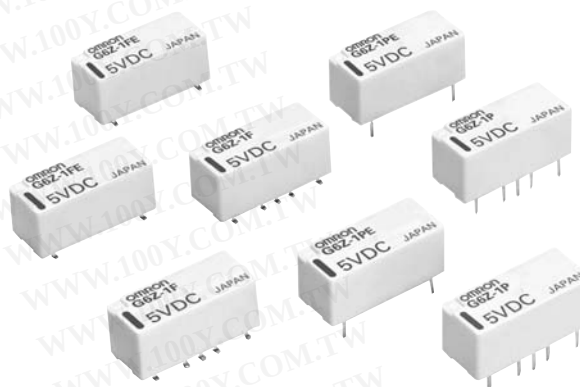


High-frequency Relay

G6Z

Miniature 2.6-GHz-Band, SPDT, High-frequency Relay

- Superior high-frequency characteristics include an isolation of 30 dB min., insertion loss of 0.5 dB max., and V.S.W.R. of 1.5 max. at 2.6 GHz.
- Triplate micro stripline technology assures superior high-frequency characteristics.
- Miniature dimensions of 20 x 8.6 x 8.9 mm (L x W x H).
- E-shape or Y-shape terminal options with reverse contact arrangements available, allows greater freedom with PCB design.
- Choose between 75- Ω or 50- Ω impedance models
- RoHS Compliant.



Ordering Information

Classification	Structure	Contact form	Terminal arrangement	Characteristic impedance	Rated coil voltage	Model	
						Through-hole	Surface Mount
Non-latching	Fully sealed	SPDT	E-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6Z-1PE	G6Z-1FE
				50 Ω		G6Z-1PE-A	G6Z-1FE-A
			Y-shape	75 Ω		G6Z-1P	G6Z-1F
				50 Ω		G6Z-1P-A	G6Z-1F-A
Single coil latching			E-shape	75 Ω		G6ZU-1PE	G6ZU-1FE
				50 Ω		G6ZU-1PE-A	G6ZU-1FE-A
			Y-shape	75 Ω		G6ZU-1P	G6ZU-1F
				50 Ω		G6ZU-1P-A	G6ZU-1F-A
Dual coil latching			E-shape	75 Ω	G6ZK-1PE	G6ZK-1FE	
				50 Ω	G6ZK-1PE-A	G6ZK-1FE-A	
			Y-shape	75 Ω	G6ZK-1P	G6ZK-1F	
				50 Ω	G6ZK-1P-A	G6ZK-1F-A	

Notes: 1. When ordering, add the rated coil voltage to the model number.

Example: G6Z-1PE-A-DC12

Rated coil voltage

2. When ordering tape packing (surface mount models), add "-TR" to the model number.

Example: G6ZU-1FE-TR-DC12

Tape packing

"-TR" is not part of the relay model number. Therefore, it is not marked on the relay case.

Model Number Legend:

G6Z - - - DC

1 2 3 4 5 6 7

1. Relay Function

None: Non-latching
 U: Single coil latching
 K: Dual coil latching

4. Terminal Structure

None: Y-shape terminal
 E: E-shape terminal

6. Contact arrangement

None: Standard contact arrangement
 R: Reverse contact arrangement

2. Contact Form

1: SPDT

5. Characteristic Impedance

None: 75 Ω
 A: 50 Ω

7. Rated Coil Voltage

3, 4.5, 5, 9, 12, 24

3. Terminal Shape

F: Surface mount terminals
 P: PCB through-hole terminals

Application Examples

These Relays can be used for switching signals in media equipment.

- **Wire communications:**
Cable TV (STB and broadcasting infrastructure), cable modems, and VRS (video response systems)
- **Wireless communications:**
Transceivers, ham radios, ETC, ITS, high-level TV, satellite broadcasting, text multiplex broadcasting, mobile phone stations, TV broadcasting facilities, community antenna systems and car navigation systems
- **Entertainment equipment:**
TVs, video games, satellite radio units,
- **Industrial equipment:**
Measuring equipment, test equipment, and multiplex transmission devices

Specifications

■ Contact Ratings

Load type	Resistive load
Contact Material	Au clad Cu alloy
Rated load	10 mA at 30 VAC; 10 mA at 30 VDC; 10 W at 900 MHz (See note)
Rated carry current	0.5 A
Max. switching voltage	30 VAC, 30 VDC
Max. switching current	0.5 A

Note: This value is for an impedance of 50 Ω or 75 Ω with a V.S.W.R. of 1.2 max.

■ High-frequency Characteristics

Frequency		900 MHz				2.6 GHz			
Terminal type		Through hole		Surface mount		Through hole		Surface mount	
Terminal structure		E-shape	Y-shape	E-shape	Y-shape	E-shape	Y-shape	E-shape	Y-shape
Isolation	75 Ω	65 dB min.		60 dB min.		35 dB min.	45 dB min.	30 dB min.	40 dB min.
	50 Ω	60 dB min.							
Insertion loss (not including substrate loss)	75 Ω	0.2 dB max.				0.5 dB max.			
	50 Ω	0.1 dB max.				0.3 dB max.			
V.S.W.R.	75 Ω	1.2 max.				1.5 max.			
	50 Ω	1.1 max.				1.3 max.			
Return loss	75 Ω	20.8 dB max.				14.0 dB max.			
	50 Ω	26.4 dB max.				17.7 dB max.			
Maximum carry power		10 W (See note 2)							
Maximum switching power		10 W (See note 2)							

Note: 1. The above values are initial values.

2. These values are for an impedance of 50 Ω or 75 Ω with a V.S.W.R. of 1.2 max.

■ Coil Ratings

Non-latching, Standard and Reverse-contact Models G6Z-1P(E), G6Z-1F(E)

Rated voltage (VDC)	Rated current (mA)	Coil resistance (Ω)	Must operate voltage (VDC)	Must dropout voltage (VDC)	Maximum voltage (VDC)	Power consumption (mW)
3	66.7	45	75% max. of rated voltage	10% min. of rated voltage	150% of rated voltage	Approx. 200
4.5	44.4	101				
5	40.0	125				
9	22.2	405				
12	16.7	720				
24	8.3	2,880				

Single Coil Latching Models G6ZU-1P(E), G6ZU-1F(E)

Rated voltage (VDC)	Rated current (mA)	Coil resistance (Ω)	Must set voltage (VDC)	Must reset voltage (VDC)	Maximum voltage (VDC)	Power consumption (mW)
3	66.7	45	75% max. of rated voltage	75% max. of rated voltage	150% of rated voltage	Approx. 200
4.5	44.4	101				
5	40.0	125				
9	22.2	405				
12	16.7	720				
24	8.3	2,880				

Dual Coil Latching Models G6ZK-1P(E), G6ZK-1F(E)

Rated voltage (VDC)	Rated current (mA)	Coil resistance (Ω)	Must set voltage (VDC)	Must reset voltage (VDC)	Maximum voltage (VDC)	Power consumption (mW)
3	120	25	75% max. of rated voltage	75% max. of rated voltage	150% of rated voltage	Approx. 360
4.5	80	56				
5	72	69				
9	40	225				
12	30	400				
24	15	1,600				

- Note:**
1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of $\pm 10\%$.
 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.
 4. The voltage measurements for operate/release and set/reset are the values obtained for instantaneous changes in the voltage (rectangular wave).

