Coaxial Switch
G9YA

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

- Isolation of 60 dB min., insertion loss of 0.8 dB max., and V.S.W.R. of 1.7 max. at 26.5 GHz (50 Ω).
- Contact carry power of 120 W at 3 GHz.
- High sensitivity with rated power consumption of 700 mW for failsafe models and 500 mW for dual coil latching models
- Models with TTL-driven dual coil latching and indicator terminals are available
- Models available with 26.5 GHz or 18 GHz operation.
- RoHS Compliant

Ordering Information

■ Model Number Legend:

G9YA□-□□-□□-□□□
1 2 3 4 5 6 7 8

1. **Relay Function**
   None: Failsafe
   K: Dual coil latching
   T: TTL-driven dual coil latching (with self cut-off function)
2. **Contact Form**
   12: SPDT
3. **Terminal Shape**
   S: SMA
4. **Frequency**
   4: 26.5 GHz
   3: 18 GHz
5. **Characteristic Impedance**
   5: 50 Ω
6. **Operating Terminals**
   None: Soldering terminals
   P: Pin terminals (See note 1.)
   C: Connector cable
7. **Auxiliary Indicator Terminals**
   None: No indicator terminals
   N: Indicator terminals
8. **Data Package**
   None: No data package
   D: Data package

Note: 1. To order, select the part number and add the desired coil voltage rating (e.g. G9YAK-12S-45-PND *DC12*).
2. Refer to “List of Models” for available part numbers

Application Examples

- Mobile communications infrastructure equipment, mobile phone base station equipment, and antenna devices
- Wireless devices, wireless LAN, and disaster prevention wireless equipment
- Test and measurement equipment
- Broadcasting equipment (digital TV, cable TV, and satellite broadcasting)

■ List of Models

Standard SPDT Models with Soldering Terminals

Classification	Indicator terminals	Data package	Rated coil voltage	Minimum packaging unit	Model
Failsafe	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	**G9YA-12S-45**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YA-12S-45-D**
	Yes	No	4.5, 12, 15, 24, and 28 VDC		**G9YA-12S-45-N**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YA-12S-45-ND**
Dual coil latching	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	**G9YAK-12S-45**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YAK-12S-45-D**
	Yes	No	4.5, 12, 15, 24, and 28 VDC		**G9YAK-12S-45-N**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YAK-12S-45-ND**
TTL-driven dual coil latching (with self cut-off function)	No	No	5, 12, 15, and 24 VDC	One per box	**G9YAT-12S-45**
		Yes	5, 12, 15, and 24 VDC		**G9YAT-12S-45-D**
	Yes	No	5, 12, 15, and 24 VDC		**G9YAT-12S-45-N**
		Yes	5, 12, 15, and 24 VDC		**G9YAT-12S-45-ND**

Standard SPDT Models with Pin Terminals

Classification	Indicator terminals	Data package	Rated coil voltage	Minimum packaging unit	Model
Failsafe	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	**G9YA-12S-45-P**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YA-12S-45-PD**
	Yes	No	4.5, 12, 15, 24, and 28 VDC		**G9YA-12S-45-PN**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YA-12S-45-PND**
Dual coil latching	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	**G9YAK-12S-45-P**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YAK-12S-45-PD**
	Yes	No	4.5, 12, 15, 24, and 28 VDC		**G9YAK-12S-45-PN**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YAK-12S-45-PND**
TTL-driven dual coil latching (with self cut-off function)	No	No	5, 12, 15, and 24 VDC	One per box	**G9YAT-12S-45-P**
		Yes	5, 12, 15, and 24 VDC		**G9YAT-12S-45-PD**
	Yes	No	5, 12, 15, and 24 VDC		**G9YAT-12S-45-PN**
		Yes	5, 12, 15, and 24 VDC		**G9YAT-12S-45-PND**

Standard SPDT Models with Connector Cables

Classification	Indicator terminals	Data package	Rated coil voltage	Minimum packaging unit	Model
Failsafe	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	**G9YA-12S-45-C**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YA-12S-45-CD**
	Yes	No	4.5, 12, 15, 24, and 28 VDC		**G9YA-12S-45-CN**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YA-12S-45-CND**
Dual coil latching	No	No	4.5, 12, 15, 24, and 28 VDC	One per box	**G9YAK-12S-45-C**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YAK-12S-45-CD**
	Yes	No	4.5, 12, 15, 24, and 28 VDC		**G9YAK-12S-45-CN**
		Yes	4.5, 12, 15, 24, and 28 VDC		**G9YAK-12S-45-CND**
TTL-driven dual coil latching (with self cut-off function)	No	No	5, 12, 15, and 24 VDC	One per box	**G9YAT-12S-45-C**
		Yes	5, 12, 15, and 24 VDC		**G9YAT-12S-45-CD**
	Yes	No	5, 12, 15, and 24 VDC		**G9YAT-12S-45-CN**
		Yes	5, 12, 15, and 24 VDC		**G9YAT-12S-45-CND**

Note: Versions with 18-GHz operation are available. Replace "-45" with "-35" when ordering.
-- Example: Order G9YA-12S-*35*-PND DC12 instead of G9YA-12S-*45*-PND DC12.

