

# MINIATURE RELAY

## 1 POLE—1 to 2 A (FOR SIGNAL SWITCHING)

### MZ SERIES

RoHS compliant



#### ■ FEATURES

- Subminiature size
- Standard and high sensitivity types available
- UL, CSA recognized
- FCC rules and regulations part 68  
—Dielectric strength 1,500 V between coil and contacts
- High reliability-bifurcated contacts available
- DIL pitch terminals
- Plastic sealed type
- RoHS compliant since date code: 0437L2  
Please see page 6 for more information



#### ■ ORDERING INFORMATION

[Example]  $\frac{MZ}{(a)} \frac{F}{(b)} - \frac{12}{(c)} \frac{W}{(d)} \frac{HG}{(e)} - \frac{K}{(f)} - \frac{U}{(g)}$

|     |                     |  |
|-----|---------------------|--|
| (a) | Series Name         | MZ : MZ Series   |
| (b) | Dielectric Function | Nil : Standard type<br>F : High dielectric strength type   |
| (c) | Nominal Voltage     | Refer to the COIL DATA CHART   |
| (d) | Contact             | Nil : 1 A single<br>D : 2 A single (without MZF)<br>W : 1 A bifurcated type                                |
| (e) | Coil Type           | HG : Standard type (without MZ-D) (450-500mW)<br>HS : High sensitivity type (without MZF/MZ-D) (190-270mW) |
| (f) | Enclosure           | Nil : Flux free type<br>K : Plastic sealed type  |
| (g) | UL, CSA Standard    | Nil : Non UL, • CSA approved type<br>U : UL • CSA approved type  |

Note: For movable and stationary contact with gold overlay type, add suffix “-OH”.

