

NAiS

26.5GHz, 18GHz COAXIAL SWITCH

RD COAXIAL SWITCHES (ARD)



FEATURES

1. Excellent high frequency characteristics (SPDT, transfer) up to 26.5 GHz.
2. SPDT, transfer and SPST type is available
3. High sensitivity
Nominal operating power:
840 mW (SPDT, Failsafe type)
1540 mW (Transfer, Failsafe type)
4. Long life: 5×10^6 (SPDT, transfer)
5. Latching type is also available

TYPICAL APPLICATIONS

Wireless and mobile communication

- Cellular phone base stations
- Amplifier switching

Digital broadcasting

- Broadcasting equipment

Measurement instruments

- All types of inspection equipment

SPECIFICATIONS

Contact

Arrangement	SPDT	Transfer	SPST					
Contact material		Gold plating						
Initial contact resistance		Max. 100mΩ						
Rating	Contact input power* ¹	120W 3GHz (V.S.W.R. 1.15 or less, no contact switching, ambient temperature 40°C [SPDT], 25°C [Transfer]) ^{#1}	120W 2.2GHz (V.S.W.R. 1.2 or less, no contact switching) 150W 2.2GHz (V.S.W.R. 1.2 or less, no contact switching when cooling fan is used)					
Indicator rating	Contact rating	Max. 30V 100mA	Max. 5V 100mA					
	Initial contact resistance (Measured by 5V 100mA)	Max. 1Ω						
High frequency characteristics (Impedance 50Ω)	V.S.W.R. (max.)	to 1 GHz	1.1	1.15	1.25	1.35	1.5	1.7
	Insertion loss (dB, max.)		0.2	0.3	0.4	0.5	0.6	0.8
	Isolation (dB, min.)		85	80	70	65	60	55
Expected life (min. operation)	Mechanical (at 180 cpm)	5×10^6						10^4
	Electrical (at 20 cpm)	5×10^6 (5W, to 3GHz, impedance 50Ω, V.S.W.R.; max. 1.2)						10 ⁴ (80W, to 2.2GHz, impedance 50Ω, V.S.W.R.; max. 1.2, ambient temperature; max. 40°C 104°F)

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

*2 18 to 26.5 GHz characteristics apply to the 26.5 GHz type only.

Characteristics

	SPDT	Transfer	SPST
Initial insulation resistance* ²	Min. 1,000 MΩ (at 500 V DC)		
Initial breakdown voltage* ³	Between open contacts	500 Vrms for 1 min.	
	Between contact and coil	500 Vrms for 1 min.	
	Between contact and earth terminal	500 Vrms for 1 min.	
	Between coil and earth terminal	500 Vrms for 1 min.	
Operate time* ⁴ (at 20°C)	Max. 15ms	Max. 20ms	Max. 15ms
Shock resistance	Functional* ⁵	Min. 500 m/s ² {50G}	
	Destructive* ⁶	Min. 1,000 m/s ² {100G}	
Vibration resistance	Functional* ⁷	10 to 55 Hz at double amplitude of 3mm	
	Destructive	10 to 55 Hz at double amplitude of 5mm	
Conditions for operation, transport and storage* ⁸ (Not freezing and condensing at low temperature)	Ambient temp	-55°C to +85°C -67°F to +185°F	
	Humidity	5 to 85% R.H.	
Unit weight (Approx.)	50g 1.76oz	110g 3.88oz	20g .71oz

Remarks

*1 Please verify the usability of input power under actual conditions because heat generated from connectors can influence connection.

*2 Measurement at same location as "Initial breakdown voltage" section.

*3 Detection current: 10mA

*4 Nominal operating voltage applied to the coil, excluding contact bounce time.

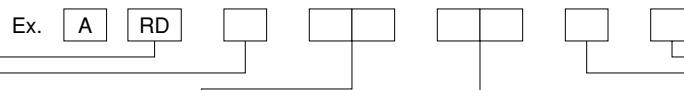
*5 Half-wave pulse of sine wave: 11ms, detection time: 10μs.

