

# COMPACT POWER RELAY

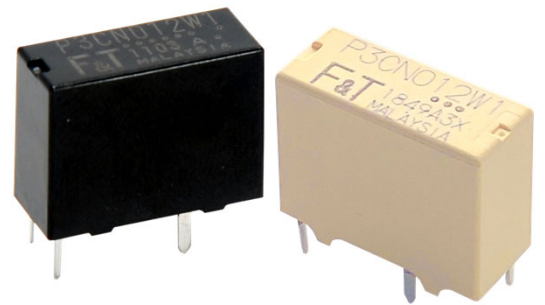
## For automotive applications

### 1 POLE – 25A (for 12V car battery)

## FTR-P3 Series

### ■ FEATURES

- Compact for high density packaging
- High contact capacity with proven contact material. (100,000 operations, 14 V, 25 A)
- Coil power savings (600mW nominal achieved with state-of-the-art magnetic design)
- Ease of PCB layout (all terminals on perimeter, coil and contact terminals separated)
- Optional over-voltage circuit breaking capability(0.6mm gap, contact our representative)
- Packaging for auto-insertion (tube packing, 30 relays/tube)
- Application examples: power window, power seat, tilt steering, sunroof, wiper, retractable antenna, etc.
- Reflowable & high stand-off type available.
- RoHS compliant



### ■ PARTNUMBER INFORMATION

[Example]  $\frac{\text{FTR-P3}}{\text{(a)}} \frac{\text{C}}{\text{(b)}} \frac{\text{N}}{\text{(c)}} \frac{\text{012}}{\text{(d)}} \frac{\text{W1}}{\text{(e)}} \frac{\text{-06}}{\text{(f)}}$

(a)	Relay type	FTR-P3	: FTR-P3 Series
(b)	Contact configuration	A C	: 1 form A (only with -06) : 1 form C
(c)	Contact gap	N P	: 0.25 mm gap : 0.6 mm gap (standard and -ML)
(d)	Coil rated voltage	012	: 9....12VDC See coil rating table
(e)	Contact material	W1	: Silver-tin oxide indium
(f)	Special type	Non -ML -06	: Standard : Multi-layered contacts : High stand-off (reflowable type)

Actual marking does not carry the type name: "FTR (-ML) (-06)"  
E.g.: Ordering code: FTR-P3CN012W1-06 Actual marking: P3CN012W1

# FTR-P3 Series

## ■ SPECIFICATIONS

Item		FTR-P3			
		Standard (without suffix)	Multi-layered contact (-ML)	Reflowable (-06)	
Contact Data	Configuration	1 form C (SPDT)		1 form A (SPST)	1 form C (SPDT)
	Material	Silver-tin-oxide indium			
	Contact path voltage drop	Max. 100mV at 1A, 12VDC			
	Contact rating	25A at 14VDC (locked motor load)			
	Max. carrying current *1	25A/1 hour (25°C, 100% rated coil voltage)			
	Max. switching voltage	16VDC (reference)			
	Max. switching current	35A (reference)			
	Min. switching load *2	6VDC, 1A (reference)			
Life	Mechanical	Min.10 x 10 <sup>6</sup> operations	Min.1 x 10 <sup>6</sup> operations		
	Electrical	Min.100 x 10 <sup>3</sup> operations, 14VDC, 25A (locked motor load) (1 operation=1 forward and 1 reverse)			
Coil Data	Operating ambient temperature range	-40°C to +85°C (no frost)		-40°C to +125°C (no frost)	
	Storage temperature range (no frost)	-40°C to +85°C, 45 to 85%RH	-40°C to +100°C , 45 to 85%RH	-40°C to +125°C, 45 to 85%RH	
Timing Data	Operate (at nominal voltage)	Min. 10 ms (without bounce, no diode)			
	Release (at nominal voltage)	Min.5 ms (without bounce, no diode) Min. 15 ms (without bounce, with diode)			
Insulation	Resistance (initial)	100MΩ at 500VAC			
	Dielectric withstanding voltage (initial)	500VAC, 1 minute			
Other	Vibration resistance	Misoperation	10 to 200Hz, acceleration 43m/s <sup>2</sup> (4.4G), constant acceleration		
		Endurance	10 to 200Hz, acceleration 43m/s <sup>2</sup> (4.4G), constant acceleration		
	Shock	Misoperation	100m/s <sup>2</sup> minimum (11 ± 1ms)		
		Endurance	1,000m/s <sup>2</sup> minimum (6 ± 1ms)		
	Weight	Approximately 5g			

\*1: Need to consider the heat from PCB when max. current is more than 10A.