# MZ SERIES

## ■ COIL DATA CHART

|                       | MODEL        |                  |               | Nominal voltage | Coil resistance ( $\pm 10\%$ ) | Must operate voltage | Must release voltage | Nominal power |
|-----------------------|--------------|------------------|---------------|-----------------|--------------------------------|----------------------|----------------------|---------------|
|                       | Single       |                  | Bifurcated    |                 |                                |                      |                      |               |
|                       | 2 A Type     | 1 A Type         | 1 A Type      |                 |                                |                      |                      |               |
| Standard Type         | MZ-1.5D-(K)  | MZ (F)-1.5HG-(K) | MZ-1.5WHG-(K) | 1.5 VDC         | 5 $\Omega$                     | 1.05 VDC             | 0.08 VDC             | 450 mW        |
|                       | MZ- 3 D-(K)  | MZ (F)- 3 HG-(K) | MZ- 3 WHG-(K) | 3 VDC           | 20 $\Omega$                    | 2.1 VDC              | 0.15 VDC             | 450 mW        |
|                       | MZ-4.5D-(K)  | MZ (F)-4.5HG-(K) | MZ-4.5WHG-(K) | 4.5 VDC         | 45 $\Omega$                    | 3.15 VDC             | 0.23 VDC             | 450 mW        |
|                       | MZ- 5 D-(K)  | MZ (F)- 5 HG-(K) | MZ- 5 WHG-(K) | 5 VDC           | 56 $\Omega$                    | 3.5 VDC              | 0.25 VDC             | 450 mW        |
|                       | MZ- 6 D-(K)  | MZ (F)- 6 HG-(K) | MZ- 6 WHG-(K) | 6 VDC           | 80 $\Omega$                    | 4.2 VDC              | 0.3 VDC              | 450 mW        |
|                       | MZ- 9 D-(K)  | MZ (F)- 9 HG-(K) | MZ- 9 WHG-(K) | 9 VDC           | 180 $\Omega$                   | 6.3 VDC              | 0.45 VDC             | 450 mW        |
|                       | MZ-12 D-(K)  | MZ (F)-12 HG-(K) | MZ-12 WHG-(K) | 12 VDC          | 320 $\Omega$                   | 8.4 VDC              | 0.6 VDC              | 450 mW        |
|                       | MZ-18 D-(K)  | MZ (F)-18 HG-(K) | MZ-18 WHG-(K) | 18 VDC          | 720 $\Omega$                   | 12.6 VDC             | 0.9 VDC              | 450 mW        |
|                       | MZ-24 D-(K)  | MZ (F)-24 HG-(K) | MZ-24 WHG-(K) | 24 VDC          | 1,280 $\Omega$                 | 16.8 VDC             | 1.2 VDC              | 450 mW        |
|                       | MZ-48 D-(K)  | MZ (F)-48 HG-(K) | MZ-48 WHG-(K) | 48 VDC          | 4,600 $\Omega$                 | 33.6 VDC             | 2.4 VDC              | 500 mW        |
| High Sensitivity Type | MZ-1.5HS-(K) | MZ-1.5WHS-(K)    |               | 1.5 VDC         | 12 $\Omega$                    | 1.05 VDC             | 0.08 VDC             | 190 mW        |
|                       | MZ- 3 HS-(K) | MZ- 3 WHS-(K)    |               | 3 VDC           | 45 $\Omega$                    | 2.1 VDC              | 0.15 VDC             | 200 mW        |
|                       | MZ-4.5HS-(K) | MZ-4.5WHS-(K)    |               | 4.5 VDC         | 100 $\Omega$                   | 3.15 VDC             | 0.23 VDC             | 200 mW        |
|                       | MZ- 5 HS-(K) | MZ- 5 WHS-(K)    |               | 5 VDC           | 120 $\Omega$                   | 3.5 VDC              | 0.25 VDC             | 200 mW        |
|                       | MZ- 6 HS-(K) | MZ- 6 WHS-(K)    |               | 6 VDC           | 180 $\Omega$                   | 4.2 VDC              | 0.3 VDC              | 200 mW        |
|                       | MZ- 9 HS-(K) | MZ- 9 WHS-(K)    |               | 9 VDC           | 400 $\Omega$                   | 6.3 VDC              | 0.45 VDC             | 200 mW        |
|                       | MZ-12 HS-(K) | MZ-12 WHS-(K)    |               | 12 VDC          | 700 $\Omega$                   | 8.4 VDC              | 0.6 VDC              | 200 mW        |
|                       | MZ-15 HS-(K) | MZ-15 WHS-(K)    |               | 15 VDC          | 1,100 $\Omega$                 | 10.5 VDC             | 0.75 VDC             | 200 mW        |
|                       | MZ-18 HS-(K) | MZ-18 WHS-(K)    |               | 18 VDC          | 1,600 $\Omega$                 | 12.6 VDC             | 0.9 VDC              | 200 mW        |
|                       | MZ-24 HS-(K) | MZ-24 WHS-(K)    |               | 24 VDC          | 2,800 $\Omega$                 | 16.8 VDC             | 1.2 VDC              | 200 mW        |
|                       | MZ-48 HS-(K) | MZ-48 WHS-(K)    |               | 48 VDC          | 8,500 $\Omega$                 | 33.6 VDC             | 2.4 VDC              | 270 mW        |

Note: All values in the table are measured at 20°C.

