# Panasonic ideas for life

### Addition of 6GHz High Reliability RD Coaxial Switch (SPDT) for Communications Market

# RD COAXIAL SWITCHES (ARD)



**Compliance with RoHS Directive** 

### **FEATURES**

- 1. Excellent high frequency characteristics (50Ω, to 26.5Ghz)
- 2. SPDT, Transfer and SP6T types are available.
- 3. High sensitivity

Nominal operating power: 840 mW (SPDT/SP6T, Fail-safe type, with indicator)

- 1,540 mW (Transfer, Fail-safe type, with indicator)
- \*Without 24V type
- 4. Long-lasting life: min.  $5 \times 10^6$  5. With termination type is added. (SP6T)

Thanks to the addition of termination, steady high frequency characteristics can be maintained when contacts are either open or closed and this contributes to increase system reliability.

6. + COM type is available.

### TYPICAL APPLICATIONS

Wireless and mobile communication

- · Cellular phone base station
- · Amplifier switching

### **Digital broadcasting**

- Broadcasting relay station
- Broadcasting equipment

# Measuring instrument All types of inspection equipment

Please inquire beforehand if you are thinking of using this product in applications that involve low level load or high frequency of switching.

### HIGH FREQUENCY CHARACTERISTICS (Impedance $50\Omega$ )

Frequency	to 1 GHz	1 to 4 GHz	4 to 8 GHz*1	8 to 12.4 GHz	12.4 to 18 GHz	18 to 26.5 GHz*2
V.S.W.R. (max.)	1.1	1.15	1.25	1.35	1.5	1.7
V.S.W.R. (SP6T With termination) (max.)	1.20		1.40	1.50	_	_
Insertion loss (dB. max.)	0.2		0.3	0.4	0.5	0.8
Isolation (dB. min.)	85	80	70	65	60	55

Notes: \*1 The 6GHz type only has the above characteristics up to 6GHz.

### ORDERING INFORMATION

**ARD** RD coaxial switches Frequency 1: to 18GHz (SPDT) 5: to 26.5GHz (SPDT) 2: to 18GHz (Transfer) 6: to 26.5GHz (Transfer) 3: to 13GHz (SP6T) 7: to 6GHz (SPDT) Operating function 00: Fail-safe (with indicator) 02: Fail-safe (without indicator) 20: Latching (with indicator) 22: Latching (without indicator) 51: Latching with TTL driver (SPDT, Transfer) 53: Latching with TTL driver (SPDT) (with self cut-off function) (with indicator) (with self cut-off function) (without indicator) Nominal operating voltage, V DC 4H: 4.5 (Fail-safe, Latching type only) 12:12 05: 5 (Latching with TTL driver type only) 24: 24 Operation terminal Nil: Solder terminal C: Connector cable (SPDT type only) Termination (SP6T type only) Nil: No termination With termination HF data attached Nil: No HF test data attached Q: HF test data attached

Note: Sealed types also available, please consult us (SPDT only)

<sup>\*2 18</sup> to 26.5GHz characteristics can be applied 26.5GHz type only (SPDT, Transfer)

### **TYPES**

### 1. SPDT

### 1) Solder terminal

	Nominal operating	NeW 6GHz type	18GH	z type	26.5GI	Hz type	
Operating function	voltage, V DC	No HF datasheet attached	No HF datasheet attached	HF datasheet attached	No HF datasheet attached	HF datasheet attached	
<b>-</b>	4.5	ARD7004H	ARD1004H	ARD1004HQ	ARD5004H	ARD5004HQ	
Fail-safe (with indicator)	12	ARD70012	ARD10012	ARD10012Q	ARD50012	ARD50012Q	
(with malcator)	24	ARD70024	ARD10024	ARD10024Q	ARD50024	ARD50024Q	
1	4.5	ARD7204H	ARD1204H	ARD1204HQ	ARD5204H	ARD5204HQ	
Latching (with indicator)	12	ARD72012	ARD12012	ARD12012Q	ARD52012	ARD52012Q	
(with indicator)	24	ARD72024	ARD12024	ARD12024Q	ARD52024	ARD52024Q	
atching with TTL driver	5	ARD75105	ARD15105	ARD15105Q	ARD55105	ARD55105Q	
(with self cut-off function)	12	ARD75112	ARD15112	ARD15112Q	ARD55112	ARD55112Q	
(with indicator)	24	ARD75124	ARD15124	ARD15124Q	ARD55124	ARD55124Q	
	4.5	ARD7024H			_	_	
Fail-safe (without indicator)	12	ARD70212	_				
(without indicator)	24	ARD70224					
	4.5	ARD7224H					
Latching (without indicator)	12	ARD72212	_	_	_	_	
(without maleator)	24	ARD72224					
Latching with TTL driver	5	ARD75305					
(with self cut-off function)	12	ARD75312	_	_	_	_	
(without indicator)	24	ARD75324					

