

COMPACT POWER RELAY

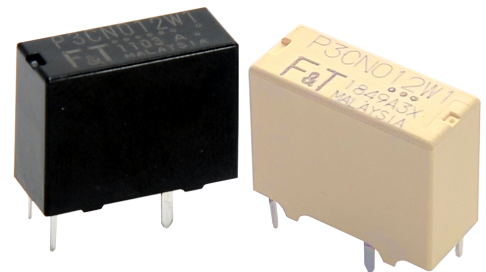
For automotive applications

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
- Please see page 7 for more information



■ PARTNUMBER INFORMATION

[Example] FTR-P3 C N 012 W1 -06
 (a) (b) (c) (d) (e) (f)

(a)	Relay type	FTR-P3 : FTR-P3 Series
(b)	Contact configuration	A : 1 form A (only with -06) C : 1 form C
(c)	Contact gap	N : 0.25mm gap P : 0.6mm gap (standard and -ML)
(d)	Coil rated voltage	012 : 9.....12VDC Coil rating table at page 3
(e)	Contact material	W1 : Silver-tin oxide indium
(f)	Special type	None : Standard -ML : Multi-layered contacts -06 : 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

■ SPECIFICATION

Item			FTR-P3			
			Standard (without suffix)	Multi layered con- tact (-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 ⁶ operations	Min. 1 x 10 ⁶ operations		
	Electrical		Min. 100 x 10 ³ 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 ~ 85% RH	-40 °C to +100 °C, 45 ~ 85% RH	-40 °C to +125 °C, 45 ~ 85% RH	
Timing Data	Operate (at nominal voltage)		Max. 10 ms (without bounce)			
	Release (at nominal voltage)		Max. 5 ms (without bounce, no diode) Max. 15 ms (without bounce, with diode)			
Insulation	Resistance (initial)		100M Ω at 500VAC			
	Dielectric withstanding voltage (initial)		500VAC, 1 minute			
Other	Vibration resistance	Misoperation	10 to 200Hz, acceleration 43m/s ² (4.4G), constant acceleration			
		Endurance	10 to 200Hz, acceleration 43m/s ² (4.4G), constant acceleration			
	Shock	Misoperation	100m/s ² minimum (11+/-1ms)			
		Endurance	1,000m/s ² minimum (6+/-1ms)			
	Weight		Approximately 5 g			

* 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.

■ 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.

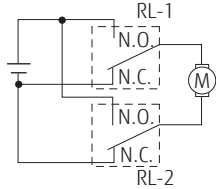
■ CHARACTERISTIC DATA

Life test (examples)

