FUJITSU

# POWER RELAY

# 1 POLE - 1/3/5/10A Medium Load Control

# LZ Series

## ■ FEATURES

- UL, CSA, SEV recognized
- Contact rating types - Low level to 10 amps switching
- Standard and high sensitivity types available
- High surge strength version available
- UL class B (130°C) insulation type available (only plastic sealed type)
- Printed circuit terminals - 0.1" grid pitch
- Plastic sealed type, RTIII
- RoHS compliant.
  Please see page 9 for more information




## ■ PARTNUMBER INFORMATION

| | LZ | - | B | 12 | H | M | S | E | - | K | HV | - | UC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [Example] | (a) | | (b) | (c) | (d) | (e) | (f) | (g) | | (h) | (i) | | (j) |

| | | | |
|---|---|---|---|
| (a) | Relay type | LZ | : LZ Series |
| (b) | Coil wire class | Nil<br>B | : Standard type<br>: UL class B insulation type (130 °C) |
| (c) | Coil rated voltage | 12 | : 1.5....100VDC<br>Coil rating table at page 3 |
| (d) | Contact type | Nil<br>H<br>V<br>W | : 3A<br>: 5A<br>: 10A (standard coil power only)<br>: 1A (bifurcated contact) |
| (e) | Contact configuration | Nil<br>M | : 1 form C (SPDT)<br>: 1 form A (SPST-NO) |
| (f) | Coil type | Nil<br>S | : Standard type (450-600mW)<br>: High sensitive type (300mW) |
| (g) | Contact material | Nil<br>Nil<br>Nil<br>E | : Gold overlay silver-palladium (1A) (only LZ-W)<br>: Gold overlay silver-nickel (3A, 5A)<br>: Silver alloy (10A) (only LZ-V) (contains cadmium)<br>: Silver-nickel (3A, 5A) |
| (h) | Enclosure | Nil<br>K<br>C | : Flux proof type, RTII<br>: Plastic sealed type (recommended for new designs) RTIII<br>: Plastic sealed type (with tape) RTIII |
| (i) | Surge strength | Nil<br>HV | : Standard type (4,000V)<br>: High surge strength type (6,000V) |
| (j) | Approvals | UC | : UL, CSA approved type |

## ■ SPECIFICATION

LZ-( ) (Standard type)

| Item | | | 10A Type | 5A Type | 3A Type | 1A Type |
|---|---|---|---|---|---|---|
| | | | LZ - ( ) V<br>LZ - ( ) VM | LZ - ( ) H<br>LZ - ( ) HE | LZ - ( )<br>LZ - ( ) E | LZ- ( ) W |
| Contact Data | Configuration | | 1 form A (SPST-NO), 1 form C (SPDT) | | | |
| | Construction | | Single | Single (crossbar) | | Bifurcated (crossbar) |
| | Material | | Silver alloy (contains cadmium) | Gold overlay silver alloy<br>Silver alloy (LZ-HE, E) | | Gold overlay silver-palladium |
| | Resistance (initial) (at 6 VDC, 1A) | | Max. 100 mOhm | Max. 70 mOhm (LZ-H, LZ)<br>Max. 100 mOhm (LZ-HE, E) | | Max. 50 mOhm |
| | Contact rating (resistive) | | 10A, 120VAC/ 24VDC<br>1/4HP, 120VAC | 5A, 120VAC/ 24VDC<br>1/8 HP, 120VAC | 3A,120VAC/ 24VDC<br>1/10HP, 120VAC | 1A, 120VAC / 30VDC |
| | Max. carrying current | | 10A | 5A | | 1A |
| | Max. switching voltage | | 250VAC, 150 VDC | | | |
| | Max. switching power | | 1,680VA, 240W | 960VA, 120W | 600VA, 90W | 190VA, 30W |
| | Max. switching current | | 10A | 5A | 3A | 1A |
| | Min. switching load * | | 100mA 5VDC | 10mA, 5VDC (LZ-H)<br>100mA, 5VDC (LZ-HE) | 10mA, 5VDC(LZ-)<br>100mA, 5VDC (LZ-E) | 0.1mA, 100mVDC |
| Life | Mechanical | | Min. 20 x $10^6$ operations | | | |
| | Electrical | | Min. 100 x $10^3$ operations (contact rating) | | | |
| Coil Data | Rated Power (at 20 °C) | | 450 - 600mW | | | |
| | Operate Power (at 20 °C) | | 170 - 220 mW (LZ- ( ) V : 290 - 390 mW) | | | |
| | Operating temperature range | | -30 °C to +70 °C (no frost) | | | |
| Timing Data | Operate (at nominal voltage) | | Max. 7 ms (without bounce) | | | |
| | Release (at nominal voltage) | | Max. 4 ms (no diode) | | | |
| Insulation | Resistance (initial) | | Min. 250MOhm at 500VDC | | | |
| | Dielectric strength | Open contacts | 750VAC, 1min | | | |
| | | Contacts to coil | 2,000VAC, 1min | | | |
| | Surge strength | Coil to contacts | 4,000V / High surge: 6,000V, 1.2 x 50μs standard wave | | | |
| Other | Vibration resistance | Misoperation | 10 to 55Hz double amplitude 3.3 mm | | | |
| | | Endurance | 10 to 55Hz double amplitude 3.3 mm | | | |
| | Shock | Misoperation | Min. 100m/s² (11 ± 1ms) | | | |
| | | Endurance | Min. 1,000m/s² (6 ± 1ms) | | | |
| | Weight | | Approximately 7.7g | | | |