Characteristics

Item		Non-latching models	Single coil latching models	Dual coil latching models
		G6Z-1P(E), G6Z-1F(E)	G6ZU-1P(E), G6ZU-1F(E)	G6ZK-1P(E), G6ZK-1F(E)
Contact resistance (See note 2)		100 mΩ max.		
Operating (set) time (See note 3)		10 ms max. (approx. 3.5 ms)	10 ms max. (approx. 2.5 ms)	
Release (reset) time (See note 3)		10 ms max. (approx 2.5 ms)		
Set/reset time		---	12 ms	
Insulation resistance (See note 4)		100 MΩ min. (at 500 VDC)		
Dielectric strength	Coil and contacts	1,000 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	Mechanical durability	10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude)		
	Malfunction durability	10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude)		
Shock resistance	Mechanical durability	1,000 m/s ²		
	Malfunction durability	500 m/s ²		
Service life	Mechanical	1,000,000 operations min. (at 36,000 operations/hour)		
	Electrical	300,000 operations min. (30 VAC, 10 mA/30 VDC, 10 mA), 100,000 operations min. (900 MHz, 10 W) at a switching frequency of 1,800 operations/hour		
Ambient temperature		Operating: -40°C to 70°C (with no icing or condensation)		
Ambient humidity		Operating: 5% to 85% RH		
Weight		Approx. 2.8 g		

Note: 1. The above values are initial values.

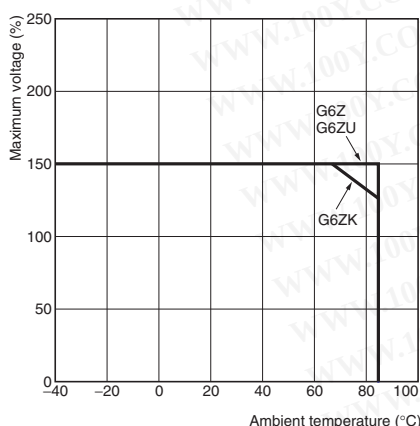
2. The contact resistance was measured with 10 mA at 1 VDC with a voltage drop method.

3. Values in parentheses are typical values.

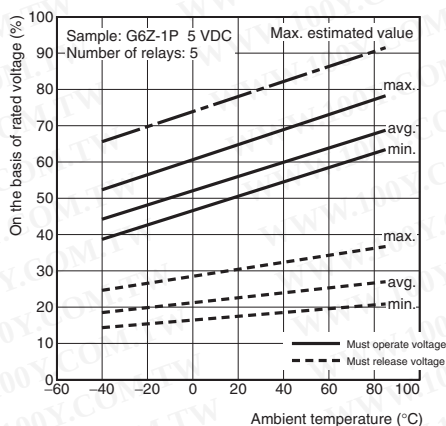
4. The insulation resistance was measured with a 500-VDC megohmmeter applied to the same parts as those used for checking the dielectric strength.

Engineering Data

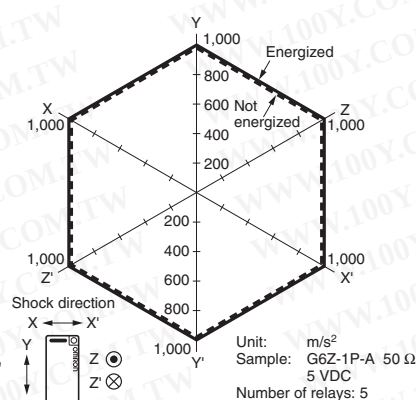
Ambient Temperature vs. Maximum Voltage



Ambient Temperature vs. Must Operate or Must Release Voltage

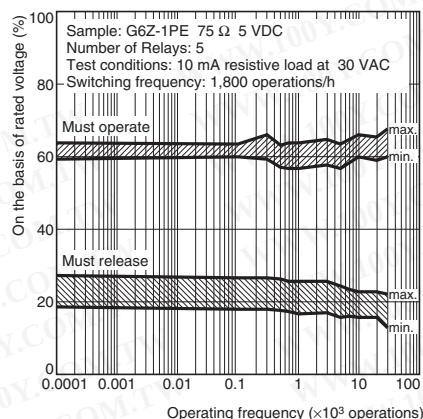


Shock Malfunction

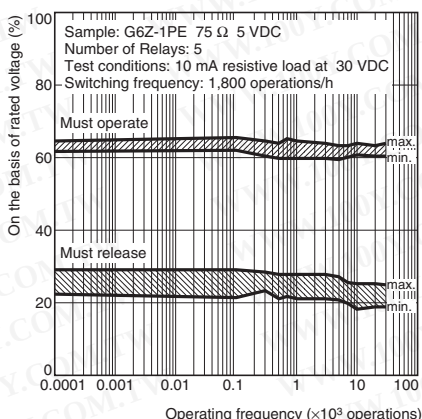


Conditions: Shock is applied in ±X, ±Y, and ±Z directions three times each with and without energizing the Relays to check for contact malfunctions.

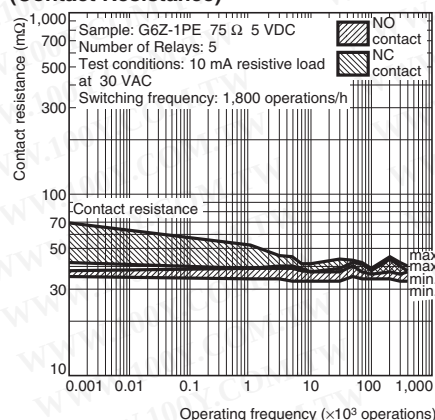
Electrical Endurance (with Must Operate and Must Release Voltage)



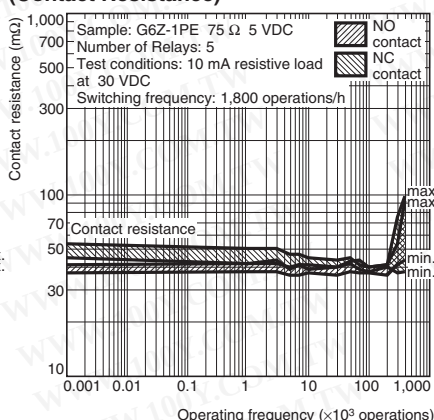
Electrical Endurance (with Must Operate and Must Release Voltage)



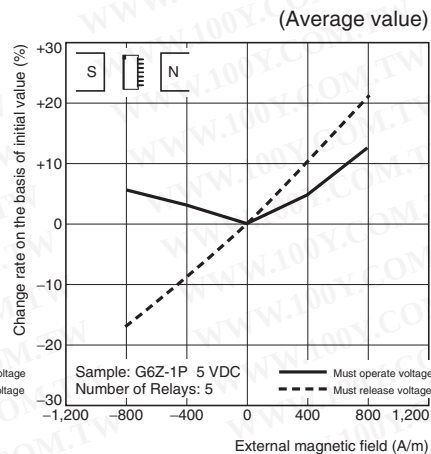
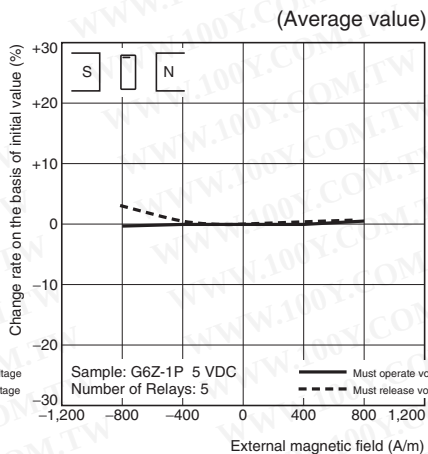
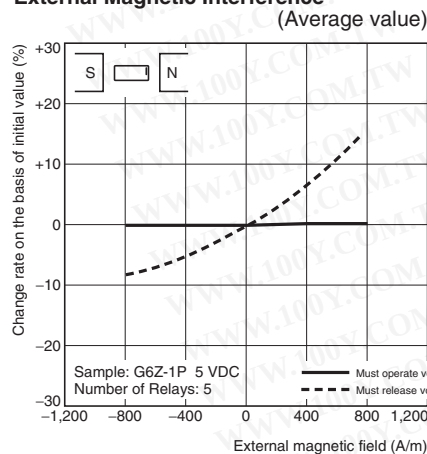
Electrical Endurance (Contact Resistance)