Note: Standard packing; Carton: 1 pc. Case: 20 pcs.

### 2) Connector cable

Operating function	Nominal operating	18GH	z type	26.5GHz type		
Operating function	voltage, V DC	No HF datasheet attached	HF datasheet attached	No HF datasheet attached	HF datasheet attached	
	4.5	ARD1004HC	ARD1004HCQ	ARD5004HC	ARD5004HCQ	
Fail-safe	12	ARD10012C	ARD10012CQ	ARD50012C	ARD50012CQ	
	24	ARD10024C	ARD10024CQ	ARD50024C	ARD50024CQ	
	4.5	ARD1204HC	ARD1204HCQ	ARD5204HC	ARD5204HCQ	
Latching	12	ARD12012C	ARD12012CQ	ARD52012C	ARD52012CQ	
	24	ARD12024C	ARD12024CQ	ARD52024C	ARD52024CQ	
Later to the transfer of	5	ARD15105C	ARD15105CQ	ARD55105C	ARD55105CQ	
Latching with TTL driver (with self cut-off function)	12	ARD15112C	ARD15112CQ	ARD55112C	ARD55112CQ	
(Will con our on function)	24	ARD15124C	ARD15124CQ	ARD55124C	ARD55124CQ	

Note: Standard packing; Carton: 1 pc. Case: 10 pcs.

### 2. Transfer

Operating function	Nominal operating	18GH	z type	26.5GHz type	
Operating function	voltage, V DC	No HF datasheet attached	HF datasheet attached	No HF datasheet attached	HF datasheet attached
	4.5	ARD2004H	ARD2004HQ	ARD6004H	ARD6004HQ
Fail-safe	12	ARD20012	ARD20012Q	ARD60012	ARD60012Q
	24	ARD20024	ARD20024Q	ARD60024	ARD60024Q
	4.5	ARD2204H	ARD2204HQ	ARD6204H	ARD6204HQ
Latching	12	ARD22012	ARD22012Q	ARD62012	ARD62012Q
	24	ARD22024	ARD22024Q	ARD62024	ARD62024Q
Land to the TTL III	5	ARD25105	ARD25105Q	ARD65105	ARD65105Q
Latching with TTL driver (with self cut-off function)	12	ARD25112	ARD25112Q	ARD65112	ARD65112Q
(With 3011 out off fullotion)	24	ARD25124	ARD25124Q	ARD65124	ARD65124Q

Note: Standard packing; Carton: 1 pc. Case: 10 pcs.

### 3. SP6T

Operating function	Nominal operating	13GHz type			
Operating function	voltage, V DC	No HF datasheet attached	HF datasheet attached		
	4.5	ARD3004H	ARD3004HQ		
Fail-safe	12	ARD30012	ARD30012Q		
	24	ARD30024	ARD30024Q		
	4.5	ARD3204H	ARD3204HQ		
Latching	12	ARD32012	ARD32012Q		
	24	ARD32024	ARD32024Q		

Note: Standard packing; Carton: 1 pc. Case: 5 pcs.

### 4. SP6T (with termination)

Operating function	Nominal operating	13GHz type			
Operating function	voltage, V DC	No HF datasheet attached	HF datasheet attached		
	4.5	ARD3004HZ	ARD3004HZQ		
Fail-safe	12	ARD30012Z	ARD30012ZQ		
	24	ARD30024Z	ARD30024ZQ		
	4.5	ARD3204HZ	ARD3204HZQ		
Latching	12	ARD32012Z	ARD32012ZQ		
	24	ARD32024Z	ARD32024ZQ		

Note: Standard packing; Carton: 1 pc. Case: 5 pcs.