* 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 contions and expected reliability levels.

## ■ SPECIFICATION

LZ-( ) S (High sensitive type)

| Item | | | 5A Type | 3A Type | 1A Type |
|---|---|---|---|---|---|
| | | | LZ-( )HS, LZ -( )HSE | LZ-( )S, LZ-( )SE | LZ-( )WS |
| Contact Data | Configuration | | 1 form A (SPST-NO), 1 form C (SPDT) | | |
| | Construction | | Single (crossbar) | | Bifurcated (crossbar) |
| | Material | | Gold overlay silver nickel | Silver nickel (LZ-HSE, SE) | Gold overlay silver-palladium |
| | Resistance (initial) (at 6VDC, 1A) | | Max. 70mOhm (LZ-HS, S)<br>Max. 100mOhm (LZ-HSE, SE) | | Max. 50mOhm |
| | Contact rating | Resistive | 5A, 120VAC / 24VDC | 3A, 120VAC / 30VDC | 1A, 120VAC / 30VDC |
| | | Motor load | 1/8 HP, 120VAC | 1/10 HP, 120VAC | - |
| | Max. carrying current | | 5A | | 1A |
| | Max. switching voltage | | 250VAC, 150 VDC | | |
| | Max. switching power | | 960VA, 120W | 600VA, 90W | 190VA, 30W |
| | Max. switching current | | 5A | 3A | 1A |
| | Min. switching load * | | 10 mA, 5VDC (LZ-HS, S)<br>100 mA, 5VDC (LZ-HSE, SE) | | 0.1 mA, 100mVDC |
| Life | Mechanical | | Min. 20 x $10^6$ operations | | |
| | Electrical | | Min. 100 x $10^3$ operations | | |
| Coil Data | Rated power (at 20 °C) | | 330 mW | | |
| | Operate power (at 20 °C) | | 140 mW | | |
| | Operating temperature range | | -30 °C to +80 °C (no frost) | | |
| Timing Data | Operate (at nominal voltage) | | Max. 7 ms | | |
| | Release (at nominal voltage) | | Max. 4 ms | | |
| Insulation | Resistance (initial) | | Min. 250MOhm at 500VDC | | |
| | Dielectric strength | Open contacts | 750VAC, 1min | | |
| | | Contacts to coil | 2,000VAC, 1min | | |
| | Surge strength | Coil to contacts | 4,000V / -HV type: 6,000V, 1.2 x 50μs standard wave | | |
| Other | Vibration resistance | Misoperation | 10 to 55Hz double amplitude 3.3 mm | | |
| | | Endurance | 10 to 55Hz double amplitude 3.3 mm | | |
| | Shock | Misoperation | Min. 100m/s² (11 ± 1ms) | | |
| | | Endurance | Min. 1,000m/s² (6 ± 1ms) | | |
| | Weight | | Approximately 7.7 g | | |

* 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 contions and expected reliability levels.