Electrical Endurance (Contact Resistance)



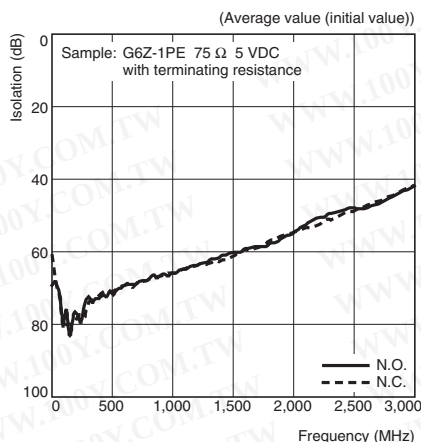
External Magnetic Interference



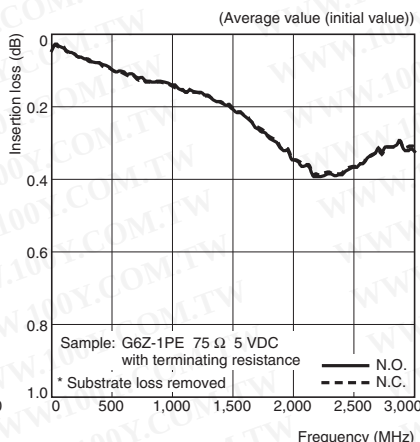
Note: 1. The tests were conducted at an ambient temperature of 23°C.

2. The contact resistance data are periodically measured reference values and are not values from monitoring each operation. Contact resistance values will vary according to the switching frequency and operating environment, so be sure to check operation under the actual operating conditions before use.

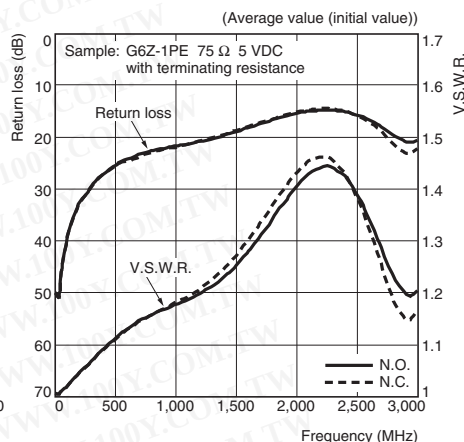
High-frequency Characteristics at 75 Ω (Isolation)



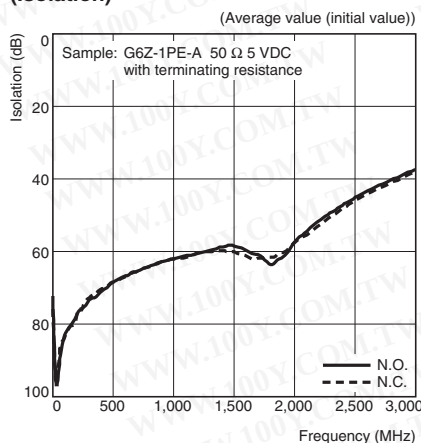
High-frequency Characteristics at 75 Ω (Insertion Loss)



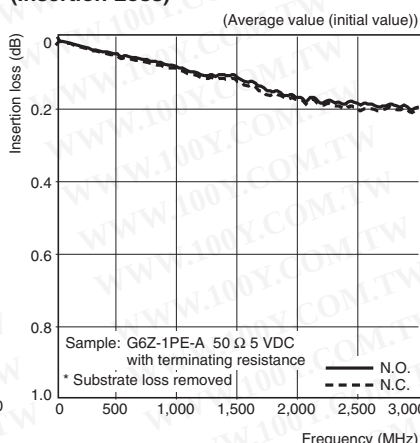
High-frequency Characteristics at 75 Ω (Return Loss, V.S.W.R.)



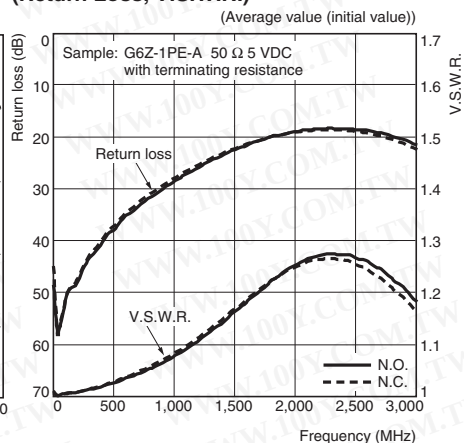
High-frequency Characteristics at 50 Ω (Isolation)



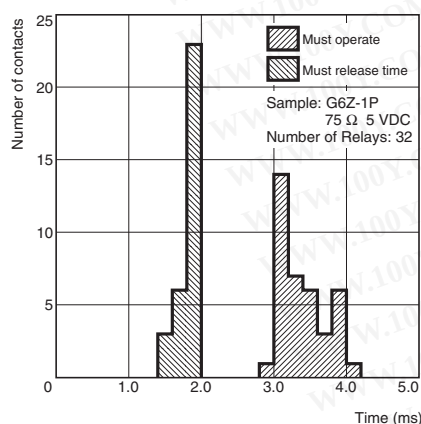
High-frequency Characteristics at 50 Ω (Insertion Loss)



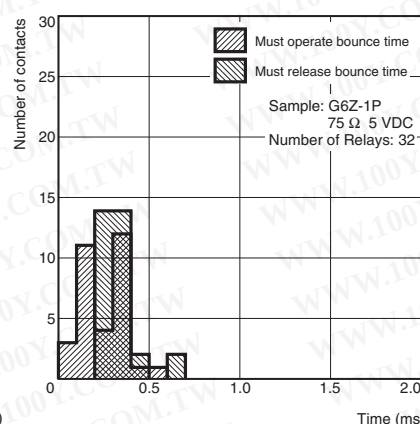
High-frequency Characteristics at 50 Ω (Return Loss, V.S.W.R.)



Must Operate and Must Release Time Distribution (See note.)



Must Operate and Must Release Bounce Time Distribution (See note.)



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

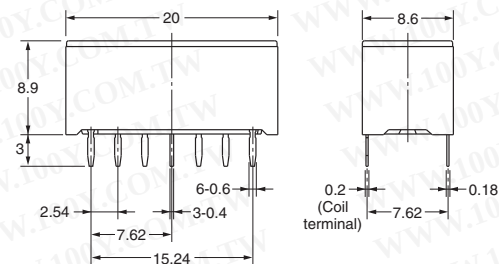
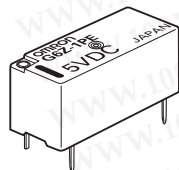
2. High-frequency characteristics depend upon the PCB to which the relay is mounted. Always check these characteristics, including endurance (service life), in the actual machine before use.

Dimensions

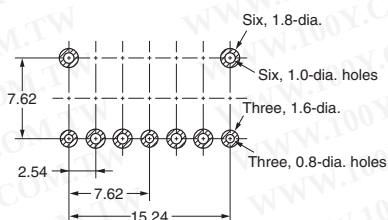
Note: All units are in millimeters unless otherwise indicated.

