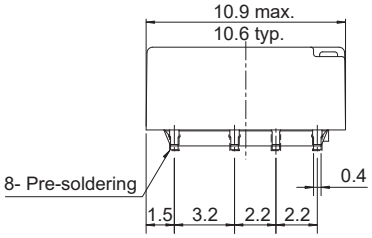


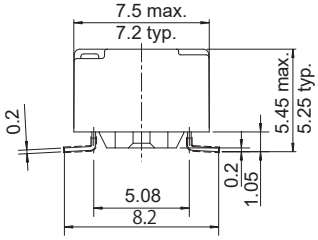
● PC board mounting hole layout
(BOTTOM VIEW)



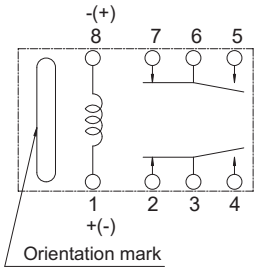
FTR-B3G - Surface mount type

● Dimensions

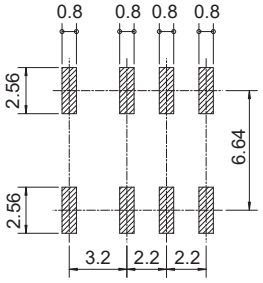




● Schematics*
(TOP VIEW)

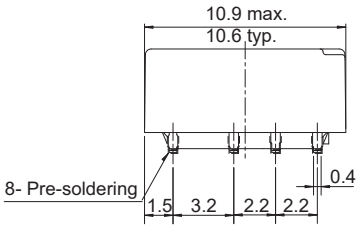


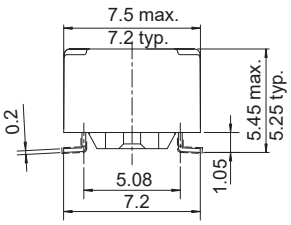
● PC board mounting pad layout
(TOP VIEW)



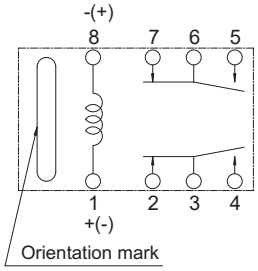
FTR-B3S - Surface mount space saving type

● Dimensions

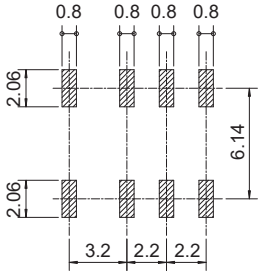




● Schematics*
(TOP VIEW)



● 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-soldering.

Unit: mm
( ) : Reference

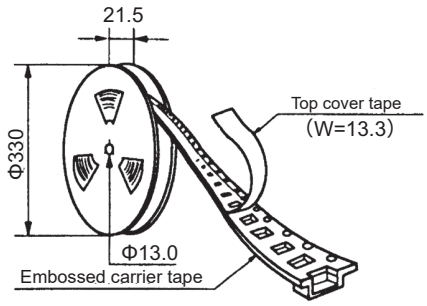
■ COIL POLARITY

Coil terminal	1	8
Set	+	-
Reset	-	+

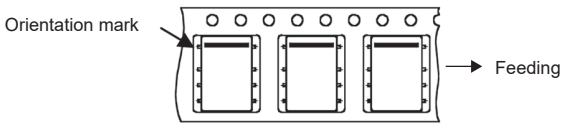
■ PACKAGING SPECIFICATIONS

(1) Packaging method
- Packaging standard: JIS C 0806
- Taping type: TB1612
- Reel type: R16D
- Quantity of 1 reel: 1000 pieces

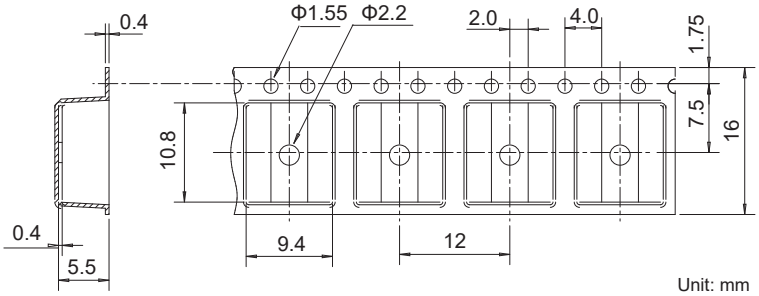
(2) Reel dimensions



● Packaging orientation code: B



● 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.

