Surface-mounting High-frequency Relay

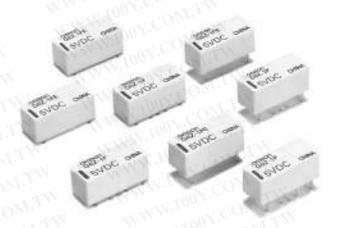
G6Z

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

- Superior high-frequency characteristics, such as an isolation of 30 dB min., insertion loss of 0.5 dB max., and V.SWR of 1.5 max. at 2.6 GHz.
- Surface-mounting terminals and superior high frequency characteristics combined using semi triplate strip transmission lines.
- Miniature dimensions of $20 \times 8.6 \times 8.9$ mm (L × W × H).
- Choose from a lineup that includes single-winding latching models (200 mW), double-winding latching models (360 mW), and models with a reverse contact arrangement.
- Series includes models with an E-shape terminal structure (same as existing models), and models with a Y-shape terminal structure, allowing greater freedom with PCB design.
- Models with 75- Ω impedance and models with 50- Ω impedance are available.

RoHS Compliant

Refer to pages 16 to 17 for details.



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Ordering Information

■ Model Number Legend:

G6Z-1 2 3 4 5 6

1. Relay Function

None: Single-side stable
U: Single-winding latching
K: Double-winding latching

2. Contact Form

1: SPDT

3. Terminal Shape

F: Surface-mounting terminals

P: PCB terminals

4. Terminal Structure

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

5. Characteristic Impedance

None: 75Ω A: 50Ω

6. Contact Arrangement

None: Standard contact arrangement R: Reverse contact arrangement

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■ List of Models

Standard Models with PCB Terminals

Classifi- cation	Structure	Contact form	Terminal arrange- ment	Characteristic impedance	Rated coil voltage	Model
Single-	Plastic	SPDT	E-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6Z-1PE
side stable sealed		W.100	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6Z-1PE-A	
		Y-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6Z-1P	
		11/	1111	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6Z-1P-A
Single-			E-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZU-1PE
winding			11/11/11	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZU-1PE-A
latching		-	Y-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZU-1P
100 7.		4	N. W.	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZU-1P-A
Double-		N .	E-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZK-1PE
winding		N		50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZK-1PE-A
latching		-1	Y-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZK-1P
1100			1/1/1/1	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZK-1P-A

Standard Models with Surface-mounting Terminals

Classifi- cation	Structure	Contact form	Terminal arrange- ment	Characteristic impedance	Rated coil voltage	Model
Single-	Plastic	SPDT	E-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6Z-1FE
side stable	le sealed	OM.	N	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6Z-1FE-A
11		10M.1	Y-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6Z-1F
11007	~1.7	W	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6Z-1F-A	
Single-		COL	E-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZU-1FE
winding		W.100 Y.COM.	COM	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZU-1FE-A
atching	100 1.00		Y-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZU-1F
11		A.COn	TW	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZU-1F-A
Double-		- c0	E-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZK-1FE
winding		001.	MIL	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZK-1FE-A
atching		ON C	Y-shape	75 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZK-1F
		100	OM.	50 Ω	3, 4.5, 5, 9, 12, and 24 VDC	G6ZK-1F-A

Note: When ordering tape packing (surface-mounting models), add "-TR" to the model number. "-TR" does not appear on the Relay itself.

