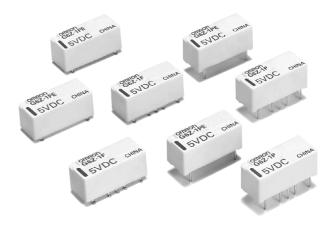
# G6Z

Surface-mounting High-frequency Relay

# Surface-mounting, 3-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- $\Omega$  impedance and models with 50- $\Omega$  impedance are available.

RoHS Compliant



# **■**Model Number Legend

# 

#### 1. Relay Function

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

#### 2. Contact Form

1: SPDT (1c)

# 3. Terminal Shape

F: Surface-mounting terminals

P: PCB terminals

#### 4. Terminal arrangement

None: Y-shape terminal structure

E: E-shape terminal structure

# 5. Characteristic Impedance

None: 75  $\Omega$ A: 50  $\Omega$ 

#### 6. Contact Arrangement

None: Standard contact arrangement
R: Reverse contact arrangement

# **■**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 TVs, TV games, satellite radio

• Public equipment:

units, car navigation systems Measuring equipment, test equipment, and multiplex

transmission devices

Industrial equipment:

# **■**Ordering Information

# Standard Models with PCB Terminals

Relay Function	Enclosure rating	Contact form	Terminal arrangement	Characteristic impedance	Model	Rated coil voltage	Minmum packing unit
			E-shape	75 Ω	G6Z-1PE	3, 4.5, 5, 9, 12, 24 VDC	
Singleside stable			E-snape	50 Ω	G6Z-1PE-A	3, 4.5, 5, 9, 12, 24 VDC	
Singleside stable		SPDT	Vahana	75 Ω	G6Z-1P	3, 4.5, 5, 9, 12, 24 VDC	
			Y-shape	50 Ω	G6Z-1P-A	3, 4.5, 5, 9, 12, 24 VDC	
			E-shape	75 Ω	G6ZU-1PE		25 pcs/tube
Singlewinding	Fully socied			50 Ω	G6ZU-1PE-A	3, 4.5, 5, 9, 12, 24 VDC	
latching	Fully sealed	(1c)	Y-shape	75 Ω	G6ZU-1P		
				50 Ω	G6ZU-1P-A		
			F -b	75 Ω	G6ZK-1PE		
Doublewinding			E-shape	50 Ω	G6ZK-1PE-A	0.45.5.0.40.043/700	
latching			Vahana	75 Ω	G6ZK-1P	3, 4.5, 5, 9, 12, 24 VDC	
			Y-shape	50 Ω	G6ZK-1P-A		

Note. Please add the coil rated voltage (V) to the model number when ordering.

Example: G6Z-1PE DC3

In addition, the delivered product and its package will be marked with voltage specification as "UDVDC".

# **Standard Models with Surface-mounting Terminals**

Relay Function	Enclosure rating	Contact form	Terminal arrangement	Characteristic impedance	Model	Rated coil voltage	Minmum packing unit	Minimum ordering unit (Tape packing)	
			E-shape	75 Ω	G6Z-1FE				
Singleside stable			L-Snape	50 Ω	G6Z-1FE-A	3, 4.5, 5, 9, 12			
Singleside stable			Y-shape	75 Ω	G6Z-1F	and 24 VDC			
			r-snape	50 Ω	G6Z-1F-A				
			E-shape	75 Ω	G6ZU-1FE	3, 4.5, 5, 9, 12 and 24 VDC			
Singlewinding	Fully socied	" , SPDT	E-snape	50 Ω	G6ZU-1FE-A		25 pcs/tube	200	
latching	Fully sealed	(1c)	Y-shape	75 Ω	G6ZU-1F		(300 pcs/ reel)	300 pcs/reel	
			r-snape	50 Ω	G6ZU-1F-A		,		
			□ abana	75 Ω	G6ZK-1FE	3, 4.5, 5, 9, 12 and 24 VDC			
Doublewinding			E-shape	50 Ω	G6ZK-1FE-A				
latching			Y-shape	75 Ω	G6ZK-1F				
				50 Ω	G6ZK-1F-A				

Note 1. Please add the coil rated voltage (V) to the model number when ordering. Example: G6Z-1PE DC3

In addition, the delivered product and its package will be marked with voltage specification as "UDVDC".