■ PART NUMBER LIST

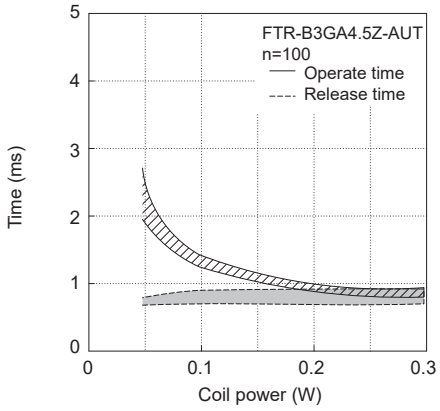
Part Number	Coil Type	Terminal Type	Contact Material	Packaging	Note
FTR-B3CA( )Z-AUT	Standard (Non-latching)	Through hole	Gold overlay silver nickel	Tube	Tape & reel is not applicable
FTR-B3CA( )P-AUT			Gold overlay silver palladium		
FTR-B3GA( )Z-AUT		Surface mount	Gold overlay silver nickel	Tube	-
FTR-B3GA( )Z-B10-AUT				Tape & reel	
FTR-B3GA( )P-AUT			Gold overlay silver palladium	Tube	
FTR-B3GA( )P-B10-AUT				Tape & reel	
FTR-B3SA( )Z-AUT		Surface mount, space saving	Gold overlay silver nickel	Tube	-
FTR-B3SA( )Z-B10-AUT				Tape & reel	
FTR-B3SA( )P-AUT			Gold overlay silver palladium	Tube	
FTR-B3SA( )P-B10-AUT				Tape & reel	
FTR-B3CB( )Z-AUT	Latching (1 coil)	Through hole	Gold overlay silver nickel	Tube	Tape & reel is not applicable
FTR-B3CB( )P-AUT			Gold overlay silver palladium		
FTR-B3GB( )Z-AUT		Surface mount	Gold overlay silver nickel	Tube	-
FTR-B3GB( )Z-B10-AUT				Tape & reel	
FTR-B3GB( )P-AUT			Gold overlay silver palladium	Tube	
FTR-B3GB( )P-B10-AUT				Tape & reel	
FTR-B3SB( )Z-AUT-AUT		Surface mount, space saving	Gold overlay silver nickel	Tube	-
FTR-B3SB( )Z-B10-AUT				Tape & reel	
FTR-B3SB( )P-AUT			Gold overlay silver palladium	Tube	
FTR-B3SB( )P-B10-AUT				Tape & reel	

■ CHARACTERISTIC DATA

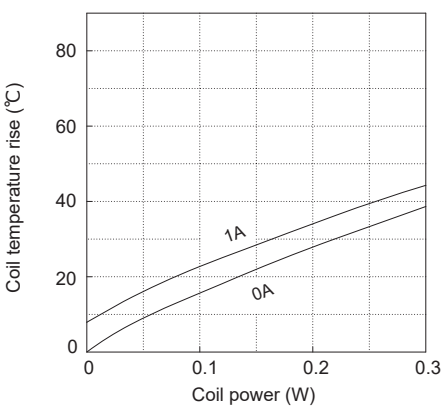
(Characteristic data is not guaranteed value but measured values of samples from production line.)

