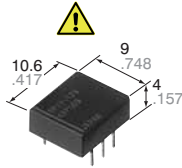


**⚠ Discontinued as of August 31, 2012**

**Panasonic**  
ideas for life

**LOW PROFILE  
HIGH FREQUENCY RELAY**

**RP RELAYS**



mm inch

**⚠ Product to be discontinued.**

**FEATURES**

- High frequency relay with the low profile of 4 mm .157 inch**
- Excellent high frequency characteristics**
  - Isolation: Min. 10dB (at 1.8 GHz)
  - Insertion loss: Max. 1.0dB (at 1.8 GHz)
  - V.S.W.R.: Max. 1.3 (at 1.8 GHz)
- High sensitivity in small size**  
Size: 10.6 × 9 × 4 mm  
.417 × .354 × .157 inch  
Nominal operating power: 140 mW

- Utilizes tube package for automatic mounting.**
- Self-clinching terminal also available**

**TYPICAL APPLICATIONS**

- Antenna switching of mobile phone
- Switching signal of measuring equipment
- All types of compact wireless devices

**SPECIFICATIONS**

**Contact**

Arrangement		1 Form C
Contact material	Stationary	Ag + Au clad
	Movable	AgPd
Initial contact resistance, max. (By voltage drop 6 V DC 0.1 A)		50 mΩ
Rating	Nominal switching capacity	0.1 A 30 V DC Contact switching power: 1 W (Max. 1.8 GHz); Contact carrying power: 3 W (Max. 1.2 GHz) 1 W (Max. 1.8 GHz)
	V.S.W.R.	Max. 1.2 (at 1 GHz) Max. 1.3 (at 1.8 GHz)
High frequency characteristics (Impedance 50Ω) (Initial)	Insertion loss	Max. 0.5 dB (at 1 GHz) Max. 1 dB (at 1.8 GHz)
	Isolation	Min. 15 dB (at 1 GHz) Min. 10 dB (at 1.8 GHz)
	Expected life (min. operations)	Mechanical (at 180 cpm) 5×10 <sup>6</sup> Electrical (at 20 cpm) 10 <sup>5</sup> (0.1 A 30 V DC resistive load) 10 <sup>5</sup> (1 W at 1.8 GHz; V.S.W.R.: max. 1.3)

**Characteristics**

Max. operating speed (at rated load)		20 cpm
Initial insulation resistance* <sup>1</sup>		Min. 1,000 MΩ at 500 V DC
Initial breakdown voltage* <sup>2</sup>	Between open contacts	750 Vrms for 1 min.
	Between contacts and coil	1,500 Vrms for 1 min.
Operate time* <sup>3</sup> (at nominal voltage)		Max. 3 ms (Approx. 1.5 ms)
Release time(without diode)* <sup>3</sup> (at nominal voltage)		Max. 2 ms (Approx. 1 ms)
Temperature rise		Max. 50Cwith nominal coil voltage across coil and at nominal switching capacity
Shock resistance	Functional* <sup>4</sup>	Min. 500 m/s <sup>2</sup> {50 G}
	Destructive* <sup>5</sup>	Min. 1,000 m/s <sup>2</sup> {100 G}
Vibration resistance	Functional* <sup>6</sup>	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* <sup>7</sup> (Not freezing and condensing at low temperature)	Ambient temp.	Đ40C to 70C Đ40F to 158F
	Humidity	5 to 85% R.H.
Unit weight		Approx. 1 g .04 oz

**Coil (at 25C, 68F)**

Voltage type	Nominal operating power
1.5 to 12 V DC	140 mW
24 V DC	270 mW

**Remarks**

- \* Specifications will vary with foreign standards certification ratings.
- \*<sup>1</sup> Measurement at same location as Initial breakdown voltage section
- \*<sup>2</sup> Detection current: 10mA
- \*<sup>3</sup> Excluding contact bounce time
- \*<sup>4</sup> Half-wave pulse of sine wave: 11ms, detection time: 10μs
- \*<sup>5</sup> Half-wave pulse of sine wave: 6ms
- \*<sup>6</sup> Detection time: 10μs
- \*<sup>7</sup> Refer to 7. Conditions for operation, transport and storage conditions in NOTES at the back of this data sheet.