### **RATING**

### 1. Coil data

(1) SPDT

1) Fail-safe type

Nominal operating voltage,	Nominal operating current, mA	A (+10%/–15%) (at 20°C 68°F)	Nominal power consumption, mW	
V DC	With indicator	Without indicator	With indicator	Without indicator
4.5	186.7	155.6	840	
12	70.0	58.3	840	700
24	40.4	29.2	970	

### 2) Latching type

	, , ,							
Nominal operating voltage,		Nominal operating current, mA	A (+10%/–15%) (at 20°C 68°F)	Nominal power consumption, mW				
	V DC	With indicator	Without indicator	With indicator	Without indicator			
	4.5	155.6	111.1	700				
	12	62.5	41.7	750	500			
	24	37.5	16.7	900				

### 3) Latching with TTL driver type

Nominal operating voltage,	TTL logic level (see 1	TL logic level range)	Electronic self cut-off	Cuitabing fraguency	
V DC	ON	OFF	Electronic sell cut-oil	Switching frequency	
5					
12	2.4 to 5.5V	0 to 0.5V	Available	Max. 180 cpm (ON time : OFF time = 1 : 1)	
24					

### (2) Transfer

### 1) Fail-safe type

.,, ., .,					
	Nominal operating voltage, V DC	Nominal operating current, mA (+10%/-15%) (at 20°C 68°F)	Nominal power consumption, mW		
	4.5	342.2	1540		
	12	128.3	1540		
	24 69.6		1670		

### 2) Latching type

Nominal operating voltage, V DC	Nominal operating current, mA (+10%/-15%) (at 20°C 68°F)	Nominal power consumption, mW	
4.5	266.7	1200	
12	104.2	1250	
24	58.3	1400	

### 3) Latching with TTL driver type (with self cut-off function)

Nominal operating voltage, V DC		TTL logic level (see	ITL logic level range)	Electronic self cut-off	Cwitching fraguency
		ON	OFF	Electronic sen cut-on	Switching frequency
	5				
	12	2.4 to 5.5V	0 to 0.5V	Available	Max. 180 cpm (ON time : OFF time = 1 : 1)
	24				(Ort time: Ort time = 1:1)

### (3) SP6T and SP6T (with termination type)

### 1) Fail-safe type

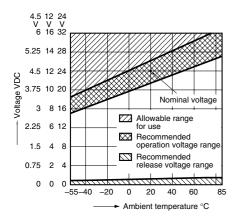
Nominal operating voltage, VDC	Nominal operating current, mA (+10%/-15%) (at 20°C 68°F)	Nominal power consumption, mW		
4.5	186.7	840		
12	70.0	040		
24	40.4	970		

### 2) Latching type

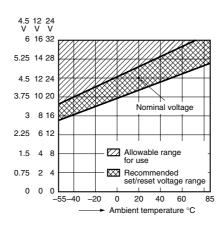
Nominal operating voltage, V DC	Nominal operating current, mA (+10%/-15%) (at 20°C 68°F)	Nominal power consumption, mW		
4.5	SET: 155.6 / RESET (ALL): 933.6	SET: 700 / RESET (ALL): 4,200		
12	SET: 62.5 / RESET (ALL): 375.0	SET: 750 / RESET (ALL): 4,500		
24	SET: 37.5 / RESET (ALL): 225.0	SET: 900 / RESET (ALL): 5,400		

### • Operating voltage range

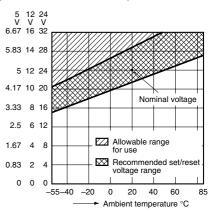
### 1) Fail-safe type



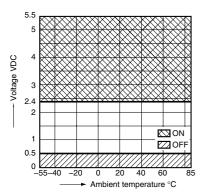
### 2) Latching type



# 3) Latching with TTL driver type (with self cut-off function)



### 4) TTL Logic level range



Note: Please consult us for use that is outside this range.

