FUJITSU

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 (a) — C (b) — N (c) — 012 (d) — W1 (e) — -06 (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	: 0.25mm gap : 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 -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

■ SPECIFICATION

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 10^6 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/s² (4.4G), constant acceleration			
		Endurance	10 to 200Hz, acceleration 43m/s² (4.4G), constant acceleration			
	Shock	Misoperation	100m/s² minimum (11+/-1ms)			
		Endurance	1,000m/s² 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)

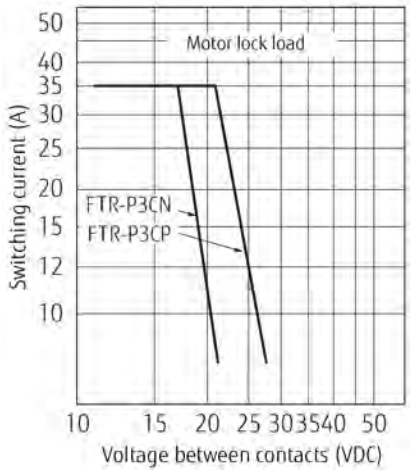
FTR-P3 Series (0.6mm contact gap) (Standard, multi layered contact)

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)

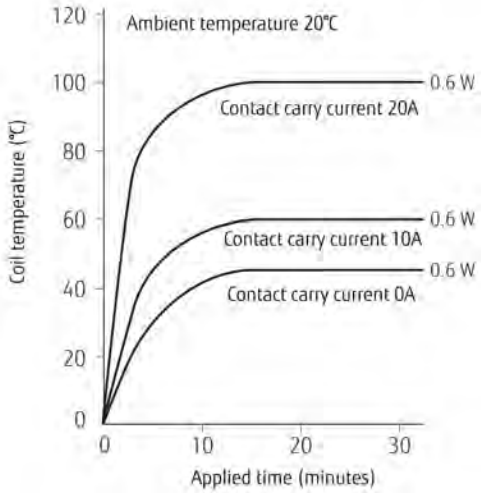
Note: All values in the tables are valid for 20°C and zero contact current, unless otherwise stated.
Must operate voltages/must release voltages at 125degC are available only for reflowable type.
* Specified operate values are valid for pulse wave voltage.

■ CHARACTERISTIC DATA

Maximum break capacity



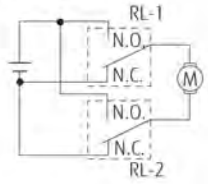
Coil temperature rise



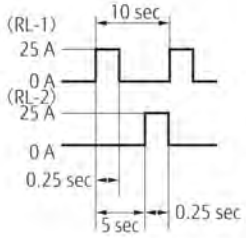
Life test (examples)