**ORDERING INFORMATION**



Contact arrangement	Operating function	Terminal shape	Coil voltage (DC)
1: 1 Form C	Nil: Single side stable	Nil: Standard PC board terminal H: Self-clinching terminal	1.5, 3, 4.5, 5, 6, 9, 12, 24 V

Note: Standard packing; Carton: 50 pcs. Case 1,000 pcs.

## TYPES AND COIL DATA (at 20°C 68°F)

Part No.		Nominal voltage, V DC	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	Maximum allowable voltage, V DC
Standard PC board terminal	Self-clinching terminal							
RP1-1.5V	RP1-H-1.5V	1.5	1.125	0.15	93.8	16	140	2.25
RP1-3V	RP1-H-3V	3	2.25	0.3	46.7	64.3	140	4.5
RP1-4.5V	RP1-H-4.5V	4.5	3.375	0.45	31.1	145	140	6.75
RP1-5V	RP1-H-5V	5	3.75	0.5	28	178	140	7.5
RP1-6V	RP1-H-6V	6	4.5	0.6	23.3	257	140	9
RP1-9V	RP1-H-9V	9	6.75	0.9	15.6	579	140	13.5
RP1-12V	RP1-H-12V	12	9	1.2	11.7	1,028	140	18
RP1-24V	RP1-H-24V	24	18	2.4	11.3	2,133	270	28.8

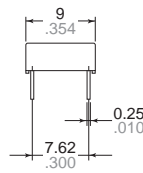
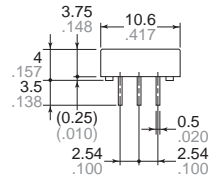
## DIMENSIONS mm inch

Download [CAD Data](#) from our Web site.

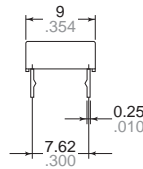
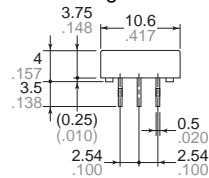
**CAD Data**



Standard PC board terminal

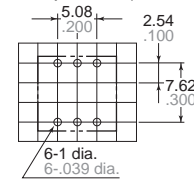


Self-clinching terminal



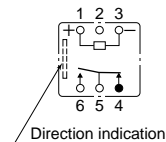
General tolerance:  $\pm 0.3 \pm .012$

PC board pattern (Bottom view)



Tolerance:  $\pm 0.1 \pm .004$

Schematic (Bottom view)



Deenergized condition

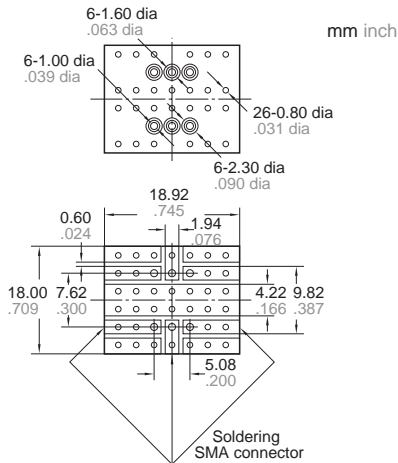
## REFERENCE DATA

### 1. High frequency characteristics

Sample: RP1-6V

Measuring method: Impedance 50%

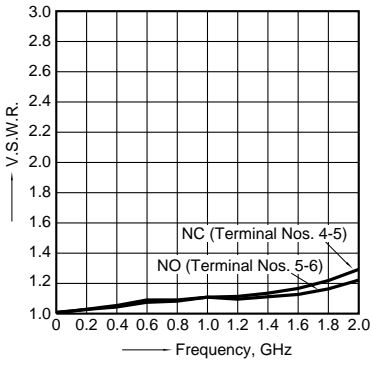
Measuring tool:



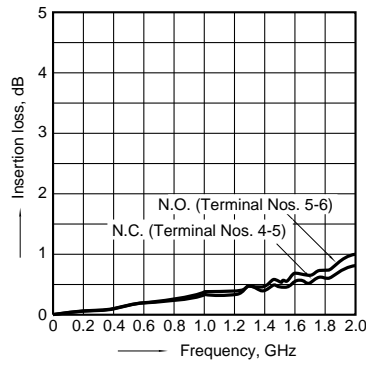
### PC board

- Double-sided through hole
- Material: Glass-epoxy resin
- t = 1.0mm .039 inch
- Copper plated thickness: 35 μm

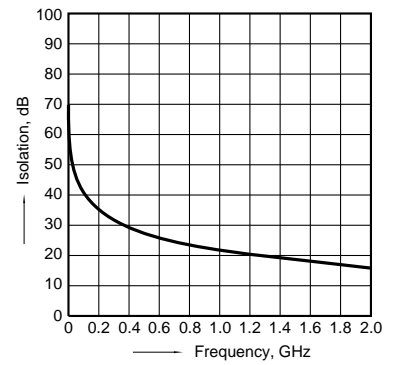
• V.S.W.R



• Insertion loss

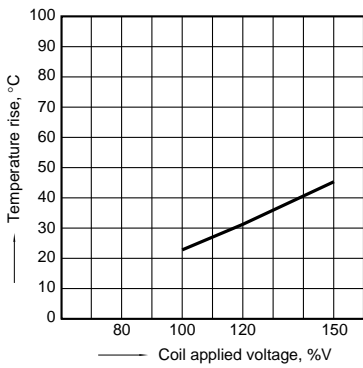


• Isolation



2. Coil temperature rise

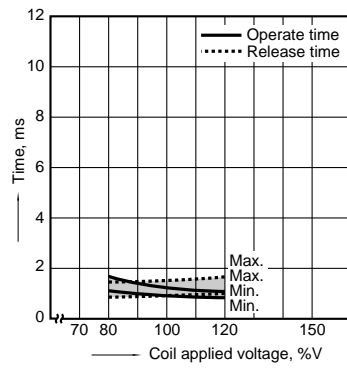
Sample: RP1-6V; No. of samples: n = 5  
 Carrying current: 0.1 A  
 Ambient temperature: 25°C 77°F



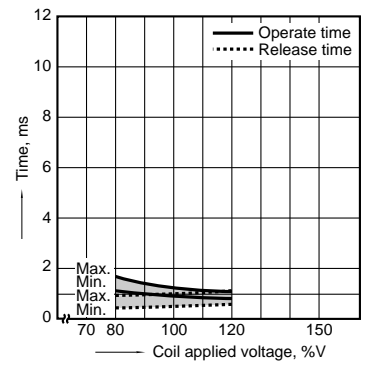
3. Operate/release time

Sample: RP1-9V; No. of samples: n = 50

• With diode



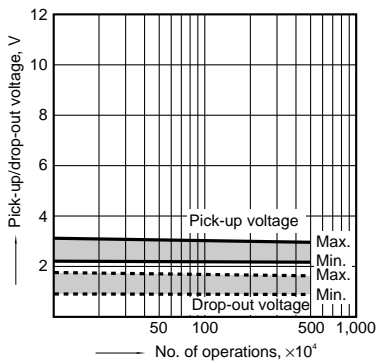
• Without diode



4. Mechanical life

Sample: RP1-5V; No. of samples: n = 8

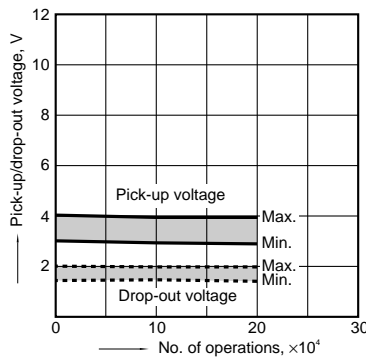
• Change of pick-up, drop-out voltage



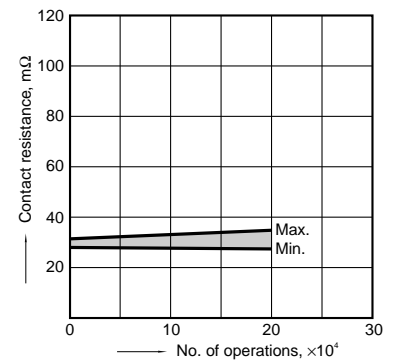
5. Electrical life (0.1 A 30 V DC)

