

### »» Features



- Wide switching capacity of 10  $\mu$  A to 2A.
- Sensitivity coil : 0.22W.
- High dielectric strength coil-contacts: 1000VAC, open contacts: 750VAC.
- Conforms to FCC part 68 requirements.
- Ag+Au clad bifurcated crossbar contacts and fully sealed for high contact reliability.
- Comply with RoHS-Directive 2002/95/EC.

### »» Type List

| Terminal style | Contact form | Coil sensitivity       | Enclosure style |
|----------------|--------------|------------------------|-----------------|
|                |              |                        | Plastics sealed |
| PCB terminal   | 2C (DPDT)    | Standard type          | 502-2C-S        |
|                |              | High sensitivity type  | 502N-2C-S       |
|                |              | Ultra-sensitivity type | 502N1-2C-S      |

### »» Ordering Information

502 N - 2C - S  
 1 2 3 4

- |                                    |                                   |
|------------------------------------|-----------------------------------|
| 1. 502 -- Basic series designation | 3. 2C -- Double pole double throw |
| 2. Blank -- Standard type          | 4. S -- Plastics sealed           |
| N -- High sensitivity type         |                                   |
| N1 -- Ultra-sensitivity type       |                                   |

### »» Contact Rating

|                                      |  |  |
|--------------------------------------|--|--|
| Number of contacts and type          | 2 changeover contacts                          |  |
| Contact assembly                     | Bifurcated crossbar                            |  |
| Contact material                     | Ag + Au-clad                                   |  |
| Max. continuous current              | 2A   |  |
| Maximum switching current            | 2A / standard type                             |  |
|                                      | 1A / high sensitivity & Ultra-sensitivity type |  |
| Maximum switching voltage            | 125VAC   |  |
|                                      | 125VDC   |  |
| Maximum switching capacity           | DC voltage                                     | 60W / standard type<br>24W / high sensitivity & Ultra-sensitivity type |
|                                      | AC voltage                                     | 62.5VA   |
| Min. permissible load <sup>(1)</sup> | 10 $\mu$ A at 10mVDC                           |  |
| Contact resistance (initial value)   | $\leq$ 100 m $\Omega$                          |  |

Note : (1) P level:  $\lambda_{60} = 0.1 \times 10^{-6}$ / operation

## »» Coil Rating (DC)

## ◆ Standard Type

| Rated voltage<br>(V) | Rated current<br>$\pm 10\%$ at 23°C<br>(mA) | Coil resistance<br>$\pm 10\%$ at 23°C<br>( $\Omega$ ) | Max. continuous<br>voltage<br>at 23°C | Pick up<br>voltage(Max)<br>at 23°C | Drop out<br>voltage(Min)<br>at 23°C | Power consumption<br>at rated<br>voltage |
|----------------------|---|---|---------------------------------------|------------------------------------|-------------------------------------|--|
| 3                    | 166.7                                       | 18  | 120 % of<br>rated<br>voltage          | 75 % of<br>rated<br>voltage        | 5 % of<br>rated<br>voltage          | approx. 0.5W                             |
| 5                    | 100   | 50  |                                       |                                    |                                     |  |
| 6                    | 83.3  | 72  |                                       |                                    |                                     |  |
| 9                    | 55.6  | 162   |                                       |                                    |                                     |  |
| 12                   | 41.7  | 288   |                                       |                                    |                                     |  |
| 24                   | 20.8  | 1152  | 110 % of<br>rated voltage             |                                    |                                     | approx. 0.58W                            |
| 48                   | 12  | 4000  |                                       |                                    |                                     |  |

## ◆ High Sensitivity Type

| Rated voltage<br>(V) | Rated current<br>$\pm 10\%$ at 23°C<br>(mA) | Coil resistance<br>$\pm 10\%$ at 23°C<br>( $\Omega$ ) | Max. continuous<br>voltage<br>at 23°C | Pick up<br>voltage(Max)<br>at 23°C | Drop out<br>voltage(Min)<br>at 23°C | Power consumption<br>at rated<br>voltage |
|----------------------|---|---|---------------------------------------|------------------------------------|-------------------------------------|--|
| 3                    | 120   | 25  | 140 % of<br>rated<br>voltage          | 75 % of<br>rated<br>voltage        | 5 % of<br>rated<br>voltage          | approx. 0.36W                            |
| 5                    | 72  | 70  |                                       |                                    |                                     |  |
| 6                    | 60  | 100   |                                       |                                    |                                     |  |
| 9                    | 40  | 225   |                                       |                                    |                                     |  |
| 12                   | 30  | 400   |                                       |                                    |                                     |  |
| 24                   | 15  | 1600  |                                       |                                    |                                     |  |
| 48                   | 7.5   | 6400  |                                       |                                    |                                     |  |