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, car telephones, ETC, ITS, high-level TV, satellite broadcasting, text multiplex broadcasting, pay TV, mobile phone stations, TV broadcasting facilities, and community antenna systems

- Public equipment:
- TVs, TV games, satellite radio units, car navigation systems
- Industrial equipment:

Measuring equipment, test equipment, and multiplex transmission devices

Specifications

■ Contact Ratings

Resistive load
10 mA at 30 VAC; 10 mA at 30 VDC; 10 W at 900 MHz (See note.)
0.5 A
30 VAC, 30 VDC
0.5 A

■ High-frequency Characteristics

	Frequency	900 MHz				2.6 GHz			
		THI 100		SMD		TH.		SI	MD
Item		E-shape	Y-shape	E-shape	Y-shape	E-shape	Y-shape	E-shape	Y-shape
Isolation	75 Ω	65 dB min.	1111.	60 dB min.		35 dB min.	45 dB min.	30 dB min.	40 dB min.
	50 Ω	60 dB min.	dB min.			M.100	COM	- 1	
Insertion loss (not in-	75 Ω	0.2 dB max.				0.5 dB max.			
cluding substrate loss)	50 Ω	0.1 dB max.				0.3 dB max.			
V.SWR	75 Ω	1.2 max.				1.5 max.			
	50 Ω	1.1 max.				1.3 max.			
Return loss	75 Ω	20.8 dB min.				14.0 dB min.			
	50 Ω	26.4 dB min.				17.7 dB min.			
Maximum carry power		10 W (See note 2.)							
Maximum switching pov	wer	10 W (See	note 2.)	W.	CO	TV	WW	You.	Co

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Single-side Stable Models G6Z-1P(E), G67-1E(E)

Single-side Stable Mo G6Z-1P(E), G6Z-1F(E)	dels					
Raged voltage	3 VDC	4.5 VDC	5 VDC	9 VDC	12 VDC	24 VDC
Rated current	66.7 mA	44.4 mA	40.0 mA	22.2 mA	16.7 mA	8.3 mA
Coil resistance	45 Ω	101 Ω	125 Ω	405 Ω	720 Ω	2,880 Ω
Must operate voltage	75% max. of	rated voltage	N N	M. 100X	. TIN	
Must release voltage	10% min. of	rated voltage	×1	MW.	COL	N
Maximum voltage	150% of rate	d voltage		4. 100	COM	T
Power consumption	Approx. 200	mW	TW	MM	DY.	W

Single-winding Latching Models

Raged voltage	3 VDC	4.5 VDC	5 VDC	9 VDC	12 VDC	24 VDC
Rated current	66.7 mA	44.4 mA	40.0 mA	22.2 mA	16.7 mA	8.3 mA
Coil resistance	45 Ω	101 Ω	125 Ω	405 Ω	720 Ω	2,880 Ω
Must operate voltage	75% max. of	rated voltage	CONTRACTOR	MW	100 X.C.	WILL
Must release voltage	75% max. of	rated voltage	COM	-XIV	W. Far C	Ohr
Maximum voltage	150% of rate	d voltage	-OM.T.		-13V.100 -	COMP
Power consumption	Approx. 200	mW	V.Co.	N N	M. TOUX	TI

Double-winding Latching Models

Double-winding Latch	ing Models					
G6ZK-1P(E), G6ZK-1F(E)						
Raged voltage	3 VDC	4.5 VDC	5 VDC	9 VDC	12 VDC	24 VDC
Rated current	120 mA	80 mA	72 mA	40 mA	30 mA	15 mA
Coil resistance	25 Ω	56 Ω	69 Ω	225 Ω	400 Ω	1,600 Ω
Must operate voltage	75% max. o	f rated voltage	T. CONT.CC	WT.	MM	1007.00
Must release voltage	75% max. o	f rated voltage	M. Ino	OM.	VIVI	COMP.
Maximum voltage	150% of rate	ed voltage	1001.	MITH	W	N 100
Power consumption	Approx. 360	mW	NAME OF STREET	CONTRACTOR	MA	100Y.

