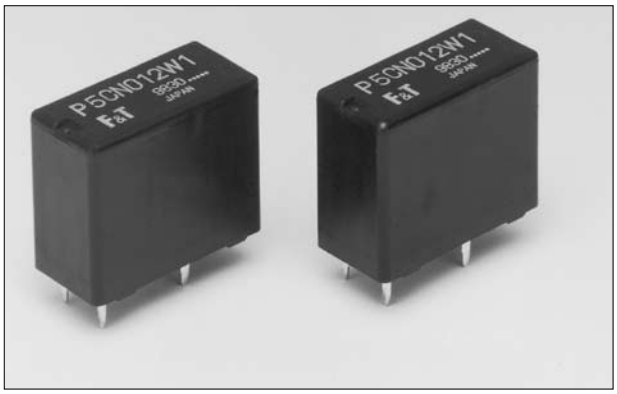
FUJITSU THE POSSIBILITIES ARE INFINITE

SILENT RELAY FOR AUTOMOTIVE APPLICATIONS 1 POLE—25 A

FTR-P5 SERIES

RoHS compliant

■ FEATURES



- Low operating sound
  An original silent mechanism decreases the propagation of operating sound when mounted on a PCB. (Average sound pressure: 50dB at 5 cm).
- Compact, high density package
  198 mm^2 mounting area. (46% less than the FTR-P1 series quiet relay).
- High sensitivity, low power consumption
  (nominal power consumption: 450 mW).
- High capacity
  Heat dissipation is high due to a single cover structure.
- Ease of PCB layout
  All terminals are on the perimeter.
- High breaking capability.
  In addition to the standard gap product (0.3 mm), a higher gap product (0.6 mm), suitable for over voltage breaking can be supplied.
- Typical applications:
  Wiper / IWW, Power window, Doorlock, Power seat
  Sunroof, Interior lighting, Fan
- RoHS compliant since date code: 0623
  Please see page 8 for more information

■ ORDERING INFORMATION

[Example]	FTR-P5 (a)	C (b)	N (c)	012 (d)	W1 (e)	** (f)

(a)	Series Name	FTR-P2 : FTR-P2 Series
(b)	Contact Arrangement	C : 1 Form C
(c)	Contact Gap	N : 0.3 mm gap
(d)	Nominal Voltage	009: 9 VDC 010: 10 VDC 012: 12 VDC
(e)	Contact Material	W1 : Silver-Tin-Oxide Indium Oxide
(f)	Special product specification	Symbol to specify special specification product

Note: The part number on the relay cover does not include 'FTR'
Example: Ordering part number: FTR-P5CN012W1
Stamped part number: P5CN012W1

■ SPECIFICATIONS

Item			Specifications
Contact	Arrangement		1 Form C
	Material		Silver-tin oxide-indium
	Voltage drop		100mV (1A, 12VDC)
	Contact rating		14VDC, 25A (motor locked)
	Maximum carrying current		25A / 1 hour (25°C, nominal voltage applied to coil)
	Maximum switching current		35A, 16 VDC (reference)
	Minimum load*		6V, 1A (reference)
Coil	Operating temperature range		-40°C to +85°C (no frost)
	Storage temperature range		-40°C to +100°C (no frost)
Time	Operate (at nominal voltage)		10 ms maximum
	Release (at nominal voltage)		5 ms maximum (without diode)
Life	Mechanical		10 million operations minimum
	Electrical		100k operations minimum (at contact rating)
Other	Vibration resistance (operational)		10-55HZ, 1.5mm double amplitude
	Shock resistance	operational	100 m/s^2 minimum (10G)
		no damage	100 m/s^2 minimum (100G)
	Weight		Approximately 13 grams
	Average sound pressure		Approximately 50dB at 5cm

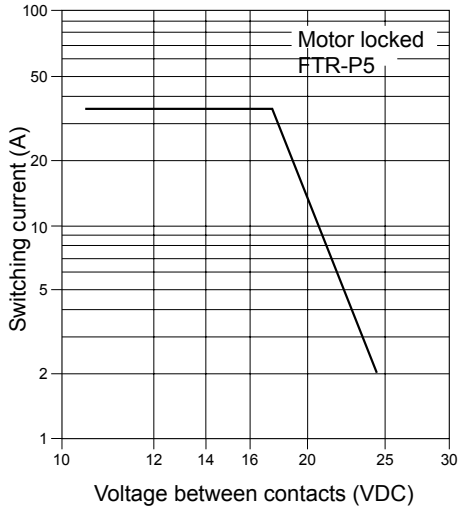
*This is the standard value of the minimum load level. This value may differ depending on the switching frequency, environmental conditions and target reliability standard. We recommend to check this value by an actual load prior to use.

