

## FEATURES

- **Excellent high frequency characteristics (50Ω, at 5GHz)**  
V.S.W.R.: Max. 1.25  
Insertion loss: Max. 0.5dB  
Isolation: Min. 35dB  
(Between open contacts)  
Min. 30dB  
(Between contact sets)
- **Surface mount terminal**  
Surface mount terminals are now standard so there is much less work in designing PC boards.
- **Small size**  
Size: 14.00 (L)×9.00 (W)×8.20 (H) mm  
.551 (L)×.354 (W)×.323 (H) inch

## TYPICAL APPLICATIONS

- Measurement equipment market**  
Attenuator circuits, spectrum analyzer, oscilloscope, mobile equipment, tester
- Mobile telecommunication market**  
IMT2000, microwave communication
- Medical instruments market**

## SPECIFICATIONS

### Contact

|   |  |  |
|---|--|--|
| Arrangement   | 2 Form C                                     |  |
| Contact material  | Gold alloy                                   |  |
| Initial contact resistance                                      | Max. 150mΩ                                   |  |
| Rating  | Contact rating                               | 1W (at 5 GHz, Impedance 50 Ω, V.S.W.R. ≤ 1.25)<br>10mA 10V DC (resistive load) |
|   | Contact carrying power                       | 1W (at 5 GHz, Impedance 50 Ω, V.S.W.R. ≤ 1.25)                                 |
|   | Max. switching voltage                       | 30 V DC  |
|   | Max. switching current                       | 0.3 A DC   |
| High frequency characteristics (Initial) (~5GHz, Impedance 50Ω) | V.S.W.R.                                     | Max. 1.25  |
|   | Insertion loss (without D.U.T. board's loss) | Max. 0.5dB   |
|   |  | Isolation  |
|   | Between contact sets<br>Min. 30dB            |  |
|   | Input power                                  | 1W (at 5GHz, impedance 50Ω, V.S.W.R. ≤ 1.25, at 20°C)                          |
| Expected life (min. operations)                                 | Mechanical (at 180 cpm)                      | 10 <sup>7</sup>  |
|   | Electrical (at 20cpm)                        | 1W, at 5GHz, V.S.W.R. ≤ 1.25<br>10 <sup>6</sup>                                |
|   |  | 10mA 10V DC (resistive load)<br>10 <sup>6</sup>                                |

### Coil (at 20°C, 68°F)

|                    | Nominal operating power |
|--------------------|-------------------------|
| Single side stable | 200 mW                  |
| 2 coil latching    | 150 mW                  |

### Characteristics

|  |                             |   |
|--|-----------------------------|---|
| Initial insulation resistance*1  | Min. 500 MΩ (at 500 V DC)   |   |
|  | Initial breakdown voltage*2 | Between open contacts<br>500 Vrms           |
|  |                             | Between contact sets<br>500 Vrms            |
|  |                             | Between contact and coil<br>500 Vrms        |
|  |                             | Between coil and earth terminal<br>500 Vrms |
| Operate time [Set time]*3 (at 20°C)  | Max. 5ms                    |   |
| Release time (without diode)[Reset time]*3 (at 20°C)   | Max. 5ms                    |   |
| Temperature rise (at 20°C)*4   | Max. 50°C                   |   |
| Shock resistance   | Functional*5                | Min. 500 m/s <sup>2</sup>                   |
|  | Destructive*6               | Min. 1,000 m/s <sup>2</sup>                 |
| Vibration resistance   | Functional*7                | 10 to 55 Hz at double amplitude of 3 mm     |
|  | Destructive                 | 10 to 55 Hz at double amplitude of 5 mm     |
| Conditions for operation, transport and storage*8 (Not freezing and condensing at low temperature) | Ambient temp.               | -30°C to 70°C<br>-22°F to 158°F             |
|  | Humidity                    | 5 to 85% R.H.                               |
| Unit weight  | Approx. 3 g .11 oz          |   |

### Remarks

- \* Specifications will vary with foreign standards certification ratings.
- \*1 Measurement at same location as "Initial breakdown voltage" section.
- \*2 Detection current: 10mA
- \*3 Nominal operating voltage applied to the coil, excluding contact bounce time.
- \*4 By resistive method, nominal voltage applied to the coil, 5GHz, V.S.W.R. ≤ 1.25
- \*5 Half-wave pulse of sine wave: 6ms, detection time: 10μs.
- \*6 Pulse of sine wave: 11ms.
- \*7 Detection time: 10μs
- \*8 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT.