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.
- 4. The voltage measurements for operate/release and set/reset are the values obtained for instantaneous changes in the voltage WWW.100Y.COM.TV (rectangular wave). WWW.100Y.COM.T

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■ Characteristics

	Item W 100	Single-side stable models	Single-winding latching models	Double-winding latching models				
		G6Z-1P(E), G6Z-1F(E)	G6ZU-1P(E), G6ZU-1F(E)	G6ZK-1P(E), G6ZK-1F(E)				
Contact res	istance (See note 1.)	100 mΩ max.	1007.0	I.TV				
Operating (s	set) time (See note 2.)	10 ms max. (approx. 3.5 ms) 10 ms max. (approx. 2.5 ms)						
Release (reset) time (See note 2.)		10 ms max. (approx. 2.5 ms)						
Minimum se	et/reset pulse time	mox.com	12 ms					
Insulation resistance (See note 3.)		100 MΩ min. (at 500 VDC)						
Dielectric	Coil and contacts	1,000 VAC, 50/60 Hz for 1 min						
strength	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	W. 100	COMPLET				
Vibration re	sistance	Destruction:10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude) Malfunction:10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude)						
Shock resis	tance	Destruction:1,000 m/s ² Malfunction:500 m/s ²						
Endurance	OY.COM.TW	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 ten	nperature	Operating: -40°C to 70°C (w	ith no icing or condensation)	N.100 CON:1.				
Ambient hu	midity CO	Operating: 5% to 85%	WW.	TW				
Weight	100 - COM. F.	Approx. 2.8 g	NI.	M. I. COM.				

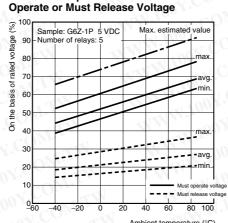
Note: The above values are initial values.

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

- 2. Values in parentheses are actual values.
- 3. The insulation resistance was measured with a 500-VDC megohmmeter applied to the same parts as those used for checking the dielectric strength.

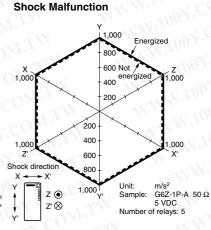
Engineering Data

Ambient Temperature vs. Maximum Voltage § 250 Maximum voltage G6Z G6ZU G6ZK 100 <u>0</u>L Ambient temperature (°C)



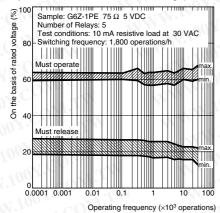
Ambient Temperature vs. Must

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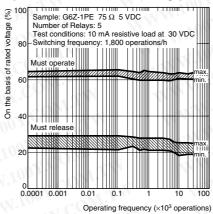


Conditions: Shock is applied in $\pm X$, $\pm Y$, and $\pm Z$ directions three times each with and without energizing the Relays to check for contact malfunctions.

Electrical Endurance (with Must Operate and Must Release Voltage)

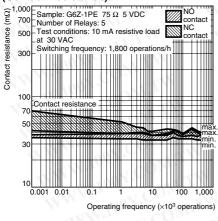


Electrical Endurance (with Must Operate and Must Release Voltage)

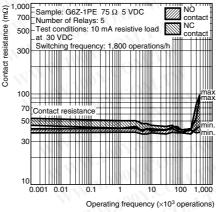


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Electrical Endurance (Contact Resistance)



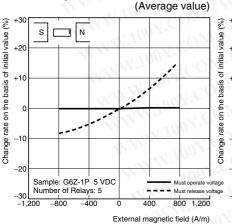
Electrical Endurance (Contact Resistance)

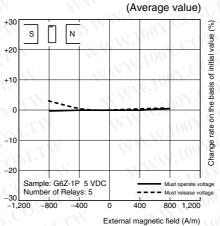


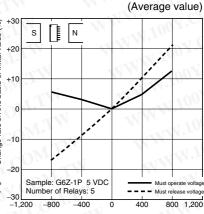
Note: 1. The tests were conducted at an ambient temperature of 23°C.