Standard type

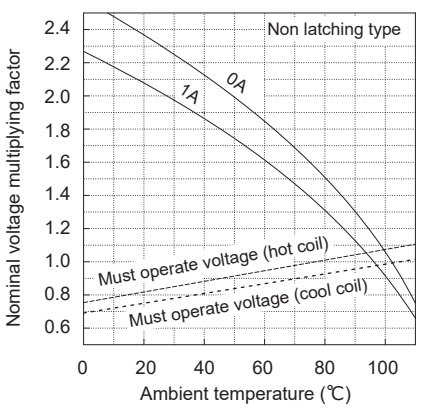
Operate/release time characteristics



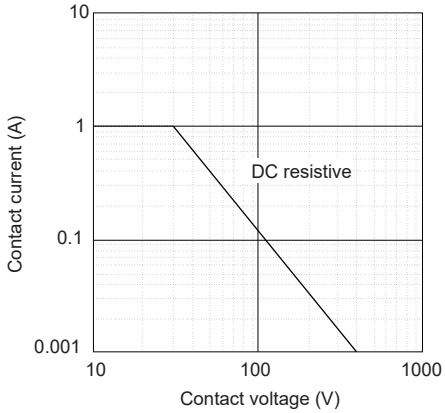
Coil temperature rise



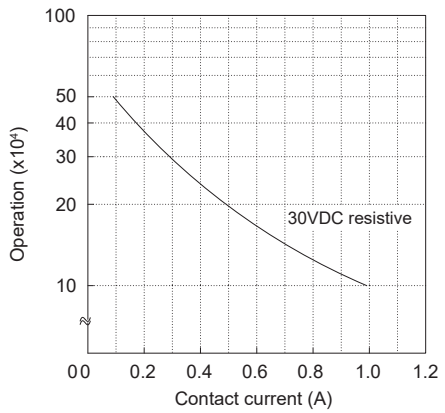
Operating range



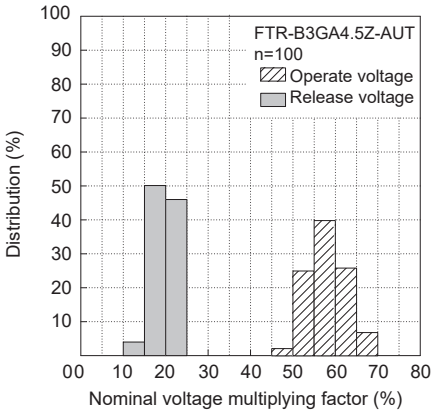
Maximum switching power



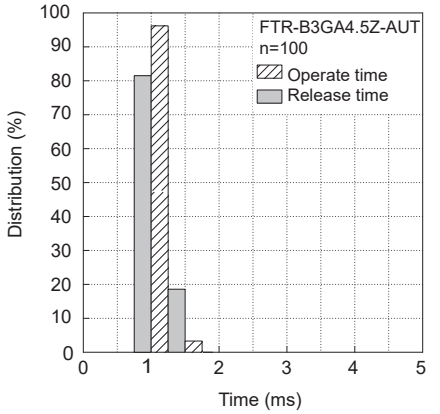
Life curve



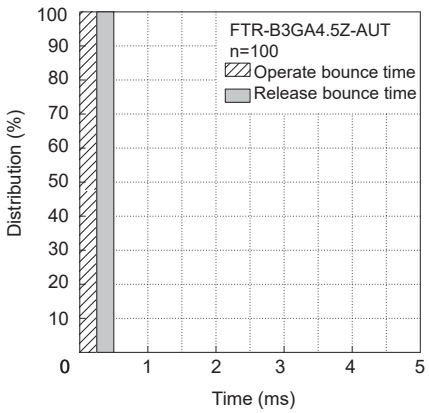
Distribution of operate/release voltage



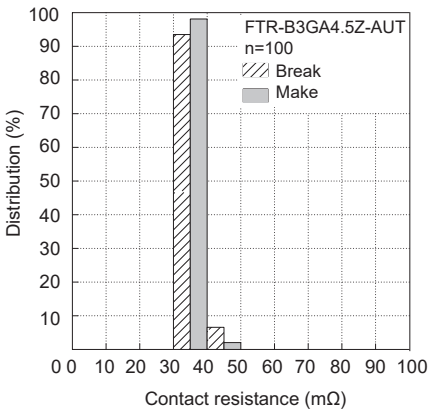