Note 2. When ordering Relays in tape packing (surface mounting terminal models), add "-TR" to the end of the model number.

This specification, however, is not part of the relay model number, so it is not marked on the relay case. (If "-TR" is not added to the end of the model number, the Relays will be provided in tube packing.)

Note 3. Consult your OMRON representative for reverse contact models.

# ■Ratings

# ●Coil: Single-side Stable Models (G6E-2P(E), G6Z-1F(E))

	Rated current (mA)	Coil resistance (Ω)	Must operate voltage (V)	(V)	Maximum voltage (V)	Power consumption (mW)	
Raged voltage				% of rated voltage			
3 VDC	66.7	45					
4.5 VDC	44.4	101					
5 VDC	40.0	125	75% max.	10% min.	150%	Approx. 200	
9 VDC	22.2	405	75 /6 IIIax.	10 /6 111111.	130 /6	Арргох. 200	
12 VDC	16.7	720					
24 VDC	8.3	2,880					

## ●Coil: Single-winding Latching Models (G6ZU-1P(E), G6ZU-1F(E))

	Rated current (mA)	Coil resistance (Ω)	Must set voltage (V)	Must reset voltage (V)	Maximum voltage (V)	Power consumption (mW)	
Raged voltage	(IIIA)	(32)	% of rated voltage			(11144)	
3 VDC	66.7	45					
4.5 VDC	44.4	101					
5 VDC	40.0	125	75% max.	75% max.	150%	Approx. 200	
9 VDC	22.2	405	75 /6 IIIax.	75 /6 IIIax.	130 /6	Арргох. 200	
12 VDC	16.7	720					
24 VDC	8.3	2,880					

# ●Coil: Double-winding Latching Models (G6ZK-1P(E), G6ZK-1F(E))

	Rated current (mA)	Coil resistance (Ω)	Must set voltage (V)	Must reset voltage (V)	Maximum voltage (V)	Power consumption (mW)	
Raged voltage	(IIIA)	(52)	% of rated voltage			(11144)	
3 VDC	120	25					
4.5 VDC	80	56			150%	Approx 260	
5 VDC	72	69	75% max.	75% max.			
9 VDC	40	225	75% max. 75% max.		150 %	Approx. 360	
12 VDC	30	400					
24 VDC	15	1,600					

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

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

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

Note 4. The voltage measurements for operate/release and set/reset are the values obtained for instantaneous changes in the voltage (rectangular wave).

#### Contacts

Item Load	Resistive load
Rated load	10 mA at 30 VAC 10 mA at 30 VDC 10 W at 900 MHz *
Rated carry current	0.5 A
Max. switching voltage	30 VAC, 30 VDC
Max. switching current	0.5 A

This value is for an impedance of  $50\Omega$  or  $75\Omega$ with a V.SWR of 1.2 max.

# ● High-frequency Characteristics \*1

Frequency		900MHz				2.6GHz			
			TH		SMD		TH		/ID
Item		E-shape	Y-shape	E-shape	Y-shape	E-shape	Y-shape	E-shape	Y-shape
Isolation	75 Ω	65 dB mi	n.	60dB min.		35 dB	45 dB	30 dB	40 dB
isolation	50 Ω	60 dB mi	n.			min.	min.	min.	min.
Insertion loss	75 Ω	0.2 dB max.		0.5 dB max.					
(not including substrate loss)	50 Ω	0.1 dB m	0.1 dB max.			0.3 dB max.			
V.SWR	75 Ω	1.2 dB m	ax.			1.5 dB max.			
v.swn	50 Ω	1.1 dB m	ax.			1.3 dB max.			
Return loss			20.8 dB min.			14.0 dB min.			
netuiii 1088	50 Ω	26.4 dB min.			17.7 dB min.				
Maximum carry	10W *2								

Note. The above values are initial values.

- \*1. Contact your OMRON representative if the Relay will be used in applications that require high repeatability with high-frequency characteristics in microload regions.
  \*2. These values are for an impedance of 50 Ω or 75 Ω with a V.SWR of 1.2 max.