Specifications

■ Indicator Ratings, SPDT Models

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 max.		0.3 dB max.	0.4 dB max.	0.5 dB max.	0.8 dB max.
Isolation	85 dB min.	80 dB min.	70 dB min.	65 dB min.	60 dB min.	
V.S.W.R.	1.1 max.	1.15 max.	1.25 max.	1.35 max.	1.5 max.	1.7 max.

Note: 1. The above values are initial values.
2. Of the above values, the rated values are 18 GHz max. for the 18-GHz models and 26.5 GHz max. for the 26.5-GHz models.

■ Coil / Input Ratings

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.

Failsafe Models (G9YA-12S-45(35))

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

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.

Dual Coil Latching Models (G9YAK-12S-45(35))

Rated voltage (VDC)	Rated current (mA)	Coil resistance (W)	Must operate voltage (V)	Must release voltage (V)	Maximum voltage (V)	Power consumption (mW)
4.5	109.8	41	80% max. of rated voltage	80% max. of rated voltage	150% of rated voltage	Approx. 500 mW
12	41.7	288				
15	33.3	450				
24	20.8	1,152				
28	17.9	1,568				

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.

TTL-driven Dual Coil Latching Models (G9YAT-12S-45(35))

Rated voltage (VDC)	TTL logic level		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				

■ Characteristics

Item \ Type		Failsafe models	Dual coil latching models	TTL-driven dual coil latching models
Item \ Model		G9YA-12S-45(35)	G9YAK-12S-45(35)	G9YAT-12S-45(35)
Contact resistance (See note 3.)		100 mΩ max.		
Operating (set) time		15 ms max.		
Release (reset) time		15 ms max.		
Minimum set/reset pulse time		---	100 ms	
Insulation resistance (See note 4.)		1,000 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, 5.0-mm double amplitude		
	Malfunction	10 to 55 Hz, 3.0-mm double amplitude		
Shock resistance	Destruction	1,000 m/s^2		
	Malfunction	500 m/s^2		
Endurance	Mechanical	5,000,000 operations min. (at 36,000 operations/hour)		
	Electrical	5,000,000 operations min. (3 GHz, 5 W, 50 Ω, V.S.W.R. 1.2 max.) at a switching frequency of 1,800 operations/hour		
Contact carry power		120 W (at 3 GHz, 50 Ω, V.S.W.R. ≤ 1.15) with an ambient temperature of 40°C		
Ambient operating temperature		–55 to 85°C (with no icing or condensation)		
Ambient operating humidity		5% to 85%		
Weight		Approx. 50 g		

Note: 1. The above values are initial values.

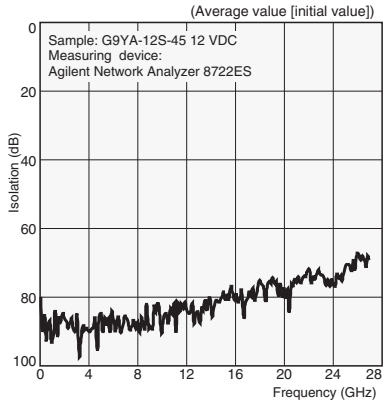
2. Rated and characteristic (initial) values are for a standard temperature of 23°C and a humidity of 65% unless otherwise indicated.

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

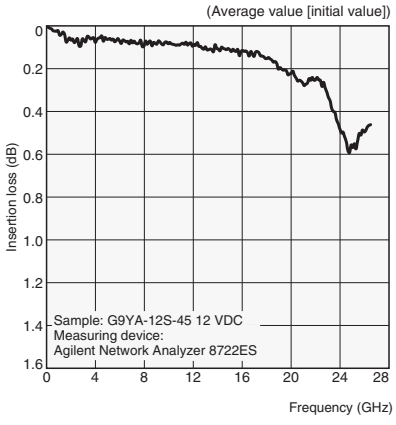
4. The insulation resistance was measured with a 500-VDC megohmmeter applied to the same parts as those used for checking the dielectric strength.