## ■ SPECIFICATIONS

| Item       |                              | Standard  |   |            | High Sensitivity Type |            |
|------------|------------------------------|---|---|------------|-----------------------|------------|
|            |                              | Single  |   | Bifurcated | Single                | Bifurcated |
|            |                              | MZ-( ) D  | MZ-( ) HG   | MZ-( ) WHG | MZ-( ) HS             | MZ-( ) WHS |
| Contact    | Arrangement                  | 1 form C (SPDT)   |   |            |                       |            |
|            | Material                     | Gold-overlay<br>silver-nickel   | Gold overlay silver-palladium   |            |                       |            |
|            | Resistance (initial)         | Maximum 100 mΩ (at 1 A 6 VDC)   |   |            |                       |            |
|            | Rating (resistive)           | 2 A 24 VDC<br>1 A 120 VAC   | 1 A 24 VDC<br>0.5 A 120 VAC   |            |                       |            |
|            | Maximum Carrying Current     | 2 A   |   |            |                       |            |
|            | Maximum Switching Power      | 120 VA/48 W   | 60 AV/24 W  |            |                       |            |
|            | Maximum Switching Voltage    | 120 VAC, 60 VDC   |   |            |                       |            |
|            | Maximum Switching Current    | 2 A   | 1 A   |            |                       |            |
|            | Minimum Switching Load*      | 1 mA 1 VDC  | 0.1 mA 100 mVDC   | 1 mA 1 VDC | 0.1 mA 100 mVDC       |            |
|            | Capacitance (at 10 MHz)      | Approximately 0.8 pF (between open contacts, adjacent contacts)<br>Approximately 7.5 pF (between coil and contacts) |   |            |                       |            |
| Coil       | Nominal Power (at 20°C)      | 450 to 500 mW   |   |            | 190 to 270 mW         |            |
|            | Operate Power (at 20°C)      | 220 to 250 mW   |   |            | 100 to 130 mW         |            |
|            | Operating Temperature        | -30°C to +55°C (no frost)   |   |            | -30°C to +75°C        |            |
| Time Value | Operate (at nominal voltage) | Maximum 6 ms  |   |            |                       |            |
|            | Release (at nominal voltage) | Maximum 3 ms  |   |            |                       |            |
| Life       | Mechanical                   | 2 × 10 <sup>7</sup> operations minimum  |   |            |                       |            |
|            | Electrical (at rating)       | 1 A 120 VAC<br>1 × 10 <sup>5</sup> ops. min.<br>2 A 24 VDC<br>2 × 10 <sup>5</sup> ops. min.                         | 0.5 A 120 VAC 2 × 10 <sup>5</sup> operations minimum<br>1 A 24 VAC 5 × 10 <sup>5</sup> operations minimum |            |                       |            |
| Other      | Vibration Resistance         | Misoperation  | 10 to 55 Hz (double amplitude of 3.28 mm)   |            |                       |            |
|            |                              | Endurance   | 10 to 55 Hz (double amplitude of 3.28 mm)   |            |                       |            |
|            | Shock Resistance             | Misoperation  | 100 m/s <sup>2</sup> (11±1 ms)  |            |                       |            |
|            |                              | Endurance   | 1,000 m/s <sup>2</sup> ( 6±1 ms)  |            |                       |            |
|            | Weight                       | Approximately 3.5 g   |   |            |                       |            |

\*1 Minimum switching loads mentioned above are reference values. Please perform the confirmation test with the actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

# MZ SERIES

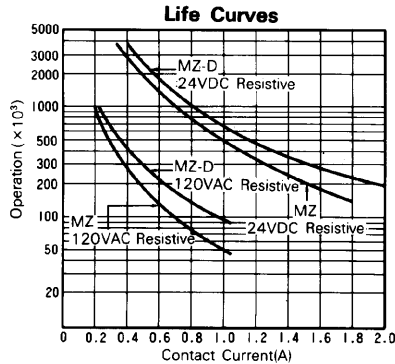
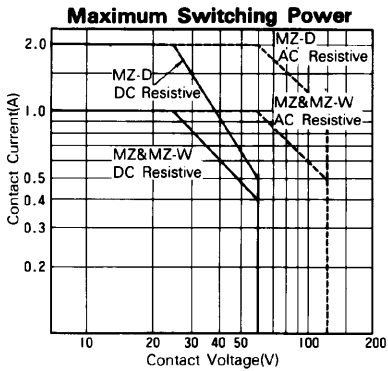
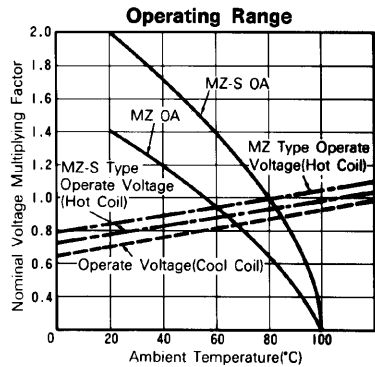
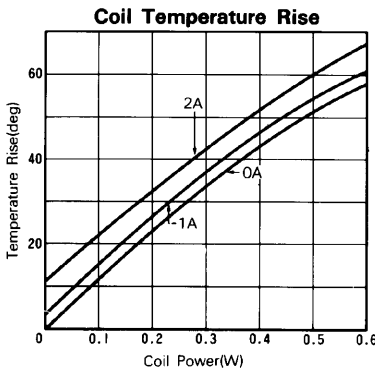
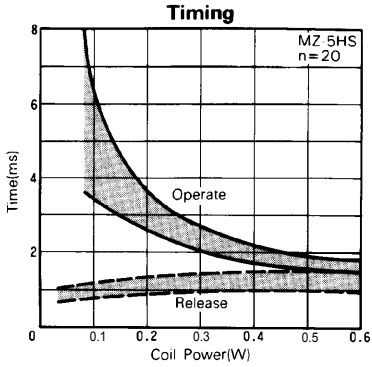
## ■ INSULATION