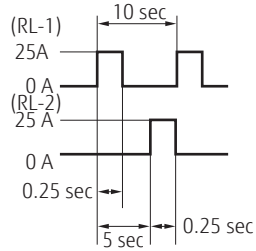
Test condition

25A, 14VDC
motor lock
100,000 operations min.
0.25 seconds ON
9.75 seconds OFF

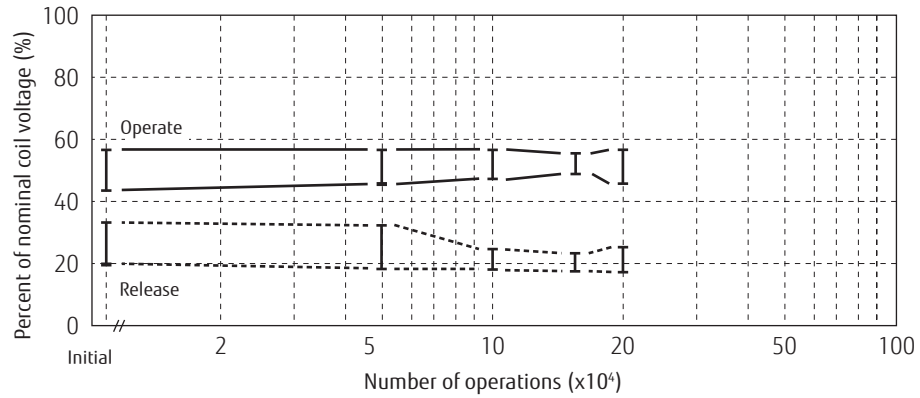
Test circuit



Current wave form

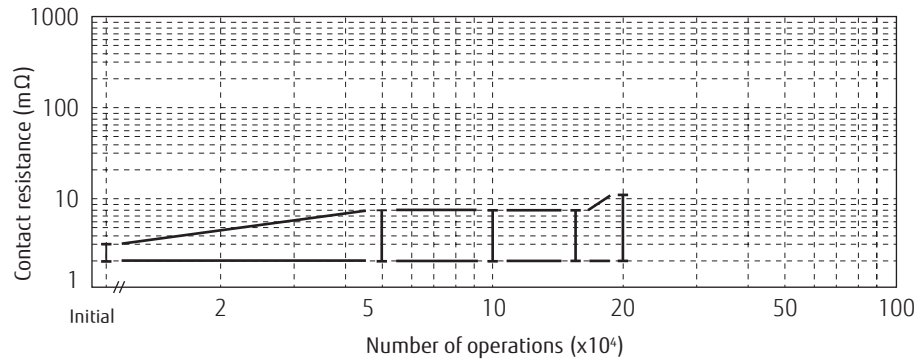


• Shift of operate / release voltage



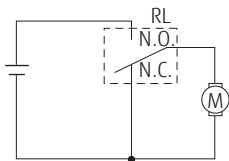
• Change of contact resistance

(Measured at DC6V, 1A wet)

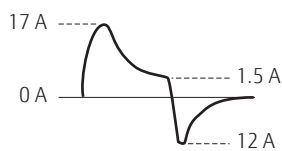


Test condition

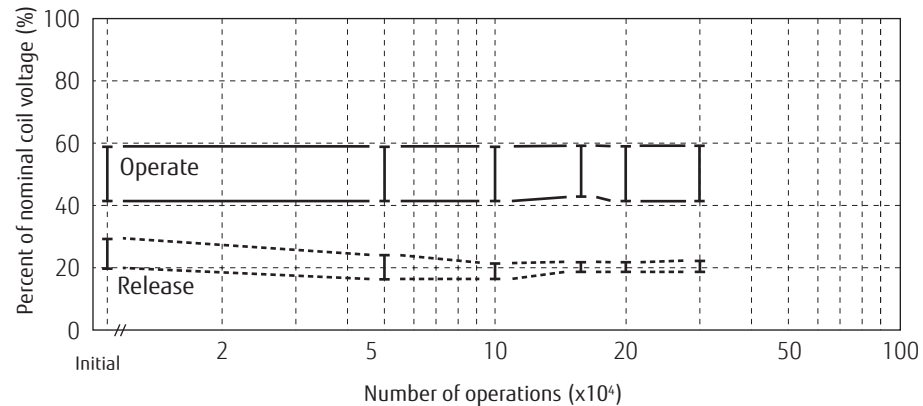
Inrush current 17A, 14VDC
motor free
300,000 operations min.
0.25 seconds ON
9.75 seconds OFF



Current wave form

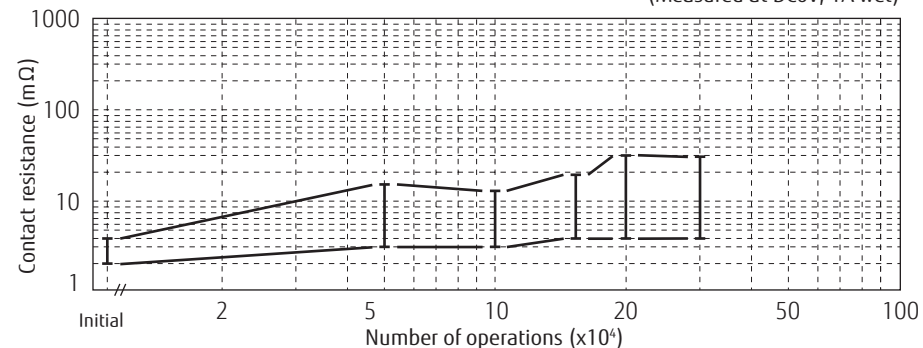


• Shift of operate / release voltage



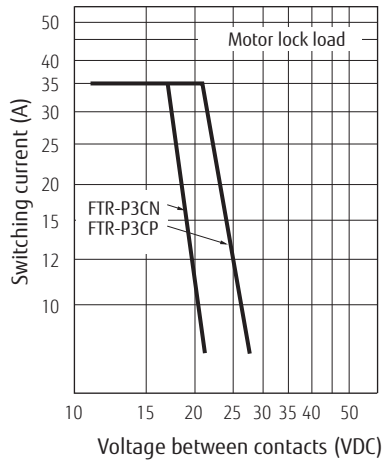
• Change of contact resistance

(Measured at DC6V, 1A wet)