# **■**Characteristics

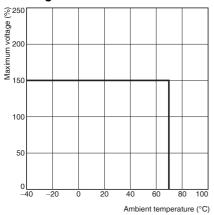
Relay Function		Single-side stable models	Single-winding latching models	Double-winding latching models					
Model		G6Z-1P(E), G6Z-1F(E)	G6ZU-1P(E), G6ZU-1F(E)	G6ZK-1P(E), G6ZK-1F(E)					
Contact resi	istance *1	100 m $\Omega$ max.							
Operating (s	set) time	10 ms max.	10 ms max.						
Release (res	set) time	10 ms max.							
Minimum se	t/reset pulse time	_	12 ms						
Insulation re	esistance *2	100 MΩ min. (at 500 VDC)							
	Between Coil and contacts	1,000 VAC, 50/60 Hz for 1 min							
Dielectric strength	Between ground and coil/contacts	500 VAC, 50/60 Hz for 1 min							
	Between Contacts of the same polarity	500 VAC, 50/60 Hz for 1 min							
Vibration	Destruction	10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude)							
resistance	Malfunction	10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude)							
Shock	Destruction	1,000 m/s <sup>2</sup>							
resistance	Malfunction	500 m/s <sup>2</sup>							
	Mechanical	1,000,000 operations min. (at 36,000 operations/hour)							
Durability	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 op	erating temperature	-40°C to 70°C (with no icing or condensation)							
Ambient op	erating humidity	5% to 85% RH							
Weight		Approx. 2.8 g							

Note. The above values are initial values.

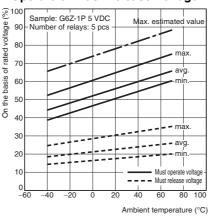
- \*1. The contact resistance was measured with 10 mA at 1 VDC with a voltage drop method.
- The insulation resistance was measured with a 500 VDC megohmmeter applied to the same parts as those used for checkingthe dielectric strength.

# **■**Engineering Data

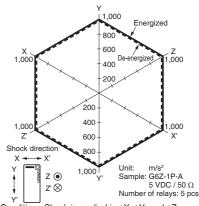
#### Ambient Temperature vs. Maximum Voltage



### Ambient Temperature vs. Must Operate or Must Release Voltage

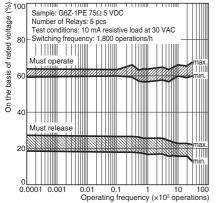


#### Shock Malfunction

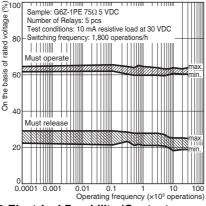


Conditions: Shock is applied in ±X, ±Y, and ±Z directions three times each with and without energizing the Relays to check for contact malfunctions.

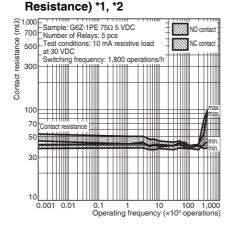
# Electrical Durability (with Must Operate and Must Release Voltage) \*1, \*2



# Electrical Durability (with Must Operate and Must Release Voltage)



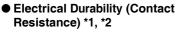
# Electrical Durability (Contact

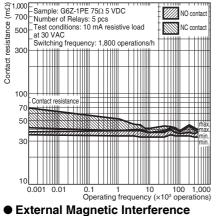


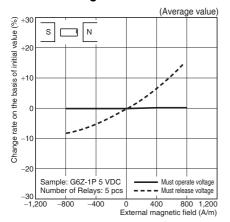
- 1. The tests were conducted at an ambient
- temperature of 23°C.

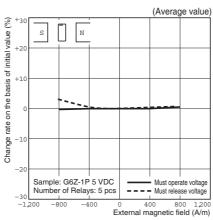
  \*2. The contact resistance data are periodically measured reference values and are not values from each monitoring operation.

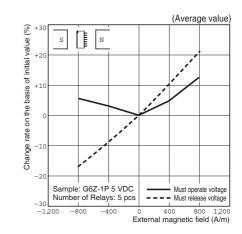
  Contact resistance values will vary according to the switching frequency and operating environment, so be sure to check operation under the actual operating conditions before use.