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

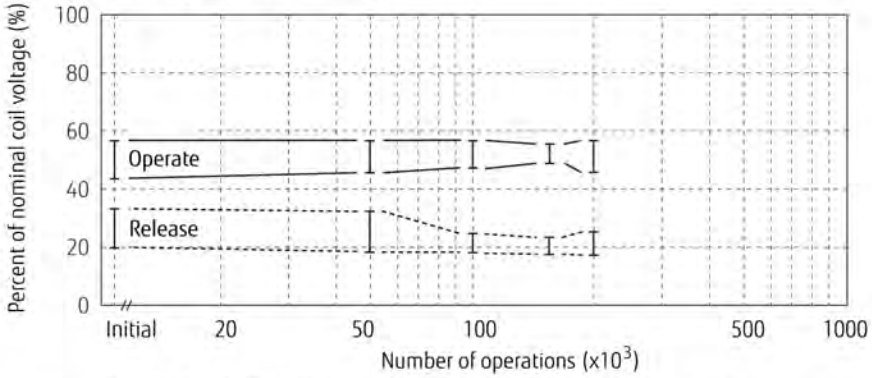
Test circuit



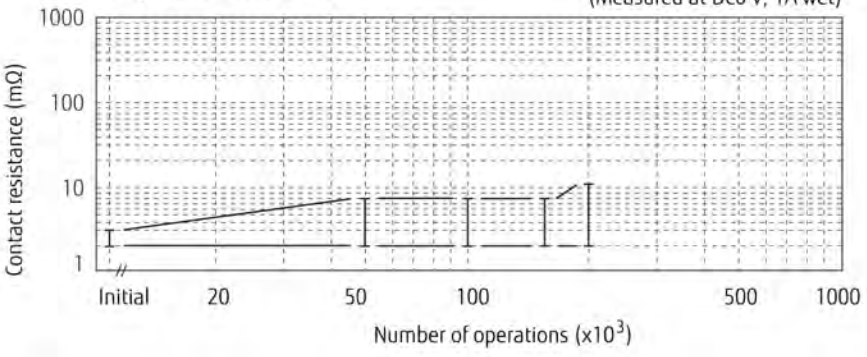
Current wave form



• Shift of operate / release voltage

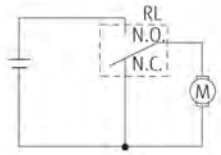


• Change of contact resistance (Measured at DC6 V, 1A wet)

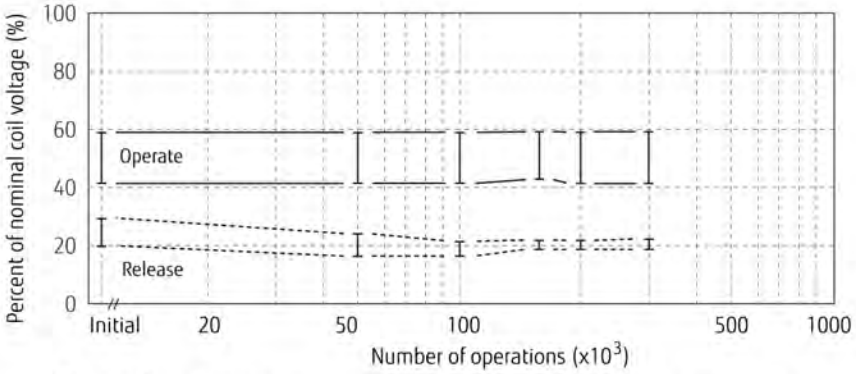


Test condition
Inrush current 17A, 14VDC
motor free
300,000 operations min.
0.25 seconds ON
9.75 seconds OFF