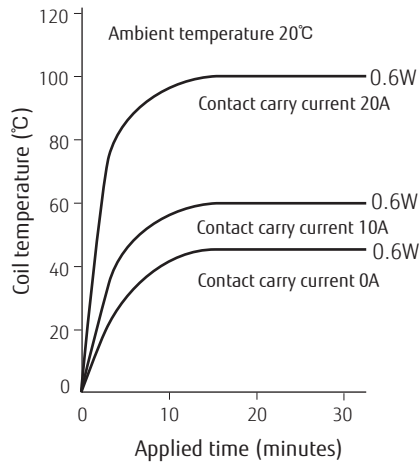


FTR-P3 SERIES

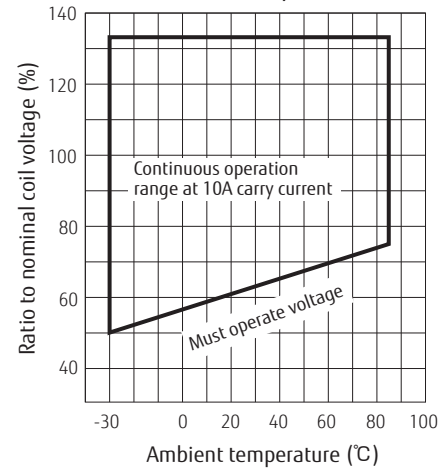
Maximum break capacity



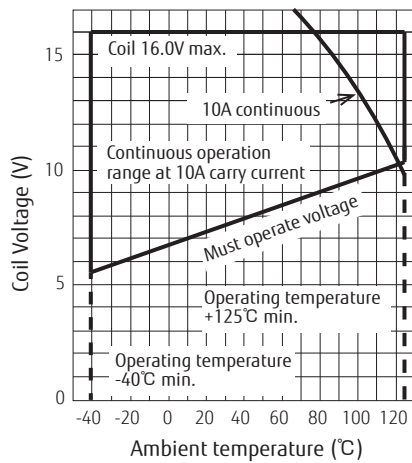
Coil temperature rise



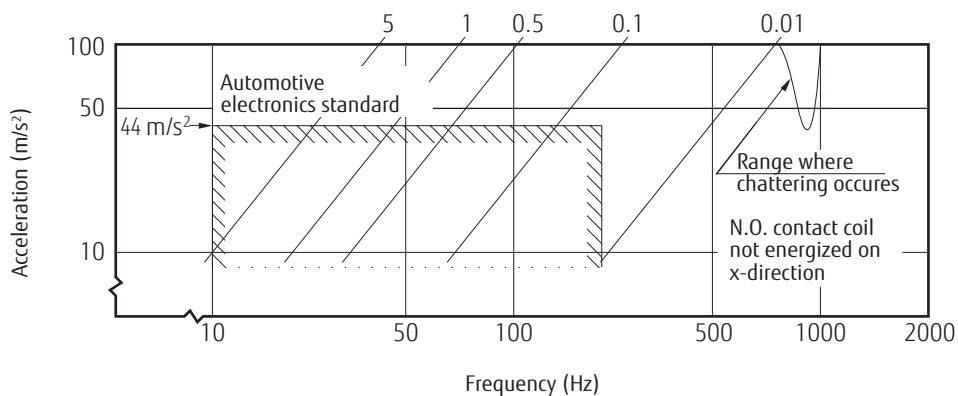
Operating coil voltage range
(Standard/ Multi-layered contacts)



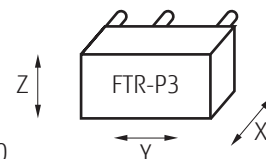
Operating coil voltage range
(Reflowable)



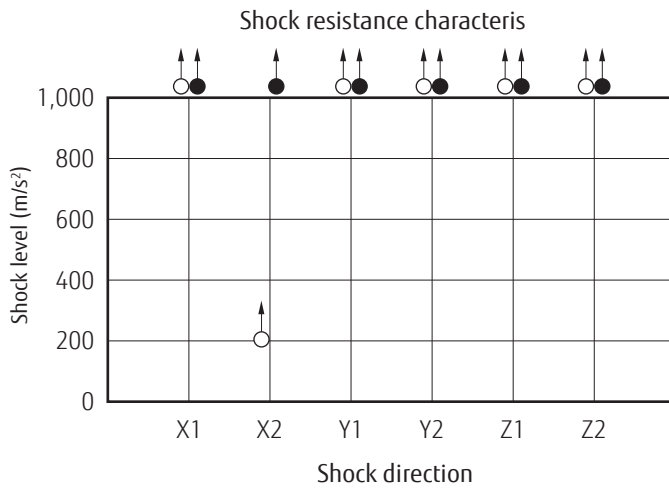
Vibration resistance characteristics
Dual amplitude (mm)