*6 Half-wave 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



Product name	Frequency	Operating function	Nominal operating voltage, V DC	Operation terminal	HF data attached (SPDT, Transfer)
RD	0: to 3GHz (SPST) 1: to 18GHz (SPDT) 2: to 18GHz (Transfer) 5: to 26.5GHz (SPDT) 6: to 26.5GHz (Transfer)	00: Failsafe 10: Latching (SPST) 20: Latching (SPDT, Transfer) 51: Latching with TTL driver (with self cut-off function) (SPDT, Transfer)	4H: 4.5V (Failsafe, Latching type only) 05: 5V (Latching with TTL driver type only) 12: 12V 24: 24V	Nil: Solder terminal (SPDT, Transfer), Lead wire (SPST) C: Connector cable (SPDT type only)	Nil: No HF test data attached Q: HF test data attached

Note: Sealed types are also available. (SPDT type only)

TYPES

1. SPDT

1) Solder terminal

Operating function	Nominal operating voltage, V DC	18GHz type		26.5GHz type	
		No HF datasheet attached	HF datasheet attached	No HF datasheet attached	HF datasheet attached
Failsafe	4.5	ARD1004H	ARD1004HQ	ARD5004H	ARD5004HQ
	12	ARD10012	ARD10012Q	ARD50012	ARD50012Q
	24	ARD10024	ARD10024Q	ARD50024	ARD50024Q
Latching	4.5	ARD1204H	ARD1204HQ	ARD5204H	ARD5204HQ
	12	ARD12012	ARD12012Q	ARD52012	ARD52012Q
	24	ARD12024	ARD12024Q	ARD52024	ARD52024Q
Latching with TTL driver (with self cut-off function)	5	ARD15105	ARD15105Q	ARD55105	ARD55105Q
	12	ARD15112	ARD15112Q	ARD55112	ARD55112Q
	24	ARD15124	ARD15124Q	ARD55124	ARD55124Q

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

2) Connector cable

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

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

2. Transfer

1) Solder terminal

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

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

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3. SPST

Operating function	Nominal operating voltage, V DC	Part No.
Failsafe	4.5	ARD0004H
	12	ARD00012
	24	ARD00024
Latching	4.5	ARD0104H
	12	ARD01012
	24	ARD01024

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

COIL DATA (at 20°C 68°F)

1. SPDT

1) Failsafe type

Nominal operating voltage, V DC	Nominal operating current, mA (+10%/-15%)	Nominal power consumption, mW
4.5	186.7	840
12	70.0	840
24	40.4	970

2) Latching type

Nominal operating voltage, V DC	Nominal operating current, mA (+10%/-15%)	Nominal power consumption, mW
4.5	155.6	700
12	62.5	750
24	37.5	900

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

Nominal operating voltage, V DC	TTL logic level (see TTL logic level range)		Switching frequency
	ON	OFF	
5	2.4 to 5.5V	0 to 0.5V	Max. 180 cpm (ON time : OFF time = 1 : 1)

2. Transfer

1) Failsafe type

Nominal operating voltage, V DC	Nominal operating current, mA (+10%/-15%)	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%)	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 TTL logic level range)		Switching frequency
	ON	OFF	
5	2.4 to 5.5V	0 to 0.5V	Max. 180 cpm (ON time : OFF time = 1 : 1)

3. SPST

1) Failsafe type

Nominal operating voltage, V DC	Nominal operating current, mA (+10%/-15%)	Nominal power consumption, mW
4.5	400	1800

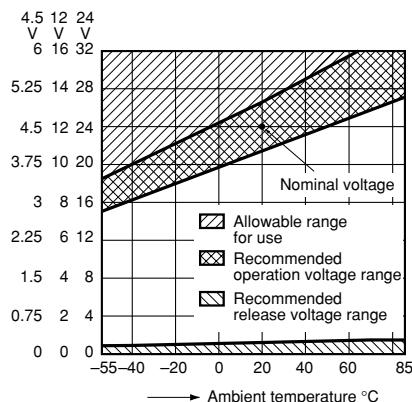
2) Latching type

Nominal operating voltage, V DC	Nominal operating current, mA (+10%/-15%)	Nominal power consumption, mW
4.5	400	1800