# RJ (ARJ)

## ORDERING INFORMATION

Ex. ARJ 2        

| Contact arrangement | Operating function                          | Terminal shape   | Coil voltage (DC)                           | Packing style  |
|---------------------|---|--|---|--|
| 2: 2 Form C         | 0: Single side stable<br>2: 2 coil latching | Nil: Standard PC board terminal<br>A: Surface-mount terminal | 03 : 3V<br>4H: 4.5V<br>12 : 12V<br>24 : 24V | Nil: Carton packing<br>X: Tape end reel packing<br>(picked from 1/2/3-pin side)<br>Z: Tape and reel packing (picked from 6/7/8-pin side) |

Note: Tape and reel packing symbol “-Z” is not marked on the relay. “X” type tape and reel packing (picked from 1/2/3-pin side) is also available. Suffix “X” instead of “Z”.

## TYPES AND COIL DATA (at 20°C 68°F)

### 1. Standard PC board terminal

• Packing of standard PC board terminal: 50 pcs. in an inner package (carton); 500 pcs. in an outer package

| Operating function | Coil Rating, V DC | Part No.                   |  | Pick-up voltage, V DC (max.) (initial) | Drop-out voltage, V DC (min.) (initial) | Nominal operating current, mA (±10%) | Coil resistance, Ω (±10%) | Nominal operating power, mW | Max. allowable voltage, V DC |
|--------------------|-------------------|----------------------------|--|--|---|--------------------------------------|---------------------------|-----------------------------|------------------------------|
|                    |                   | Standard PC board terminal |  |  |   |                                      |                           |                             |                              |
| Single side stable | 3                 | ARJ2003                    |  | 2.25                                   | 0.3                                     | 66.6                                 | 45                        | 200                         | 3.3                          |
|                    | 4.5               | ARJ204H                    |  | 3.375                                  | 0.45                                    | 44.4                                 | 101.2                     | 200                         | 4.95                         |
|                    | 12                | ARJ2012                    |  | 9                                      | 1.2                                     | 16.6                                 | 720                       | 200                         | 13.2                         |
|                    | 24                | ARJ2024                    |  | 18                                     | 2.4                                     | 8.3                                  | 2,880                     | 200                         | 26.4                         |

| Operating function | Coil Rating, V DC | Part No.                   |  | Set voltage, V DC (max.) (initial) | Reset voltage, V DC (min.) (initial) | Nominal operating current, mA (±10%) | Coil resistance, Ω (±10%) | Nominal operating power, mW | Max. allowable voltage, V DC |
|--------------------|-------------------|----------------------------|--|------------------------------------|--------------------------------------|--------------------------------------|---------------------------|-----------------------------|------------------------------|
|                    |                   | Standard PC board terminal |  |                                    |                                      |                                      |                           |                             |                              |
| 2 coil latching    | 3                 | ARJ2203                    |  | 2.25                               | 2.25                                 | 50                                   | 60                        | 150                         | 3.3                          |
|                    | 4.5               | ARJ224H                    |  | 3.375                              | 3.375                                | 33.3                                 | 135                       | 150                         | 4.95                         |
|                    | 12                | ARJ2212                    |  | 9                                  | 9                                    | 12.5                                 | 960                       | 150                         | 13.2                         |
|                    | 24                | ARJ2224                    |  | 18                                 | 18                                   | 6.3                                  | 3,840                     | 150                         | 26.4                         |

### 2. Surface-mount terminal

• Packing of surface-mount terminal: 50 pcs. in an inner package (carton); 500 pcs. in an outer package