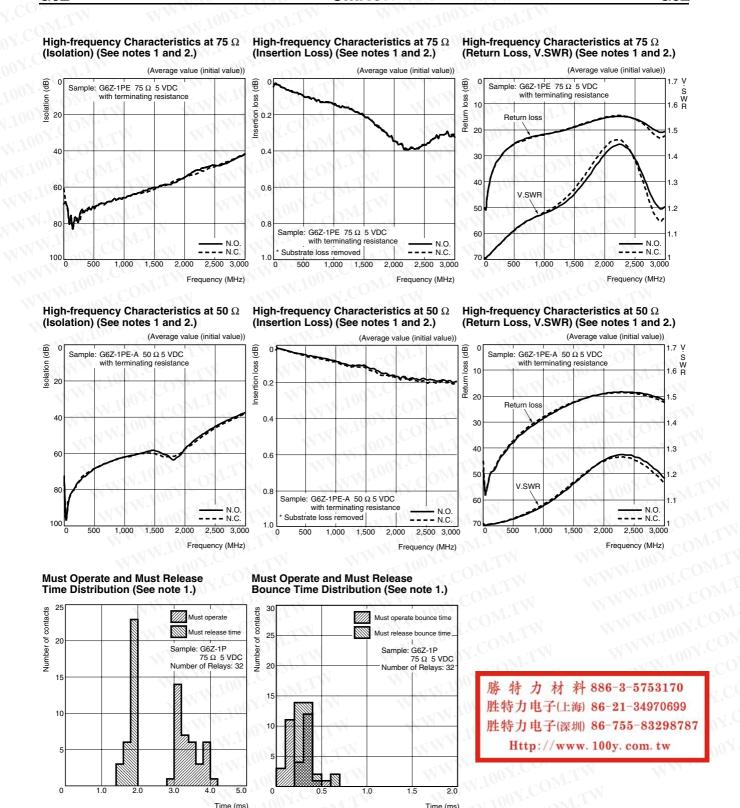
2. The contact resistance data are periodically measured reference values and are not values from each monitoring operation. Contact resistance values will vary according to the switching frequency and operating environment, so be sure to check operation under the actual operating conditions before use.

External Magnetic Interference









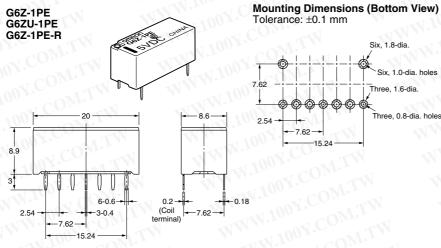
Note: 1. The tests were conducted at an ambient temperature of 23°C.

 High-frequency characteristics depend on the PCB to which the Relay is mounted. Always check these characteristics, including endurance, in the actual machine before use.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

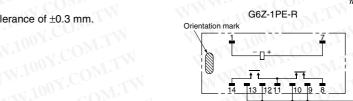
■ Models with PCB Terminals

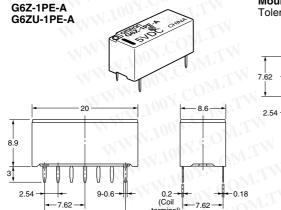


Note: Each value has a tolerance of ± 0.3 mm.

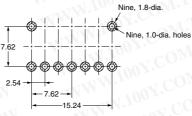
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15.24





Mounting Dimensions (Bottom View) Tolerance: ±0.1 mm



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

Terminal Arrangement/Internal Connections (Bottom View)

Terminal Arrangement/Internal Connections (Bottom View)

Orientation mark

Orientation mark

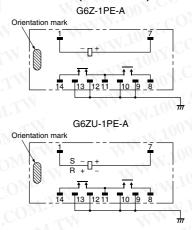
G6Z-1PE

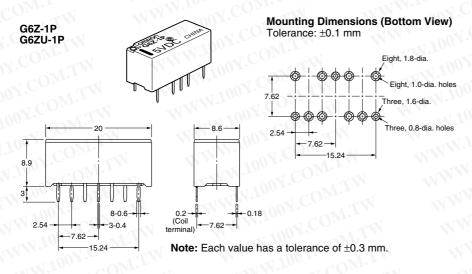
13 1211

13 1211

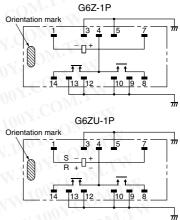
G6ZU-1PE

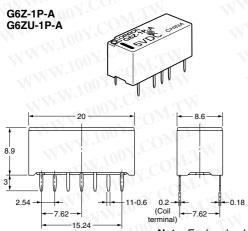
10 9 8



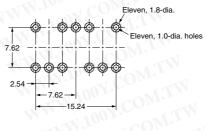


Terminal Arrangement/Internal Connections (Bottom View)