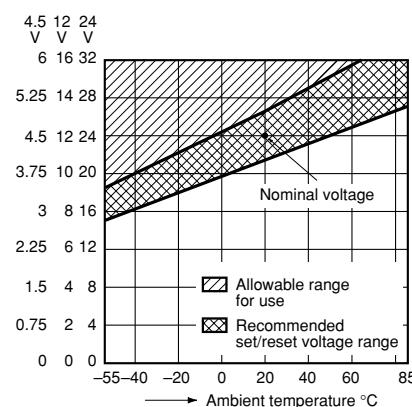
• Operating voltage range

(1) SPDT, Transfer type

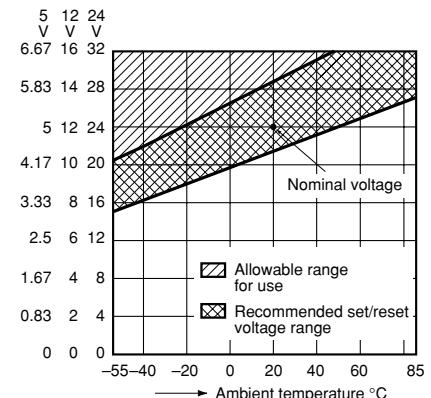
1) Failsafe type



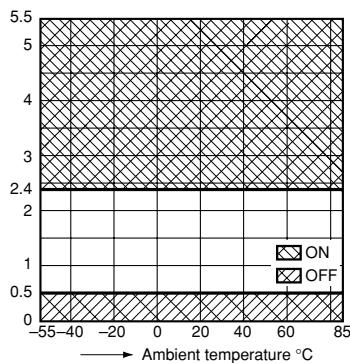
2) Latching type



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



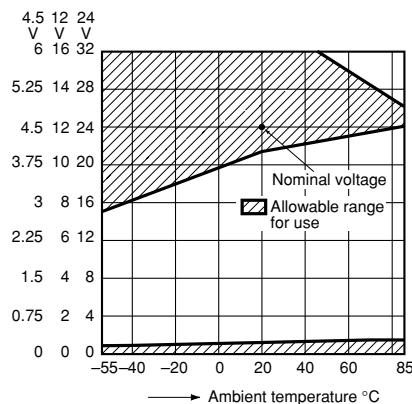
4) TTL Logic level range



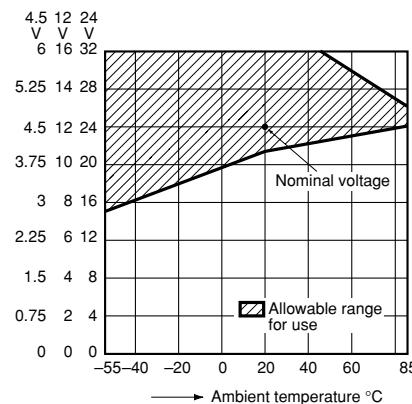
Note) Please consult us for use that is outside this range.

(2) SPST type

1) Failsafe type



2) Latching type



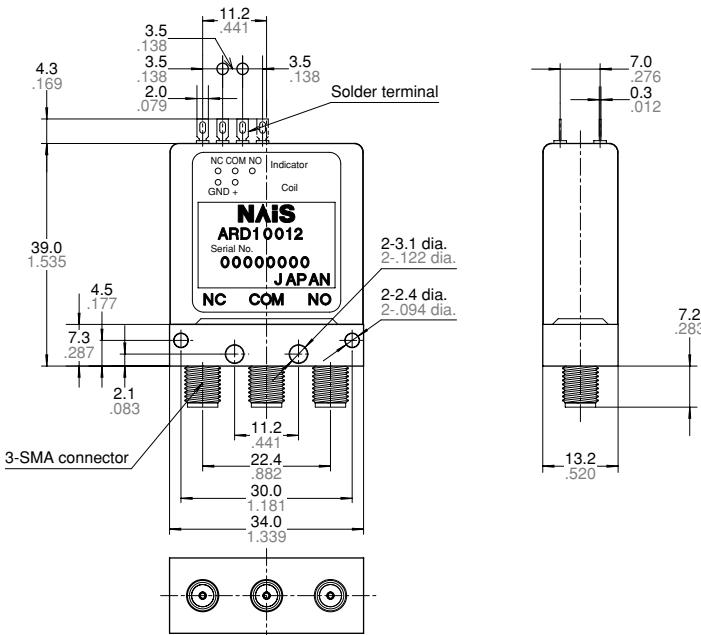
RD (ARD)