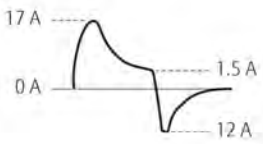
Test circuit



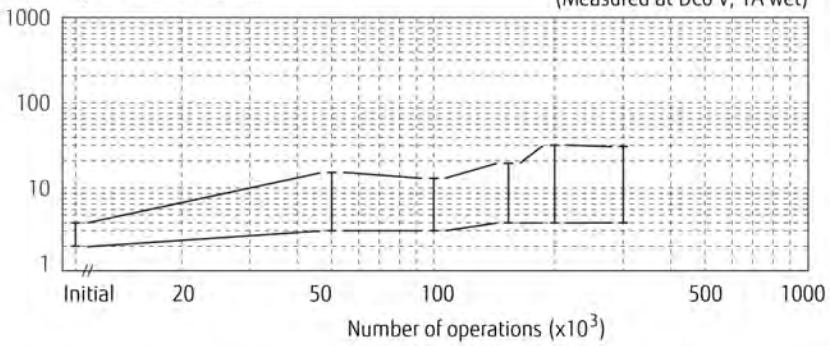
• Shift of operate / release voltage



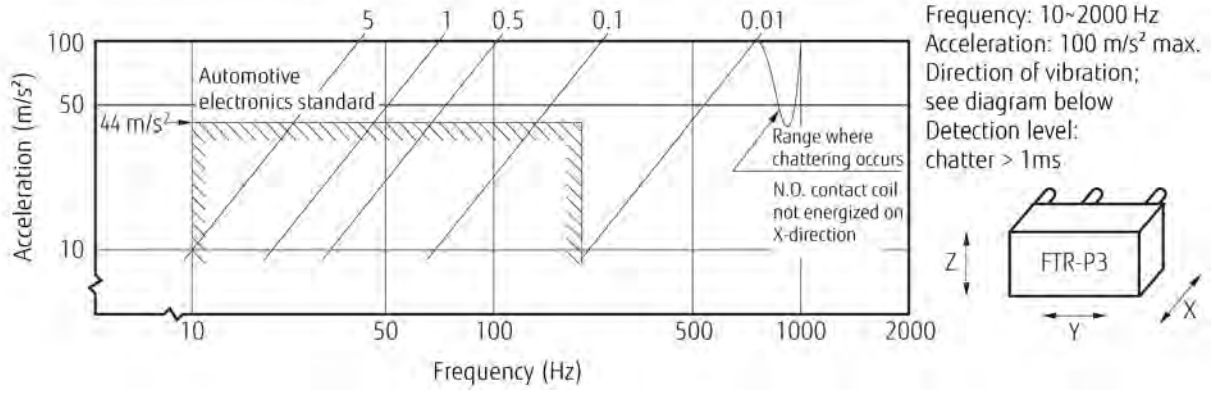
Current wave form



• Change of contact resistance (Measured at DC6 V, 1A wet)

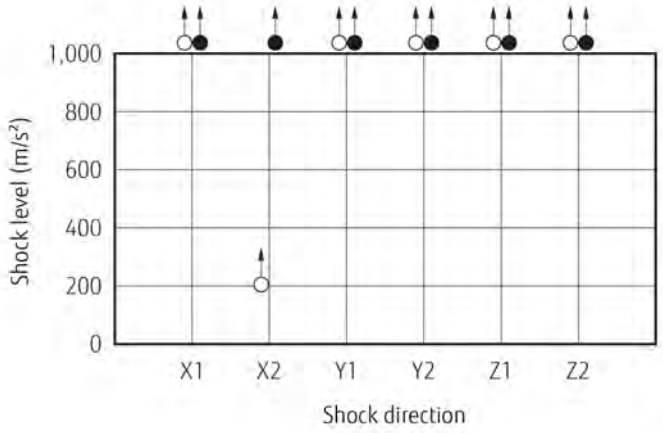


Vibration resistance characteristics
Dual amplitude (mm)

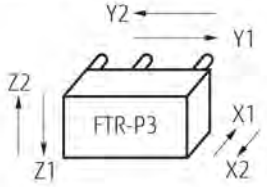


Frequency: 10~2000 Hz
Acceleration: 100 m/s² max.
Direction of vibration;
see diagram below
Detection level:
chatter > 1ms

Shock resistance characteristics

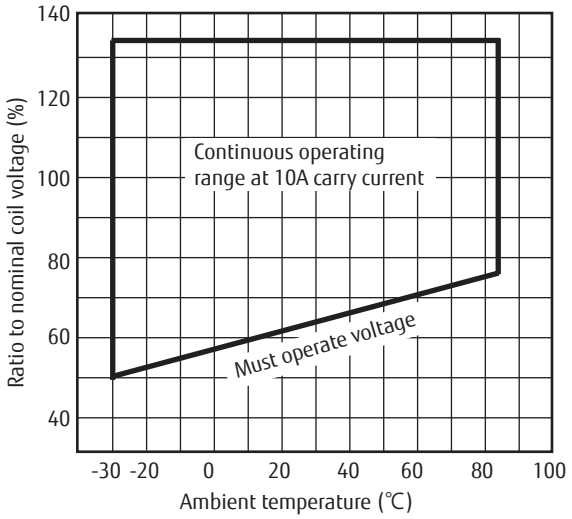


Shock application time: 11±1ms, half-sine wave
Test material: coil energized and de-energized
Shock direction: see diagram below
Detection level: chatter > 1ms

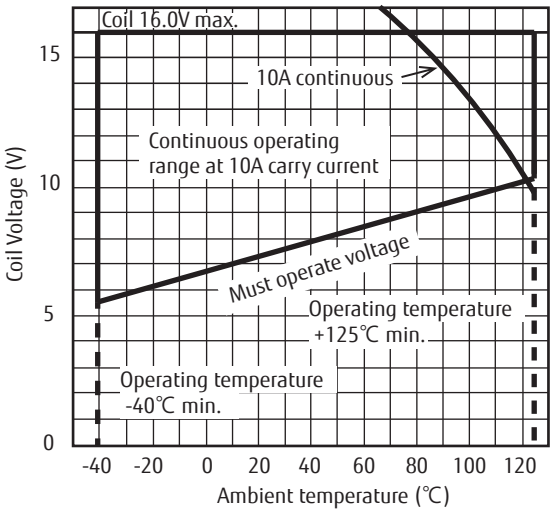


○ : break contact (coil de-energized)
● : make contact (coil energized)