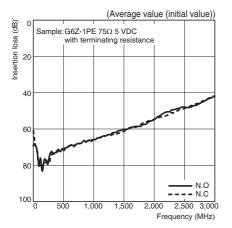




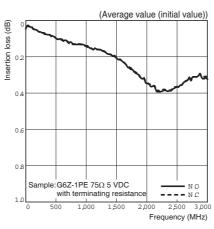




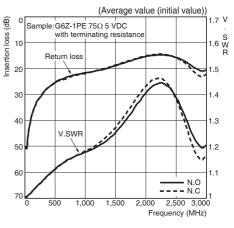
# High-frequency Characteristics at 75Ω (Isolation) \*1, \*2



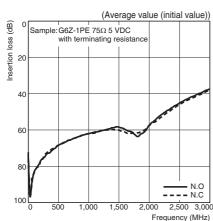
# High-frequency Characteristics at 75Ω (Insertion Loss) \*1, \*2



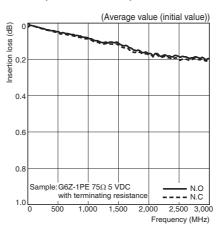
 High-frequency Characteristics at 75Ω (Return Loss, V.SWR) \*1, \*2



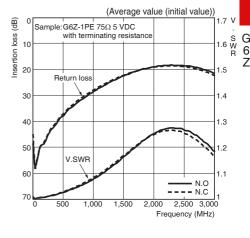
# High-frequency Characteristics at 50Ω (Isolation) \*1, \*2



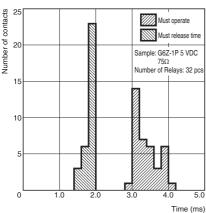
 High-frequency Characteristics at 50Ω (Insertion Loss) \*1, \*2



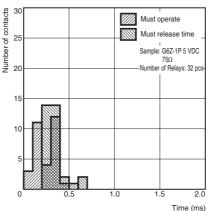
 High-frequency Characteristics at 50Ω (Return Loss, V.SWR) \*1, \*2



#### Must Operate and Must Release Time Distribution \*1



### Must Operate and Must Release Bounce Time Distribution \*1

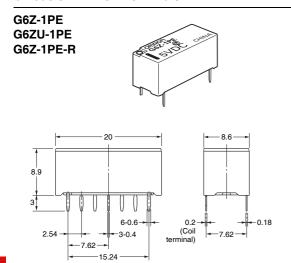


- 1. The tests were conducted at an ambient temperature of 23°C.
- \*2. High-frequency characteristics depend on the PCB to which the Relay is mounted.

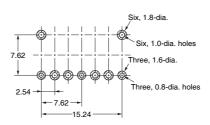
  Always check these characteristics, including endurance, in the actual machine before use.

■Dimensions (Unit: mm)

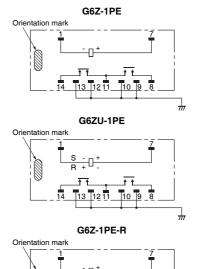
#### Models with PCB Terminals



# **PCB Mounting Holes** (Bottom View) Tolerance: $\pm 0.1$ mm

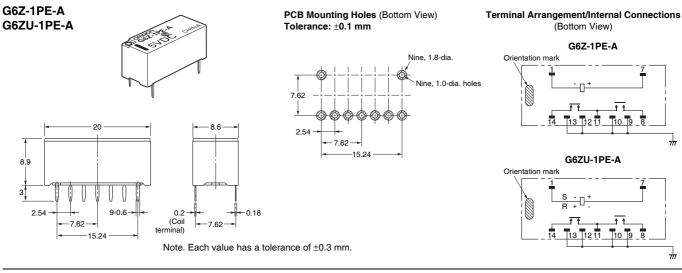


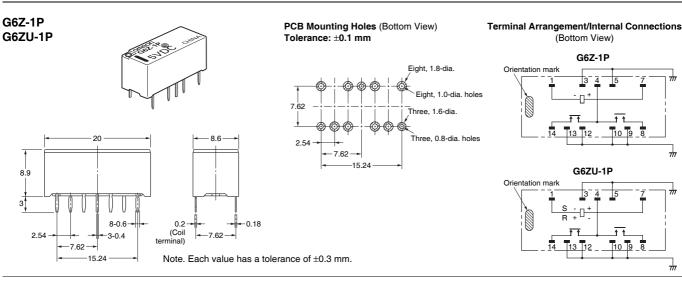
# Terminal Arrangement/Internal Connections (Bottom View)

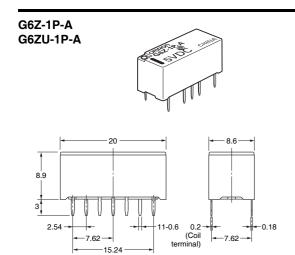


13 12 11 10 9 8

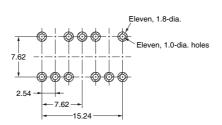
Note. Each value has a tolerance of  $\pm 0.3$  mm.