• Packing of surface-mount terminal: 500 pcs. in an inner package (tape and reel); 500 pcs. in an outer package

| Operating function | Coil Rating, V DC | Part No.       |                       | Pick-up voltage, V DC (max.) (initial) | Drop-out voltage, V DC (min.) (initial) | Nominal operating current, mA (±10%) | Coil resistance, Ω (±10%) | Nominal operating power, mW | Max. allowable voltage, V DC |
|--------------------|-------------------|----------------|-----------------------|--|---|--------------------------------------|---------------------------|-----------------------------|------------------------------|
|                    |                   | Carton packing | Tape and reel packing |  |   |                                      |                           |                             |                              |
| Single side stable | 3                 | ARJ20A03       | ARJ20A03Z             | 2.25                                   | 0.3                                     | 66.6                                 | 45                        | 200                         | 3.3                          |
|                    | 4.5               | ARJ20A4H       | ARJ20A4HZ             | 3.375                                  | 0.45                                    | 44.4                                 | 101.2                     | 200                         | 4.95                         |
|                    | 12                | ARJ20A12       | ARJ20A12Z             | 9                                      | 1.2                                     | 16.6                                 | 720                       | 200                         | 13.2                         |
|                    | 24                | ARJ20A24       | ARJ20A24Z             | 18                                     | 2.4                                     | 8.3                                  | 2,880                     | 200                         | 26.4                         |

| Operating function | Coil Rating, V DC | Part No.       |                       | Set voltage, V DC (max.) (initial) | Reset voltage, V DC (min.) (initial) | Nominal operating current, mA (±10%) | Coil resistance, Ω (±10%) | Nominal operating power, mW | Max. allowable voltage, V DC |
|--------------------|-------------------|----------------|-----------------------|------------------------------------|--------------------------------------|--------------------------------------|---------------------------|-----------------------------|------------------------------|
|                    |                   | Carton packing | Tape and reel packing |                                    |                                      |                                      |                           |                             |                              |
| 2 coil latching    | 3                 | ARJ22A03       | ARJ22A03Z             | 2.25                               | 2.25                                 | 50                                   | 60                        | 150                         | 3.3                          |
|                    | 4.5               | ARJ22A4H       | ARJ22A4HZ             | 3.375                              | 3.375                                | 33.3                                 | 135                       | 150                         | 4.95                         |
|                    | 12                | ARJ22A12       | ARJ22A12Z             | 9                                  | 9                                    | 12.5                                 | 960                       | 150                         | 13.2                         |
|                    | 24                | ARJ22A24       | ARJ22A24Z             | 18                                 | 18                                   | 6.3                                  | 3,840                     | 150                         | 26.4                         |

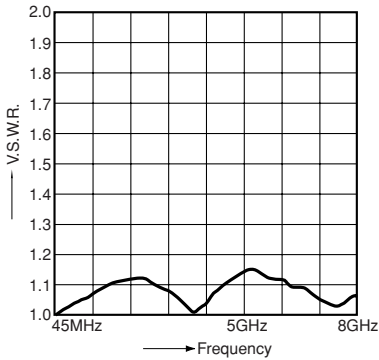
# REFERENCE DATA

## 1. High frequency characteristics

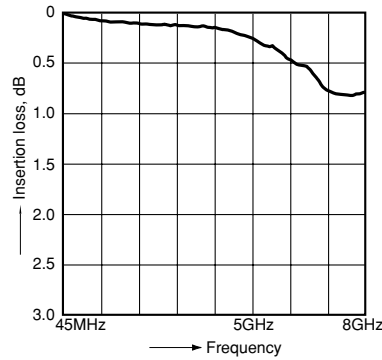
Sample: ARJ20A12

Measuring method: Measured with MEW PC board by HP network analyzer (HP8510C).