■ COIL DATA

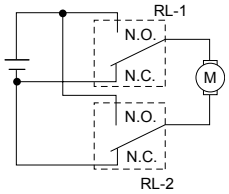
Product Name	Nominal Coil Voltage	Coil Resistance* (±10%)	Power Consumption at nominal coil voltage*	Must Operate Voltage*	Must Release Voltage
FTR-P5CN009W1	DC 9V	180Ω	450mW	5.5V (20˚) 6.9V (85˚)	0.72
FTR-P5CN010W1	DC 10V	220Ω	455mW	6.3V (20˚) 7.9V(85˚)	0.8
FTR-P5CN012W1	DC 12V	320Ω	450mW	7.3V (20˚) 9.2V (85˚)	0.96

■ CHARACTERISTIC DATA

1. MAXIMUM BREAK CAPACITY

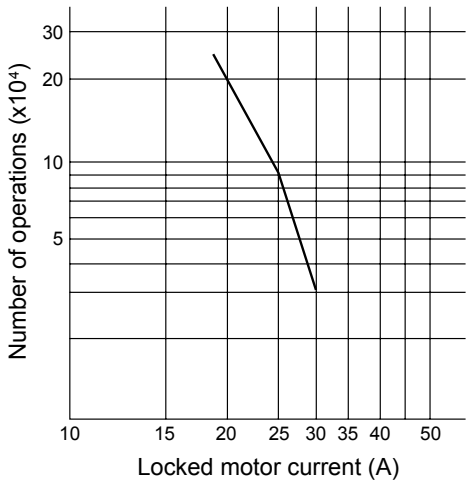


Test circuit



2. LIFE

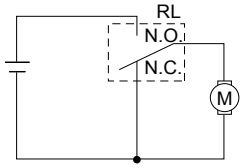
14 VDC motor locked load



3. LIFE TEST (EXAMPLES)

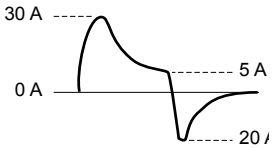
• Test item
14 V DC,
inrush current: 30 A
motor free
300K operations minimum
0.25 seconds ON,
9.75 seconds OFF