PCB Through-hole Terminal Types

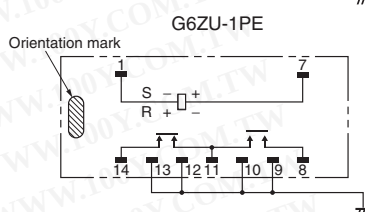
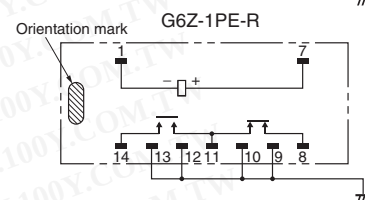
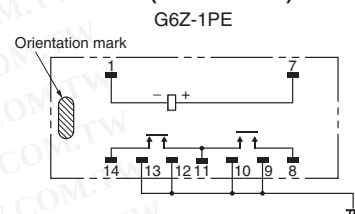
G6Z-1PE
G6Z-1PE-R
G6ZU-1PE



Mounting Dimensions (Bottom View)
Tolerance: ± 0.1 mm

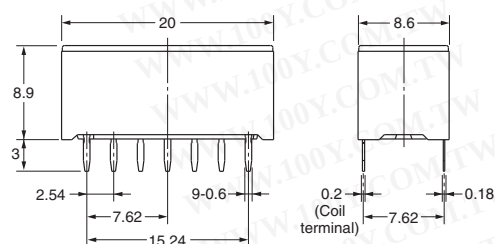
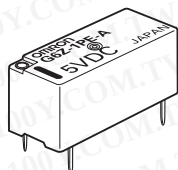


Terminal Arrangement/Internal Connections (Bottom View)

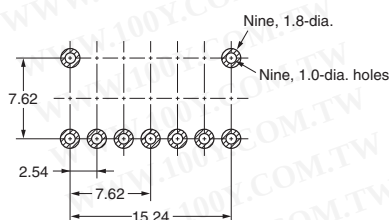


Note: Each value has a tolerance of ± 0.3 mm.

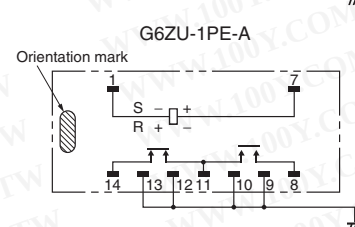
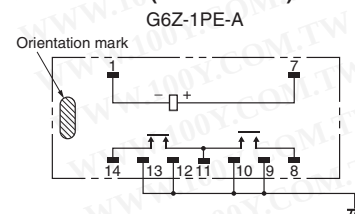
G6Z-1PE-A
G6ZU-1PE-A



Mounting Dimensions (Bottom View)
Tolerance: ± 0.1 mm

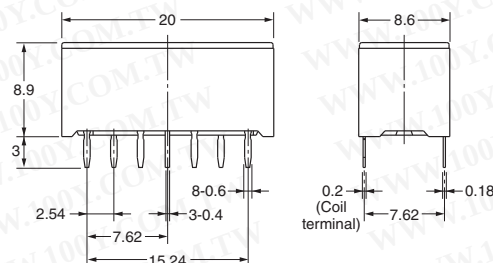
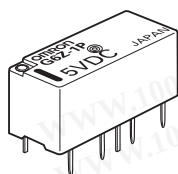


Terminal Arrangement/Internal Connections (Bottom View)



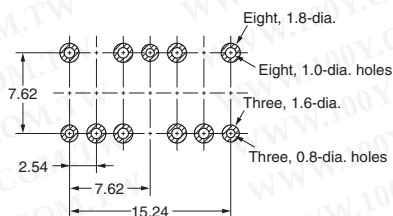
Note: Each value has a tolerance of ± 0.3 mm.

**G6Z-1P
G6ZU-1P**

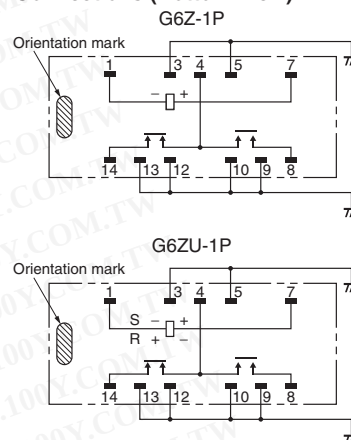


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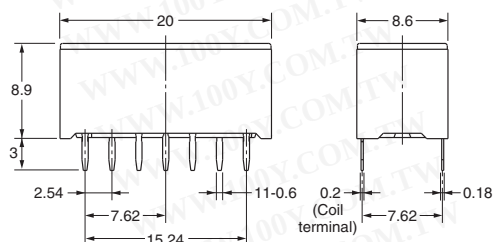
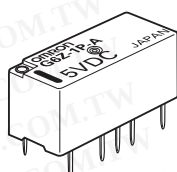
Mounting Dimensions (Bottom View)
Tolerance: ± 0.1 mm



Terminal Arrangement/Internal Connections (Bottom View)

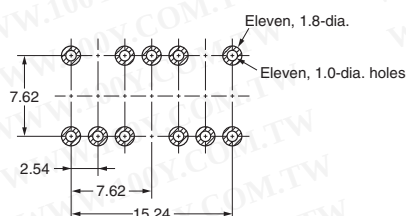


**G6Z-1P-A
G6ZU-1P-A**

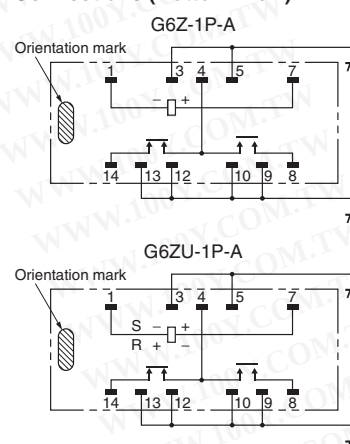


Note: Each value has a tolerance of ± 0.3 mm.

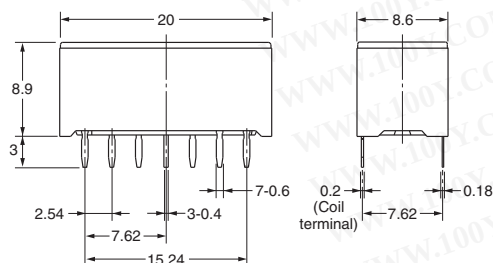
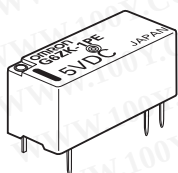
Mounting Dimensions (Bottom View)
Tolerance: ± 0.1 mm



Terminal Arrangement/Internal Connections (Bottom View)

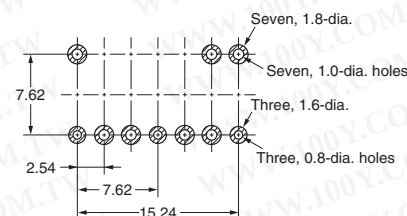


G6ZK-1PE

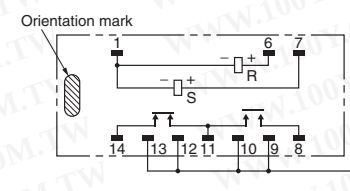


Note: Each value has a tolerance of ± 0.3 mm.