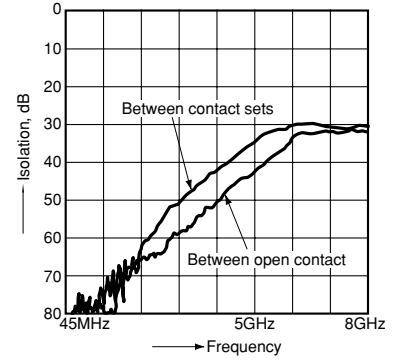
• V.S.W.R. characteristics



• Insertion loss characteristics (without D.U.T. board's loss)



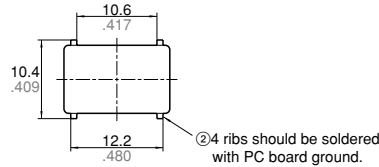
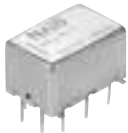
• Isolation characteristics



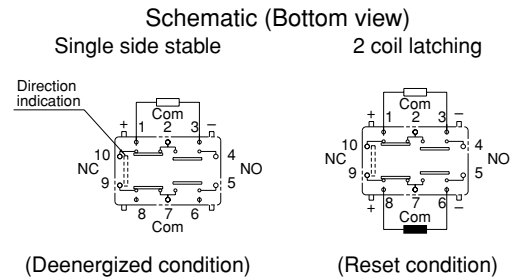
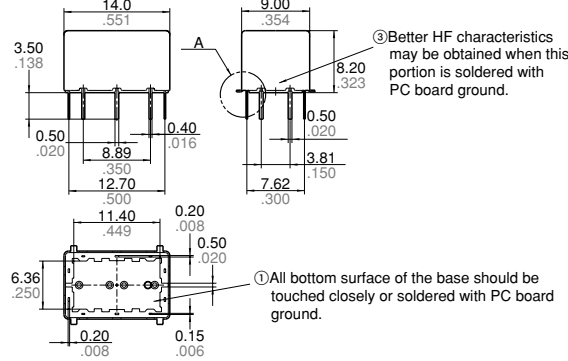
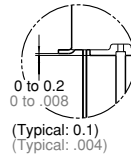
# DIMENSIONS

mm inch

## 1. Standard PC board terminal



Expansion of A

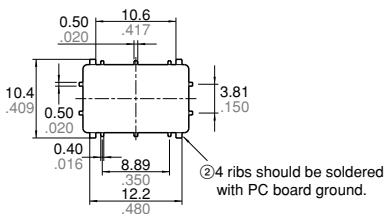


(Deenergized condition)

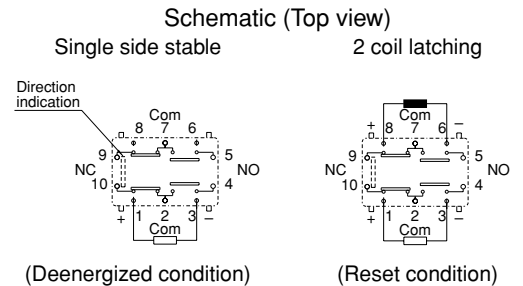
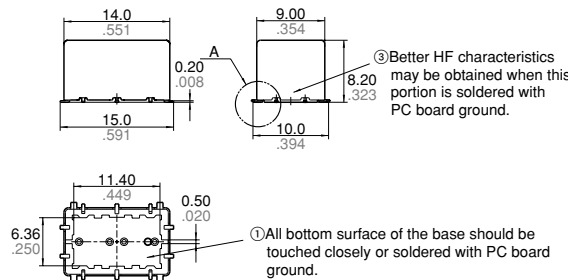
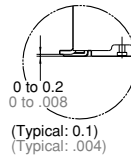
(Reset condition)

General tolerance:  $\pm 0.3 \pm .012$

## 2. Surface mount terminal



Expansion of A



(Deenergized condition)

(Reset condition)