## ◆ Ultra-sensitivity Type

| Rated voltage<br>(V) | Rated current<br>$\pm 10\%$ at 23°C<br>(mA) | Coil resistance<br>$\pm 10\%$ at 23°C<br>( $\Omega$ ) | Max. continuous<br>voltage<br>at 23°C | Pick up<br>voltage(Max)<br>at 23°C | Drop out<br>voltage(Min)<br>at 23°C | Power consumption<br>at rated<br>voltage |
|----------------------|---|---|---------------------------------------|------------------------------------|-------------------------------------|--|
| 3                    | 50  | 60  | 180 % of<br>rated<br>voltage          | 75 % of<br>rated<br>voltage        | 5 % of<br>rated<br>voltage          | approx. 0.15W                            |
| 5                    | 30  | 166.7   |                                       |                                    |                                     |  |
| 6                    | 25  | 240   |                                       |                                    |                                     |  |
| 9                    | 16.7  | 540   |                                       |                                    |                                     |  |
| 12                   | 12.5  | 960   |                                       |                                    |                                     |  |
| 24                   | 8.3   | 2880  | 150 % of<br>rated voltage             |                                    |                                     | approx. 0.2W                             |
| 48                   | 6.25  | 7680  |                                       |                                    |                                     | approx. 0.3W                             |

## &gt;&gt;&gt; Specification

|                                      |  |  |
|--------------------------------------|--|--|
| Contact resistance <sup>(1)</sup>    | 50 mΩ Max. / standard type & high sensitivity type   |  |
|                                      | 100 mΩ Max. / Ultra-sensitivity type                 |  |
| Operate time <sup>(1)</sup>          | 7 ms max.  |  |
| Release time <sup>(1)</sup>          | 3 ms max.  |  |
| Bounce time                          | operate  | approx. 0.5ms  |
|                                      | release  | approx. 3.5ms  |
| Insulation resistance <sup>(1)</sup> | 1000 MΩ Min. (DC 500V)                               |  |
| Surge withstand voltage              | 1500V 10 X 160 μs (conforms to part 68 of FCC rules) |  |
| Dielectric strength <sup>(1)</sup>   | Between contact and coil                             | : AC 1000V, 50/60Hz 1 min.   |
|                                      | Between contacts of different poles                  | : AC 1000V, 50/60Hz 1 min.   |
|                                      | Between contact of same poles                        | : AC 750V, 50/60Hz 1 min.  |
|                                      |  | : AC 500V, 50/60Hz 1 min.<br>for Ultra-sensitivity type                          |
| Vibration resistance                 | Operating extremes                                   | 10 ~ 55Hz , amplitude 1.5 mm   |
|                                      | Damage limits  | 10 ~ 55Hz , amplitude 1.5 mm   |
| Shock resistance                     | Operating extremes                                   | 20G  |
|                                      | Damage limits  | 100G   |
| Life expectancy                      | Mechanical   | 15,000,000 operations<br>(frequency 36,000 operations/hr)                        |
|                                      | Electrical   | AC 100,000 operations / DC 300,000 operations<br>(frequency 1,800 operations/hr) |
| Operating ambient temperature        | -25 ~ +70°C (no freezing)                            |  |
|                                      | -25 ~ +65°C (no freezing) for standard coil          |  |
| Weight                               | Approx. 6 g  |  |

Note : (1) initial value

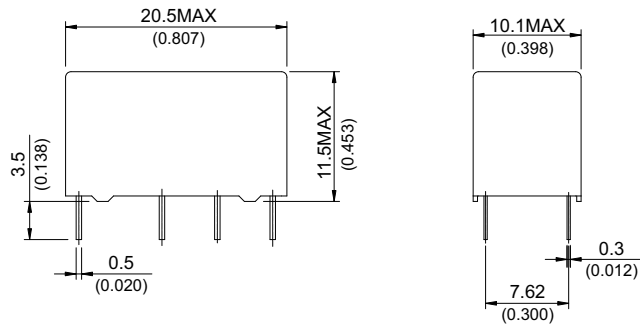
## &gt;&gt;&gt; Safety Approval

| Certified | UL     | CSA    |
|-----------|--------|--------|
| File No.  | E74321 | 218083 |