## ■ COIL RATING

Standard type (450 mW)

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) * | | Must Release-Voltage (VDC) * | Rated Power (mW) |
|---|---|---|---|---|---|---|
| | | | LZ-(B) ( ) VM<br>LZ-(B) ( ) (M) (E)<br>LZ-(B) ( ) W (M) | LZ-(B) ( ) V | | |
| 1.5 | 1.5 | 5 | 0.97 | 1.2 | 0.08 | 450 |
| 3 | 3 | 20 | 1.95 | 2.4 | 0.15 | |
| 5 | 5 | 56 | 3.25 | 4 | 0.25 | |
| 6 | 6 | 80 | 3.9 | 4.8 | 0.3 | |
| 9 | 9 | 180 | 5.85 | 7.2 | 0.45 | |
| 12 | 12 | 320 | 7.8 | 9.6 | 0.6 | |
| 18 | 18 | 720 | 11.7 | 14.4 | 0.9 | |
| 24 | 24 | 1,280 | 15.6 | 19.2 | 1.2 | |
| 48 | 48 | 3,800 | 28.8 | 38.4 | 2.4 | 600 |
| 100 | 100 | 22,200 | 65 | 80 | 5 | 450 |

High sensitive type (330 mW)

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) *1 | Must Release-Voltage (VDC) *1 | Rated Power (mW) |
|---|---|---|---|---|---|
| 1.5 | 1.5 | 6.8 | 0.97 | 0.08 | 330 |
| 3 | 3 | 27 | 1.95 | 0.15 | |
| 5 | 5 | 80 | 3.25 | 0.25 | |
| 6 | 6 | 110 | 3.9 | 0.3 | |
| 9 | 9 | 250 | 5.85 | 0.45 | |
| 12 | 12 | 440 | 7.8 | 0.6 | |
| 18 | 18 | 990 | 11.7 | 0.9 | |
| 24 | 24 | 1,780 | 15.6 | 1.2 | |

Note: All values in the table are valid for 20°C and zero contact current.
* Specified operate values are valid for pulse wave voltage.

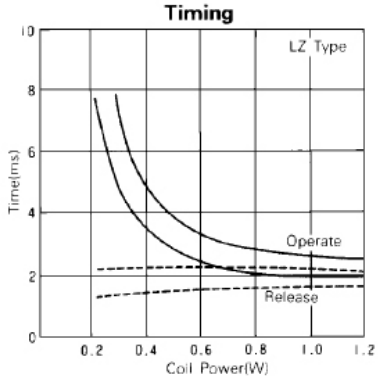
## ■ SAFETY STANDARDS

| Type | Compliance | Contact rating |
|---|---|---|
| UL | UL 508<br><br>E 56149, E 45026 | Flammability: UL 94-V0 (plastics)<br>[LZ-( )W, LZ-( )WS]<br>0.8A, 240VDC (resistive)<br>1A, 120VAC / 30VDC (resistive)<br>[LZ-( ), LZ-( )S]<br>2.5A, 240 VDC (resistive)<br>3A, 120 VAC / 30VDC (resistive)<br>1/10 HP, 120VAC/2400VAC<br>Pilot duty: D150<br>[LZ-( ), LZ-( )S]<br>2.5A, 240 VAC (resistive)<br>3A, 120 VAC / 30VDC (resistive)<br>1/10 HP, 120VAC/2400VAC<br>Pilot duty: D150<br>[LZ-( )V]<br>7A, 240 VDC (resistive)<br>10A, 120 VAC / 30VDC (resistive)<br>1/4 HP, 120VAC/2400VAC |
| CSA | C22.2 No. 14<br>LR 35579 | |

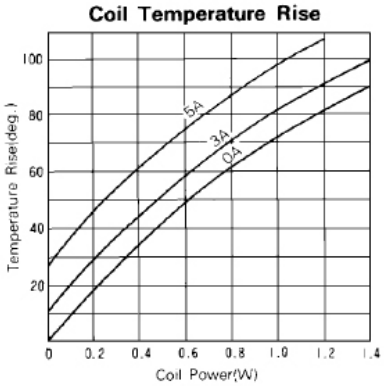
Also complies with SEV.