\*2: 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-P3 Series

## ■ COIL RATING

FTR-P3 Series (0.25mm contact gap) (Standard, multi layered contact)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/-10% (Ohm)	Must Operate Voltage (VDC)	Must Release Voltage (VDC) *
009	9	135	5.5 (at 20°C)	0.7 (at 20°C)
			6.9 (at 85°C)	0.9 (at 85°C)
010	10	167	6.3 (at 20°C)	0.8 (at 20°C)
			7.9 (at 85°C)	1.0 (at 85°C)
012	12	240	7.3 (at 20°C)	1.0 (at 20°C)
			9.2 (at 85°C)	1.3 (at 85°C)

FTR-P3-06 Series

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/-10% (Ohm)	Must Operate Voltage (VDC)	Must Release Voltage (VDC) *
009	9	135	5.5 (at 20°C)	0.7 (at 20°C)
			6.9 (at 85°C)	0.9 (at 85°C)
			7.8 (at 125°C)	1.0 (at 125°C)
010	10	167	6.3 (at 20°C)	0.8 (at 20°C)
			7.9 (at 85°C)	1.0 (at 85°C)
			8.9 (at 125°C)	1.1 (at 125°C)
012	12	240	7.3 (at 20°C)	1.0 (at 20°C)
			9.2 (at 85°C)	1.3 (at 85°C)
			10.3 (at 125°C)	1.4 (at 125°C)

FTR-P3 Series (0.6mm contact gap) (Standard, multi layered contact)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/-10% (Ohm)	Must Operate Voltage (VDC)	Must Release Voltage (VDC) *
009	9	100	5.5 (at 20°C)	0.7 (at 20°C)
			6.9 (at 85°C)	0.9 (at 85°C)
010	10	125	6.3 (at 20°C)	0.8 (at 20°C)
			7.9 (at 85°C)	1.0 (at 85°C)
012	12	167	7.3 (at 20°C)	1.0 (at 20°C)
			9.2 (at 85°C)	1.3 (at 85°C)

Note: All values in the tables are valid for 20° C and zero contact current, unless otherwise stated.

Must operate voltages/must release voltages at 125degC are available only for reflowable type.