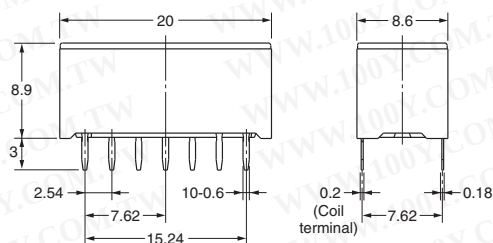
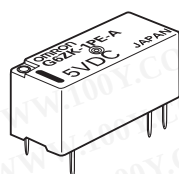
Mounting Dimensions (Bottom View)
Tolerance: ± 0.1 mm



Terminal Arrangement/Internal Connections (Bottom View)



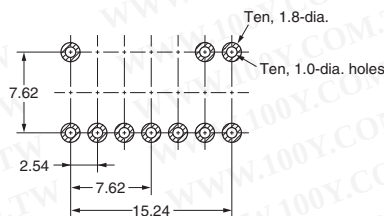
G6ZK-1PE-A



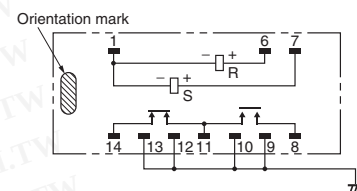
Note: Each value has a tolerance of ± 0.3 mm.

Mounting Dimensions (Bottom View)

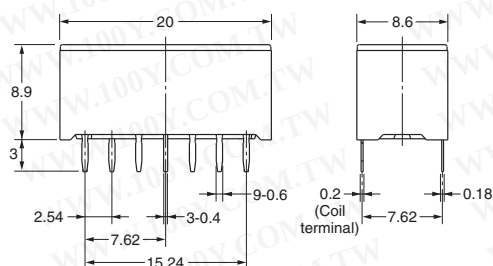
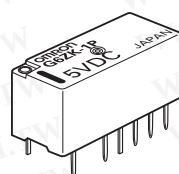
Tolerance: ± 0.1 mm



Terminal Arrangement/Internal Connections (Bottom View)



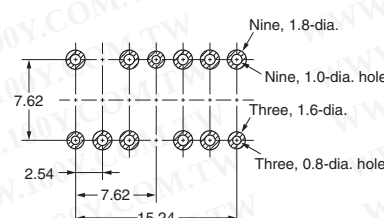
G6ZK-1P



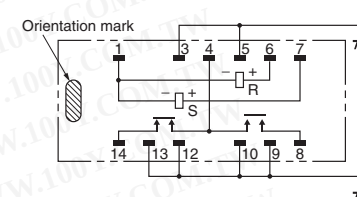
Note: Each value has a tolerance of ± 0.3 mm.

Mounting Dimensions (Bottom View)

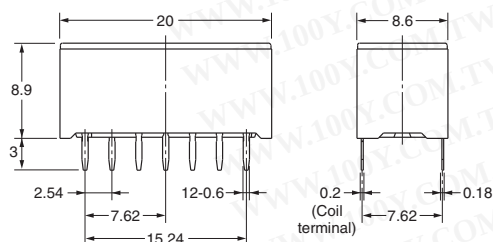
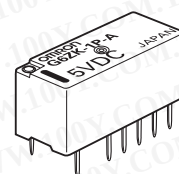
Tolerance: ± 0.1 mm



Terminal Arrangement/Internal Connections (Bottom View)



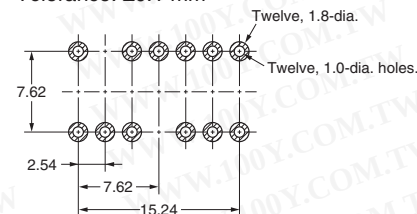
G6ZK-1P-A



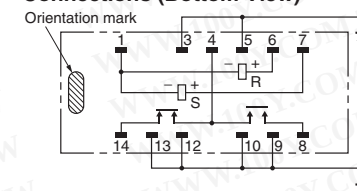
Note: Each value has a tolerance of ± 0.3 mm.

Mounting Dimensions (Bottom View)

Tolerance: ± 0.1 mm

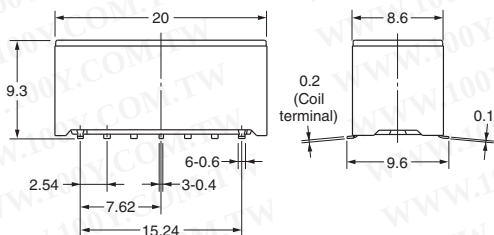
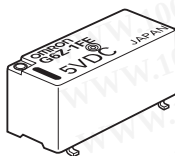


Terminal Arrangement/Internal Connections (Bottom View)

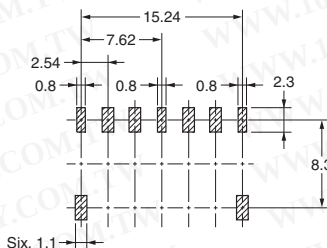


■ Surface Mount Terminal Types

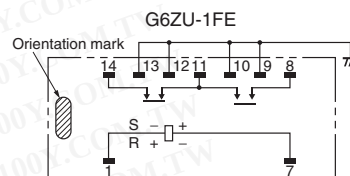
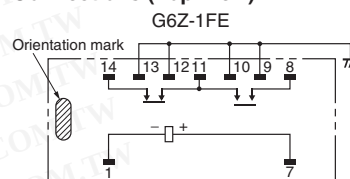
**G6Z-1FE
G6ZU-1FE**



Mounting Dimensions (Top View)
Tolerance: ± 0.1 mm

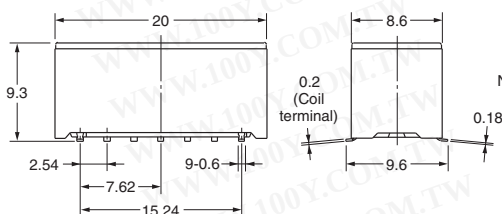
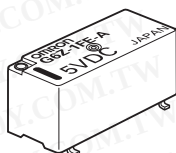


Terminal Arrangement/Internal Connections (Top View)

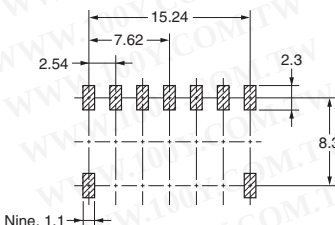


Note 1: Each value has a tolerance of ± 0.3 mm.
Note 2: The coplanarity of the terminals is 0.1 mm max.

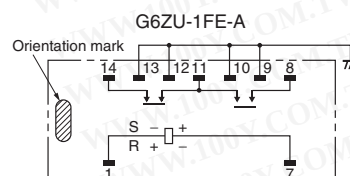
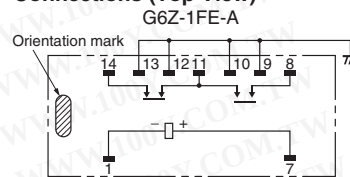
**G6Z-1FE-A
G6ZU-1FE-A**



Mounting Dimensions (Top View)
Tolerance: ± 0.1 mm

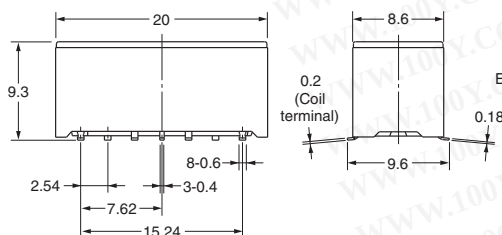
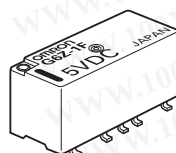


Terminal Arrangement/Internal Connections (Top View)

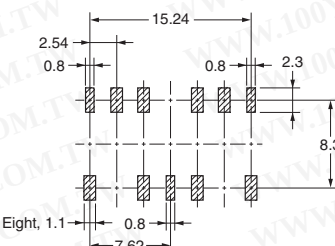


Note 1: Each value has a tolerance of ± 0.3 mm.
Note 2: The coplanarity of the terminals is 0.1 mm max.