Distribution of operate/release time



Distribution of bounce time



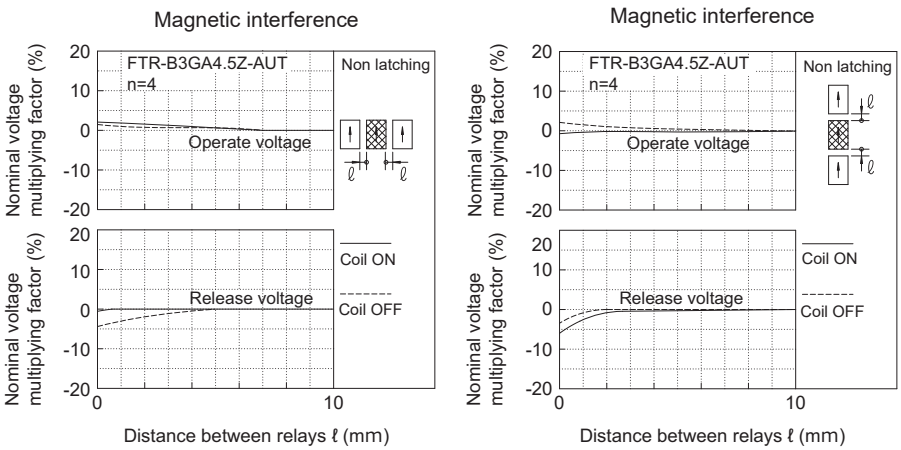
Distribution of contact resistance



■ CHARACTERISTIC DATA

(Characteristic data is not guaranteed value but measured values of samples from production line.)

Standard type

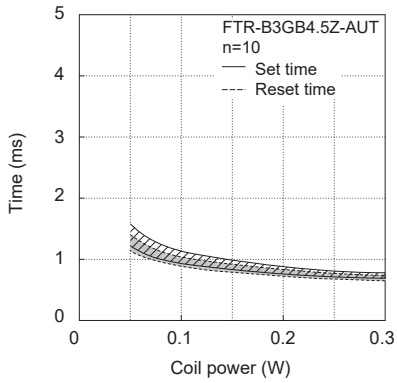


■ CHARACTERISTIC DATA

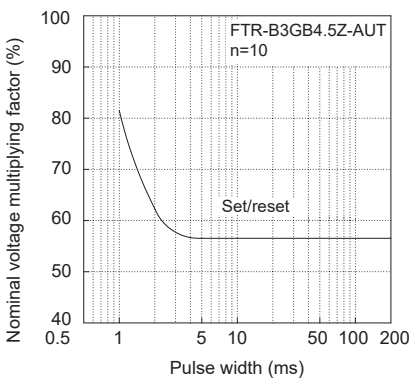
(Characteristic data is not guaranteed value but measured values of samples from production line.)