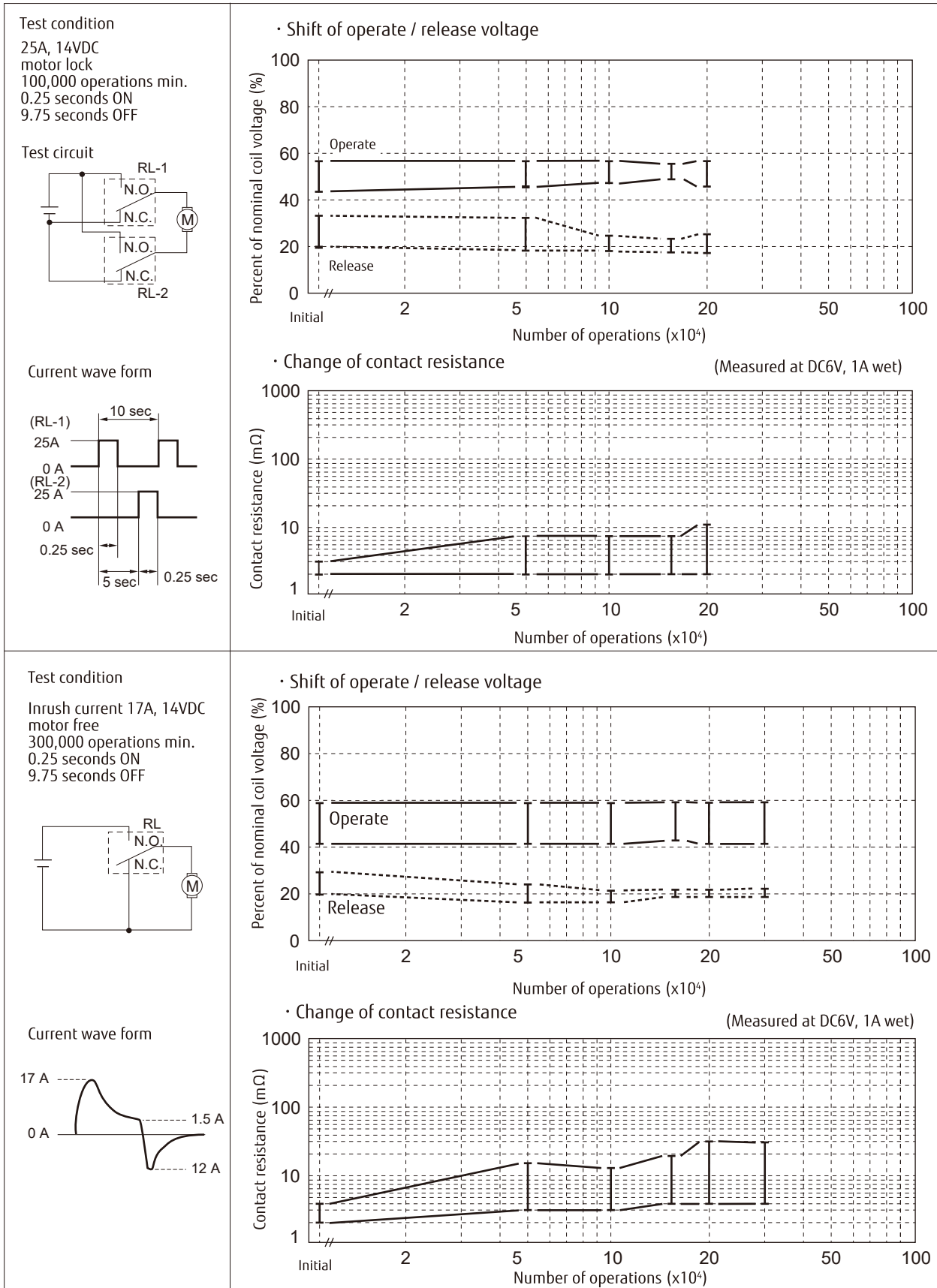
\* Specified operate values are valid for pulse wave voltage.

# FTR-P3 Series

## CHARACTERISTIC DATA

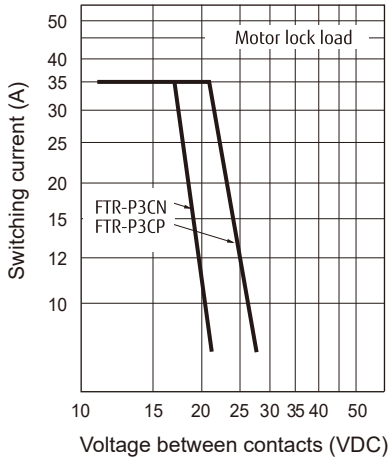
(Characteristic data is not guaranteed value but measured values of samples from production line)