## &gt;&gt;&gt; Safety Approval Rating

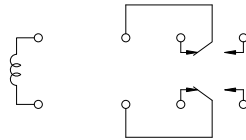
| Standard 、 high sensitivity type | Ultra-sensitivity type |
|----------------------------------|------------------------|
| 0.6A 125VAC                      | 0.5A 125VAC            |
| 0.6A 110VDC                      | 0.2A 110VDC            |
| 2A 30VDC                         | 1A 24VDC               |

## »» Outline Dimensions



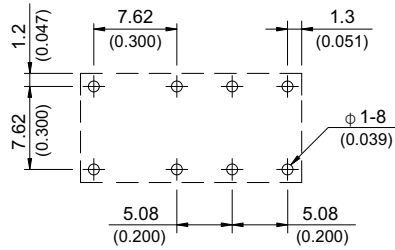
## »» Wiring Diagram

BOTTOM VIEW

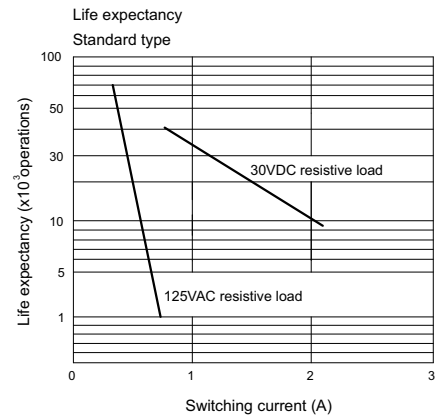
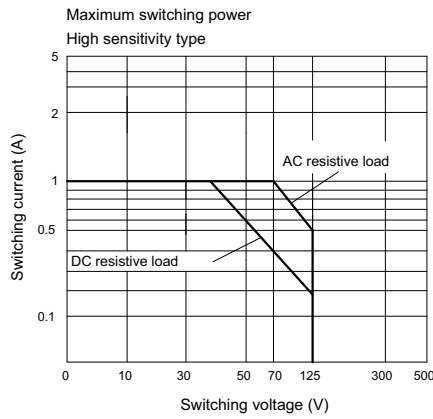
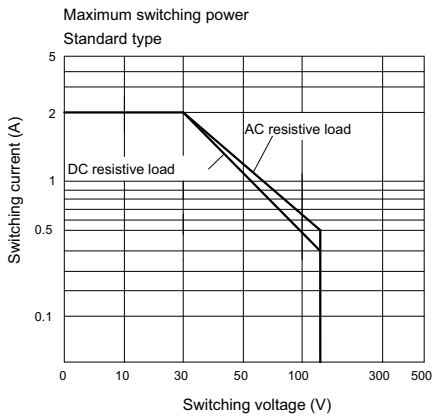


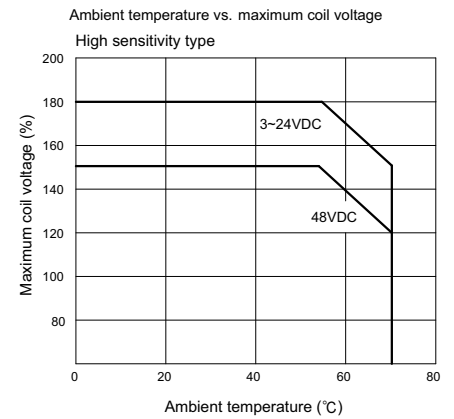
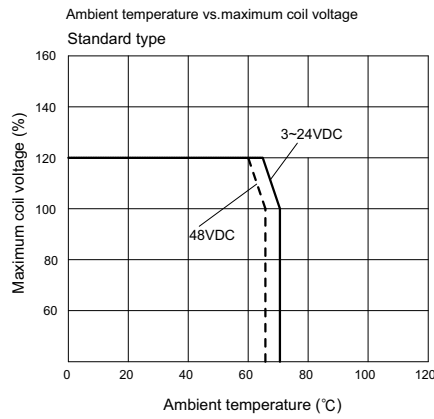
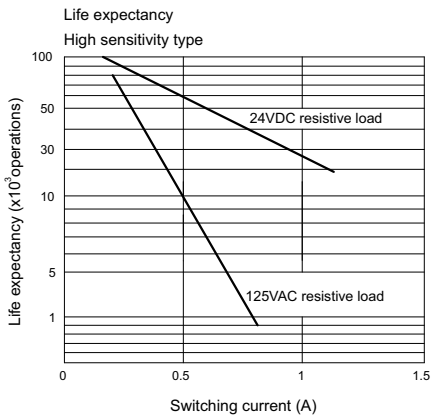
## »» PC Board Layout