Sample: RP1-6V; No. of samples: n = 6

• Change of pick-up/drop-out voltage

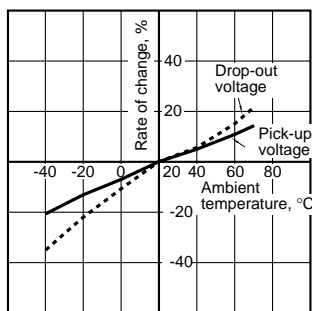


• Change of contact resistance



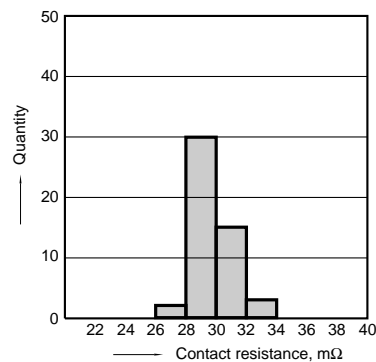
6. Ambient temperature characteristics

Sample: RP1-6V; No. of samples: n = 5

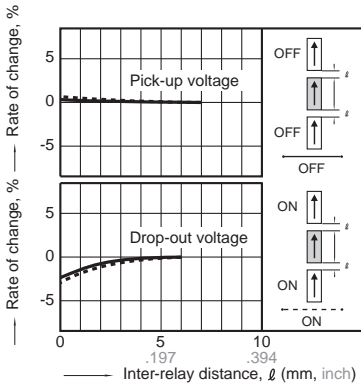


7. Contact resistance distribution (initial)

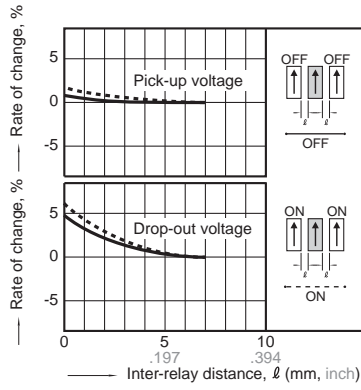
Sample: RP1-12V; No. of samples: n = 25



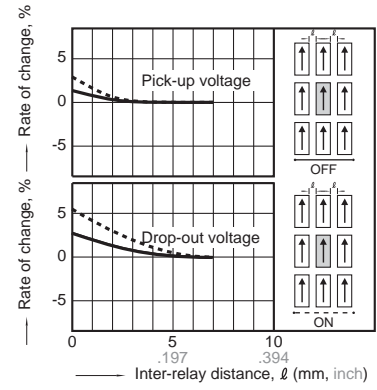
8.-(1) Influence of adjacent mounting  
Sample: RP1-12V; No. of samples: n = 6



