High-frequency, High-capacity Coaxial Switch Supporting Bandwidth to 26.5 GHz

- ROHS compliant.
- Superior high-frequency characteristics, such as an isolation of 60 dB min., insertion loss of 0.8 dB max., and V.SWR of 1.7 max. at 26.5 GHz (50Ω).
- Models supporting bandwidth of 18GHz added to the series
- Contact carry power of 120 W at 3 GHz.
- High sensitivity with rated powe consumption of 700 mW for failsafe models and 500 mW for double-winding latching models.

NEW

Application Examples

- Mobile phone stations and antenna devices
- Wireless devices, wireless LAN, and disaster prevention wireless

- Test equipment, measuring equipment, and jigs
- Broadcasting facilities (digital TV, cable TV, and satellite broadcasting)

Ordering Information

Model Number Legend

G9YA☐-☐☐-☐☐-☐☐☐
   1 2 3 4 5 6 7 8

1. Relay Function
  None: Failsafe
  K: Double-winding latching
  T: TTL-driven double-winding latching (with self cut-off function)

2. Contact Form
  12:    SPDT

3. Terminal Shape
  S: SMA

4. Frequency
  3:     18GHz
  4:     26.5 GHz

5. Characteristic Impedance
  5:     50 Ω

6. Operating Terminal
  None: Soldering terminal
  P: Pin terminal
  C: Connector cable

7. Indicator Terminal
  None: No indicator terminal
  N: Indicator terminal

8. Data Package
  None: No data package
  D: Data package

■ List of Models

Standard Models with Soldering Terminals

Classification	Contact form	Indicator terminal	Data package	Rated coil voltage	Model packaging unit	Minimum
Failsafe	SPDT	No	No	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)	One per box
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-D	
		Yes	No	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-N	
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-ND	
Double-winding latching	SPDT	No	No	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)	One per box
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-D	
		Yes	No	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-N	
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-ND	
TTL-driven double-winding latching (with self cutoff function) latching	SPDT	No	No	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)	One per box
			Yes	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-D	
		Yes	No	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-N	
			Yes	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-ND	

Standard Models with Pin Terminals

Classification	Contact form	Indicator terminal	Data package	Rated coil voltage	Model packaging unit	Minimum
Failsafe	SPDT	No	No	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-P	One per box
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-PD	
		Yes	No	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-PN	
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-PND	
Double-winding latching	SPDT	No	No	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-P	One per box
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-PD	
		Yes	No	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-PN	
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-PND	
TTL-driven double-winding latching (with self cutoff function) latching	SPDT	No	No	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-P	One per box
			Yes	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-PD	
		Yes	No	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-PN	
			Yes	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-PND	

Standard Models with Connector Cables

Classification	Contact form	Indicator terminal	Data package	Rated coil voltage	Model packaging unit	Minimum
Failsafe	SPDT	No	No	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-C	One per box
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-CD	
		Yes	No	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-CN	
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YA-12S-45(35)-CND	
Double-winding latching	SPDT	No	No	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-C	One per box
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-CD	
		Yes	No	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-CN	
			Yes	4.5, 12, 15, 24, and 28 VDC	G9YAK-12S-45(35)-CND	
TTL-driven double-winding latching (with self cutoff function) latching	SPDT	No	No	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-C	One per box
			Yes	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-CD	
		Yes	No	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-CN	
			Yes	5, 12, 15, and 24 VDC	G9YAT-12S-45(35)-CND	

Specifications

■ Ratings

Indicator Rating

Rating	100 mA max. at 30 V
Contact resistance	1 Ω max. (See note 2.)

Note: 1. The above values are initial values.

    2. The contact resistance was measured with 10 mA at 1 VDC with a voltage drop method.

High Frequency Characteristics

Frequency Item	1 GHz max.	4 GHz max.	8 GHz max.	12.4 GHz max.	18 GHz max.	26.5 GHz max.
Insertion loss	0.2 dB		0.3 dB	0.4 dB	0.5 dB	0.8 dB
Isolation	85 dB	80 dB	70 dB	65 dB	60 dB	
V.SWR	1.1	1.15	1.25	1.35	1.5	1.7

Note: 1. The above values are initial values.