BOTTOM VIEW

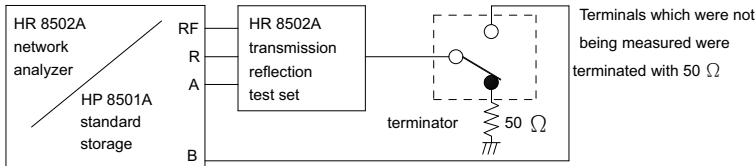


## »» Engineering Data

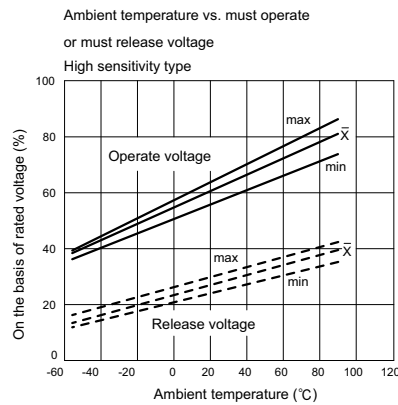
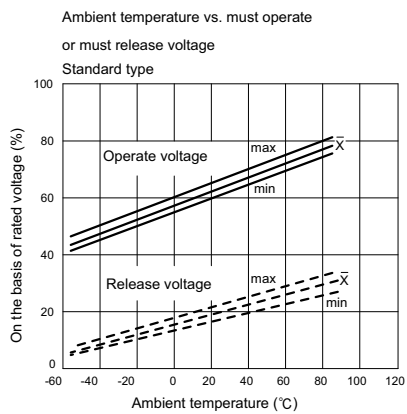
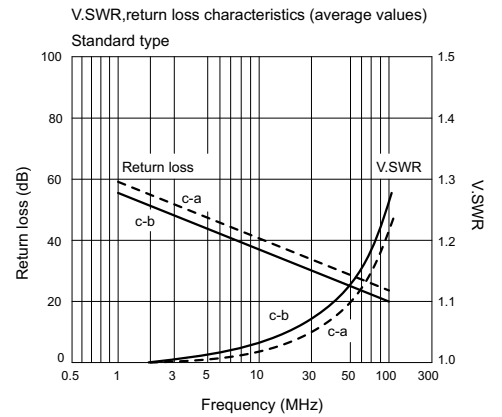
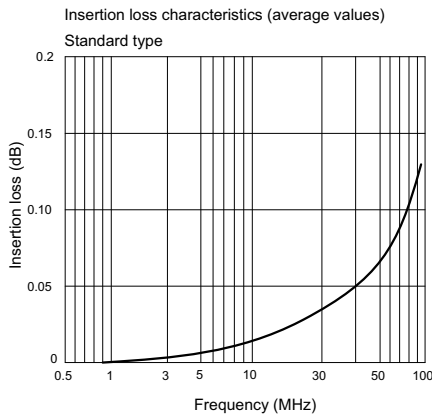
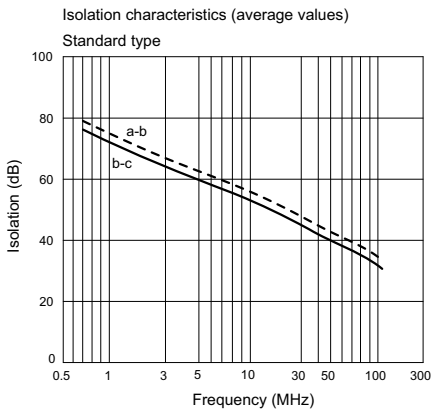




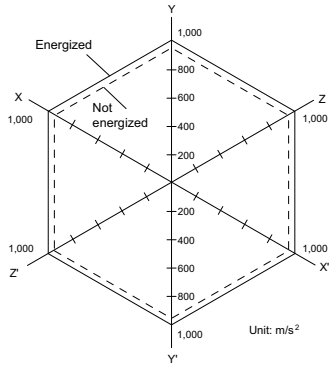
**High-frequency characteristics**  
measurement conditions



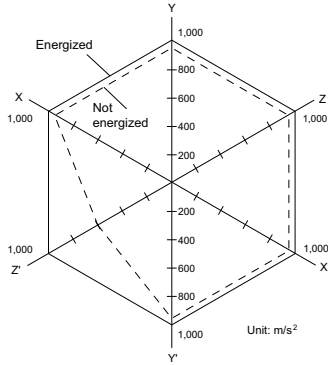
Notes: The high-frequency characteristics data were measured using a dedicated circuit board and actual values will vary depending on the usage conditions. Check the characteristics of the actual equipment used.