• Test circuit

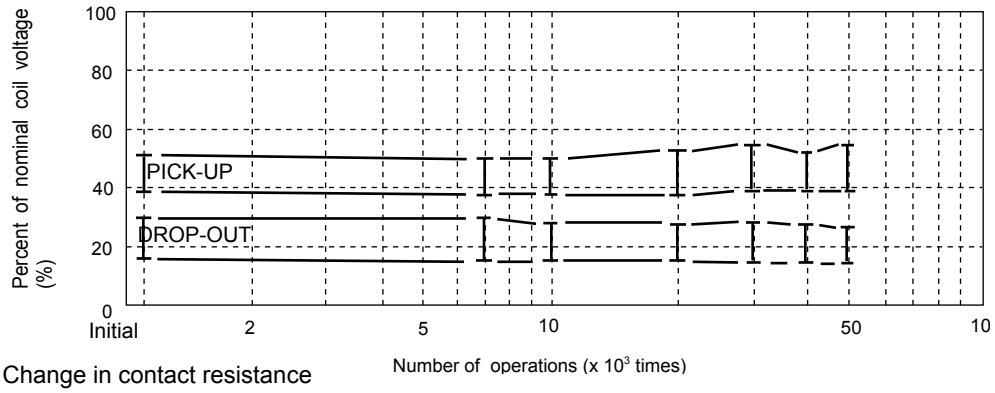


Note: NC contacts provide dynamic brake circuit

• Current wave form

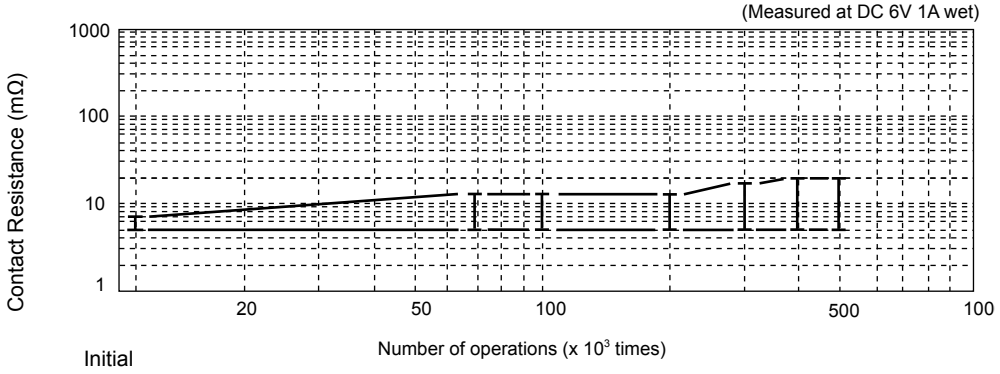


• Change in pick-up drop-out voltage



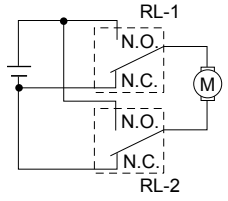
• Change in contact resistance

(Measured at DC 6V 1A wet)

