

# G3VM-21GR□/41GR4/41GR5/41GR6/81GR□

MOS FET Relays SOP 4-pin, Low-output-capacitance and Low-ON-resistance Type (with Low C × R)

## MOS FET Relays in SOP 4-pin packages that achieve a low C × R

- Load voltage: 20 V, 40 V, or 80 V
- G3VM-21GR: Low C × R = 5 pF·Ω, C<sub>OFF</sub> (standard) = 1 pF, R<sub>ON</sub> (standard) = 5 Ω
- G3VM-21GR1: Low C × R = 5 pF·Ω, C<sub>OFF</sub> (standard) = 5 pF, R<sub>ON</sub> (standard) = 1 Ω
- G3VM-41GR6: Low C × R = 10 pF·Ω, C<sub>OFF</sub> (standard) = 1 pF, R<sub>ON</sub> (standard) = 10 Ω
- G3VM-41GR4: Low C × R = 10 pF·Ω, C<sub>OFF</sub> (standard) = 5 pF, R<sub>ON</sub> (standard) = 2 Ω
- G3VM-41GR5: Low C × R = 10 pF·Ω, C<sub>OFF</sub> (standard) = 10 pF, R<sub>ON</sub> (standard) = 1 Ω



Note: The actual product is marked differently from the image shown here.

RoHS Compliant

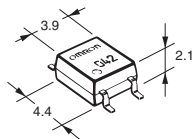
### Application Examples

- Semiconductor test equipment
- Security equipment
- Amusement equipment
- Test & Measurement equipment
- Industrial equipment
- Communication equipment
- Power circuit

### Package

(Unit : mm, Average)

SOP 4-pin



Note: The actual product is marked differently from the image shown here.

### Model Number Legend

G3VM-□□□□□  
1 2 3 4 5

- 1. Load Voltage**  
2 : 20 V  
4 : 40 V  
8 : 80 V
- 2. Contact form**  
1 : 1a (SPST-NO)
- 3. Package**  
G : SOP 4-pin
- 4. Additional functions**  
R : Low ON resistance
- 5. Other informations**  
When specifications overlap, serial code is added in the recorded order.

### Ordering Information

Package	Contact form	Terminals	Load voltage (peak value) *	Continuous load current (peak value) *	Stick packaging		Tape packaging	
					Model	Minimum package quantity	Model	Minimum package quantity
SOP4	1a (SPST-NO)	Surface-mounting Terminals	20 V	160 mA	G3VM-21GR	100 pcs.	G3VM-21GR(TR)	2,500 pcs.
				300 mA	G3VM-21GR1		G3VM-21GR1(TR)	
			40 V	120 mA	G3VM-41GR6		G3VM-41GR6(TR)	
				250 mA	G3VM-41GR4		G3VM-41GR4(TR)	
			80 V	300 mA	G3VM-41GR5		G3VM-41GR5(TR)	
				40 mA	G3VM-81GR		G3VM-81GR(TR)	
		200 mA	G3VM-81GR1	G3VM-81GR1(TR)				

\* The AC peak and DC value are given for the load voltage and continuous load current.

Note: To order tape packaging for Relays with surface-mounting terminals, add "(TR)" to the end of the model number.

### Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	G3VM-21GR	G3VM-21GR1	G3VM-41GR6	G3VM-41GR4	G3VM-41GR5	G3VM-81GR	G3VM-81GR1	Unit	Measurement conditions	
Input	LED forward current	50							mA		
	LED forward current reduction rate	-0.5							mA/°C	Ta ≥ 25°C	
	LED reverse voltage	5							V		
	Connection temperature	125							°C		
Output	Load voltage (AC peak/DC)	20		40			80		V		
	Continuous load current (AC peak/DC)	160	300	120	250	300	40	200	mA		
	ON current reduction rate	-1.6	-3.0	-1.2	-2.5	-3.0	-0.4	-2.0	mA/°C	Ta ≥ 25°C	
	Pulse ON current	I <sub>op</sub>	480	900	360	750	900	120	600	mA	t=100 ms, Duty=1/10
	Connection temperature	T <sub>J</sub>	125							°C	
Dielectric strength between I/O *	V <sub>I-o</sub>	1500							V <sub>rms</sub>	AC for 1 min	
Ambient operating temperature	T <sub>a</sub>	-20 to +85							°C	With no icing or condensation	
Ambient storage temperature	T <sub>stg</sub>	-40 to +125		-55 to +125			-40 to +125		°C		
Soldering temperature	-	260							°C	10 s	