## ■ CHARACTERISTIC DATA

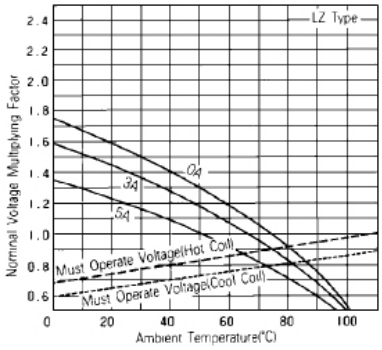
**Timing**



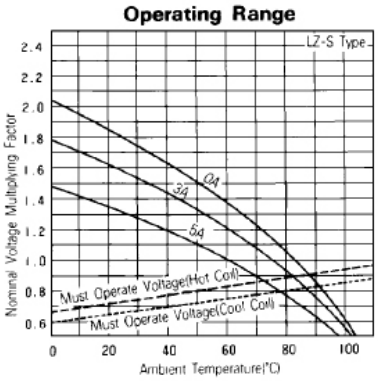

**Coil Temperature Rise**



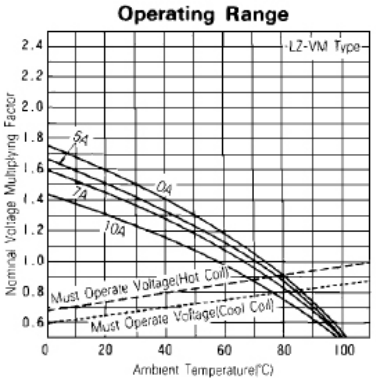

**Operating Range**



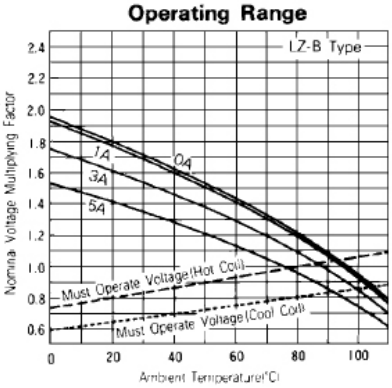

**Operating Range**



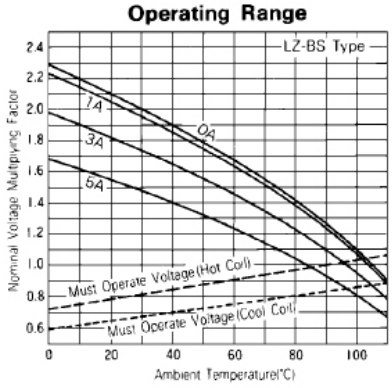

**Operating Range**



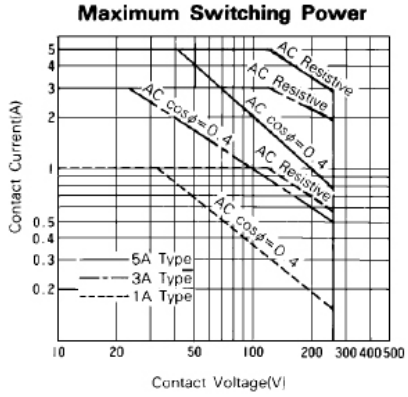

**Operating Range**



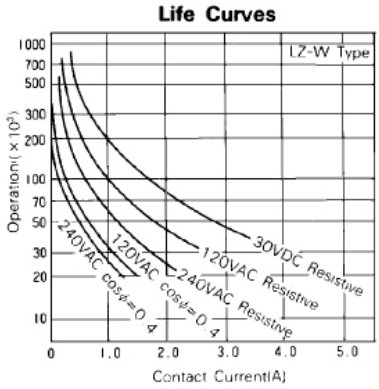

**Operating Range**



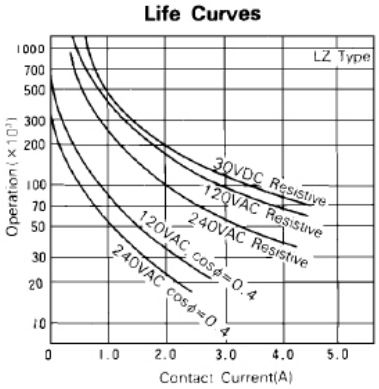