DIMENSIONS

mm inch

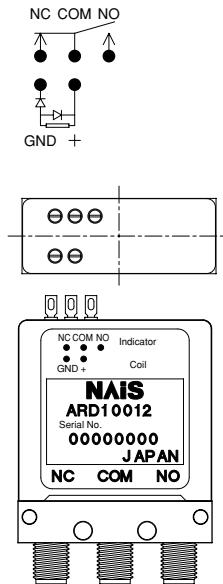
1. SPDT

1) Solder terminal

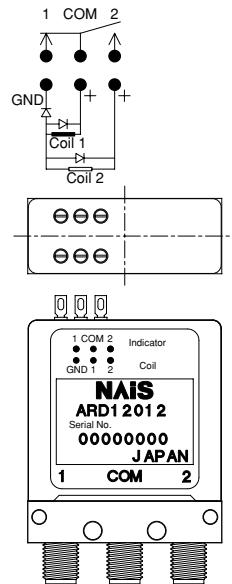


Tolerance: $\pm 0.3 \pm .012$

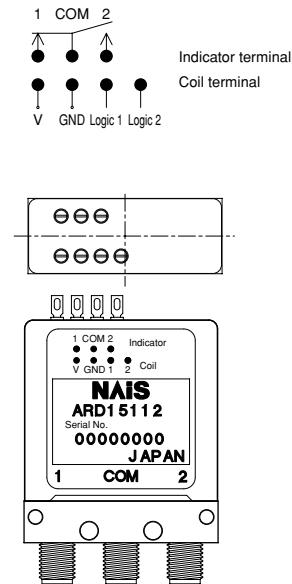
Failsafe



Latching



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

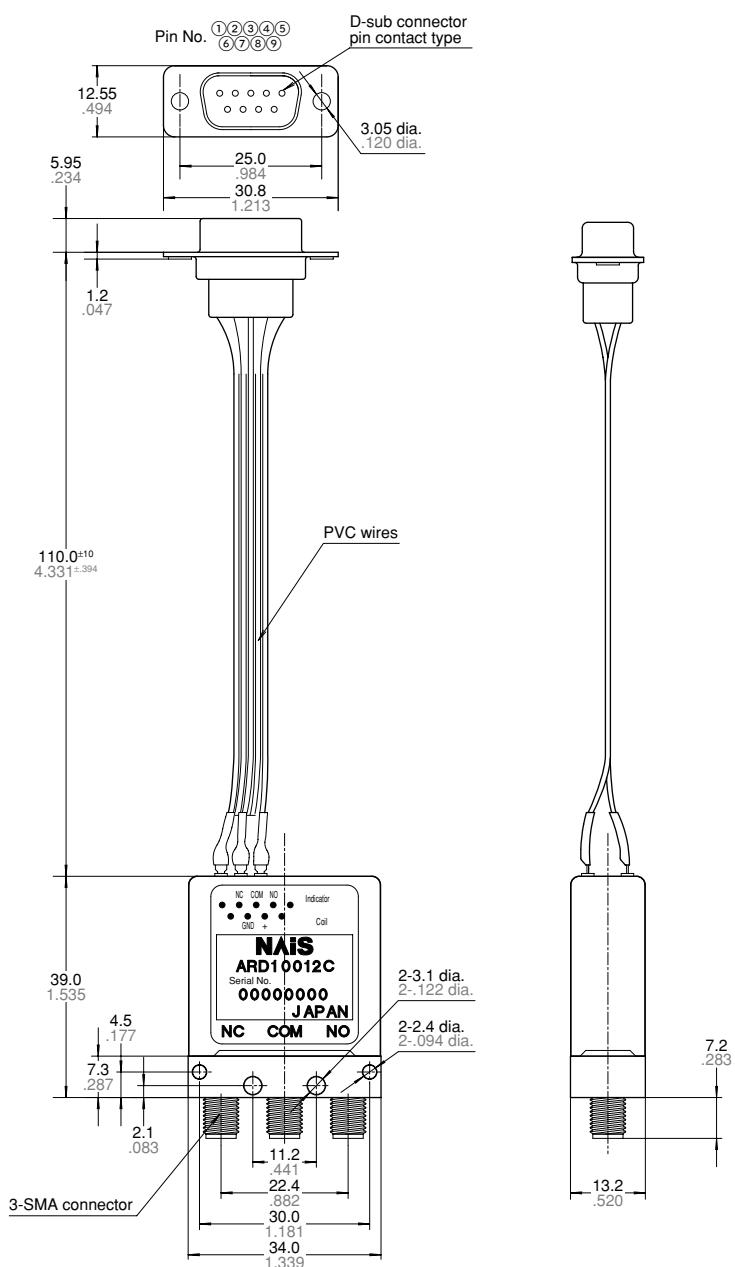


2) Connector cable

mm inch



Pin No.	Indicator					Coil			
	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Fail safe	—	NC	COM	NO	—	—	GND	+	—
Latching	—	1	COM	2	—	—	GND	1	2
Latching with TTL driver	—	1	COM	2	—	V	GND	Logic 1	Logic 2