# 2. Specifications1) SPDT/Transfer

Characteristics		Item	Specifications							
	Arrangement			SPDT Transfer						
Contact	Contact material		Gold plating							
	Initial contact resistance		Max. 100mΩ (By voltage drop 6V DC 1A)							
				() (		at 3GHz)	ina			
	Contact input	Contact input power		(V.S.W.R. 1.15 or less, no contact switching, ambient temperature 40°C 104°F [SPDT], 25°C 77°F [Transfer])*1						
Rating	Nominal Fail-safe		840mW (4.5V, 12V DC), 970mW (24V DC) 1,540mW (4.5V, 12V DC), 1,670mW (24V DC)							
	operating		700mW (4.5V DC), 750mW (12V DC),			1,200mW (4.5V DC), 1,250mW (12V DC),				
	power	Latching	900mW (24V DC)			1,400mW (24V DC)				
	Contact rating	g			Max. 30\	/ 100mA				
Indicator rating (with	Initial contact	resistance			Max. 1Ω (Measur	ed by 5V 100mA)				
indicator type only)	Min. switching (Reference va			3V DC,	0.1mA (5 × 10 <sup>6</sup> , R	eliability level: 10%	6 (3kΩ))			
High frequency			to 1 GHz	1 to 4 GHz	4 to 8 GHz*2	8 to 12.4 GHz	12.4 to 18 GHz	18 to 26.5 GHz*3		
characteristics	V.S.W.R. (ma	x.)	1.1	1.15	1.25	1.35	1.5	1.7		
(Impedance $50\Omega$ )	Insertion loss	(dB, max.)	0.	.2	0.3	0.4	0.5	0.8		
	Isolation (dB,	min.)	85	80	70	65	60	55		
	Insulation res	istance (Initial)	Min. 1,000 Mg	$\Omega$ (at 500 V DC) M	easurement at san	ne location as "bre	akdown voltage (Ini	tial)" section.		
		Between open contacts	500 Vrms for 1 min. (Detection current: 10mA)							
Electrical characteristics	Breakdown voltage (Initial)	Between contact and coil	500 Vrms for 1 min. (Detection current: 10mA)							
Characteristics		Between contact and earth terminal	500 Vrms for 1 min. (Detection current: 10mA)							
		Between coil and earth terminal	500 Vrms for 1 min. (Detection current: 10mA)							
Time characteristics (at 20°C 68°F)	Operate time		Max. 15ms (Nominal operating voltage applied to the coil, excluding contact bounce time.)  Max. 20ms (Nominal operating voltage applied to the coil, excluding contact bounce time.)							
	Shock	Functional	Min. 500 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11ms, detection time: 10μs.)							
Mechanical	resistance	Destructive	Min. 1,000 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11ms.)							
characteristics	Vibration	Functional		10 to 55 Hz a	t double amplitude	of 3mm (Detection	n time: 10μs.)			
	resistance Destructive		10 to 55 Hz at double amplitude of 5mm							
	Mechanical		6GHz type: Min. 10 <sup>6</sup> 18 and 26.5GHz type: Min. 5 × 10 <sup>6</sup> (All types, at 180 cpm)			Min. 5 × 10 <sup>6</sup> (at 180 cpm)				
Expected life	Electrical	High frequency contact (Hot switch)	6GHz type: Min. 10 $^{\rm s}$ 18 and 26.5GHz type: Min. 5 × 10 $^{\rm s}$ (All types, 5W to 3GHz, impedance 50 $\Omega$ , V.S.W.R.; max. 1.2) (at 20 cpm)			$\begin{array}{c} \text{Min.}~5\times10^6\\ \text{(5W to 3GHz, impedance}~50\Omega, V.S.W.R.; max.}~1.2)\\ \text{(at 20 cpm)} \end{array}$				
		Indicator (with indicator type only)	5 V DC, 10 mA, Min. 10 <sup>6</sup> (at 20 cpm)							
Conditions	Conditions for operation, transport and storage*4		Ambient temperature: -55°C to +85°C -67°F to +185°F Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)							
Unit weight			,	Approx. 50g 1.76o	Z	A	approx. 110g 3.88oz	<u> </u>		
Notes: *1 Easters such	a a baating of	the connected connec	tar influence the hi	ah franssanas ahar		ra places verificum				

Notes: \*1 Factors such as heating of the connected connector influence the high frequency characteristics; therefore, please verify under actual conditions of use.

\*2 The 6GHz type only has the above characteristics up to 6GHz.

\*3 18 to 26.5GHz characteristics can be applied 26.5GHz type only (SPDT, Transfer)

\*4 The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Refer to [6] AMBIENT ENVIRONMENT in GENERAL APPLICATION GUIDELINES.