**Maximum Switching Power**



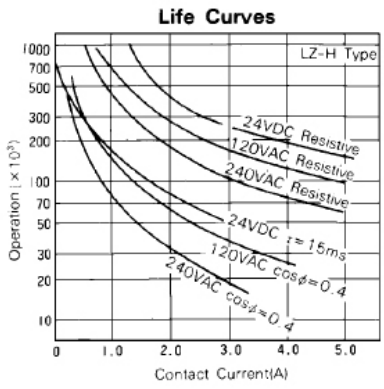

**Life Curves**



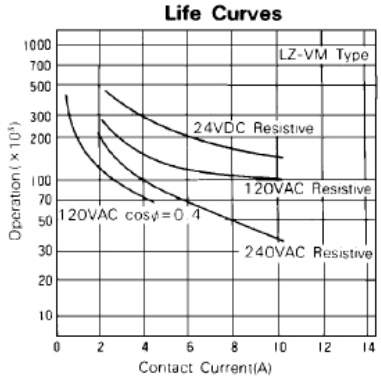

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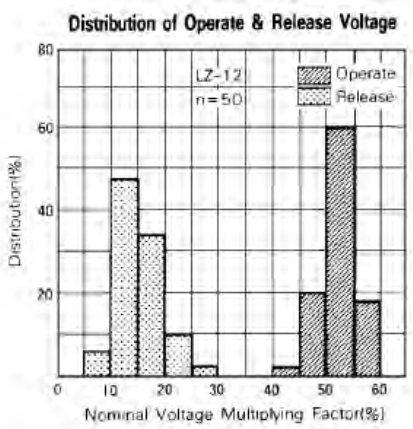

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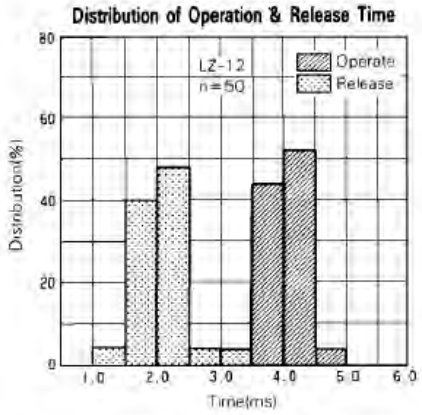


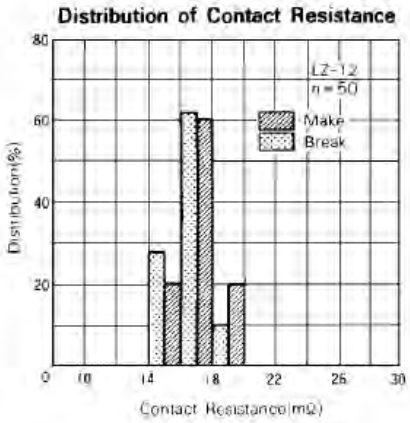

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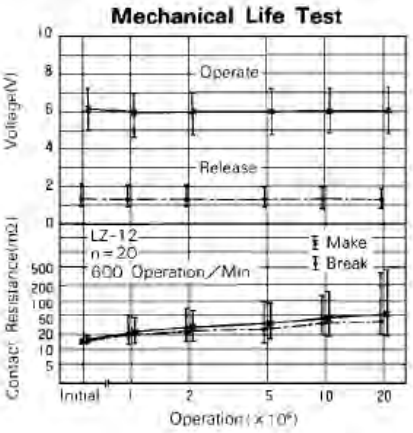