\* The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.

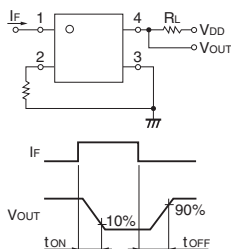
SOP

G3VM-21GR□/41GR4/41GR5/41GR6/81GR□

## ■Electrical Characteristics (Ta = 25°C)

Item		Symbol	G3VM-21GR		G3VM-21GR1		G3VM-41GR6		G3VM-41GR4		G3VM-41GR5		G3VM-81GR		G3VM-81GR1		Unit	Measurement conditions
Input	LED forward voltage	VF	Minimum		1.0												V	If=10 mA
			Typical		1.15													
			Maximum		1.3													
	Reverse current	IR	Maximum		10												μA	Vr=5 V
	Capacitance between terminals	CT	Typical		15												pF	V=0, f=1 MHz
Output	Trigger LED forward current	IFT	Maximum		4						3						mA	G3VM-21GR/21GR1/41GR4/41GR5/41GR6 : Io=100 mA G3VM-81GR : Io=40 mA G3VM-81GR1 : Io=200 mA
	Release LED forward current	IFC	Minimum		0.2						0.1						mA	Ioff=10μA
	Maximum resistance with output ON	RON	Typical		5	1	10	2	1	16	5	G3VM-21GR/21GR1/41GR4/41GR5/41GR6 : If=5 mA, Io=Continuous load current ratings, t<1s G3VM-81GR/81GR1 : If=5 mA, Io=Continuous load current ratings						Ω
			Maximum		8	1.5	15	3	1.5	25	8							
	Current leakage when the relay is open	I <sub>LEAK</sub>	Maximum		1												nA	G3VM-21GR/21GR1 : V <sub>OFF</sub> =20 V, Ta=50°C G3VM-41GR4/41GR5/41GR6 : V <sub>OFF</sub> =30 V, Ta=50°C G3VM-81GR : V <sub>OFF</sub> =80 V, Ta=60°C G3VM-81GR1 : V <sub>OFF</sub> =80 V, Ta=50°C
Capacitance between terminals	C <sub>OFF</sub>	Typical		1	5	1	5	10	2.5	6.5	G3VM-21GR/21GR1/41GR4/41GR5/41GR6 : V=0, f=100 MHz, t<1 s G3VM-81GR/81GR1 : V=0, f=100 MHz, t<10 s						pF	
		Maximum		2.5	12	2	7	14	3.5	11								
Capacitance between I/O terminals	C <sub>I-O</sub>	Typical		0.8						0.7						pF	f=1 MHz, Vs=0 V	
Insulation resistance between I/O terminals	R <sub>I-O</sub>	Minimum		1000												MΩ	Vi-o=500 VDC, RoH≤60%	
		Typical		10 <sup>8</sup>														
Turn-ON time	t <sub>ON</sub>	Typical		-						0.07	0.13	G3VM-21GR/21GR1/41GR4/41GR5/41GR6 : If=10 mA, RL=200 Ω, V <sub>DD</sub> =20 V * G3VM-81GR/81GR1 : If=5 mA, RL=200 Ω, V <sub>DD</sub> =10 V *						ms
		Maximum		-						0.5								
Turn-OFF time	t <sub>OFF</sub>	Typical		-						0.07	0.17	G3VM-21GR/21GR1/41GR4/41GR5/41GR6 : If=10 mA, RL=200 Ω, V <sub>DD</sub> =20 V * G3VM-81GR/81GR1 : If=5 mA, RL=200 Ω, V <sub>DD</sub> =10 V *						ms
		Maximum		-						0.5								