    2. Of the above values, the rated values are 18GHz max, for the 18GHz model and the 26.5 GHz max, for the 26.5GHz model.

Failsafe Model
G9YA-12S-45(35)

Frequency Item	Rated current	Coil resistance	Must operate voltage	Must release voltage	Maximum voltage	Power consumption
4.5 VDC	155.2 mA	29 Ω	80% max. of rated voltage	10% min. of rated voltage	150% of rated voltage	Approx. 700 mW
12 VDC	58.5 mA	205 Ω				
15 VDC	46.7 mA	321 Ω				
24 VDC	29.2 mA	822 Ω				
28 VDC	25.0 mA	1,118 Ω				

Note: 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.

    2. The operating characteristics are measured at a coil temperature of 23°C.

    3. The maximum voltage is the highest voltage that can be imposed on the Relay coil instantaneously.

Double-winding Latching Model
G9YA-12S-45(35)

Item \ Frequency	Rated current	Coil resistance voltage	Must set voltage	Must reset voltage	Maximum voltage	Power consumption
4.5 VDC	109.8 mA	41 Ω	80% max. of rated voltage	10% min. of rated voltage	150% of rated voltage	Approx. 500 mW
12 VDC	41.7 mA	288 Ω				
15 VDC	33.3 mA	450 Ω				
24 VDC	20.8 mA	1,152 Ω				
28 VDC	17.9 mA	1,568 Ω				

TTL-driven Latching Model
G9YA-12S-45(35)

Item \ Frequency	Rated current		Electronic self cut-off	Switching frequency
	On	**Off**		
5 VDC	2.4 to 5.5 V	0 to 0.5 V	Yes	180 operations per minute max. (ON time: OFF time = 1:1)
12 VDC				
15 VDC				
24 VDC				

Note: 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
   2. The operating characteristics are measured at a coil temperature of 23°C.
   3. The maximum voltage is the highest voltage that can be imposed on the Relay coil instantaneously.

Models with Indicator Terminals
Note: An extra 140 to 300 mW of power consumption is added to models with indicator terminals, due to the operating coil and voltage specifications.

■ Characteristics

	Type	Failsafe model	Double-winding Latching	TTL-driven latching model
Item	**Model**	**G9YA-125-45(35)**	**G9YAK-125-45(35)**	**G9YA-12S-45(35)**
Contact resistance (See note 3.)		100 mΩ max.		
Operate (set) time		15 ms max.		
Release (reset) time		15 ms max.		
Minimum set/reset signal width		-	100ms	
Insulation resistance (See note 4.)		1000 MΩ min. (at 500 VDC)		
Dielectric strength	Coil and contacts	500 VAC, 50/60 Hz for 1 min		
	Coil and ground, contacts and ground	500 VAC, 50/60 Hz for 1 min		
	Contacts of same polarity	500 VAC, 50/60 Hz for 1 min		
Vibration resistance	Destruction	10 to 55 Hz, 2-mm single amplitude (5.0 mm double amplitude)		
	Malfunction	10 to 55 Hz, 1.5-mm single amplitude (3.0 mm double amplitude)		
Shock resistance	Destruction	1,000 m/s²		
	Malfunction	500 m/s²		
Endurance	Mechanical	5,000,000 operations min. (at 36,000 operations/hour)		
	Electrical	5,000,000 operations min. 3 GHz, 5W 50Ω, V.SWR1.2 max.(at switching frequency of 1,800 operations per hour)		
Ambient temperature		Operating: -55ºC to 85ºC (with no icing or condensation)		
Ambient humidity		Operating: 5% to 85%		
Weight		Approx. 50 g		