### 2) SP6T

Characteristics	Item		Specifications						
	Arrangement		SP6T						
Contact material		Gold plating							
	Initial contact resistance		Max. 100mΩ (By voltage drop 6V DC 1A)						
Cor	Contact	No termination	120 W (at 3GHz) (V.S.W.R. 1.15 or less, no contact switching, ambient temperature 25°C 77°F)*1						
	input power	With termination	2W (at 3GHz) (V.S.W.R. 1.15 or less, no contact switching, ambient temperature 25°C 77°F)*1						
Rating	Nominal	Fail-safe	840mW (4.5V, 12V DC), 970mW (24V DC)						
	operating power	Latching	700mW (4.5V DC), 750mW (12V DC), 900mW (24V DC)						
	Contact rating	g		Max. 30V	′ 100mA				
Indicator rating	Initial contact	resistance		Max. 1Ω (Measure	ed by 5V 100mA)				
maioator rating	Min. switching (Reference va			3V DC, 0.1mA (5 × 10 <sup>6</sup> , Re	eliability level: 10% (3kΩ))				
			to 1 GHz	1 to 4 GHz	4 to 8 GHz	8 to 13 GHz			
High frequency	V.S.W.R.	No termination	1.1	1.15	1.25	1.35			
characteristics	(max.)	With termination	1.	.20	1.40	1.50			
(Impedance $50\Omega$ )	Insertion loss (dB, max.)		0.2		0.3	0.4			
	Isolation (dB,	min.)	85	80	70	65			
	Insulation res	istance (Initial)	Min. 1,000 M $\Omega$ (at 500 V DC) Measurement at same location as "breakdown voltage (Initial)" section.						
		Between open contacts	500 Vrms for 1 min. (Detection current: 10mA)						
Electrical characteristics	Breakdown	Between contact and coil	500 Vrms for 1 min. (Detection current: 10mA)						
Characteristics	voltage (Initial)	Between contact and earth terminal	500 Vrms for 1 min. (Detection current: 10mA)						
	Between coil and earth terminal		500 Vrms for 1 min. (Detection current: 10mA)						
Time characteristics (at 20°C 68°F)	Operate time		Max. 20ms (Nominal operating voltage applied to the coil, excluding contact bounce tir		tact bounce time.)				
	Shock	Functional	Min. 500 m/s² (Half-wave pulse of sine wave: 11ms, detection time: 10μs.)			ne: 10μs.)			
Mechanical resistance		Destructive	Min. 1,000 m/s² (Half-wave pulse of sine wave: 11ms.)						
characteristics Vibration		Functional	10 to 55 Hz at double amplitude of 3mm (Detection time: 10μs.)						
	resistance	Destructive	10 to 55 Hz at double amplitude of 5mm						
	Mechanical		Min. 5 × 10 <sup>6</sup> (at 180 cpm)						
		High frequency	No termination Min. $5 \times 10^6$ (5W to 3GHz, impedance $50\Omega$ , V.S.W.R.; max. 1.2) (at 20 cpm)						
Expected life	Electrical	contact (Hot switch)	With termination Min. $5 \times 10^{\circ}$ (2W to 3GHz, impedance $50\Omega$ , V.S.W.R.; max. 1.2) (at 20 cpm)						
		Indicator (with indicator type only)	5 VDC, 10 mA, Min. 10 <sup>6</sup> (at 20 cpm)						
Conditions	Conditions for operation, transport and storage*2		Ambient temperature: $-55^{\circ}$ C to $+85^{\circ}$ C $-67^{\circ}$ F to $+185^{\circ}$ F Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)						
Unit weight			Approx. 320g 11.29oz						

Notes: \*1 Factors such as heating of the connected connector influence the high frequency characteristics; therefore, please verify under actual conditions of use.

\*2 The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Refer to [6] AMBIENT ENVIRONMENT in GENERAL APPLICATION GUIDELINES.

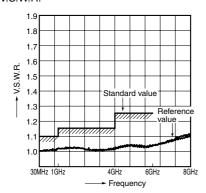
### REFERENCE DATA

### 1-(1). High frequency characteristics (SPDT) 6GHz type

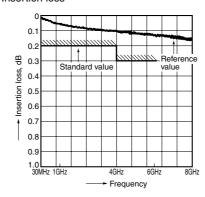
Sample: ARD70012

Measuring method: Measured with Agilent Technologies network analyzer (E8363B).