Latching type

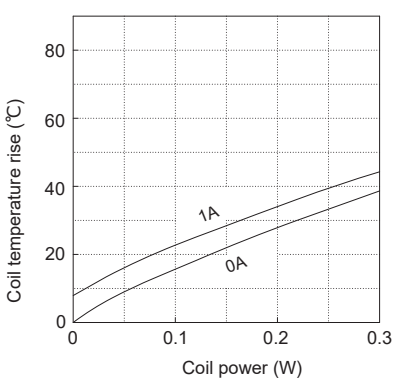
Set/reset time characteristics



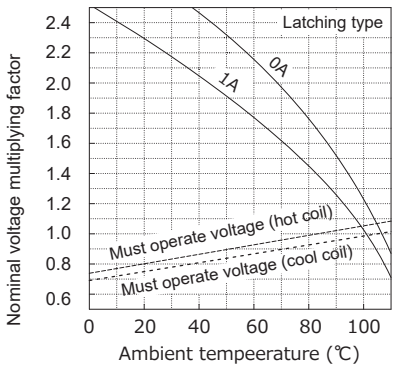
Pulse characteristics



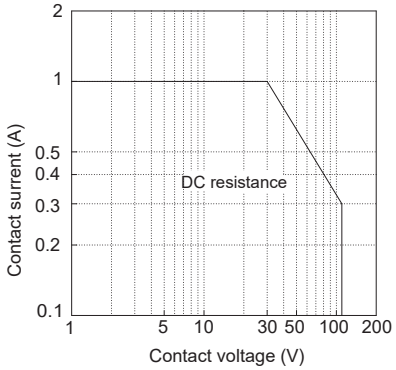
Coil temperature rise



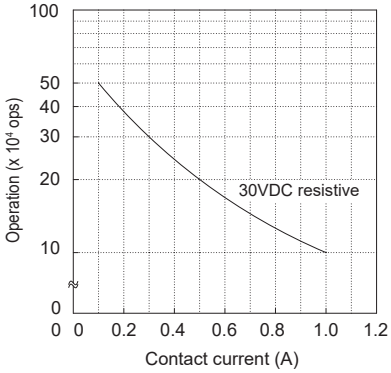
Operating range



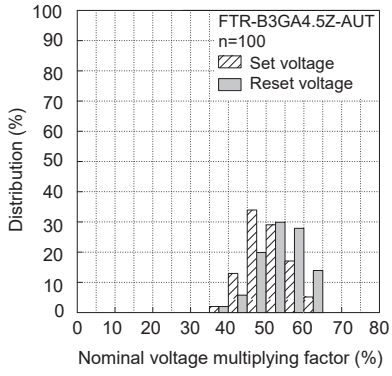
Maximum switching power



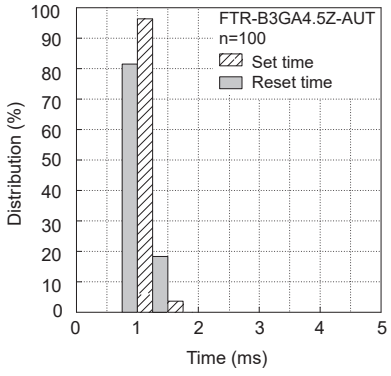
Life curve



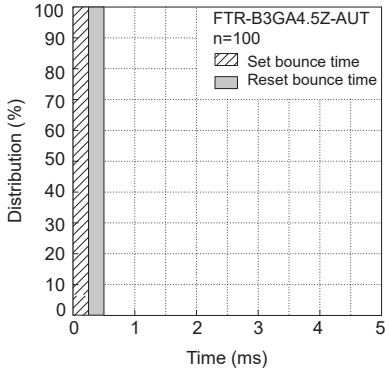
Distribution of set/reset voltage



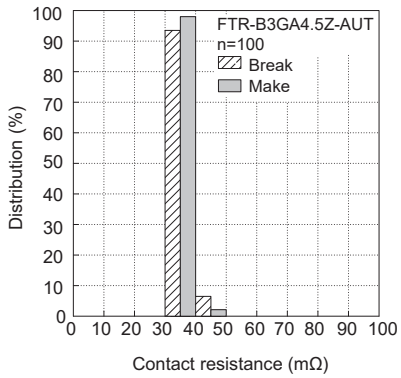
Distribution of set/reset time



Distribution of bounce time



Distribution of contact resistance



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

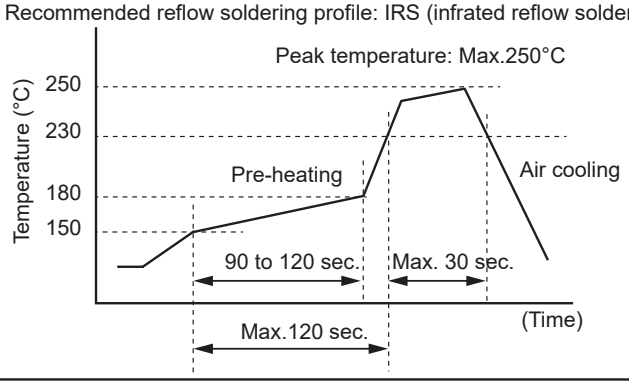
Relay must be cooled by air immediately after soldering

Solder by Soldering Iron:

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

Refow 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

- SMT versions of FTR-B3 relays in Tape & Reel package will be shipped in Moisture Barrier Bag (MBB).
- Moisture Sensitivity Level (MSL) of FTR-B3 relay is indicated on the packing caution label.
- Relays must be stored in the unopened MBB at strage conditions <40°C/90% RH for a maximum 1 year.
- SMT versions of FTR-B3 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/Jedex 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.

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