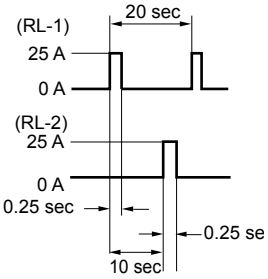


• Test item
14 V DC-25 A
Motor Lock
100K operations minimum*

• Test circuit

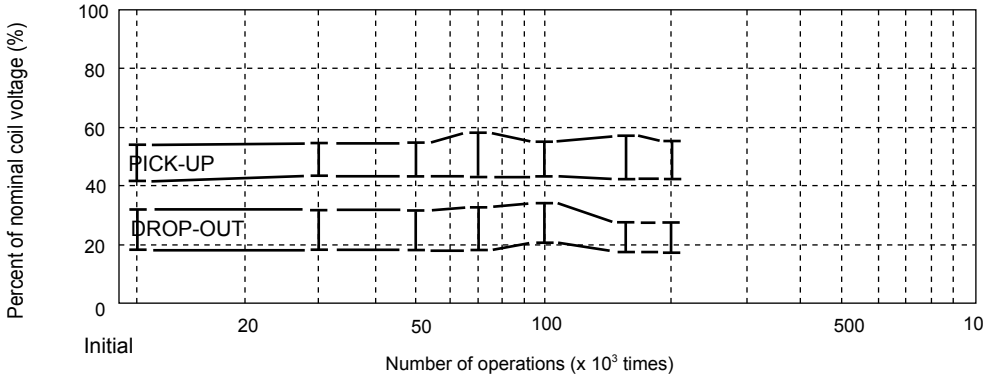


• Current wave form



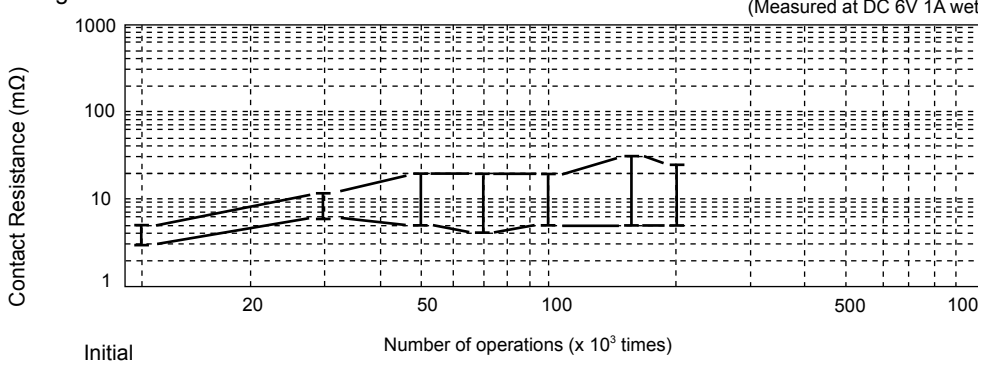
* 1 operation = 1 forward and 1 reverse

• Shift of pick-up drop-out voltage

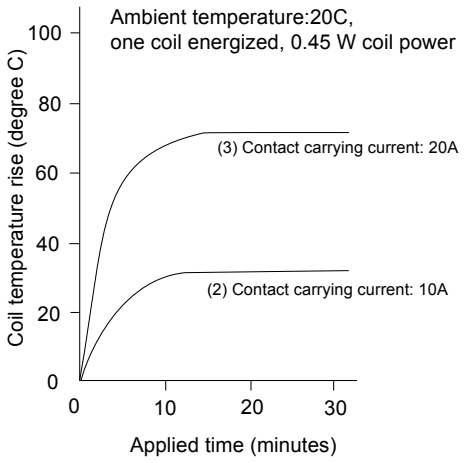


• Change in contact resistance

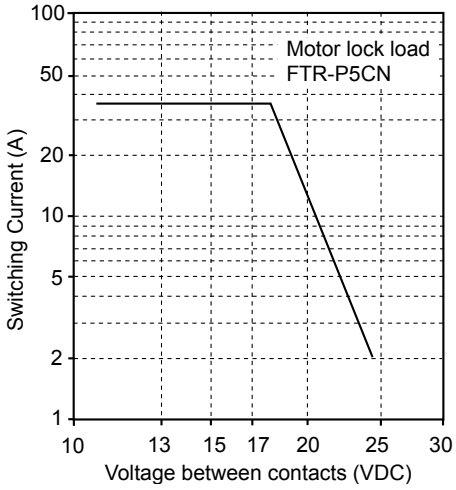
(Measured at DC 6V 1A wet



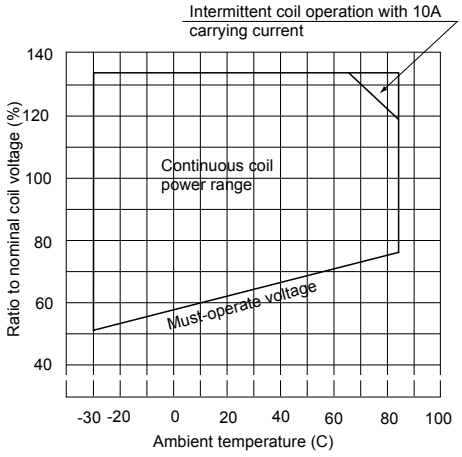
4. COIL TEMPERATURE RISE



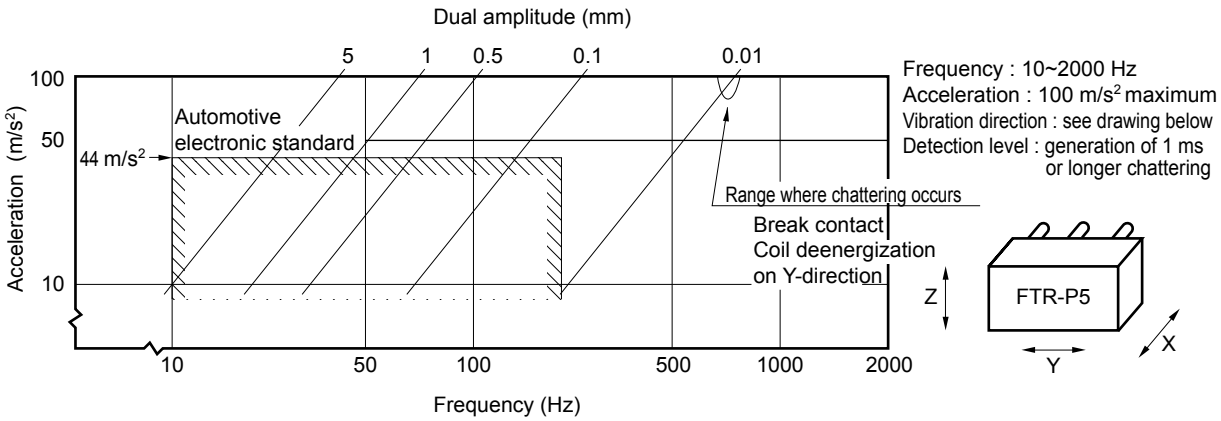
5. MAXIMUM BREAK CAPACITY



6. OPERATING COIL VOLTAGE RANGE