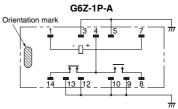


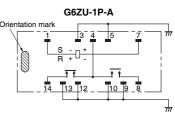


#### 



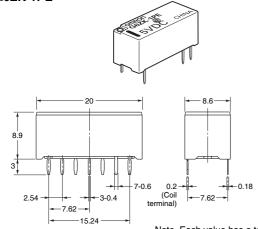
# Terminal Arrangement/Internal Connections (Bottom View)



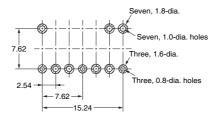


Note. Each value has a tolerance of  $\pm 0.3$  mm.

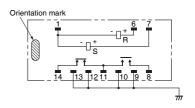




# PCB Mounting Holes (Bottom View) Tolerance: $\pm 0.1 \ mm$

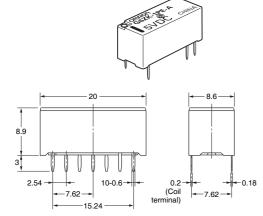


# Terminal Arrangement/Internal Connections (Bottom View)

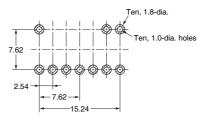


Note. Each value has a tolerance of  $\pm 0.3$  mm.

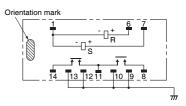
# G6ZK-1PE-A



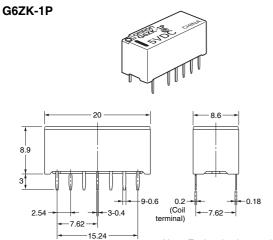
# PCB Mounting Holes (Bottom View) Tolerance: ±0.1 mm



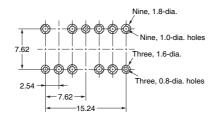
# Terminal Arrangement/Internal Connections (Bottom View)



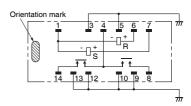
Note. Each value has a tolerance of  $\pm 0.3$  mm.



# PCB Mounting Holes (Bottom View) Tolerance: $\pm 0.1 \ mm$

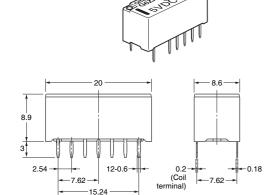


# Terminal Arrangement/Internal Connections (Bottom View)

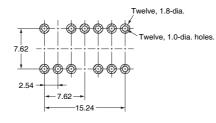


Note. Each value has a tolerance of  $\pm 0.3$  mm.

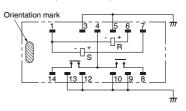




# PCB Mounting Holes (Bottom View) Tolerance: ±0.1 mm



# Terminal Arrangement/Internal Connections (Bottom View)

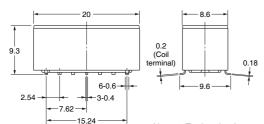


Note. Each value has a tolerance of  $\pm 0.3$  mm.

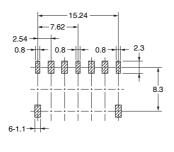
# ● Models with Surface-mounting Terminals







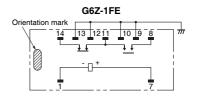
# Mounting Dimensions (Top View) Tolerance: ±0.1 mm

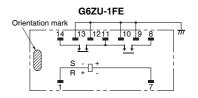


#### Note 1. Each value has a tolerance of ±0.3 mm.

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

# Terminal Arrangement/Internal Connections (Top View)

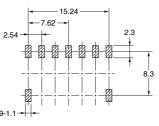




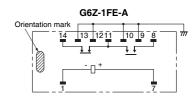
# G6Z-1FE-A G6ZU-1FE-A

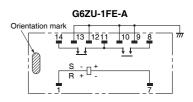
-7.62 <del>→</del> ----15.24

# Mounting Dimensions (Top View) Tolerance: ±0.1 mm



Terminal Arrangement/Internal Connections (Top View)





Note 1. Each value has a tolerance of  $\pm 0.3$  mm.