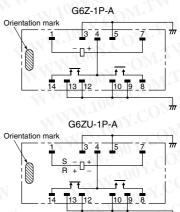




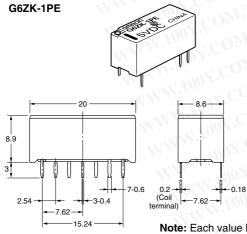
Mounting Dimensions (Bottom View) Tolerance: $\pm 0.1 \text{ mm}$



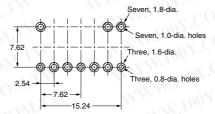
Terminal Arrangement/Internal Connections (Bottom View)



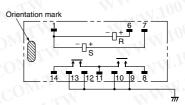
Note: Each value has a tolerance of ±0.3 mm



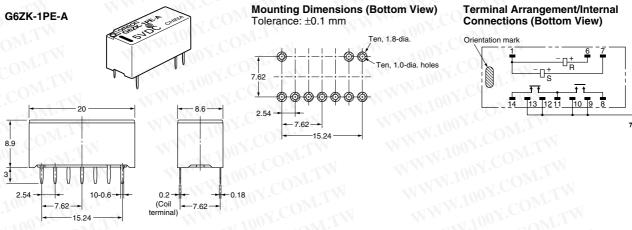
Mounting Dimensions (Bottom View) Tolerance: ±0.1 mm



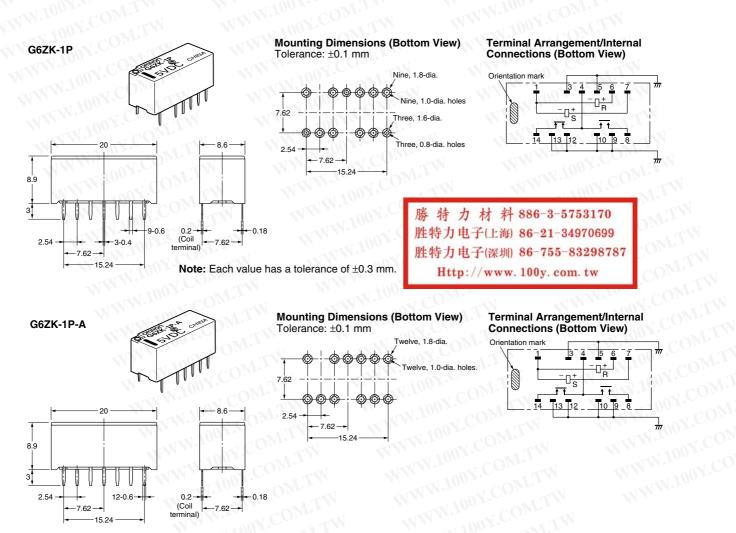
Terminal Arrangement/Internal Connections (Bottom View)



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

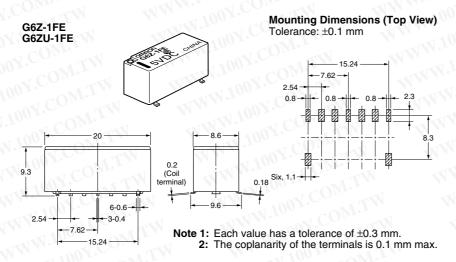


Note: Each value has a tolerance of ±0.3 mm.