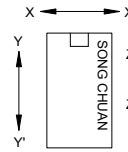
Shock malfunction  
Standard type



Shock malfunction  
High sensitivity type



Shock direction



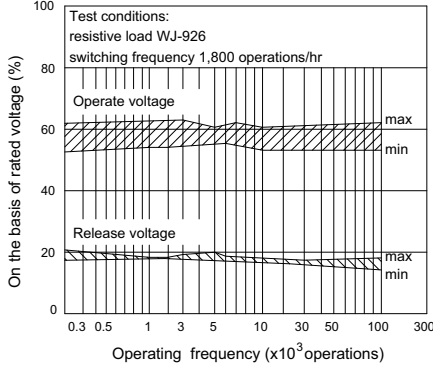
Conditions:

Shock is applied in +X, +Y, and +Z directions three times each with and without energizing the Relays to check the number of contact malfunctions.

Electrical life expectancy

(with must operate and must release voltage)

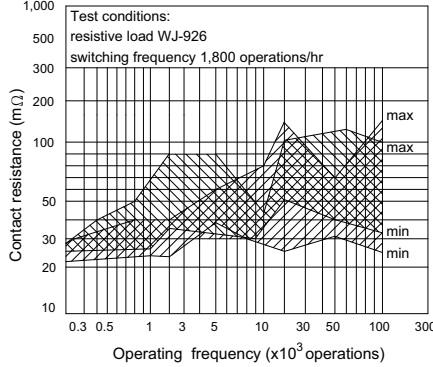
Standard type



Electrical life expectancy

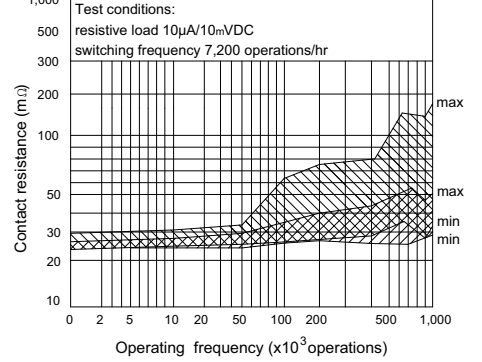
(contact resistance)

Standard type



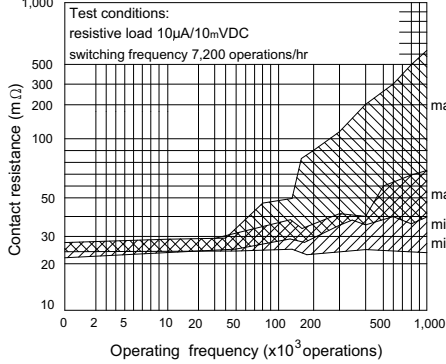
Contact reliability test

Standard type



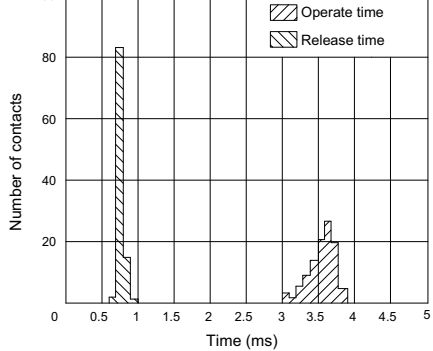
Contact reliability test

High sensitivity type



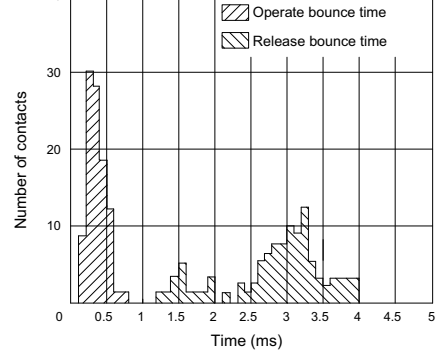
Must operate and must release time distribution

Standard type



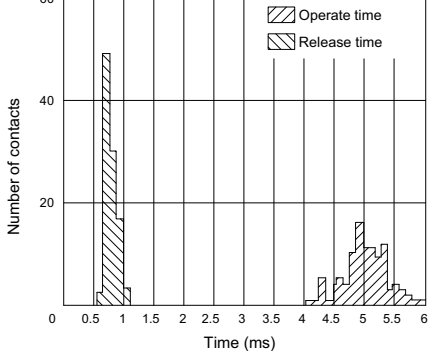
Must operate and must release bounce time distribution

Standard type



Must operate and must release time distribution

High sensitivity type



Must operate and must release bounce time distribution

High sensitivity type