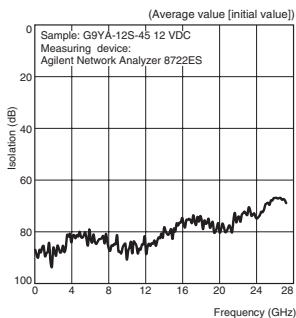**Note: 1.** The above values are initial values.
    2. Rated and characteristic (initial) values are for a standard temperature of 23°C and a humidity of 65% unless otherwise indicated.
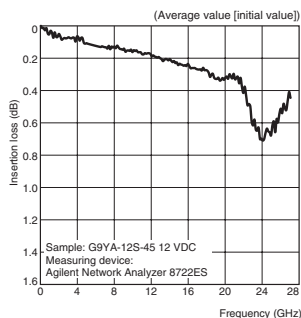   **3.** The contact resistance was measured with 10 mA at 1 VDC with a voltage drop method.
    4. The insulation resistance was measured with a 500-VDC megohmmeter applied to the same parts as those used for checking the dielectric strength.
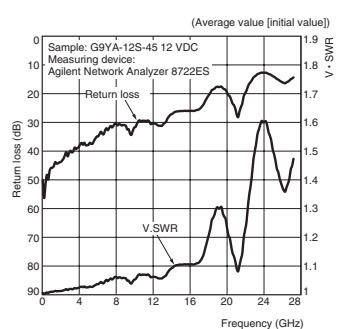
Engineering Data

High-frequency Characteristics (Isolation) (See notes 1 and 2.)

(Average value [initial value])

Sample: G9YA-12S-45 12 VDC
Measuring device:
Agilent Network Analyzer 8722ES

High-frequency Characteristics (Insertion Loss) (See notes 1 and 2.)

(Average value [initial value])

Sample: G9YA-12S-45 12 VDC
Measuring device:
Agilent Network Analyzer 8722ES

High-frequency Characteristics (Return Loss, V.SWR) (See notes 1 and 2.)

(Average value [initial value])

Sample: G9YA-12S-45 12 VDC
Measuring device:
Agilent Network Analyzer 8722ES
Return loss
V.SWR

Note: 1. The tests were conducted at an ambient temperature of 23°C.
    2. The high-frequency characteristics will vary according to the connectors. Be sure to check operation including durability at the actual device before use.
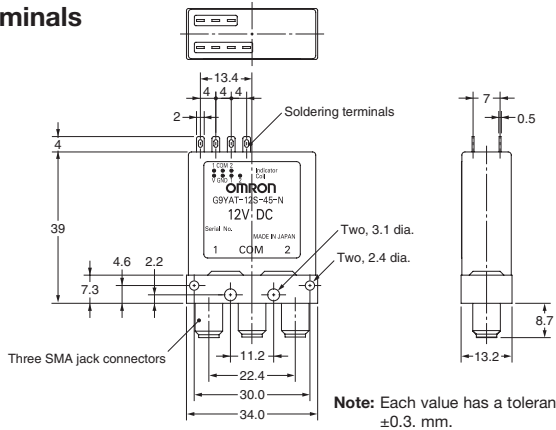
Dimensions

Note: All units are in millimetres unless otherwise indicated.

■ **Models with Soldering Terminals**

G9YA-12S-45(35)-□
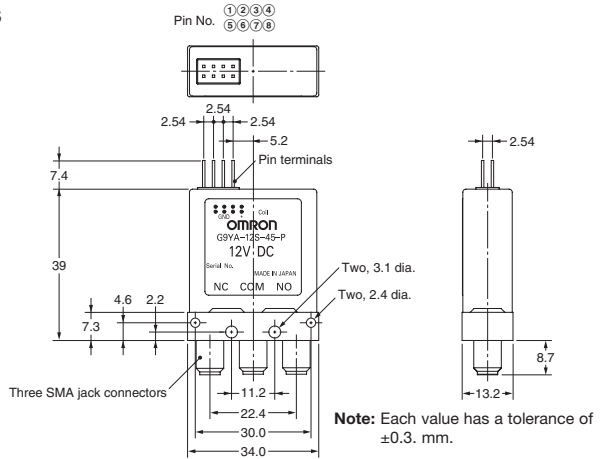**G9YAK-12S-45(35)-□**
G9YAT-12S-45(35)-□

Soldering terminals

Three SMA jack connectors

Two, 3.1 dia.
Two, 2.4 dia.

13.4
4 4 4
2
4
39
4.6 2.2
7.3
11.2
22.4
30.0
34.0

7
0.5
8.7
13.2

Note: Each value has a tolerance of ±0.3. mm.