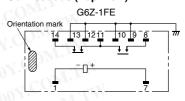


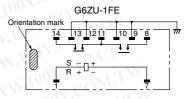
Note: Each value has a tolerance of ±0.3 mm.

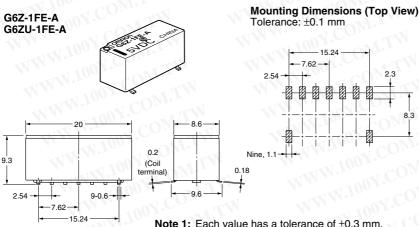
■ Models with Surface-mounting Terminals



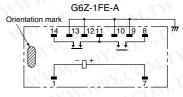
Terminal Arrangement/Internal Connections (Top View)

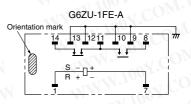


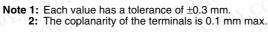


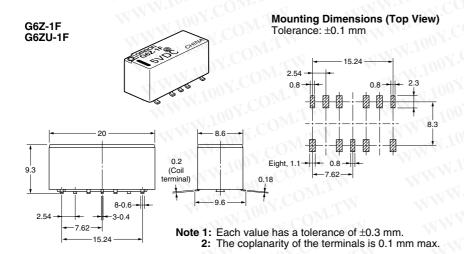


Terminal Arrangement/Internal Connections (Top View)

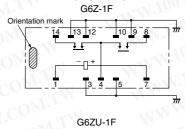


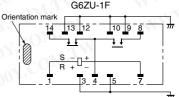


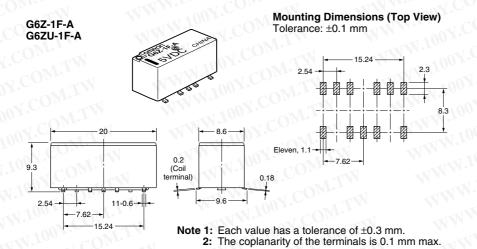




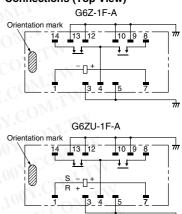
Terminal Arrangement/Internal Connections (Top View)





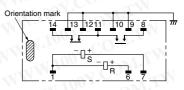


Terminal Arrangement/Internal Connections (Top View)



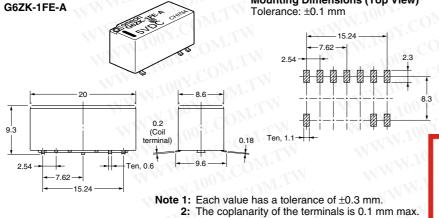
Mounting Dimensions (Top View) Tolerance: ±0.1 mm Output Tolerance: ±0.1 mm Output Tolerance: ±0.1 mm Output Tolerance: ±0.1 mm Output Tolerance: ±0.1 mm Note 1: Each value has a tolerance of ±0.3 mm.

Terminal Arrangement/Internal Connections (Top View)

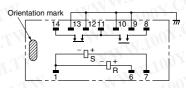




2: The coplanarity of the terminals is 0.1 mm max.



Terminal Arrangement/Internal Connections (Top View)

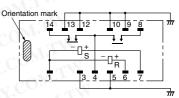


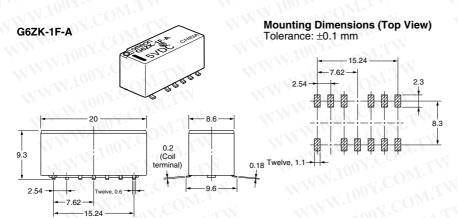
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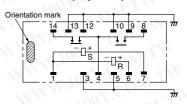
Mounting Dimensions (Top View) G6ZK-1F Tolerance: ±0.1 mm 15.24 -7.62· 2.54 0.8 0.8 8.6 0.2 (Coil terminal) - 0.8 2.54 -7.62 --Note 1: Each value has a tolerance of ±0.3 mm. -15.24 2: The coplanarity of the terminals is 0.1 mm max.