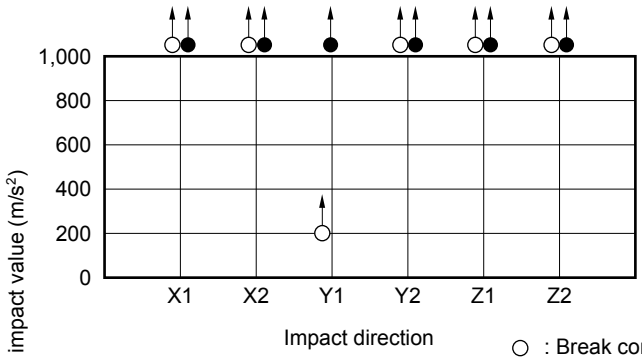


7. VIBRATION RESISTANCE CHARACTERISTICS



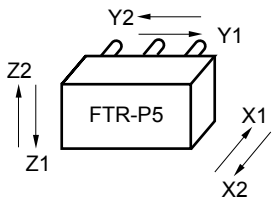
Frequency : 10~2000 Hz
Acceleration : 100 m/s² maximum
Vibration direction : see drawing below
Detection level : generation of 1 ms
or longer chattering

8. SHOCK RESISTANCE CHARACTERISTIC



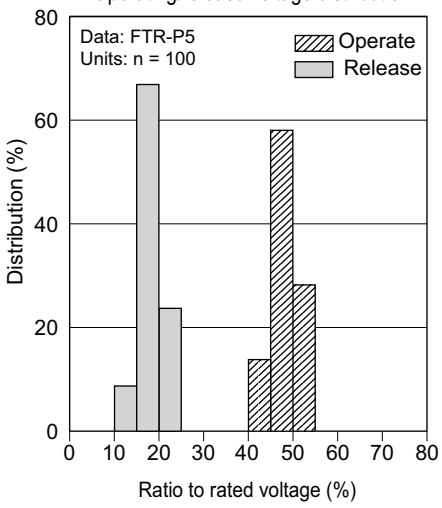
○ : Break contact
(coil de-energized)
● : Make contact
(coil energized)

Impact apply time : 111 ms, half-sine wave
Test condition: coil, energized and de-energized
Impact direction: see drawing below
Detection level : generation of 1ms or longer
contact chattering

