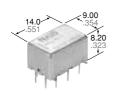
# **Panasonic** ideas for life

# **SMD RELAYS** WITH 8GHz CAPABILITIES

# RJ RELAYS (ARJ)





# **FEATURES**

· Excellent high frequency characteristics (50 $\Omega$ , 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 materi	al	Gold alloy			
Initial contact re	esistance	Max. 150mΩ			
	Contact ra	ating	1W (at 5 GHz, Impedance 50 $\Omega$ , V.S.W.R. $\leq$ 1.25) 10mA 10V DC (resistive load)		
Rating	Contact of	arrying power	1W (at 5 GHz, Impedance 50 Ω, V.S.W.R. ≦1.25)		
	Max. swite	ching voltage	30 V DC		
	Max. swite	ching current	0.3 A DC		
	V.S.W.R.		Max. 1.25		
High frequency	Insertion (without D.	loss U.T. board's loss)	Max. 0.5dB		
characteristics (Initial) (~5GHz,	11-6	Between open contacts	Min. 35dB		
Impedance $50\Omega$ )	Isolation	Between contact sets	Min. 30dB		
	Input pow	ver	1W (at 5GHz, impedance 50Ω, V.S.W.R. ≦1.25, at 20°C)		
	Mechanic	al (at 180 cpm)	107		
Expected life (min. operations)	Electrical	1W, at 5GHz, V.S.W.R. ≦ 1.25	106		
	(at 20cpm)	10mA 10V DC (resistive load)	106		

#### Coil (at 20°C, 68°F)

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

#### Characteristics

Initial insula	tion resistance*1	Min. 500 MΩ (at 500 V DC)		
	Between open co	ntacts	500 Vrms	
	Between contact	sets	500 Vrms	
Initial breakdown	Between contact	and coil	500 Vrms	
voltage*2	Between coil and	earth terminal	500 Vrms	
Ü	Between contact terminal	500 Vrms		
Operate tim	e [Set time]*3 (at 2	0°C)	Max. 5ms	
Release tim	e (without diode)[F	Reset time]*3	Max. 5ms	
Temperature	e rise (at 20°C)*4		Max. 50°C	
Shock resis	tonoo	Functional*5	Min. 500 m/s <sup>2</sup>	
SHOCK TESIS	lance	Destructive*6	Min. 1,000 m/s <sup>2</sup>	
Vibration re	oiotonoo	Functional*7	10 to 55 Hz at double amplitude of 3 mm	
Vibration res	Sistarice	Destructive	10 to 55 Hz at double amplitude of 5 mm	
transport ar		Ambient temp.	-30°C to 70°C -22°F to 158°F	
(Not freezing and condensing at low temperature)		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.

# **ORDERING INFORMATION**

		Ex. ARJ	2					
Contact ar	rangement	Operating function	Termin	al shape	Coil voltage	(DC)	Packin	g style
2: 2 F	2: 2 Form C 0: Single side stab 2: 2 coil latching		Nil: Standard PC board terminal A: Surface-mount terminal		03 : 3V 4H: 4.5V 12 : 12V 24 : 24V	V /	Nil: Carton packing X: Tape end reel packing (picked from 1/2/3-pin side Z: Tape and reel packing (pic 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. Standard PC board terminal	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
	3	ARJ2003	2.25	0.3	66.6	45	200	3.3
Single side	4.5	ARJ204H	3.375	0.45	44.4	101.2	200	4.95
stable	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. Standard PC board terminal	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
	3	ARJ2203	2.25	2.25	50	60	150	3.3
2 coil	4.5	ARJ224H	3.375	3.375	33.3	135	150	4.95
latching	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