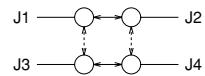
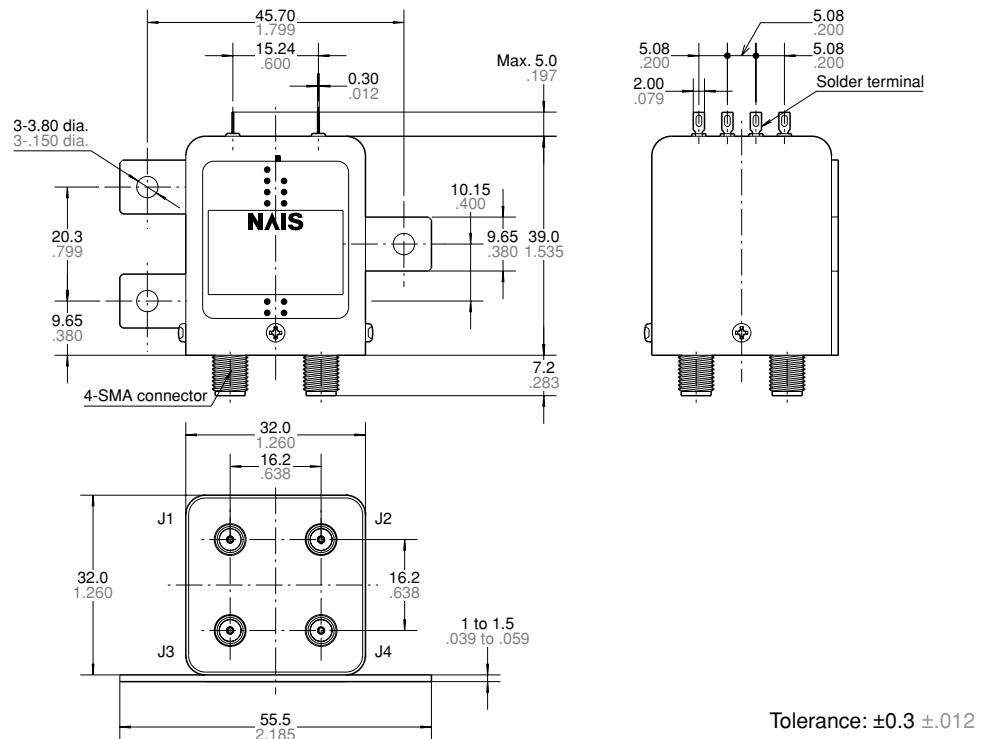


Tolerance: ±0.3 ±.012

RD (ARD)

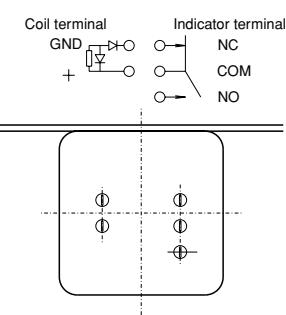
2. Transfer

mm inch

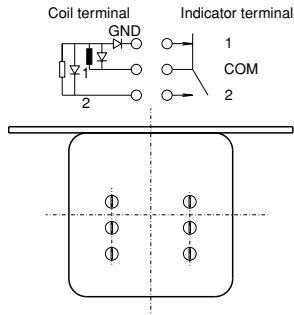


Fail safe	NC: J1-J2, J3-J4 NO: J1-J3, J2-J4
Latching	POS1: J1-J2, J3-J4 POS2: J1-J3, J2-J4
Latching with TTL driver	POS1: J1-J2, J3-J4 POS2: J1-J3, J2-J4