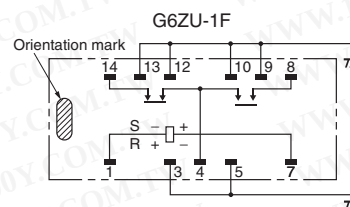
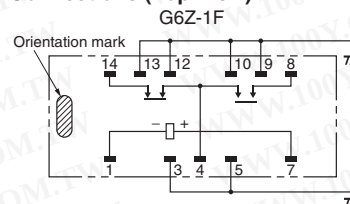
**G6Z-1F
G6ZU-1F**



Mounting Dimensions (Top View)
Tolerance: ± 0.1 mm

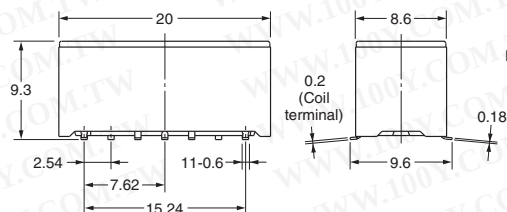
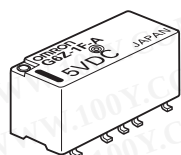


Terminal Arrangement/Internal Connections (Top View)



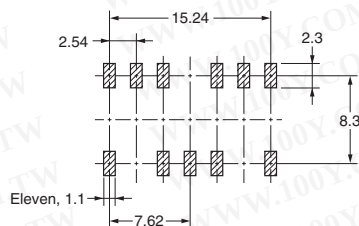
Note 1: Each value has a tolerance of ± 0.3 mm.
Note 2: The coplanarity of the terminals is 0.1 mm max.

**G6Z-1F-A
G6ZU-1F-A**



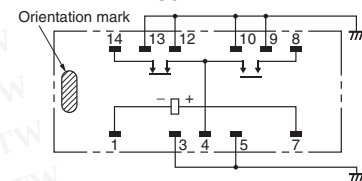
Mounting Dimensions (Top View)

Tolerance: ± 0.1 mm



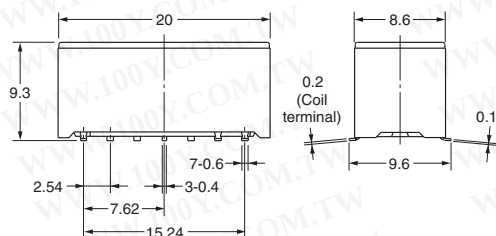
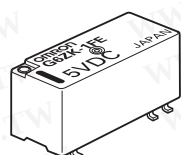
Terminal Arrangement/Internal Connections (Top View)

G6Z-1F-A



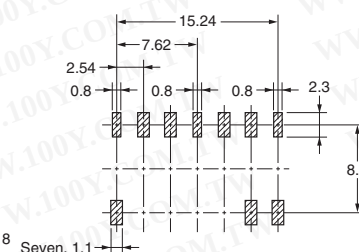
- Note 1:** Each value has a tolerance of ± 0.3 mm.
Note 2: The coplanarity of the terminals is 0.1 mm max.

G6ZK-1FE

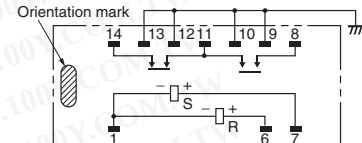


Mounting Dimensions (Top View)

Tolerance: ± 0.1 mm

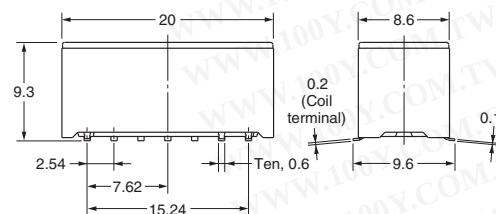
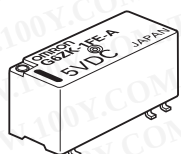


Terminal Arrangement/Internal Connections (Top View)



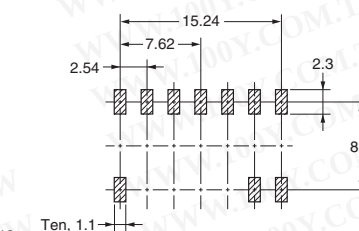
- Note 1:** Each value has a tolerance of ± 0.3 mm.
Note 2: The coplanarity of the terminals is 0.1 mm max.

G6ZK-1FE-A

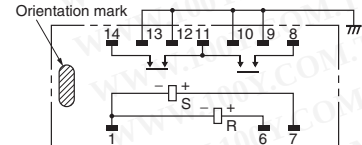


Mounting Dimensions (Top View)

Tolerance: ± 0.1 mm

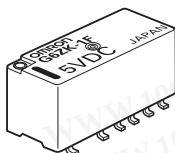


Terminal Arrangement/Internal Connections (Top View)



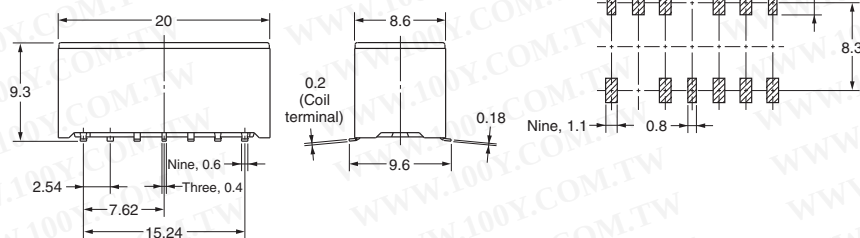
- Note 1:** Each value has a tolerance of ± 0.3 mm.
Note 2: The coplanarity of the terminals is 0.1 mm max.

G6ZK-1F



Mounting Dimensions (Top View)

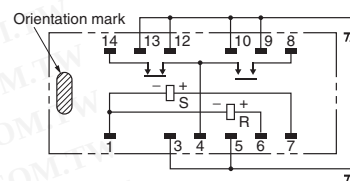
Tolerance: ± 0.1 mm



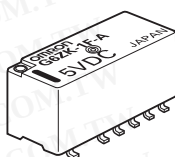
Note 1: Each value has a tolerance of ± 0.3 mm.

2: The coplanarity of the terminals is 0.1 mm max.

Terminal Arrangement/Internal Connections (Top View)

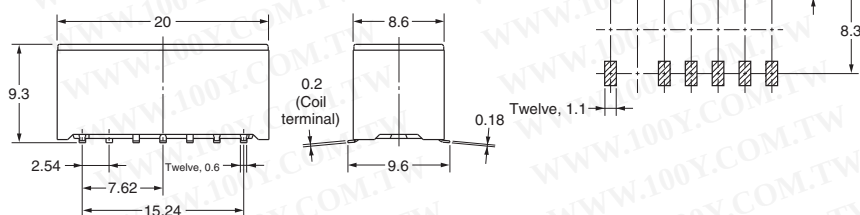


G6ZK-1F-A



Mounting Dimensions (Top View)

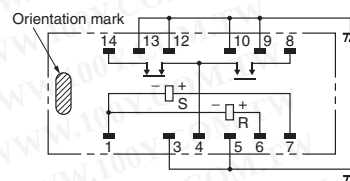
Tolerance: ± 0.1 mm



Note 1: Each value has a tolerance of ± 0.3 mm.

2: The coplanarity of the terminals is 0.1 mm max.

Terminal Arrangement/Internal Connections (Top View)

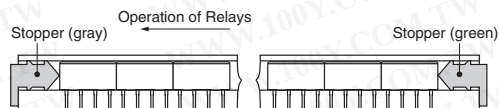


Packaging

1. Tube Packaging

Relays in tube packaging are arranged so that the orientation mark of each Relay is on the left side.