8.-(2) Influence of adjacent mounting  
Sample: RP1-12V; No. of samples: n = 6

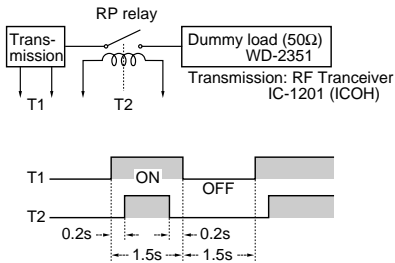


8.-(3) Influence of adjacent mounting  
Sample: RP1-12V; No. of samples: n = 6

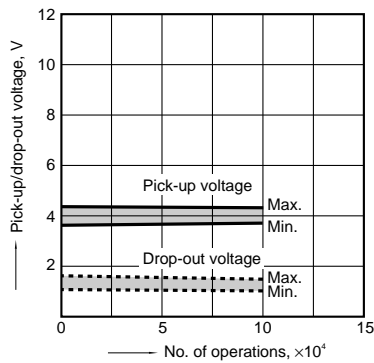


9. High frequency switching test (1.2 GHz, 1 W)

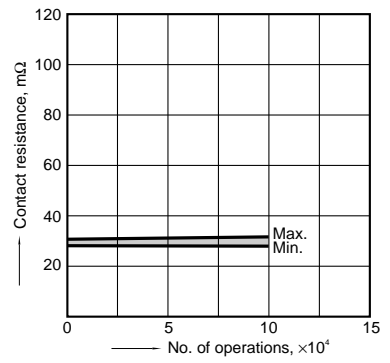
Sample: RP1-6V; No. of samples: n = 6  
Ambient temperature: 20°C 68°F



• Change of pick-up/drop-out voltage



• Change of contact resistance



## NOTES

### 1. Coil operating power

Pure DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%.

However, check it with the actual circuit since the characteristics may be slightly different. The nominal operating voltage should be applied to the coil for more than 20 ms to set/reset the latching type relay.

### 2. Coil connection

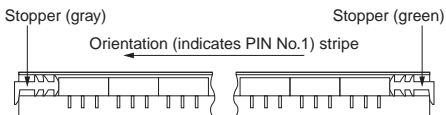
When connecting coils, refer to the wiring diagram to prevent mis-operation or malfunction.

### 3. External magnetic field

Since RP relays are highly sensitive polarized relays, their characteristics will be affected by a strong external magnetic field. Avoid using the relay under that condition.

### 4. Packing direction

Relays are packed in a tube with the orientation stripe (PIN NO. 1) toward the green stopper.



### 5. Automatic mounting

To maintain the internal function of the relay, the chucking pressure should not exceed the values below.

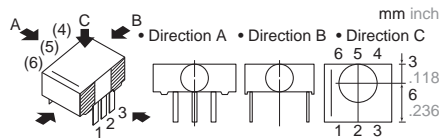
Chucking pressure\* in the direction A:  
4.9 N {500 gf} or less

Chucking pressure\* in the direction B:  
9.8 N {1 kgf} or less

Chucking pressure\* in the direction C:  
9.8 N {1 kgf} or less

Please chuck the portion.

Avoid chucking the center of the relay. In addition, excessive chucking pressure to the pinpoint of the relay should be avoided.



\*Value of chucking pressure is shown by the value of weight pressed on the portion (4 mm .157 inch dia.).

### 6. Soldering

Preheat according to the following conditions.

Temperature	120°C 248°F or less
Time	Within 2 minute

Soldering should be done at 260±5°C 500±9°F within 6 s.

1) Perform manual soldering under the conditions below.

- Within 10 s at 260°C 500°F

- Within 3 s at 350°C 662°F

### 7. Conditions for operation, transport and storage conditions

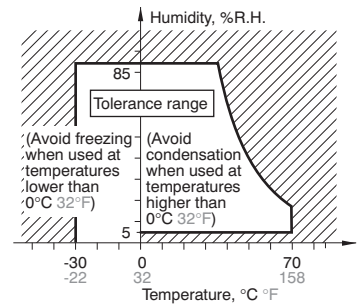
1) Ambient temperature, humidity, and atmospheric pressure during usage, transport, and storage of the relay:

(1) Temperature:  
-40 to +70°C -40 to +158°F

(2) Humidity: 5 to 85% RH  
(Avoid freezing and condensation.)  
The humidity range varies with the temperature. Use within the range indicated in the graph below.

(3) Atmospheric pressure: 86 to 106 kPa  
Temperature and humidity range for

usage, transport, and storage:



### 2) Condensation

Condensation forms when there is a sudden change in temperature under high temperature and high humidity conditions. Condensation will cause deterioration of the relay insulation.

### 3) Freezing

Condensation or other moisture may freeze on the relay when the temperature is lower than 0°C 32°F. This causes problems such as sticking of movable parts or operational time lags.

### 4) Low temperature, low humidity environments

The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

**For Cautions for Use, see [Relay Technical Information](#).**