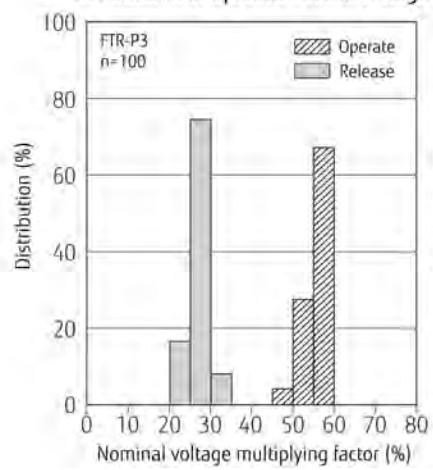
Operating coil voltage range (Standard/Multi-layered contacts)



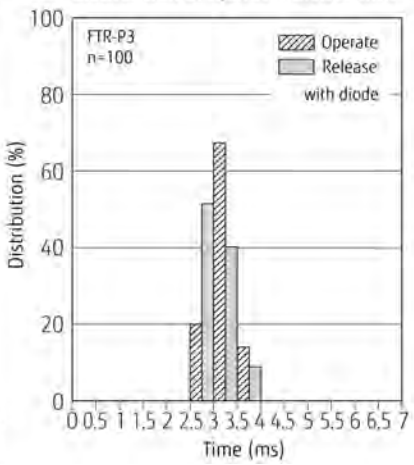
Operating coil voltage range (Reflowable)



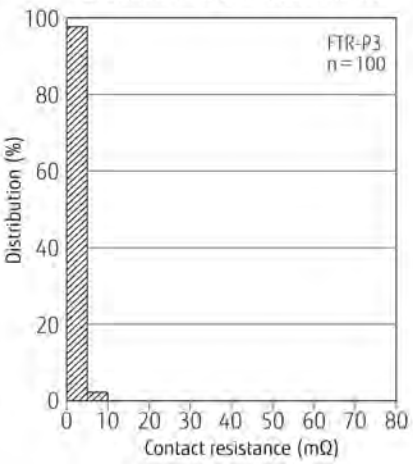
Distribution of operate/release voltage



Distribution of operate/release time



Distribution of contact resistance

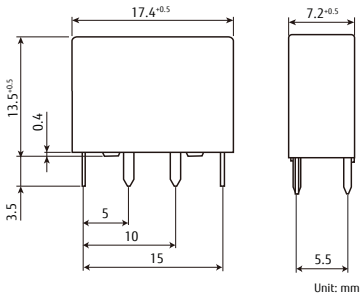


■ DIMENSIONS

Standard multi layered contact

FTR-P3 dimensions

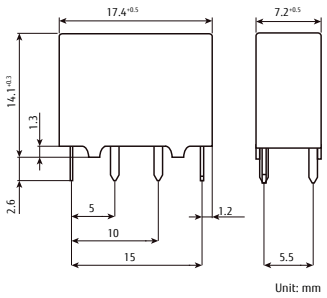
FTR-P3CN*** W1 dimensions



Unit: mm

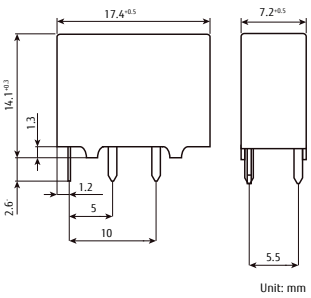
FTR-P3-06 dimensions

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



Unit: mm

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

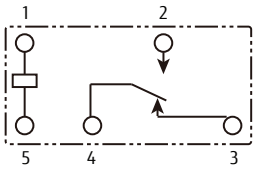


Unit: mm

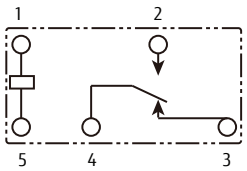
* Dimensions of the terminals does not include thickness of pre-solder

● Schematics
(BOTTOM VIEW)

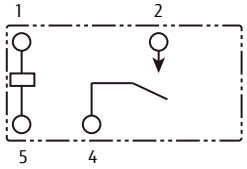
FTR-P3CN***W1(-ML)