|                     |  |  |
|---------------------|--|--|
| Item                | Single                                       |  |
| Isolation (initial) | Minimum 100 MΩ (at 500VDC)                   |  |
| Dielectric Strength | open contacts                                | Standard: 500VAC 1 min., High isolation: 1,000VAC 1 min. |
|                     | coil and contacts                            | Standard: 500VAC 1 min., High isolation: 1,500VAC 1 min. |
| Surge Voltage       | 1500V (coil-contact) (1/40 μs standard wave) |  |

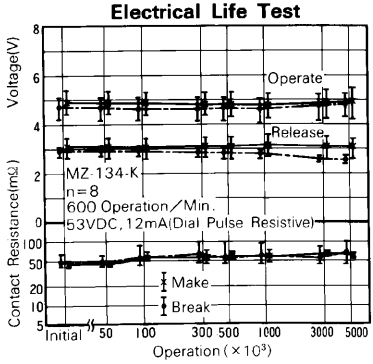
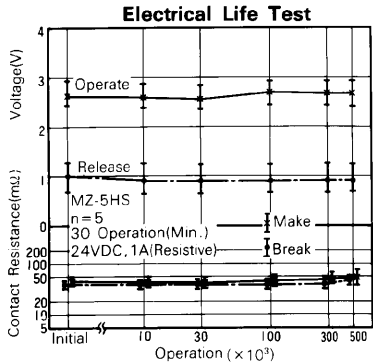
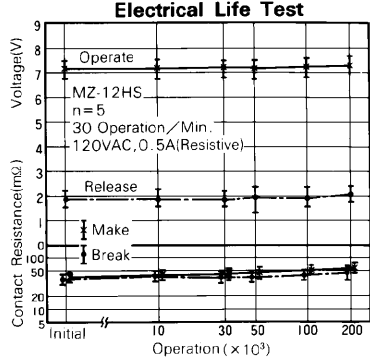
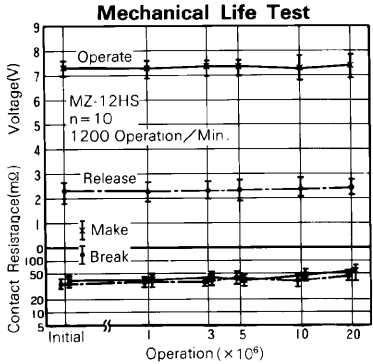
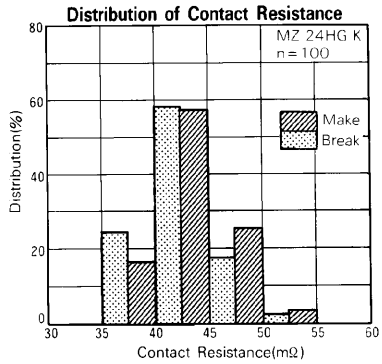
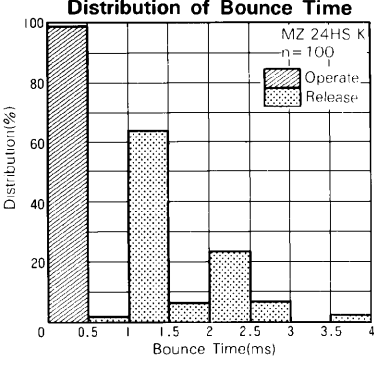
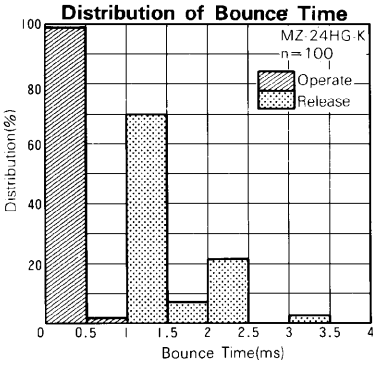
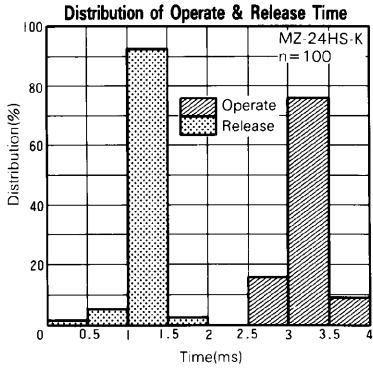
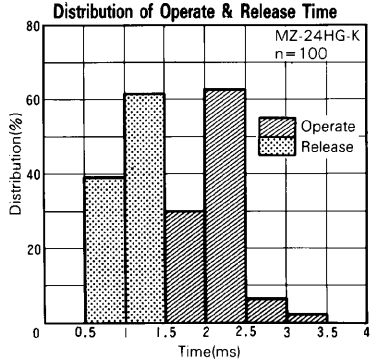
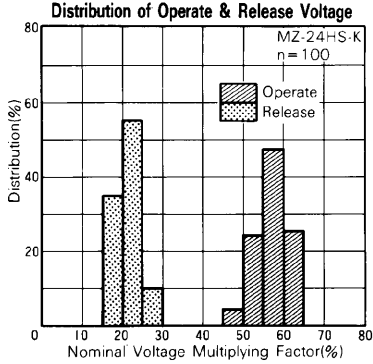
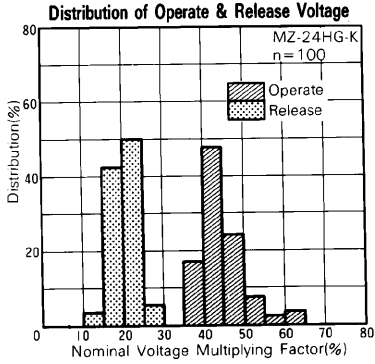
## ■ SAFETY STANDARDS AND FILE NUMBERS