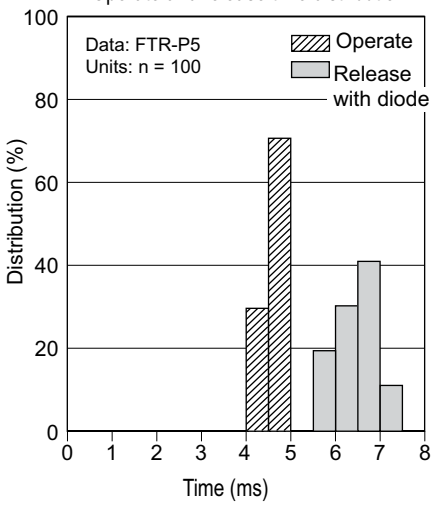


■ REFERENCE DATA

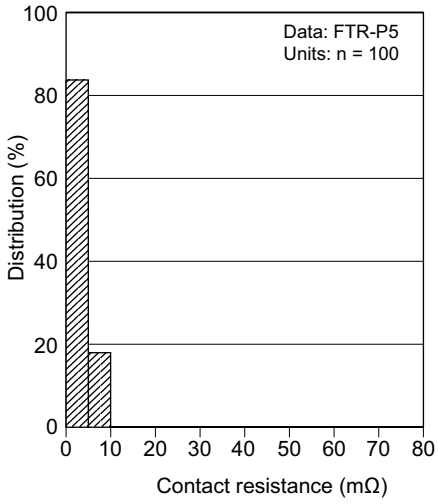
Operating/release voltage distribution



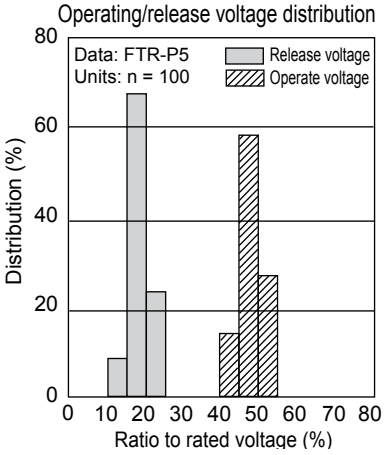
Operate and release time distribution



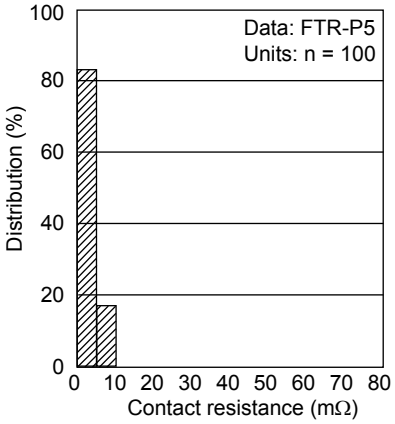
Contact resistance distribution



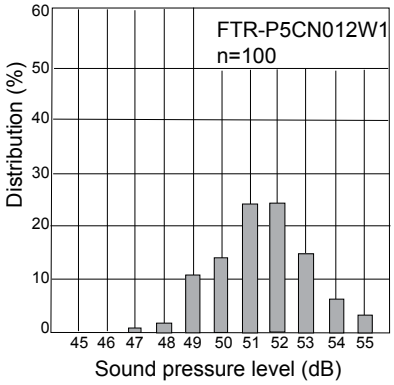
Operating/release voltage distribution



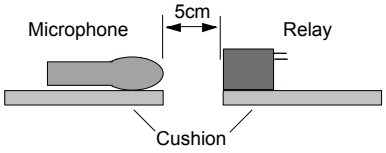
Contact resistance distribution



Distribution of sound pressure (with diode)

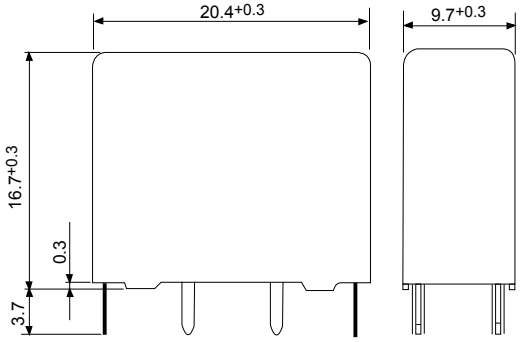


Method of acoustic noise measure
Measuring condition: Distance from 5 cm, relay operation at 10Hz
Tester: Noise tester Ryon NA-61, A range

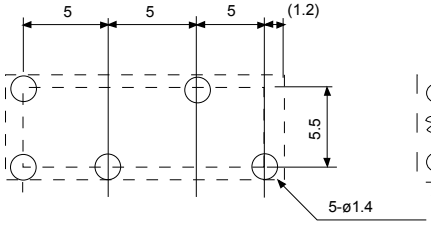


■ DIMENSIONS

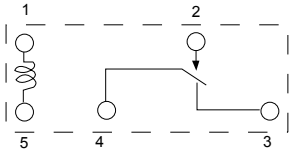
• Dimensions



• PCB mounting hole layout (bottom view)



• Schematic (bottom view)



Unit: mm

RoHS Compliance and Lead Free Relay Information

1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
- All signal and most power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded assembly process will not cause any problems (compatible).
- “LF” is marked on each outer and inner carton. (No marking on individual relays).
- To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.
- We will ship leaded relays as long as the leaded relay inventory exists.

Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

Reflow Solder condtion

Flow Solder condtion:	
Pre-heating:	maximum 120˚C
Soldering:	dip within 5 sec. at 260˚C soler bath

Solder by Soldering Iron:	
Soldering Iron Temperature:	maximum 360˚C
Duration:	maximum 3 sec.

We highly recommend that you confirm your actual solder conditions

3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical realys.

4. Tin Whisker

- Dipped SnAgCu solder is known as low risk tin whisker. No considerable length whisker was found by our in house test.

Fujitsu Components International Headquarter Offices

Japan
Fujitsu Component Limited
Gotanda-Chuo Building
3-5, Higashigotanda 2-chome, Shinagawa-ku
Tokyo 141 8630, Japan
Tel: (81-3) 5449-7010
Fax: (81-3) 5449-2626
Email: promothq@fcl.fujitsu.com
Web: www.fcl.fujitsu.com

North and South America
Fujitsu Components America, Inc.
250 E. Caribbean Drive
Sunnyvale, CA 94089 U.S.A.
Tel: (1-408) 745-4900
Fax: (1-408) 745-4970
Email: components@us.fujitsu.com
Web: http://www.fujitsu.com/us/services/edevices/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: emea.fujitsu.com/components/

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@fcal.fujitsu.com
Web: http://www.fujitsu.com/sg/services/micro/components/