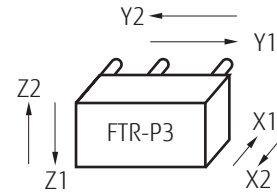
Frequency: 10 to 2000 Hz
Acceleration: 100m/s² max.
Direction of vibration:
see diagram below
Detection level:
chatter > 1ms



FTR-P3 SERIES

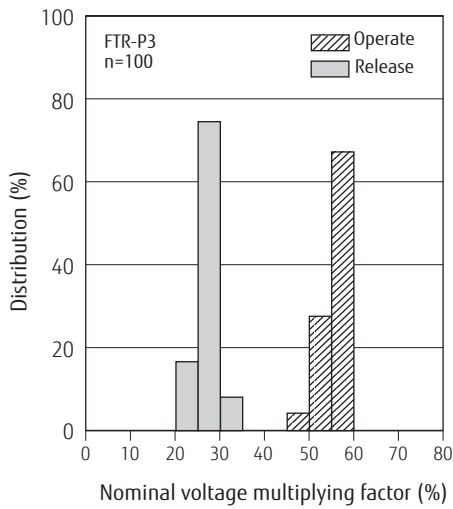


Shock application time: 11 ± 1 ms, half-sine wave
 Test material: coil energized and de-energized
 Detection level: chatter > 1 ms

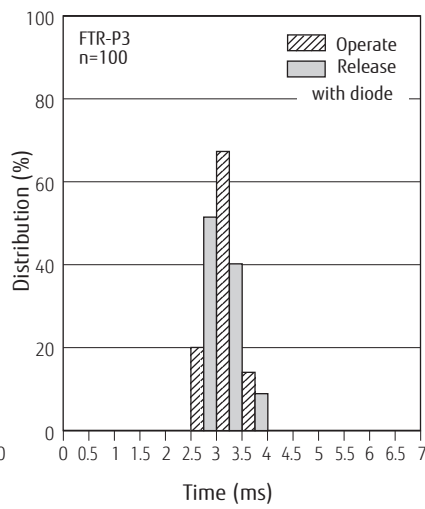


○ : break contact (coil de-energized)
 ● : make contact (coil energized)

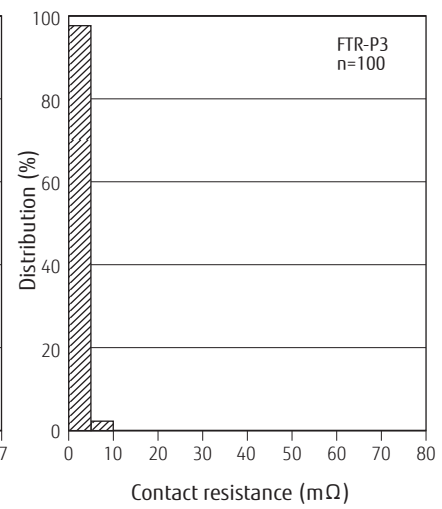
Distribution of operate / release voltage