3 -			<b> </b>		3 - (	//			
Operating Cail Dating	Part No.		Pick-up	Drop-out	Nominal operating	Coil	Nominal	Max. allowable	
Operating function	Coil Rating, V DC	Carton packing	Tape and reel packing	voltage, V DC (max.) (initial)	voltage, V DC (min.) (initial)	current, mA (±10%)	resistance, $\Omega$ (±10%)	operating power, mW	voltage V DC
	3	ARJ20A03	ARJ20A03Z	2.25	0.3	66.6	45	200	3.3
Single side	4.5	ARJ20A4H	ARJ20A4HZ	3.375	0.45	44.4	101.2	200	4.95
stable	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 Coil Rating,		Part No.		Set voltage,	Reset voltage,	Nominal operating	Coil	Nominal	Max. allowable
function	V DC	Carton packing	Tape and reel packing	V DC (max.) (initial)	V DC (min.) (initial)	current, mA (±10%)	resistance, $\Omega$ (±10%)	operating power, mW	voltage V DC
	3	ARJ22A03	ARJ22A03Z	2.25	2.25	50	60	150	3.3
2 coil	4.5	ARJ22A4H	ARJ22A4HZ	3.375	3.375	33.3	135	150	4.95
latching	12	ARJ22A12	ARJ22A12Z	9	9	12.5	960	150	13.2
	24	ARJ22A24	ARJ22A24Z	18	18	6.3	3,840	150	26.4

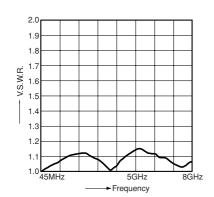
# REFERENCE DATA

#### 1. High frequency characteristics

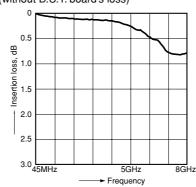
Sample: ARJ20A12

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

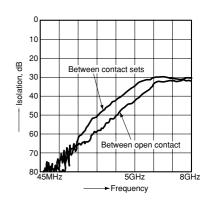
· V.S.W.R. characteristics



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



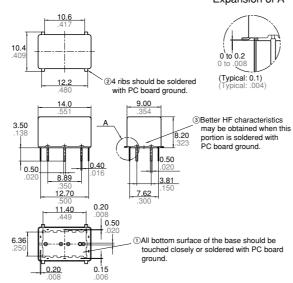
· Isolation characteristics



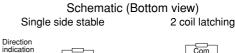
## **DIMENSIONS**

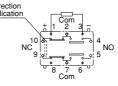
#### 1. Standard PC board terminal

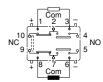




Expansion of A







mm inch

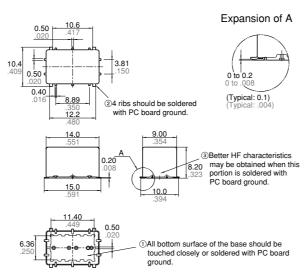
(Deenergized condition)

(Reset condition)

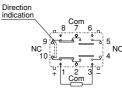
General tolerance: ±0.3 ±.012

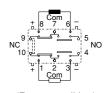
#### 2. Surface mount terminal





Schematic (Top view)
Single side stable 2 coil latching





(Deenergized condition)

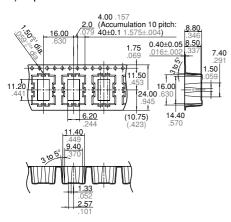
(Reset condition)

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

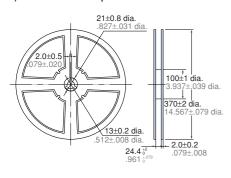
## **NOTES**

## 1. Tape and reel packing

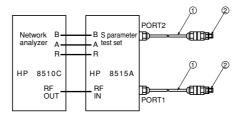
#### 1) Tape dimensions



## 2) Dimensions of plastic reel



#### 2. Measuring method (Impedance $50\Omega$ )



#### 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  $\Omega$  terminals on connectors other than those for measurement.

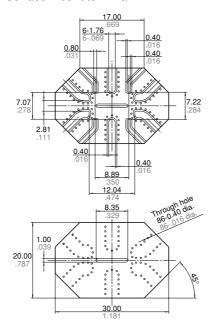
#### Notes)

- 1. All bottom surface of the base should be touched closely or soldered with PC board ground.
- 2. 4 ribs should be soldered with PC board ground.

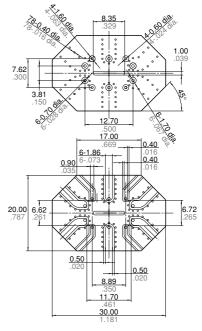
#### Measuring board

1) Dimensions

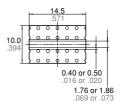
<Surface mount terminal>



#### <Standard PC board terminal>



#### <Calibration board>



- 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)