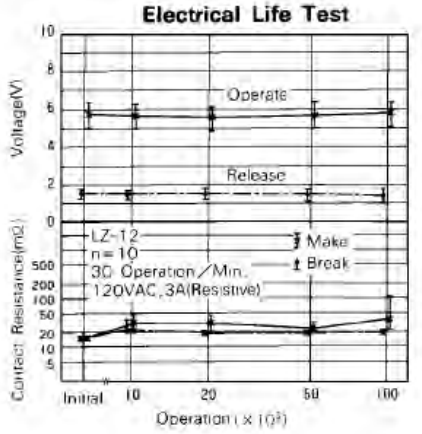
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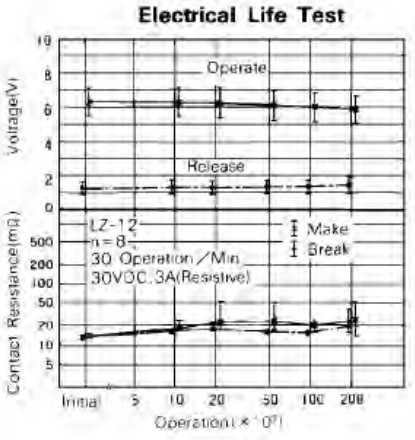


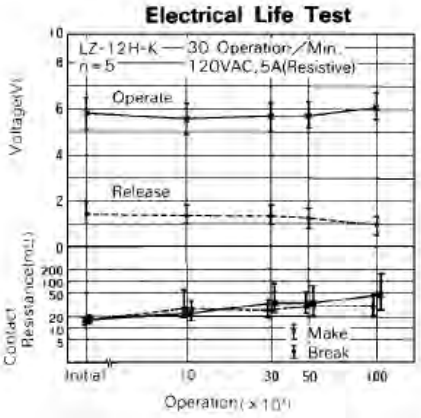



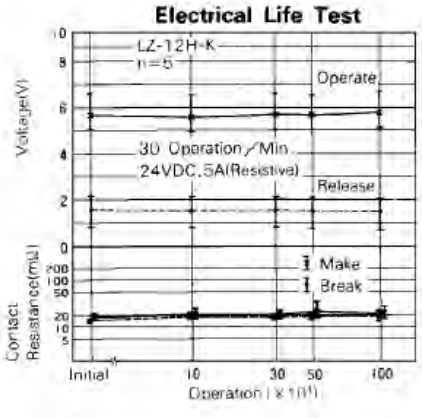



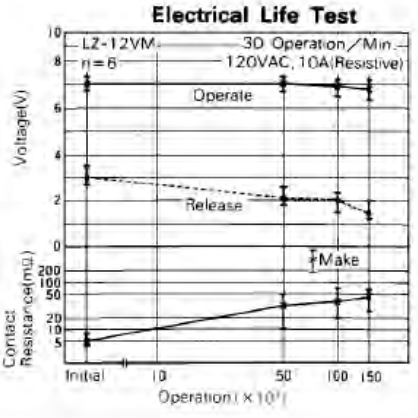



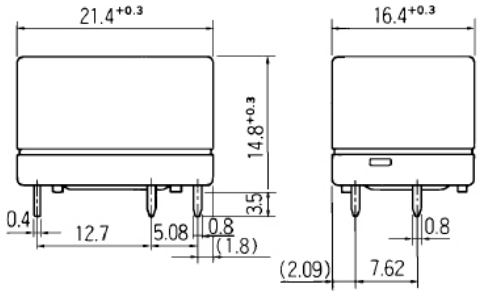



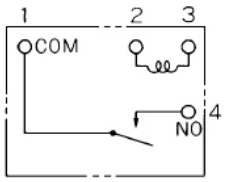



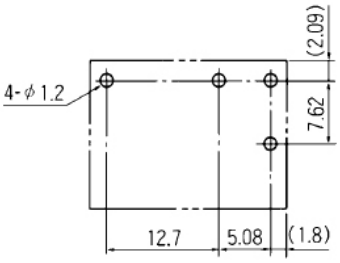
## ■ DIMENSIONS

- Dimensions
- Schematics (BOTTOM VIEW)
- PC board mounting hole layout (BOTTOM VIEW)