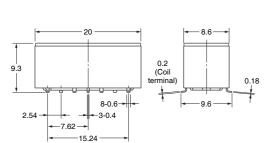
Note 2. The coplanarity of the terminals is 0.1 mm max.



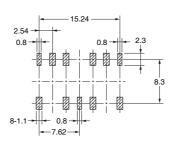
2.54



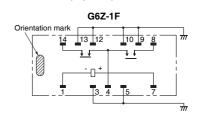
0.2 (Coil erminal)

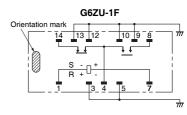


# 



Terminal Arrangement/Internal Connections (Top View)

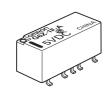


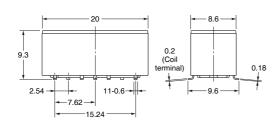


Note 1. Each value has a tolerance of  $\pm 0.3 \ \text{mm}.$ 

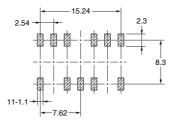
Note 2. The coplanarity of the terminals is 0.1 mm max.

# G6Z-1F-A G6ZU-1F-A

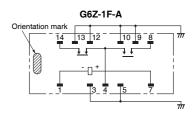


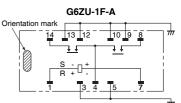


Mounting Dimensions (Top View) Tolerance: ±0.1 mm



Terminal Arrangement/Internal Connections (Top View)



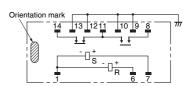


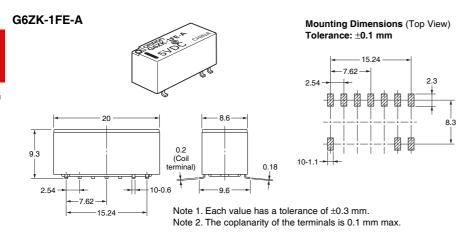
Note 1. Each value has a tolerance of  $\pm 0.3 \ \text{mm}.$ 

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

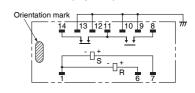
# Mounting Dimensions (Top View) Tolerance: ±0.1 mm 0.2 (Coil terminal) 7-0.6 Note 1. Each value has a tolerance of ±0.3 mm. Note 2. The coplanarity of the terminals is 0.1 mm max.

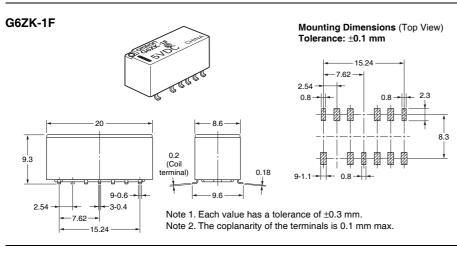
# Terminal Arrangement/Internal Connections (Top View)



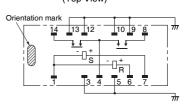


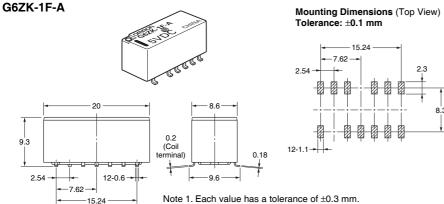
# Terminal Arrangement/Internal Connections (Top View)





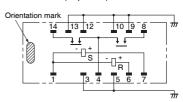
# Terminal Arrangement/Internal Connections (Top View)





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

# Terminal Arrangement/Internal Connections (Top View)

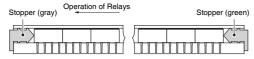


# **■**Tube Packing and Tape Packing

### (1) Tube Packing

• Relays in tube 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.