Model	G9YA-12S-45(35)-□	G9YAK-12S-45(35)-□	G9YAT-12S-45(35)-□
Indicator terminal Type	**Failsafe**	**Double-winding latching**	**TTL-driven double-winding**
Without indicator terminals			
With indicator terminals			

■ Models with Pin Terminals

G9YA-12S-45(35)-P□

G9YAK-12S-45(35)-P□

G9YAT-12S-45(35)-P□

Pin No. ①②③④ ⑤⑥⑦⑧

Pin terminals

2.54
2.54
2.54
5.2
7.4
39
4.6 2.2
7.3

Two, 3.1 dia.
Two, 2.4 dia.

NC COM NO

Three SMA jack connectors

11.2
22.4
30.0
34.0

2.54

8.7

13.2

Note: Each value has a tolerance of ±0.3. mm.

Pin Terminal arrangement

		Indicator				Coil			
Pin number		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Without indicator terminals	**Failsafe**						GND		+
	Double-winding latching						GND	1	2
	TTL-driven double-winding latching					V	GND	Logic 1	Logic 2
With indicator terminals	**Failsafe**		NC	COM	NO		GND		+
	Double-winding latching		1	COM	2		GND	1	2
	TTL-driven double winding latching		1	COM	2	V	GND	Logic 1	Logic 2

■ Models with Connector Cables

G9YA-12S-45(35)-C☐

G9YAK-12S-45(35)-C☐

G9YAT-12S-45(35)-C☐

Pin No. ①②③④⑤ ⑥⑦⑧⑨

D-sub connector pin-contact type

12.6

24.99

30.8

Two, 3.05 dia.

6

1.2

110±10

Polyvinyl chloride wire

39

Two, 3.1 dia.

Two, 2.4 dia.

4.6 2.2

7.3

NC COM NO

Three SMA jack connectors

11.2

22.4

30.0

34.0

8.7

13.2

Note: Each value has a tolerance of ±0.3. mm.
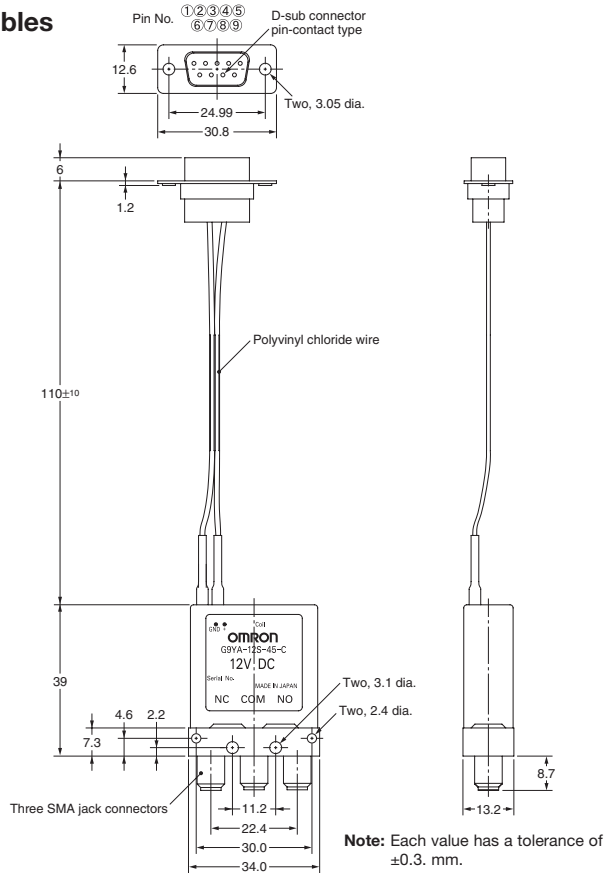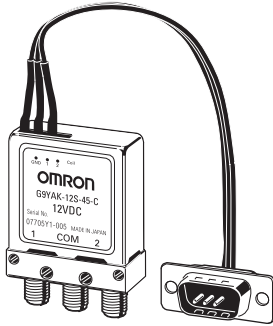
Pin Terminal arrangement