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

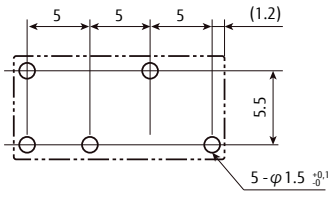


FTR-P3AN***W1-06 (1 form A)

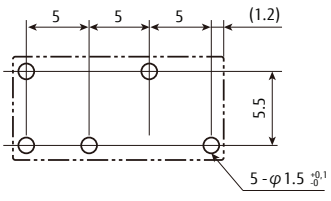


● PC board mounting hole layout (Plated through hole)
(BOTTOM VIEW)

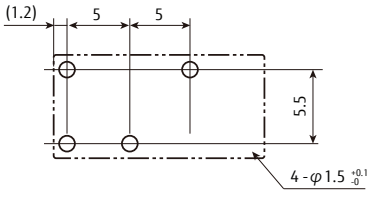
FTR-P3CN***W1(-ML)



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



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



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

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 2001/65/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 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:

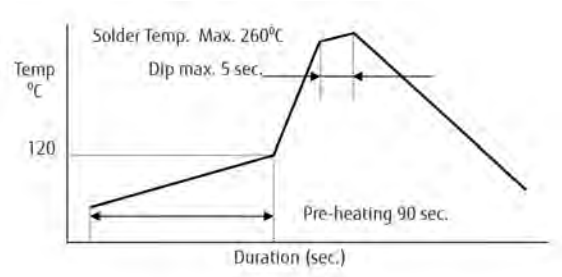
Soldering Iron Temperature:	30-60W maximum 350-360˚C
Duration:	maximum 3 sec.

Reflow Solder Condition:

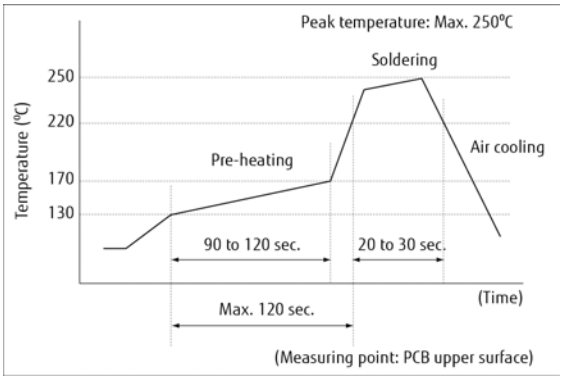
Pre-heating:	maximum 170˚C within 120 sec.
Soldering:	maximum 250˚C within 30 sec.

Note: Please do not reflow non-reflowable relays.

Flow Solder Condition:



Reflow Solder Condition:



We highly recommend that you confirm your actual solder conditions

3. Moisture Sensitivity

- Moisture Sensitivity Level is not applicable, 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 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/

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
Alpha Tower #403, 645 Sampyeong-dong,
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
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

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

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 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/

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Automotive Relays ***category:***

Click to view products by Fujitsu ***manufacturer:***

Other Similar products are found below :

7-1414968-8 7-1617345-6 9-1617516-5 G5CE1ASIDC12 1393204-2 1393302-3 13Z99A115-0074 1432872-1 1617057-2 1617058-6 1617518-5 2-1617057-2 2-1617057-6 2-1617058-3 CB1F-M-12V-H15 898H-1AH-D-001-12VDC 24198-1 4-1617057-0 41FZ-200ACG-BSL 5-1616920-2 5-1617052-9 5407-0011-HS CB1AF-M-12V-H59 5-1617346-8 103-1AH-C-12VDC V23134A1052X299 6-1393302-1 897H-1AH-D-R1-U01-12VDC FTR-P3CP024W1-06 1-1617057-8 3-1393305-1 5436-0001-HS V23086-R1851-A502 898H-1AH-D1SW-R1-12VDC RH4C1P2607 RE031005 V23134M0052G242 23234B0001X001-EV-144 V23234-A1001-X036 2138602-1 3-1904020-8 FBR56ND12-W1 S11-1A-C1-12VDC S11-1A-C1-24VDC FRC2U-DC12 FRC7A-S-DC24V FTR-P6GN012WA LQ-12 2-1414939-2 FRC7C-S-DC12V