### Life test (examples)

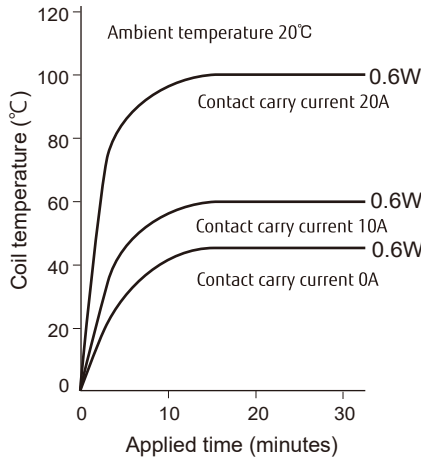


# FTR-P3 Series

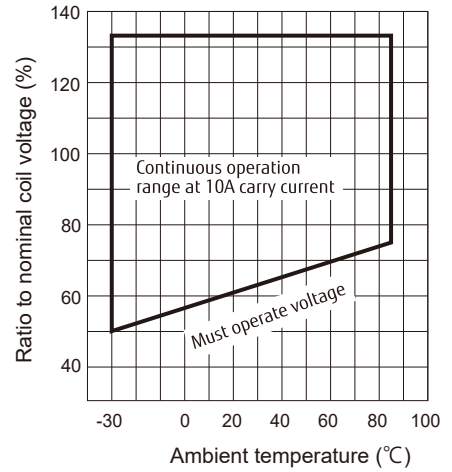
Maximum break capacity



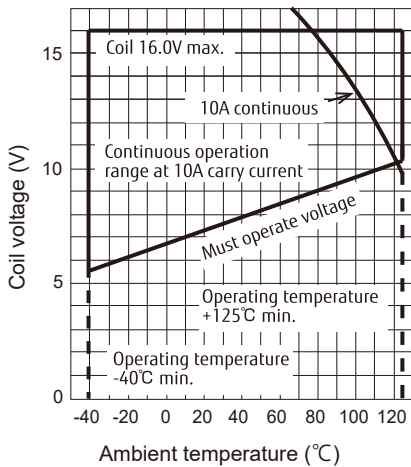
Coil temperature rise



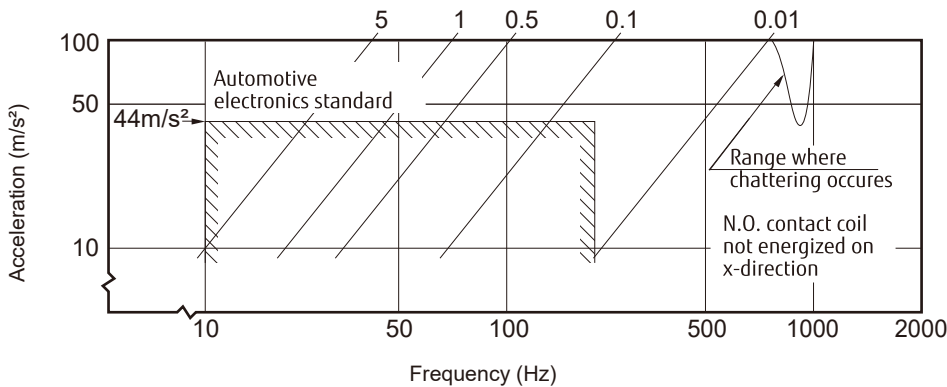
Operating coil voltage range (Standard/Multi-layered contacts)



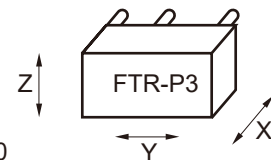
Operating coil voltage range (Reflowable)



Vibration resistance characteristics  
Dual amplitude (mm)

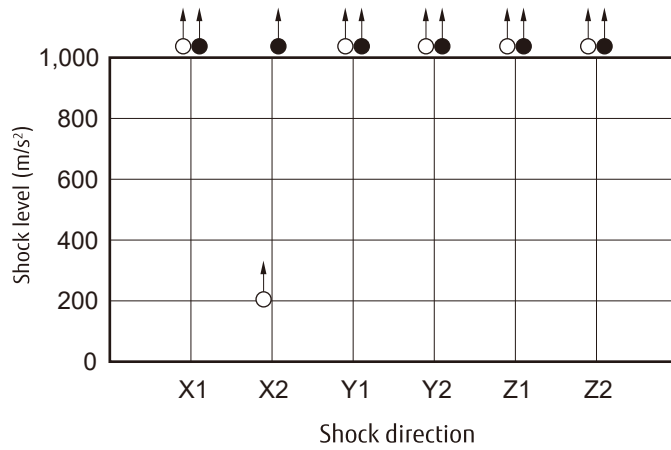


Frequency: 10 to 2000 Hz  
Acceleration: 100m/s<sup>2</sup> max.  
Direction of vibration:  
see diagram below  
Detection level:  
chatter > 1ms