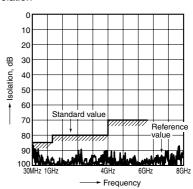
• V.S.W.R.



• Insertion loss



Isolation

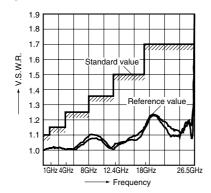


1-(2). High frequency characteristics (SPDT) 18, 26.5GHz type

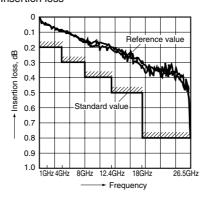
Sample: ARD10012

Measuring method: Measured with Agilent Technologies network analyzer (HP8510).

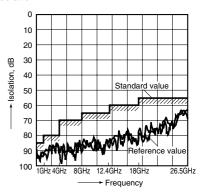
• V.S.W.R.



• Insertion loss



Isolation

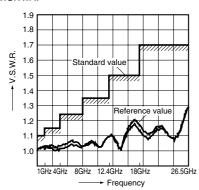


1-(3). High frequency characteristics (Transfer)

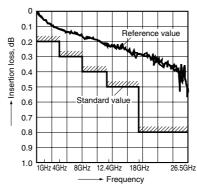
Sample: ARD60012

Measuring method: Measured with Agilent Technologies network analyzer (HP8510).

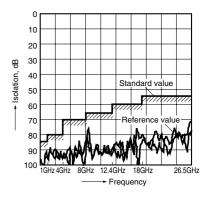
• V.S.W.R.



• Insertion loss



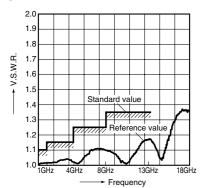
• Isolation



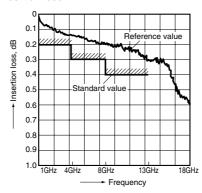
### 1-(4). High frequency characteristics (SP6T)

Sample: ARD30012
Measuring method: Measured with Agilent Technologies network analyzer (HP8510).

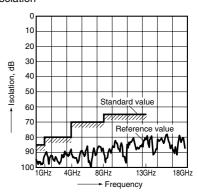
• V.S.W.R.



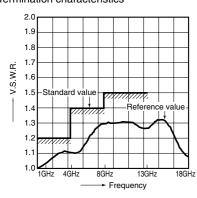
• Insertion loss



Isolation



### • Termination characteristics



## **DIMENSIONS** (mm inch)

The CAD data of the products with a CAD Data mark can be downloaded from: http://panasonic-electric-works.net/ac