Be sure not to make mistakes in Relay orientation when mounting the Relay to the PCB.



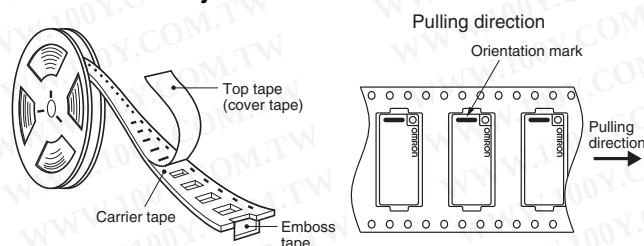
Tube length: 530 mm (stopper not included)
No. of Relays per tube: 25

2. Tape and Reel Packaging (Surface mount Terminal Models)

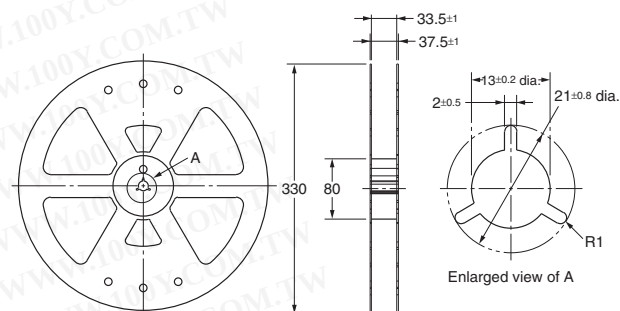
When ordering Relays in tape packing, add the prefix "TR" to the model number, otherwise the Relays in stick packing will be provided.

Relays per Reel: 300

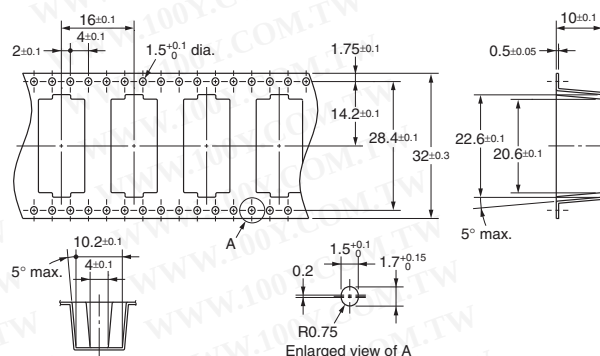
Direction of Relay Insertion



Reel Dimensions



Carrier Tape Dimensions

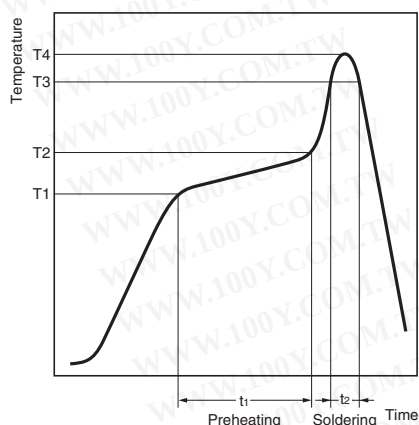


Note: The radius of the unmarked corner is 0.3 mm.

Recommended Soldering Method

■ Temperature Conditions for IRS Method

When using reflow soldering, ensure that the Relay terminals and the top of the case stay below the following curve. Check that these conditions are actually satisfied before soldering the terminals.

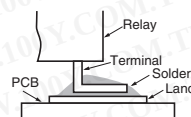


Measured part	Preheating (T1 → T2, t1)	Soldering (T3, t2)	Maximum peak (T4)
Terminals	150 → 180°C, 120 s max.	230°C min, 30 s max.	250°C max.
Top of case	---	---	255°C max.

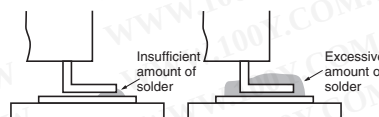
Do not quench the terminals after mounting. Clean the Relay using alcohol or water no hotter than 40°C max.

The thickness of cream solder to be applied should be between 150 and 200 μm on OMRON's recommended PCB pattern.

Correct Soldering



Incorrect Soldering



Check the soldering in the actual mounting conditions before use.

Safety Precautions

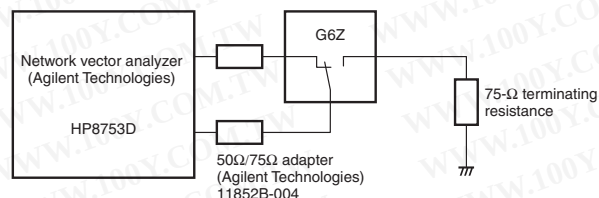
■ Precautions for Correct Use

Please observe the following precautions to prevent failure to operate, malfunction, or undesirable effect on product performance.

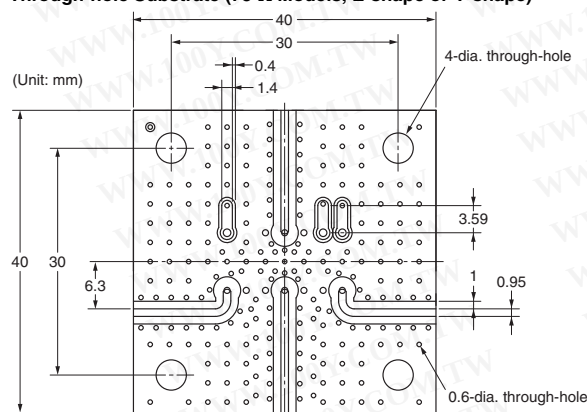
High-frequency Characteristics Measurement Method and Measurement Substrate

High-frequency characteristics for the G6Z are measured in the way shown below. Consult your OMRON representative for details on 50- Ω models.

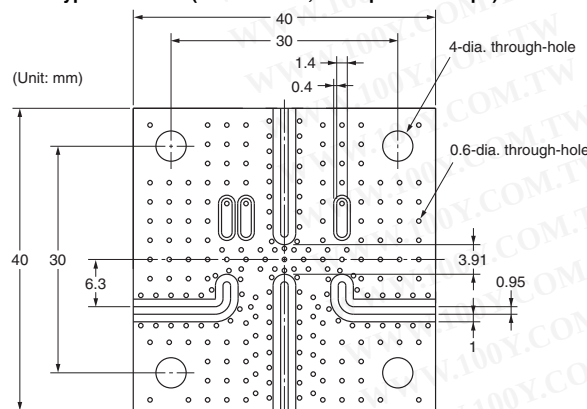
Measurement Method for 75- Ω Models



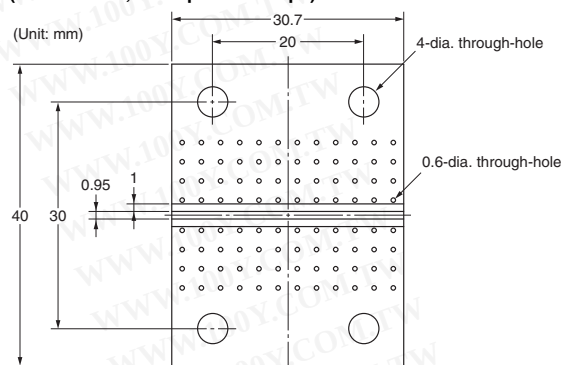
Through-hole Substrate (75- Ω Models, E-shape or Y-shape)



SMD-type Substrate (75- Ω Models, E-shape or Y-shape)



Substrate for High-frequency Characteristic Compensation (75- Ω Models, E-shape or Y-shape)



Substrate Types

Material: FR-4 glass epoxy (glass cloth impregnated with epoxy resin and copper laminated to its outer surface)

Thickness: 1.6 mm

Thickness of copper plating: 18 μ m

Note: 1. The compensation substrate is used when measuring the Relay's insertion loss. The insertion loss is obtained by subtracting the measured value for the compensation substrate from the measured value with the Relay mounted to the high-frequency measurement substrate.