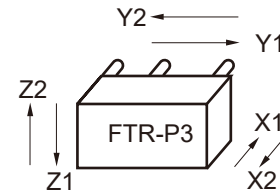


# FTR-P3 Series

Shock resistance characteristics

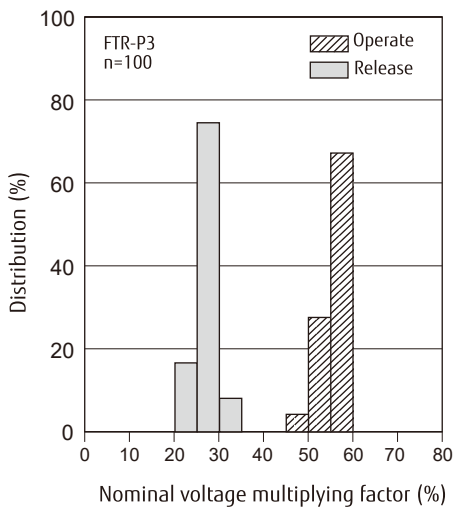


Shock application time: 11±1ms, half-sine wave  
 Test material: coil energized and de-energized  
 Detection level: chatter > 1ms

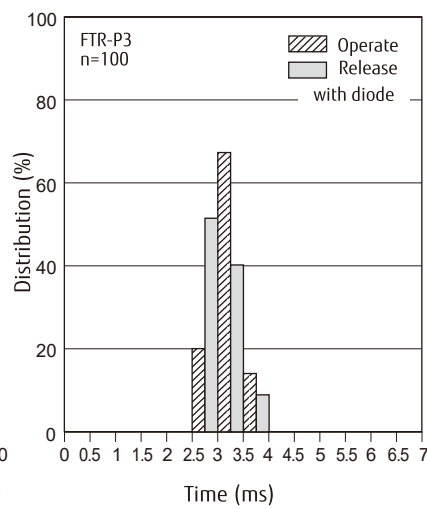


○ : break contact (coil de-energized)  
 ● : make contact (coil energized)

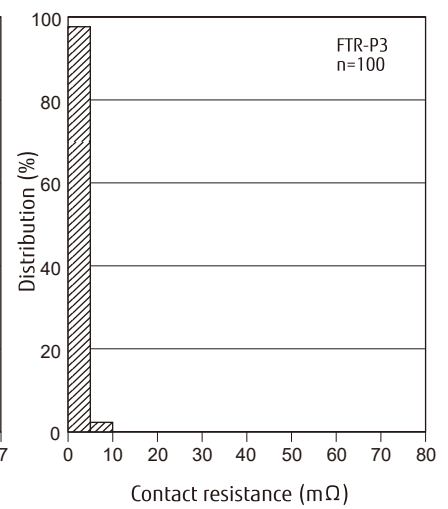
Distribution of operate/relase voltage



Distribution of operate/relase time



Distribution of contact resistance

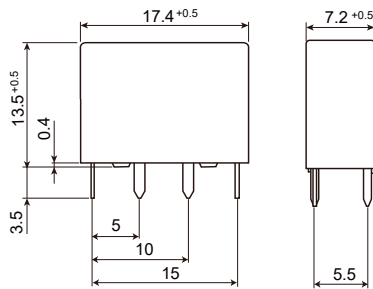


# FTR-P3 Series

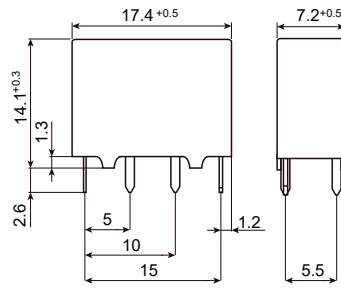
## ■ DIMENSIONS

- Dimensions

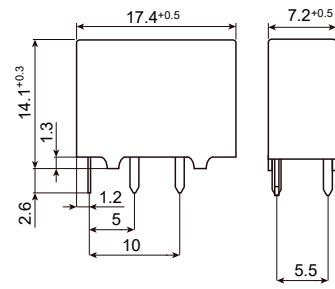
FTR-P3CN\*\*\* W1(-ML)