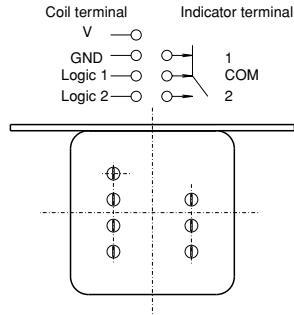
Failsafe



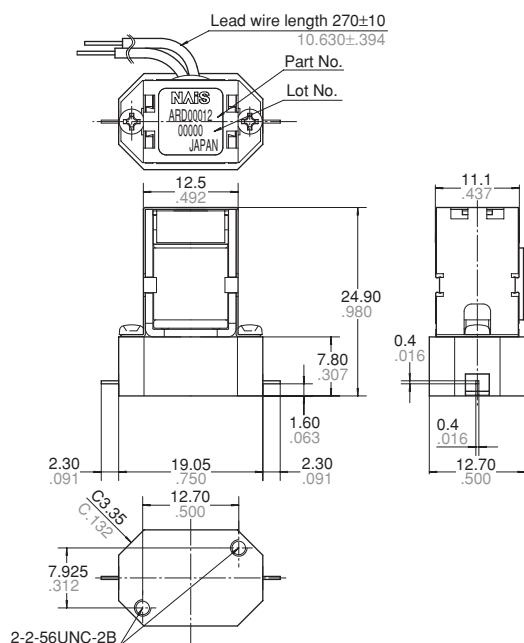
Latching



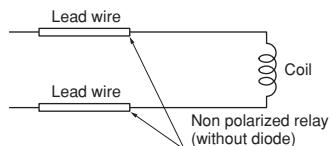
Latching with TTL driver
(with self cut-off function)



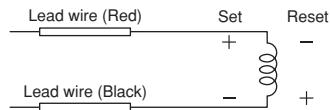
3. SPST



Fail safe type



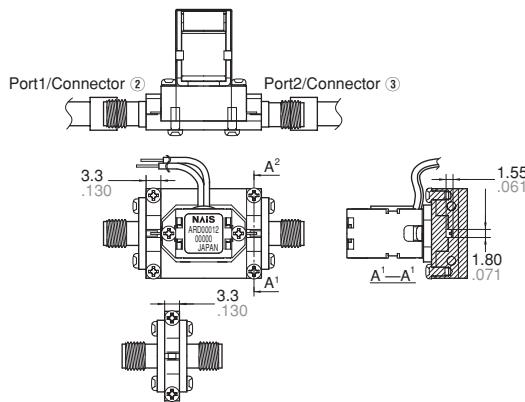
Latching type



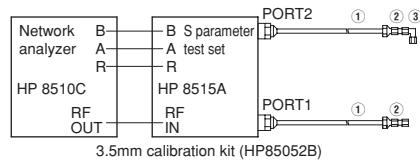
Tolerance: ±0.3 ±.012

• Measuring method (Impedance 50Ω)

(V.S.W.R.) The contact must be ON.
 (Insert loss) The contact must be ON.
 (without DUT board's loss)
 (Isolation) The contact must be OFF.
 At that time, conduct measurement with an averaging of 64 times and 1% smoothing.



• Measuring equipment



• Connector

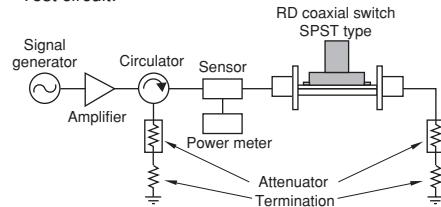
No.	Contents	Product name
(1)	3.5 mm testport, Extention cable	HP85131-60013
(2)	3.5 mm coaxial adaptor	HP83059
(3)	SMA adaptor	HP125.771.000

• Input power test

Sample: ARD01024, Quantity: n = 5

Frequency: 2.2 GHz, Ambient temperature: Room temperature

Test circuit:



Sample	Cooling fan	Input power, W												
		80	90	100	110	120	130	140	150	160	170	180	190	200
No. 1	Without		○	○					○					
No. 2				○	→	○		→	○					
No. 3					○	○	→	○						
No. 4	With			○	→	○		→	○					○
No. 5									○	→	○	○	○	○

○: No abnormality for high frequency and operating characteristics were observed after 30 min. power carrying.

(→: Test sequence)

RD (ARD)

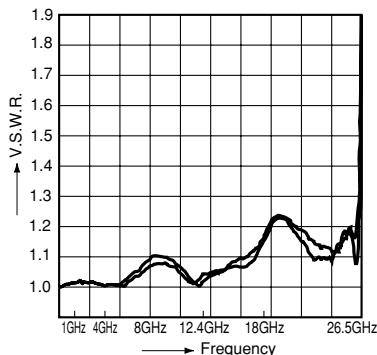
REFERENCE DATA

1-(1). High frequency characteristics (SPDT)

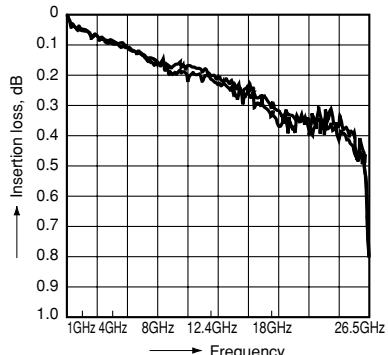
Sample: ARD10012

Measuring method: Measured with HP network analyzer (HP8510).