Engineering Data

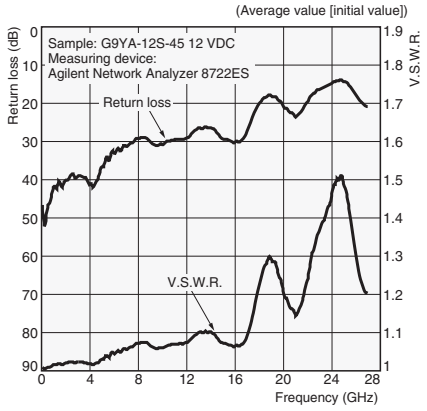
High-frequency Characteristics (Isolation)



High-frequency Characteristics (Insertion Loss)



High-frequency Characteristics (Return Loss, V.S.W.R.)



Note: 1. The tests were conducted at an ambient temperature of 23°C.

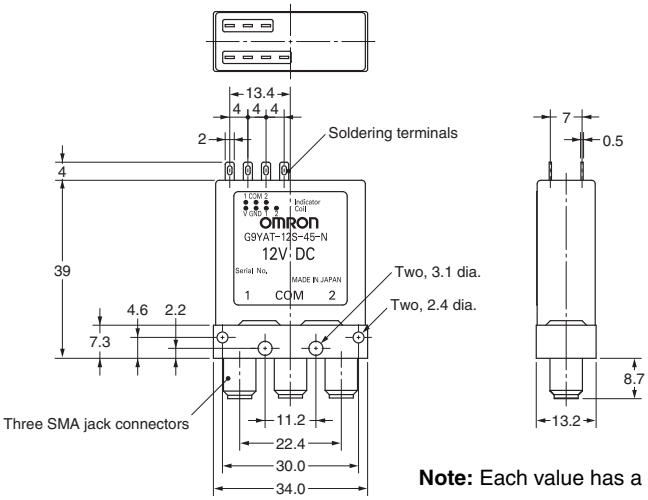
2. The high-frequency characteristics will vary according to the connectors. Be sure to check operation including durability at the actual device before use.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

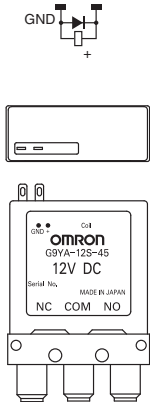
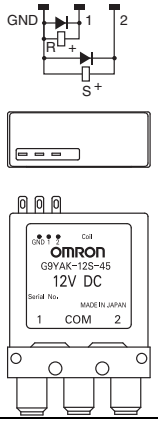
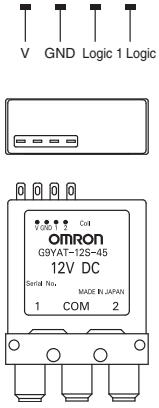
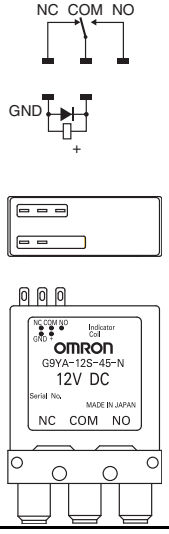
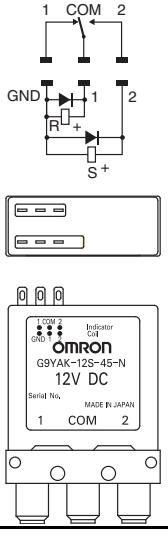
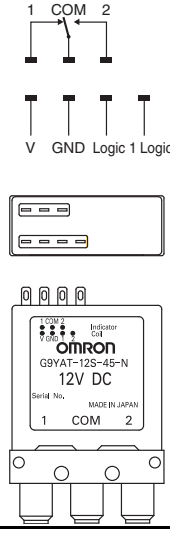
■ Models with Soldering Terminals

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



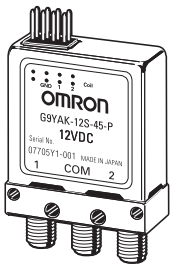
Note: Each value has a tolerance of ±0.3 mm.