		Indicator				Coil				
	Pin number	1	2	3	4	5	6	7	8	9
Without indicator terminals	Failsafe							GND	+	
	Double-winding latching							GND	1	2
	TTL-driven double-winding latching					V	GND	Logic 1	Logic 2	
With indicator terminals	Failsafe		NC	COM	NO			GND	+	
	Double-winding latching		1	COM	2			GND	1	2
	TTL-driven double winding latching		1	COM	2		V	GND	Logic 1	Logic 2

Signal Relays

Precautions

■ Precautions for Correct Use

Relay handing

- Relays are precision components. Do not subject the Relay to vibration or shock in excess of the standard values, whether before or after mounting. The original performance cannot be maintained if the Relay is subjected to abnormal vibration or shock or dropped. Also, do not subject the Relay to vibration or shock in excess of the rated values when it is still packaged.

- Avoid subjecting the Relay to direct sunlight when it is being used, stored or transported. Keep the Relay at conditions of normal temperature, humidity, and pressure.

- The Relay is not sealed. It cannot be washed.

- Be absolutely sure not to wire the Relay incorrectly. Incorrect wiring will result in failure of Relay functions and damage or fire in the Relay, in addition to affecting external circuits.

- Recommended torque for mounting the SMA connectors is the MIL-C-39012 standard of 0.90±0.1 N·m. The conditions, however, depend on the compatibility with the material of the connectors.

- Use of two or more Relays may result in change in the Relay characteristics due to interference in the magnetic fields generated by the Relays. Be sure to check operation using the actual devices before use.

- Use a power supply for the coil operating power supply with a maximum ripple of 5%. Be sure to check operation using the actual devices before use.

- Operation in excess of the coil ratings, contact ratings, switching service life or other specifications may result in abnormal heat generation, smoke, or fire.

Latching Relay Mounting

Make sure that the vibration or shock generated from other devices (e.g., Relays) on the same panel during operation or resetting do not exceed the values provided in the catalog, otherwise the latching Relay that has been set may be reset or vice versa. The latching Relay is reset before shipping. If excessive vibration or shock is imposed, however, the latching Relay may be set accidentally. Be sure to apply a reset signal before use.

Long-term Continuously ON Contacts

Using the Relay in a circuit where the Relay will be ON continuously for long periods (without switching) can lead to unstable contacts because the heat generated by the coil itself will deteriorate the insulation, causing a film to develop on the contact surfaces. We recommend using a latching Relay (magnetic-holding Relay) in this kind of circuit. If a failsafe Relay must be used in this kind of circuit, use a full-loop circuit design toprovide protection against possible poor connections and coil disconnection.

Using Relays in an Atmosphere Containing Corrosive Gas (Silicon, Sulfuric, or Organic Gas)

Do not use Relays in a location where silicon gas, sulfuric gas (SO2, H2S), or organic gas is present. If Relays are used for a long period in an atmosphere of sulfuric gas or organic gas, contact surfaces may become corroded and cause contact instability and obstruction, and terminal soldering characteristics may be degraded. If Relays are stored or used for a long time in an atmosphere of silicon gas, a silicon coating will be generated on contact surfaces, causing contact failure.

Connecting to Coil Terminals and Indicator Terminals

I. Models with Soldering Terminals

Perform manual soldering under the following conditions.

    Soldering iron tip temperature: 280 to 300°C

    Soldering time: Approx. 3 s max.

II. Models with Pin Terminals

Heed the following precautions when using models with pin terminals.

    1. Connectors for use: Straight dip type for panels Male connectors: HKP-8M29 (Honda Tsushin Kogyo) Refer to the general catalog of Honda Tsushin Kogyo for connector models and specifications.

    2. The sockets do not have a lock mechanism. Pulling the lead wires, shock, or long-term vibration may cause the connectors to become disconnected. Heed the following precautions.

- Securely fix the Relay and connectors and make sure that no force is pulling on the lead wires during use.

- Fully insert the socket into the Relay connector.

    3. Do not solder the lead wires directly to the pin connectors.

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES.
To convert millimetres into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.