Distribution of operate / release time



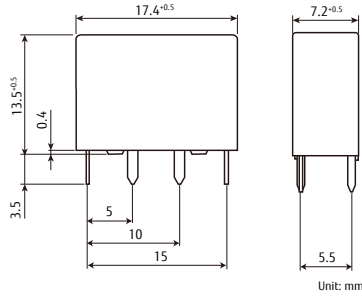
Distribution of contact resistance



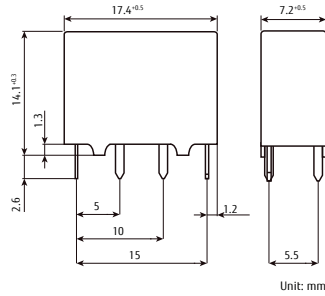
■ DIMENSIONS

Standard multi layered contact

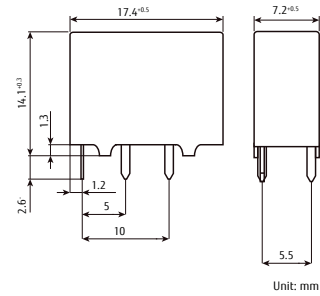
FTR-P3 dimensions



FTR-P3-06 dimensions



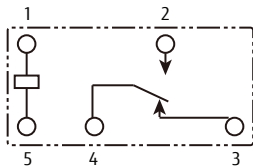
FTR-P3AN***W1-06 (1 form A) dimensions



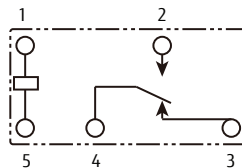
* Dimensions of the terminals does not include thickness of pre-solder

● Schematics (BOTTOM VIEW)

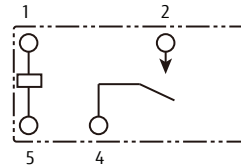
FTR-P3CN***W1(-ML)



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

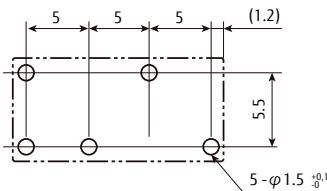


FTR-P3AN***W1-06 (1 form A)

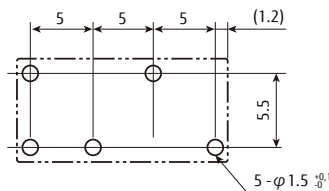


● PC board mounting hole layout (Plated through hole) (BOTTOM VIEW)

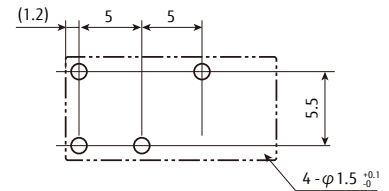
FTR-P3CN***W1(-ML)



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



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



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

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. ROH Compliance

- All relays produced by Fujitsu 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

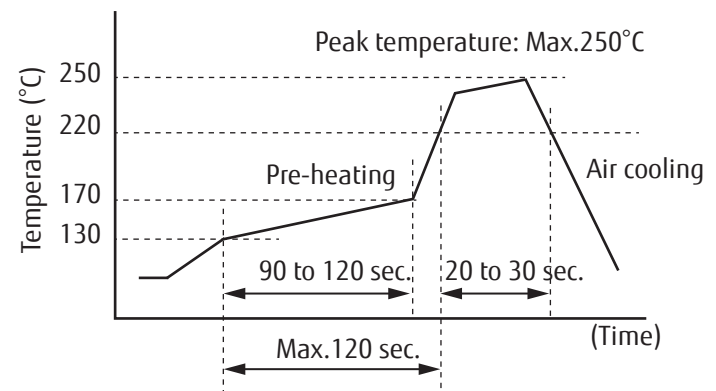
Solder by Soldering Iron:

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.

Fujitsu Components International Headquarter Offices

Japan FUJITSU COMPONENT LIMITED Shinagawa Seaside Park Tower 20F, 12-4, Higashi-shinagawa 4-chome, Shinagawa-ku, Tokyo, 140-0002, Japan Tel: (81-3) 3450-1682 Email: fcl-contact@cs.jp.fujitsu.com Web: www.fcl.fujitsu.com/	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	Korea FUJITSU COMPONENTS KOREA LIMITED #403, 180, Pangyoeyeok-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13524 Korea Tel: (82) 31-708-7108 Fax: (82) 31-709-7108 Email: fcal@sg.fujitsu.com www.fujitsu.com/sg/products/devices/components/
North and South America FUJITSU COMPONENTS AMERICA, INC 1230 E. Arques Ave. M/S 160 Sunnyvale, CA. 94085, USA Tel: (1-408) 745-4900 Fax: (1-408) 745-4970 Email: components@us.fujitsu.com Web: us.fujitsu.com/components	China FUJITSU ELECTRONIC COMPONENTS (SHANGHAI) CO., LTD. Unit 4306, B.M. InterContinental Center 100 Yu Tong Road, Shanghai 200070, China Tel: (86-21) 3253 0998 Fax: (86-21) 3253 0997 Email: fcsh@cn.fujitsu.com Web: www.fujitsu.com/cn/products/devices/components/	
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	Hong Kong FUJITSU COMPONENTS HONG KONG CO., LTD Unit 2313, Seapower Tower, Concordia Plaza No.1 Science Museum 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/	

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