\* Turn-ON and Turn-OFF Times



## ■Recommended Operating Conditions

For usage with high reliability, Recommended Operation Conditions is a measure that takes into account the derating of Absolute Maximum Ratings and Electrical Characteristics.

Each item on this list is an independent condition, so it is not simultaneously satisfy several conditions.

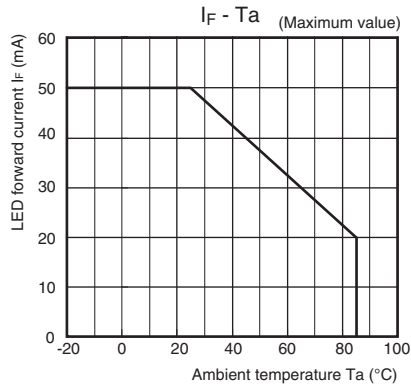
Item	Symbol		G3VM-21GR	G3VM-21GR1	G3VM-41GR6	G3VM-41GR4	G3VM-41GR5	G3VM-81GR	G3VM-81GR1	Unit	
Load voltage (AC peak/DC)	V <sub>DD</sub>	Maximum	20		32			64		V	
Operating LED forward current	IF	Minimum	7		10			5		mA	
		Maximum	30								
Continuous load current (AC peak/DC)	Io	Maximum	160	300	120	250	300	40	200		
Ambient operating temperature	Ta	Minimum	-20								°C
		Maximum	60								

## ■Spacing and Insulation

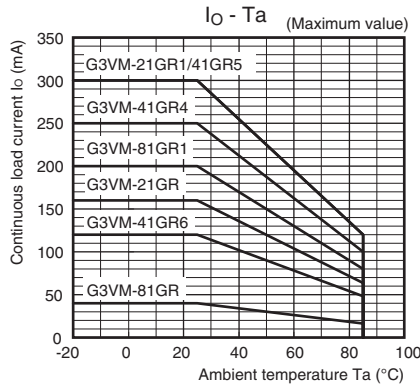
Item	Minimum	Unit
Creepage distances	4.0	mm
Clearance distances	4.0	
Internal isolation thickness	0.1	

## Engineering Data

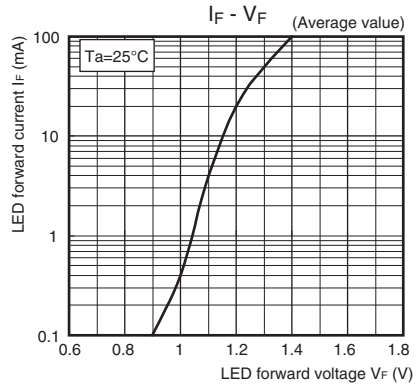
### LED forward current vs. Ambient temperature



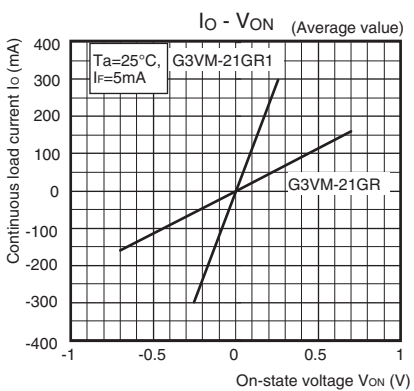
### Continuous load current vs. Ambient temperature