Note: 2. For convenience, the diagrams of the high-frequency measurement substrates given here apply both to models with an E-shape terminal structure and to models with a Y-shape terminal structure.

Note: 3. Be sure to mount a standoff tightly to the through-hole substrate.

Note: 4. Use measuring devices, connectors, and substrates that are appropriate for 50 Ω and 75 Ω respectively.

Note: 5. Ensure that there is no pattern under the Relay. Otherwise, the impedance may be adversely affected and the Relay may not be able to attain its full characteristics.

Handling

Do not use the Relay if it has been dropped. Dropping the Relay may adversely affect its functionality.

Protect the Relay from direct sunlight and keep the Relay under normal temperature, humidity, and pressure.

Flow Soldering

Solder: JIS Z3282, H63A

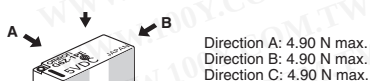
Soldering temperature: Approx. 250°C (260°C if the DWS method is used)

Soldering time: Approx. 5 s max. (approx. 2 s for the first time and approx. 3 s for the second time if the DWS method is used)

Be sure to make a molten solder level adjustment so that the solder will not overflow on the PCB.

Claw Securing Force During Automatic Mounting

During automatic insertion of Relays, be sure to set the securing force of each claw to the following so that the Relay's characteristics will be maintained.



Secure the claws to the shaded area.
Do not attach them to the center area
or to only part of the Relay.

Latching Relay Mounting

Make sure that the vibration or shock that is generated from other devices, such as Relays, on the same panel or substrate and imposed on the Latching Relay does not exceed the rated value, otherwise the set/reset status of the Latching Relay may be changed. 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.

Coating

Do not use silicone coating to coat the Relay when it is mounted to the PCB. Do not wash the PCB after the Relay is mounted using detergent containing silicone. Otherwise, the detergent may remain on the surface of the Relay.

[illegible]

Omron Electronic Components, LLC

Terms and Conditions of Sales

I. GENERAL

- Definitions:** The words used herein are defined as follows.
 - Terms:** These terms and conditions
 - Seller:** Omron Electronic Components LLC and its subsidiaries
 - Buyer:** The buyer of Products, including any end user in section III through VI
 - Products:** Products and/or services of Seller
 - Including:** Including without limitation
- Offer/Acceptance:** These Terms are deemed part of all quotations, acknowledgments, invoices, purchase orders and other documents, whether electronic or in writing, relating to the sale of Products by Seller. Seller hereby objects to any Terms proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
- Distributor:** Any distributor shall inform its customer of the contents after and including section III of these Terms.

II. SALES

- Prices; Payment:** All prices stated are current, subject to change without notice by Seller. Buyer agrees to pay the price in effect at the time the purchase order is accepted by Seller. Payments for Products received are due net 30 days unless otherwise stated in the invoice. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice.
- Discounts:** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (a) the invoice is paid according to Seller's payment terms and (b) Buyer has no past due amounts owing to Seller.
- Interest:** Seller, at its option, may charge Buyer 1.5% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
- Orders:** Seller will accept no order less than 200 U.S. dollars net billing.
- Currencies:** If the prices quoted herein are in a currency other than U.S. dollars, Buyer shall make remittance to Seller at the then current exchange rate most favorable to Seller; provided that if remittance is not made when due, Buyer will convert the amount to U.S. dollars at the then current exchange rate most favorable to Seller available during the period between the due date and the date remittance is actually made.
- Governmental Approvals:** Buyer shall be responsible for all costs involved in obtaining any government approvals regarding the importation or sale of the Products.
- Taxes:** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Seller or required to be collected directly or indirectly by Seller for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Seller.
- Financial:** If the financial position of Buyer at any time becomes unsatisfactory to Seller, Seller reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Seller may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
- Cancellation; Etc:** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Seller fully against all costs or expenses arising in connection therewith.
- Force Majeure:** Seller shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
- Shipping; Delivery:** Unless otherwise expressly agreed in writing by Seller:
 - All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Seller), at which point title to and all risk of loss of the Products shall pass from Seller to Buyer, provided that Seller shall retain a security interest in the Products until the full purchase price is paid by Buyer;
 - Delivery and shipping dates are estimates only; and
 - Seller will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
- Claims:** Any claim by Buyer against Seller for shortage or damage to the Products occurring before delivery to the carrier or any claim related to pricing or other charges must be presented in detail in writing to Seller within 30 days of receipt of shipment.

III. PRECAUTIONS

- Suitability:** IT IS THE BUYER'S SOLE RESPONSIBILITY TO ENSURE THAT ANY OMRON PRODUCT IS FIT AND SUFFICIENT FOR USE IN A MOTORIZED VEHICLE APPLICATION. BUYER SHALL BE SOLELY RESPONSIBLE FOR DETERMINING APPROPRIATENESS OF THE PARTICULAR PRODUCT WITH RESPECT TO THE BUYER'S APPLICATION INCLUDING (A) ELECTRICAL OR ELECTRONIC COMPONENTS, (B) CIRCUITS, (C) SYSTEM ASSEMBLIES, (D) END PRODUCT, (E) SYSTEM, (F) MATERIALS OR SUBSTANCES OR (G) OPERATING ENVIRONMENT. Buyer acknowledges that it alone has determined that the Products will meet their requirements of the intended use in all cases. Buyer must know and observe all prohibitions of use applicable to the Product/s.
- Use with Attention:** The followings are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible use of any Product, nor to imply that any use listed may be suitable for any Product:
 - Outdoor use, use involving potential chemical contamination or electrical interference.

- Use in consumer Products or any use in significant quantities.
 - Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
 - Systems, machines, and equipment that could present a risk to life or property.
- Prohibited Use:** NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
 - Motorized Vehicle Application:** USE OF ANY PRODUCT/S FOR A MOTORIZED VEHICLE APPLICATION MUST BE EXPRESSLY STATED IN THE SPECIFICATION BY SELLER.
 - Programmable Products:** Seller shall not be responsible for the Buyer's programming of a programmable Product.

IV. WARRANTY AND LIMITATION

- Warranty:** Seller's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Seller (or such other period expressed in writing by Seller). SELLER MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT ALL OTHER WARRANTIES, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS.
- Buyer Remedy:** Seller's sole obligation hereunder shall be to replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product or, at Seller's election, to repay or credit Buyer an amount equal to the purchase price of the Product; provided that there shall be no liability for Seller or its affiliates unless Seller's analysis confirms that the Products were correctly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Seller before shipment.
- Limitation on Liability:** SELLER AND ITS AFFILIATES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. FURTHER, IN NO EVENT SHALL LIABILITY OF SELLER OR ITS AFFILIATES EXCEED THE INDIVIDUAL PRICE OF THE PRODUCT ON WHICH LIABILITY IS ASSERTED.
- Indemnities:** Buyer shall indemnify and hold harmless Seller, its affiliates and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Seller is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products.

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 - (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this product.

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- 6. RoHS Compliance.** Where indicated, our products currently comply, to the best of our knowledge as of the date of this publication, with the requirements of the European Union's Directive on the Restriction of certain Hazardous Substances ("RoHS"), although the requirements of RoHS do not take effect until July 2006. These requirements may be subject to change. Please consult our website for current information.

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