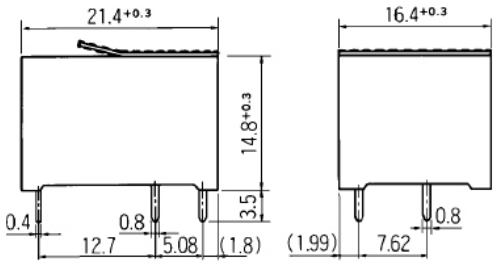
LZ-M type (Flux proof type)

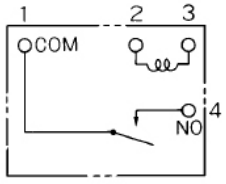


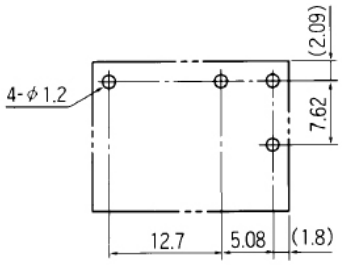




LZ-M-K, LZ-M-C type (Plastic sealed type or sealed with tape)

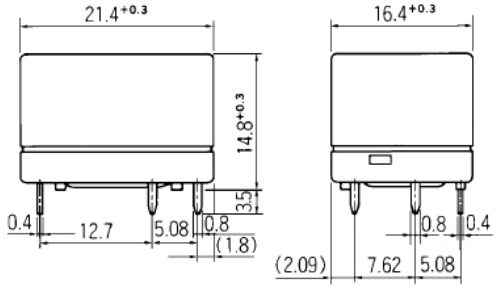


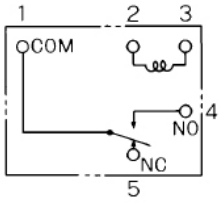



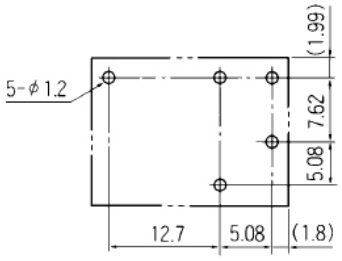




Dotted line: Seal tape [LZ-M-C Type]

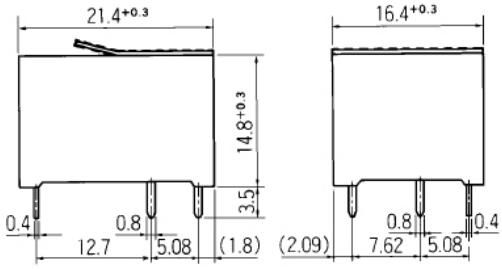
LZ type (Flux proof type)

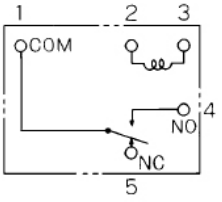


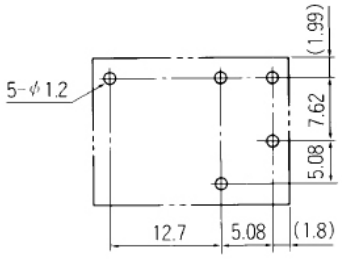




LZ-K, LZ-C type (Plastic sealed type or sealed with tape)




Dotted line: Seal tape [LZ-C Type]

Unit: mm

# RoHS Compliance and Lead Free Information

## 1. General Information

- All signal and power relays produced by Fujitsu Components are compliant with RoHS directive 2002/95EC including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives on October 21st, 2005. (Amendment to Directive 2002/95/EC)
- All of our signal and power relays are lead-free. Please refer to Lead-Free Status Info for older date codes at: http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf
- 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.

## 2. Recommended Lead Free Solder Profile

- Recommended solder Sn-3.0Ag-0.5Cu.

**Flow Solder condition:**

| | |
|---|---|
| Pre-heating: | maximum 120˚C |
| Soldering: | dip within 5 sec. at 260˚C solder 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 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
Gotanda-Chuo Building
3-5, Higashigotanda 2-chome, Shinagawa-ku
Tokyo 141, Japan
Tel: (81-3) 5449-7010
Fax: (81-3) 5449-2626
Email: promothq@ft.ed.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://us.fujitsu.com/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/

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