- 1. SPDT
- 1) Solder terminal

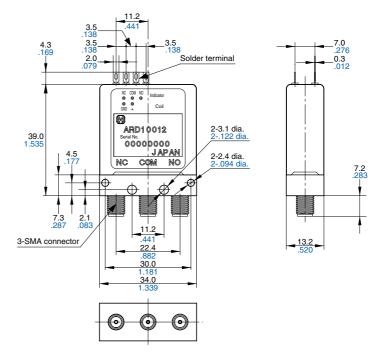




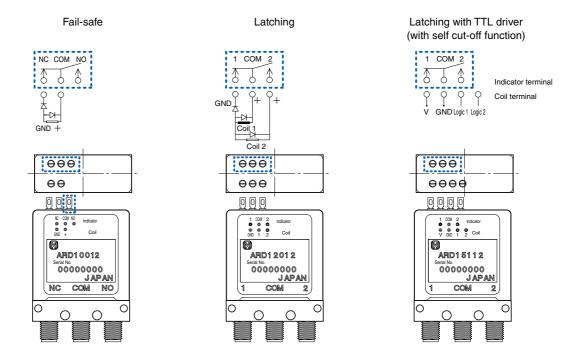
6GHz type



18 and 26.5GHz types



Tolerance: ±0.3 ±.012



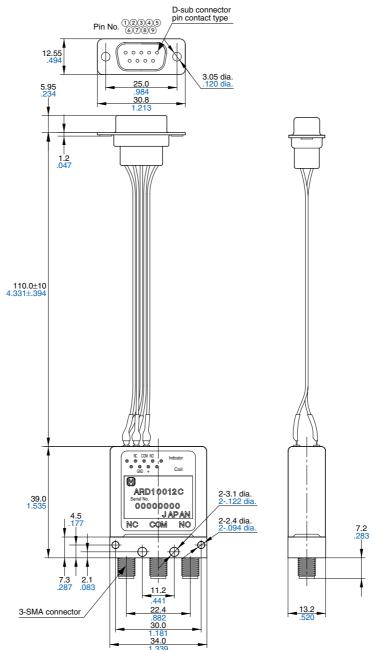
<sup>\* +</sup> COM type is available
\* The type without indicator terminals will not have the indicator terminals that are marked with the dotted box.

### 2) Connector cable

### CAD Data

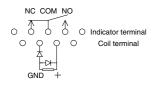


	Indicator						С	oil	
Pin No.	1	2	3	4	5	6	7	8	9
Fail-safe	_	NC	СОМ	NO	_	-	GND	+	-
Latching	_	1	СОМ	2	_	-	GND	1	2
Latching with TTL driver	-	1	СОМ	2	_	V	GND	Logic 1	Logic 2

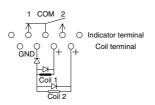


Tolerance:  $\pm 0.3 \pm .012$ 

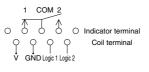




### Latching



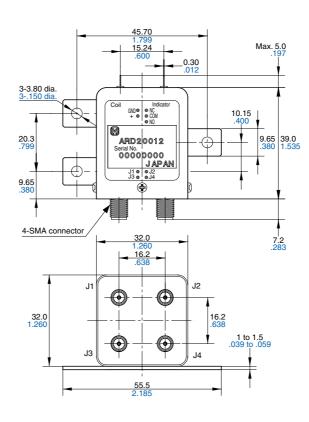
# Latching with TTL driver (with self cut-off function)

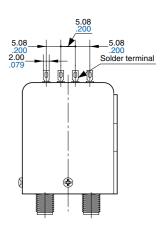


### 2. Transfer

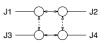
### CAD Data







Tolerance:  $\pm 0.3 \pm .012$ 

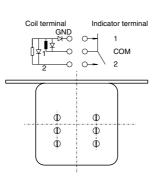


Fail-safe	NC: J1-J2, J3-J4 NO: J1-J3, J2-J4
Latching	POS1: J1-J2, J3-J4 POS2: J1-J3, J2-J4
Latching with TTL driver	POS1: J1-J2, J3-J4 POS2: J1-J3, J2-J4

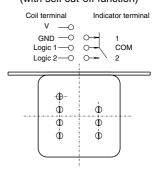
### Fail-safe

# Coil terminal Indicator terminal SND NC COM NO

### Latching



# Latching with TTL driver (with self cut-off function)

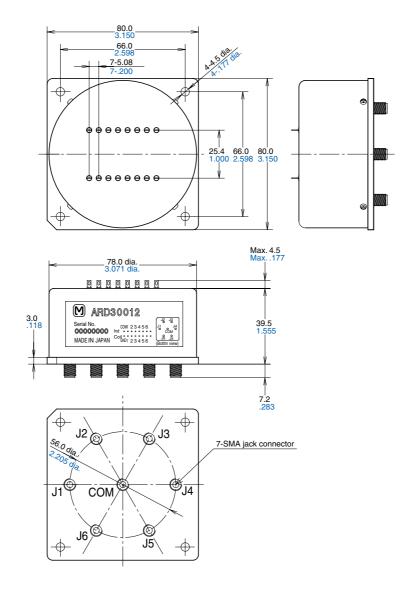


\* + COM type is available

### 3. SP6T

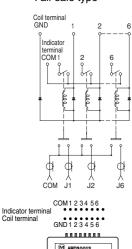
### CAD Data



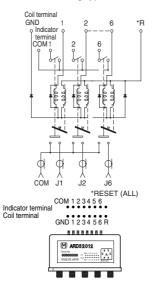


Tolerance:  $\pm 0.3 \pm .012$ 

### Fail-safe type



### Latching type

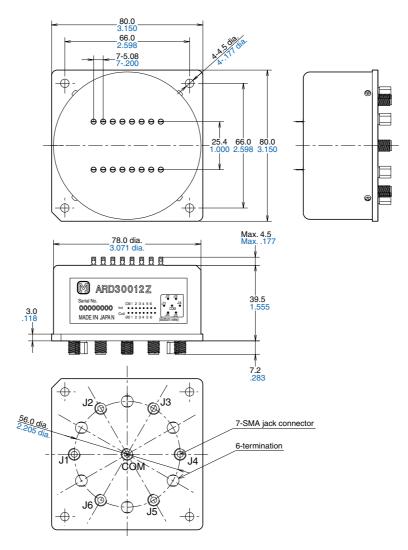


\* + COM type is available.