Terminal Arrangement/Internal Connections (Top View)





Terminal Arrangement/Internal Connections (Top View)



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

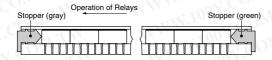
2: The coplanarity of the terminals is 0.1 mm max.

Stick Packing and Tape Packing

Stick Packing

Relays in stick packing are arranged so that the orientation mark of each Relay in on the left side.

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



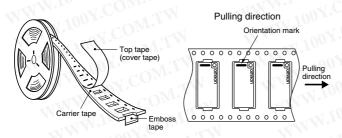
Stick length: 530 mm (stopper not included) No. of Relays per stick: 25

Tape Packing (Surface-mounting Terminal Models)

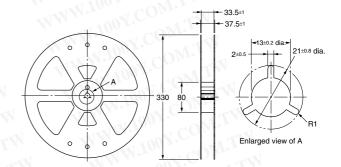
When ordering Relays in tape packing, add the prefix "-TR" to the model number, otherwise the Relays in stick packing will be provided

Relays per Reel: 300

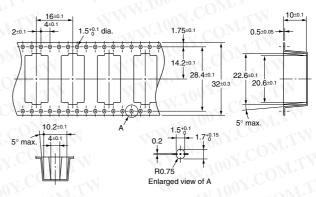
Direction of Relay Insertion



Reel Dimensions



Carrier Tape Dimensions

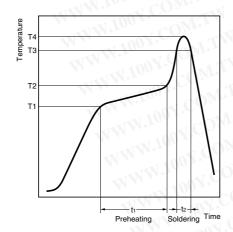


Note: The radius of the unmarked corner is 0.3 mm.

Recommended Soldering Method

Temperature Conditions for IRS Method

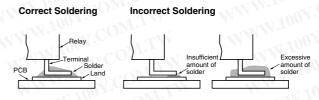
When using reflow soldering, ensure that the Relay terminals and the top of the case stay below the following curve. Check that these conditions are actually satisfied before soldering the terminals.



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 $200 \mu m$ on OMRON's recommended PCB pattern.



Check the soldering in the actual mounting conditions before use

Precautions

Refer to page 25 for information on general precautions. Be sure to read these precautions before using the Relay.

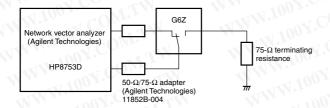
Precautions for Correct Use

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

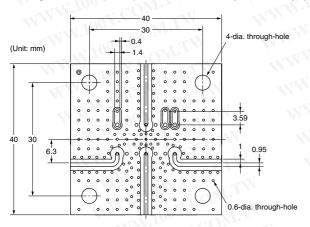
High-frequency Characteristics Measurement Method and Measurement Substrate

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

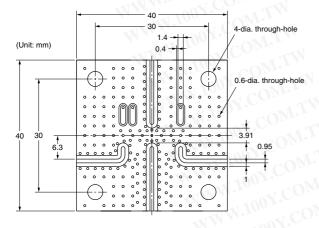
Measurement Method for 75- Ω Models



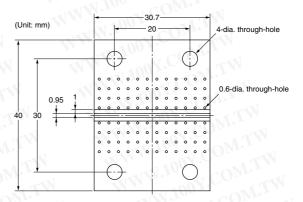
Through-hole Substrate (75-Ω Models, E-shape or Y-shape)



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



Substrate for High-frequency Characteristic Compensation (75-ΩModels, 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 μm

Note:

- 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.
- 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.
- Be sure to mount a standoff tightly to the through-hole substrate.
- 4. Use measuring devices, connectors, and substrates that are appropriate for 50 Ω and 75 Ω respectively.
- 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

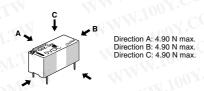
Soldering temperature: Approx. 250°C (260°C if the DWS method is used)

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 adjust the level of the molten solder so that the solder will not overflow onto 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

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.

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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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