Tube length: 530 mm (stopper not included)

No. of Relays per tube: 25 pcs

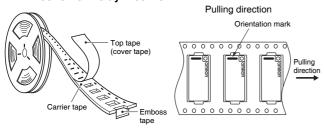
# (2) Tape Packing (Surface-mounting Terminal Models)

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

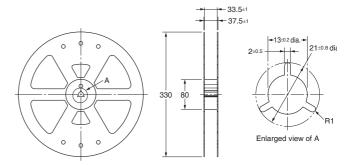
Relays per Reel: 300 pcs

Minimum packing unit: 1 Reel (300 pcs)

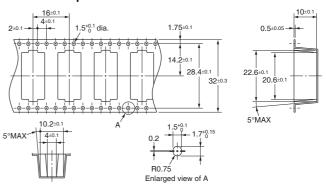
#### 1. Direction of Relay Insertion



#### 2. Reel Dimensions



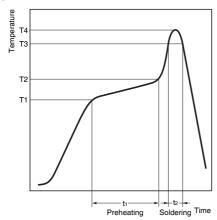
# 3. Carrier Tape Dimensions



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.  $\bullet$  The thickness of cream solder to be applied should be between 150 and 200  $\mu m$  on OMRON's recommended PCB pattern.

# Correct Soldering Incorrect Soldering Relay Terminal Land PCB Solder Insufficient amount of solder Excessive amount of solder

Check the soldering in the actual mounting conditions before use.

# ■Precautions

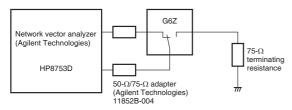
• For general precautions on PCB Relays, refer to the precautions provided in General Information of the Relay Product Data Book.

#### Correct Use

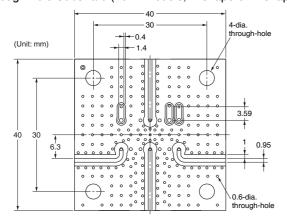
# High-frequency Characteristics Measurement Method and Measurement Substrate

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

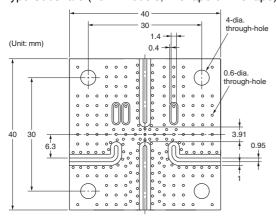
#### Measurement Method for 75- $\Omega$ Models



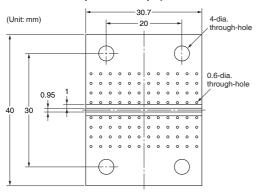
Through-hole Substrate (75-Ω Models, E-shape or Y-shape)



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



Substrate for High-frequency Characteristic Compensation (75- $\Omega$  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 μm

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  $50\Omega$  and  $75\Omega$  respectively.

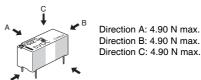
Note 5. Ensure that there is no pattern under the Relay. Otherwise, the impedance may be adversely affected and the Relay may not be able to attain its full characteristics.

#### 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.
- Use the Relay as soon as possible after opening the moistureproof package. If the Relay is left for a long time after opening the moisture-proof package, the appearance may suffer and seal failure may occur after the solder mounting process. To store the Relay after opening the moisture-proof package, place it into the original package and sealed the package with adhesive tape.
- When washing the product after soldering the Relay to a PCB, use a water-based solvent or alcohol-based solvent, and keep the solvent temperature to less than 40°C. Do not put the relay in a cold cleaning bath immediately after soldering.

#### **●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.

#### Repeatability

 Contact your OMRON representative if the Relay will be used in an application that requires high repeatability in high-frequencycharacteristics for the microload region. (Such applications include testing and measurement equipment and ATE applications.)

Contact: www.omron.com/ecb

Note: Do not use this document to operate the Unit.

**OMRON Corporation** 

**Electronic and Mechanical Components Company** 

Cat. No. K124-E1-03 0812(0207)(O)

Application examples provided in this document are for reference only. In actual applications, confirm equipment functions and safety before using the product.
 Consult your OMRON representative before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment and the systems, and other systems or equipment that may have a serious influence on lives and property if used improperly. Make sure that the ratings and performance characteristics of the product provide a margin of safety for the system or equipment, and be sure to provide the system or equipment with double safety mechanisms.

# **ПОСТАВКА** ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

# Данный компонент на территории Российской Федерации Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

# http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

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Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

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# Офис по работе с юридическими лицами:

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