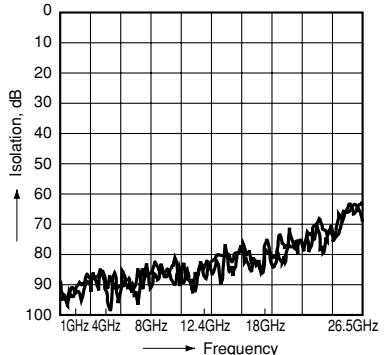
• V.S.W.R.



• Insertion loss



• Isolation

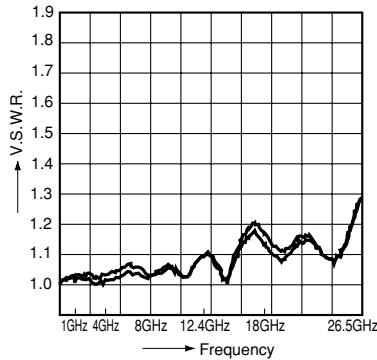


1-(2). High frequency characteristics (Transfer)

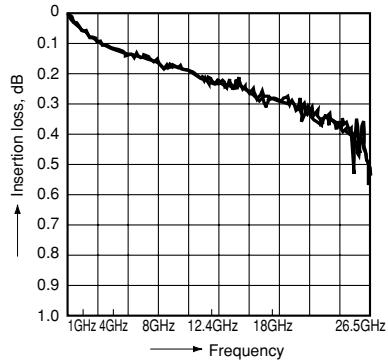
Sample: ARD60012

Measuring method: Measured with HP network analyzer (HP8510).

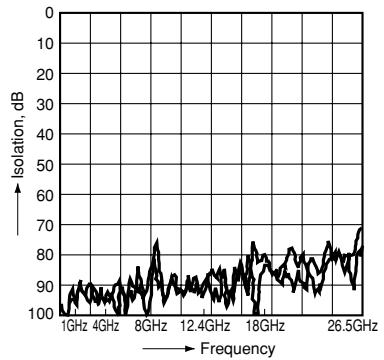
• V.S.W.R.



• Insertion loss



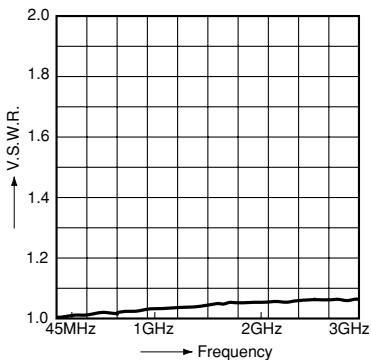
• Isolation



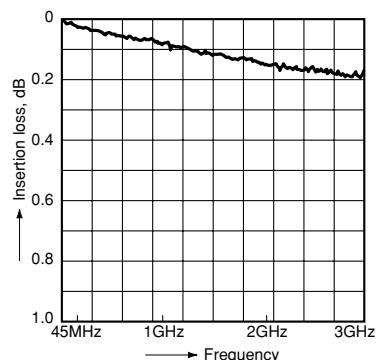
1-(3). High frequency characteristics (SPST)

Measuring method: Measured with HP network analyzer (HP8510).

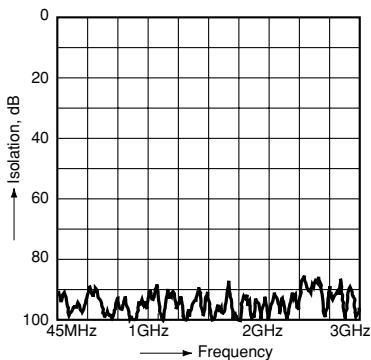
• V.S.W.R.



• Insertion loss



• Isolation



NOTES

1. Coil connection

When connecting coils, refer to the wiring diagram to prevent mis-operation or malfunction. (Only SPST failsafe type is non polarized relay)

2. Connection of coil indicator and washing conditions (SPDT, Transfer)

1) 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.

3. Other handling precautions.

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.

For Cautions for Use, see Relay Technical Information.