FTR-P3CN\*\*\*W1-06 (1 form C)



FTR-P3AN\*\*\*W1-06 (1 form A)

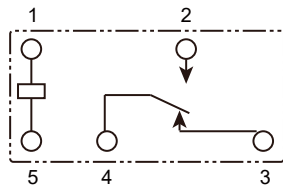


\* Dimensions of the terminals does not include thickness of pre-solder

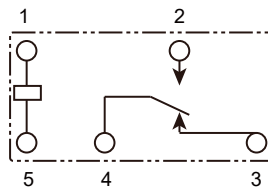
Unit: mm

- Schematics  
(Bottom view)

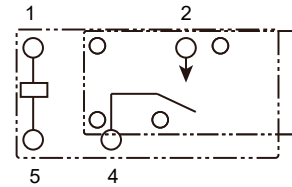
FTR-P3CN\*\*\*W1(-ML)



FTR-P3CN\*\*\*W1-06 (1 form C)

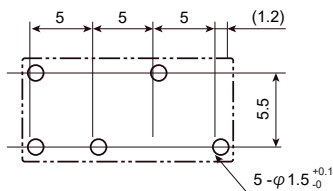


FTR-P3AN\*\*\*W1-06 (1 form A)

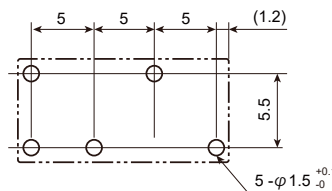


- PC board mounting hole layout (Plated through hole)  
(Bottom view)

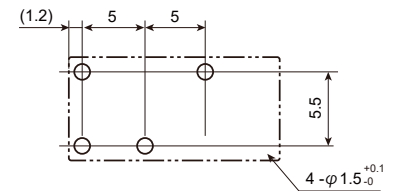
FTR-P3CN\*\*\*W1(-ML)



FTR-P3CN\*\*\*W1-06 (1 form C)



FTR-P3AN\*\*\*W1-06 (1 form A)



Tolerance: +0.1 / -0 mm unless otherwise specified  
unit: mm

# FTR-P3 Series

## 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 flow soldering 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.

## 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

- 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:

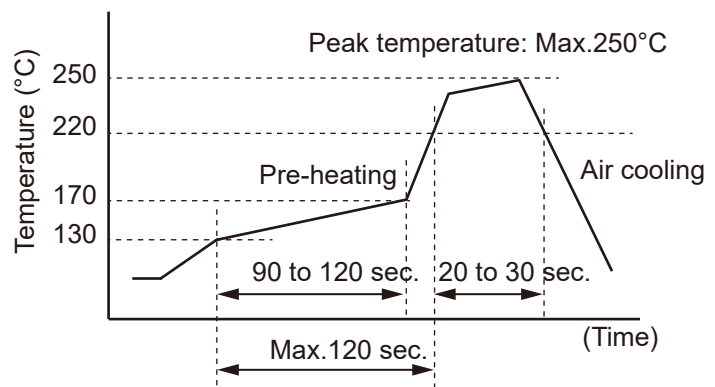
Pre-Heating: Maximum 120°C  
within 90 sec.  
Soldering: Dip within 5 sec. at 255°C±5°C  
solder bath  
Relay must be cooled by air immediately after  
soldering

#### Solder by Soldering Iron:

Soldering Iron: 30-60W  
Temperature: maximum 340-360°C  
Duration: maximum 3 sec.

#### Reflow Solder Condition:

(Applicable only for reflow capable type)  
Recommended reflow soldering profile  
IRS (infrared reflow soldering)



**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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## Contact

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