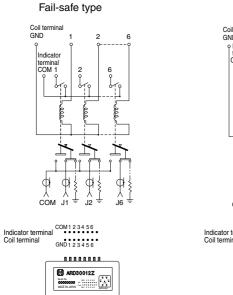
### 4. SP6T (with termination)

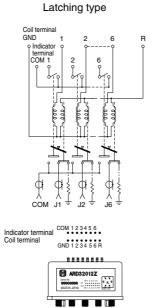
### CAD Data





Tolerance: ±0.3 ±.012





### **NOTES**

# 1. For general cautions for use, please refer to the "General Application Guidelines".

### 2. 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 50 ms to set/reset the latching type relay.

Please use the latching type for circuits that are continually powered for long periods of time.

### 3. Coil connection

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

# 4. Connection of coil indicator and washing conditions

 The connection of coil indicator terminal shall be done by soldering. Soldering conditions

Max. 260°C 500°F (solder temp) within 10sec (soldering time)

Max. 350°C 662°F (solder temp) within 3sec (soldering time)

2) This product is not sealed type, therefore washing is not allowed.

# 5. Conditions for operation, transport and storage conditions

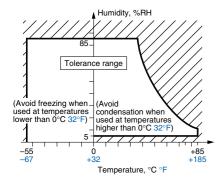
1) Temperature:

 $-55 \text{ to } +85^{\circ}\text{C} -67 \text{ to } +185^{\circ}\text{F}$ 

2) Humidity: 5 to 85% RH (Avoid freezing and condensation.) The humidity range varies with the

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:



### 4) 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.

5) 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.

6) Low temperature, low humidity environments.

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

### 6. Other handling precautions.

- 1) The relay's on/off service life is based on standard test conditions (temperature: 15 to 35°C 59 to 95°F, humidity: 25 to 75%) specified in JIS C5442-1996. Life will depend on many factors of your system: coil drive circuit, type of load, switching intervals, switching phase, ambient conditions, to name a few. 2) Use the relay within specifications such as coil rating, contact rating and on/
- relay may overheat, generate smoke or catch fire.

  3) Be careful not to drop the relay. If accidentally dropped, carefully check its appearance and characteristics before

off service life. If used beyond limits, the

- 4) Be careful to wire the relay correctly. Otherwise, malfunction, overheat, fire or other trouble may occur.
- 5) The latching type relay is shipped in the reset position. But jolts during transport or impacts during installation can move it to the set position. It is, therefore, advisable to build a circuit in which the relay can be initialized (set and reset) just after turning on the power. 6) If a relay stays on in a circuit for many months or years at a time without being activated, circuit design should be reviewed so that the relay can remain non-excited. A coil that receives current all the time heats, which degrades insulation earlier than expected. A latching type relay is recommended for such circuits.

- 7) For SMA connectors, we recommend a torque of 0.90±0.1 N·m for installation, which falls within the prescribed torque of MIL-C-39012. Please be aware that conditions might be different depending on the connector materials and how it interacts with surrounding materials.
  8) Please do not use silicon based substances such as silicon rubber, silicon
- substances such as silicon rubber, silicon oil, silicon coatings and silicon fillings, in the vicinity of the relay. Doing so may cause volatile silicon gas to form which may lead to contact failure due to the adherence of silicon on the contacts when they open and close in this atmosphere.
- 9) Please note that when switching contacts (latching type only), you must apply reset (ALL) voltage and release all contacts first. (SP6T type)
- 10) Do not use multiple contacts simultaneously. (SP6T type)
- 11) The indicator terminal is the terminal that indicates the operation status of the MAIN contact.
- 12) For details about the drive method of the latching with TTL driver type, please refer to the RD coaxial switch catalog on the website.