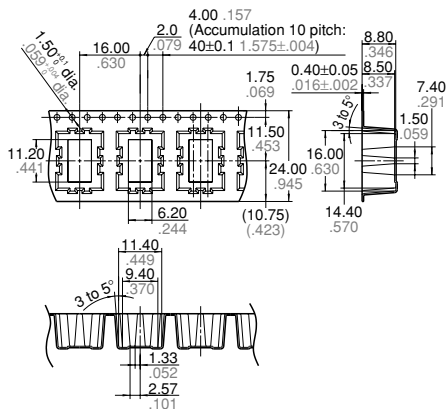
General tolerance:  $\pm 0.3 \pm .012$

# RJ (ARJ)

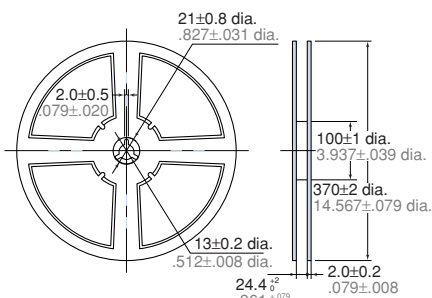
## NOTES

### 1. Tape and reel packing

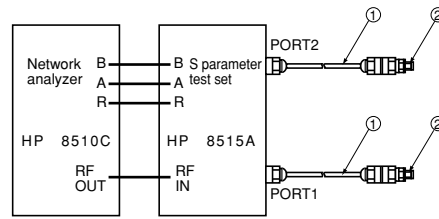
#### 1) Tape dimensions



#### 2) Dimensions of plastic reel



### 2. Measuring method (Impedance 50Ω)



#### Connector

| No. | Product name   | Contents                         |
|-----|----------------|----------------------------------|
| 1   | HP 85131-60013 | 3.5 mm testport, Extension cable |
| 2   | HP 83059       | 3.5 mm coaxial adaptor           |

(Step 1) Calibrate the test system with HP calibration kit [HP85052B]

(Step 2) After calibration, connect the D.U.T. board and measure. Connect 50 Ω terminals on connectors other than those for measurement.

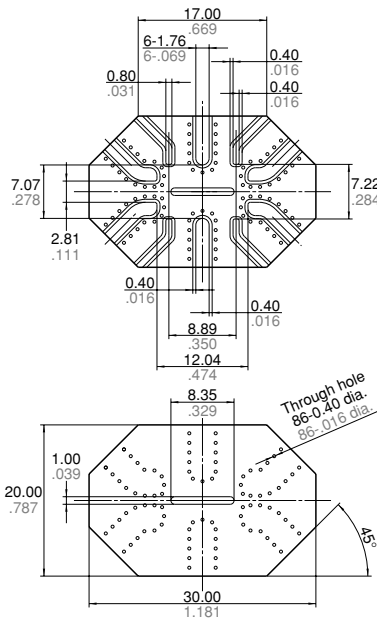
#### Notes

- All bottom surface of the base should be touched closely or soldered with PC board ground.
- 4 ribs should be soldered with PC board ground.

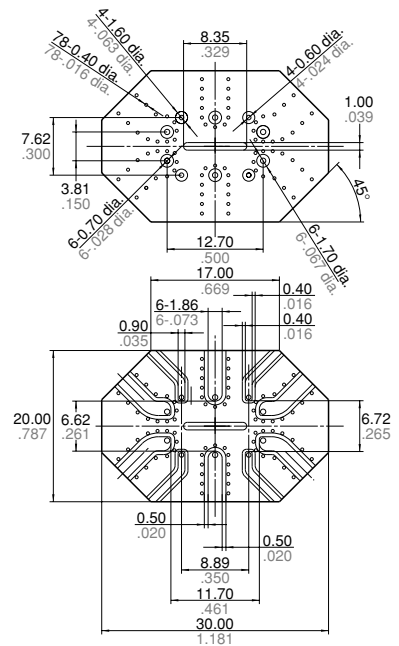
#### Measuring board

##### 1) Dimensions

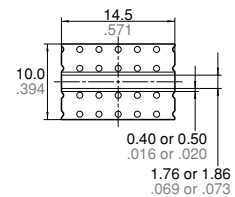
<Surface mount terminal>



<Standard PC board terminal>



<Calibration board>



2) Material: Glass PTFE double-sided through hole PC board R-4737 (Matsushita Electric Works)

3) Board thickness:  $t = 0.8$  mm

4) Copper plating: 18μm

• Connector (SMA type receptacle)

Product name: R125 510 (RADIALL)

Insertion loss compensation

The insertion loss of relay itself is given by

subtracting the insertion loss of short-circuit the Com and the NC (or NO).

(signal path and two connectors)