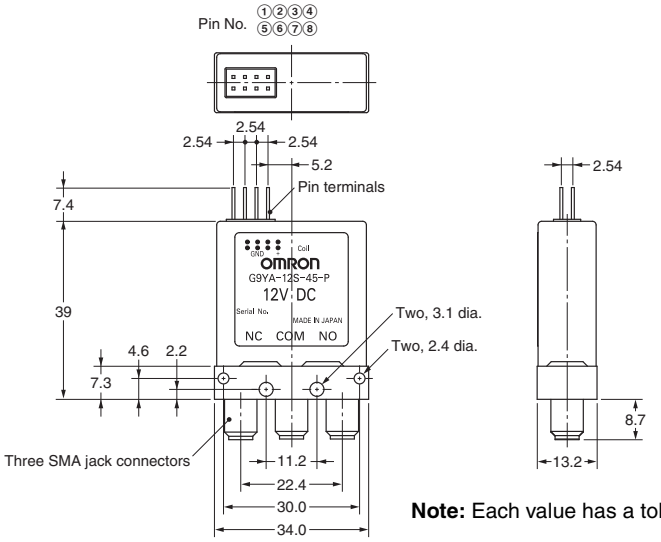
Soldering Terminal Arrangement

Model	G9YA-12S-45(35)-□	G9YAK-12S-45(35)-□	G9YAT-12S-45(35)-□
Indicator terminals Type	Failsafe	Dual coil latching	TTL-driven dual coil latching
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□





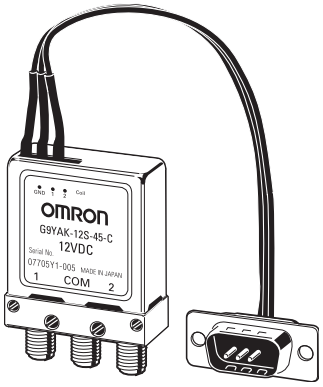
Note: Each value has a tolerance of ±0.3 mm.

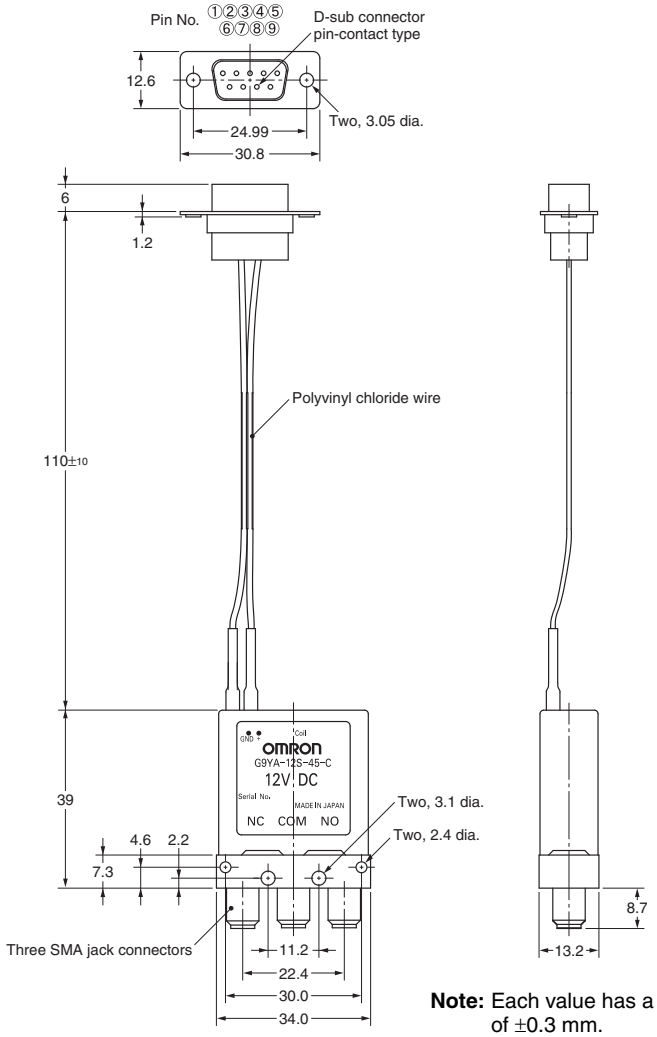
Pin Terminal Arrangement

	Pin number	Indicator				Coil			
		①	②	③	④	⑤	⑥	⑦	⑧
Without indicator terminals	Failsafe						GND		+
	Dual coil latching						GND	1	2
	TTL-driven dual coil latching					V	GND	Logic 1	Logic 2
With indicator terminals	Failsafe		NC	COM	NO		GND		+
	Dual coil latching		1	COM	2		GND	1	2
	TTL-driven dual coil 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□





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

Pin Terminal Arrangement

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

Precautions

■ Precautions for Correct Use

Relay Handling

- 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 to provide 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 (SO_2, H_2S), 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 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.

MEMO

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

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