| Type | Compliance                      | Contact rating   |
|------|---------------------------------|--|
| UL   | UL 508<br>UL 60950-1<br>E 45026 | Flammability: UL 94-V0 (plastics)<br>[1A]<br>0.5A, 120VAC (resistive)<br>1A, 24VDC (resistive)<br>[2A] |
| CSA  | C22.2 No. 14<br>LR 35579        | 1A, 120VAC (resistive)<br>2A, 30VDC (resistive)  |

## ■ CHARACTERISTIC DATA



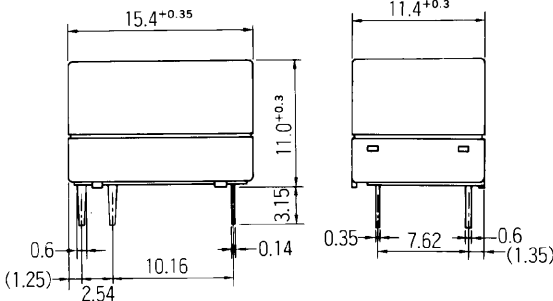
## ■ REFERENCE DATA



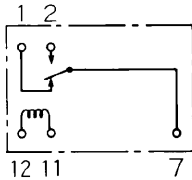
■ DIMENSIONS

● Dimensions

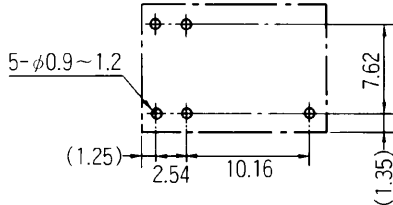
MZ (F) type (Flux free type)



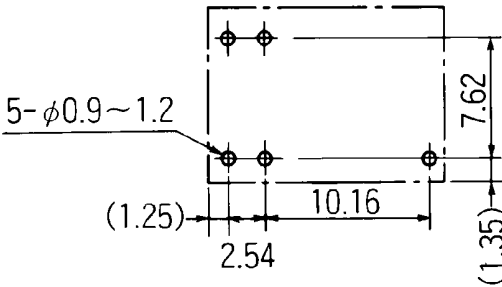
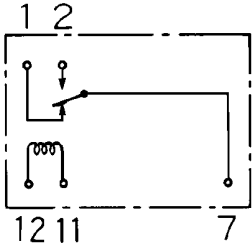
● Schematics (Bottom View)



● PC board mounting hole layout (Bottom View)



MZ (F)-K type (Plastic sealed type)



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 condition

**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.

### 4. Tin Whisker

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

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