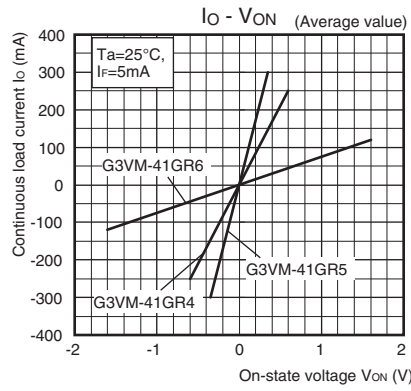
### LED forward current vs. LED forward voltage



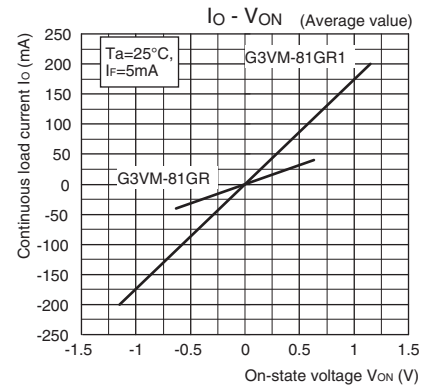
### Continuous load current vs. On-state voltage



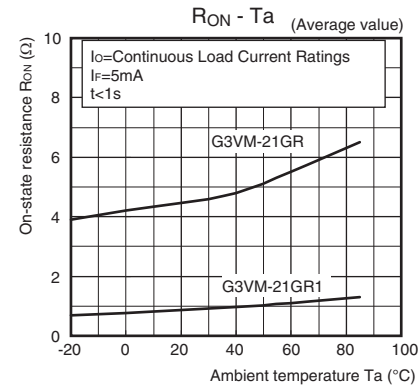
### G3VM-41GR6/41GR4/41GR5



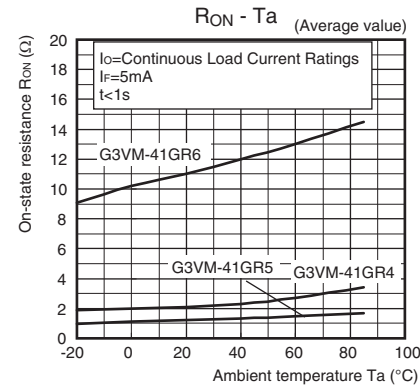
### G3VM-81GR/81GR1



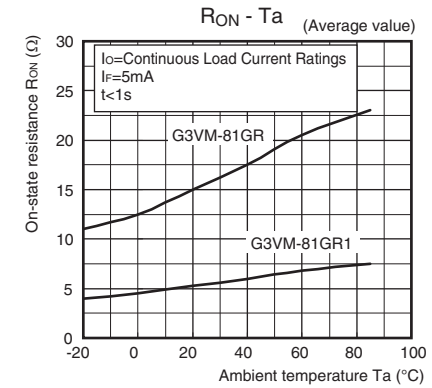
### On-state resistance vs. Ambient temperature



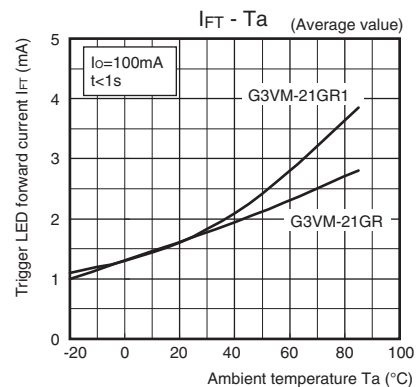
### G3VM-41GR6/41GR4/41GR5



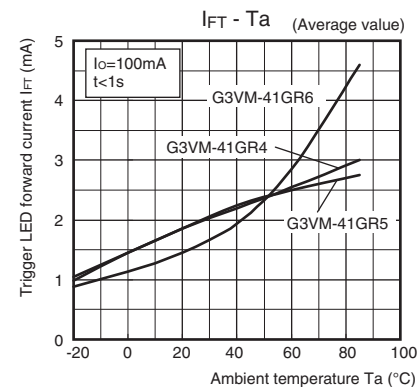
### G3VM-81GR/81GR1



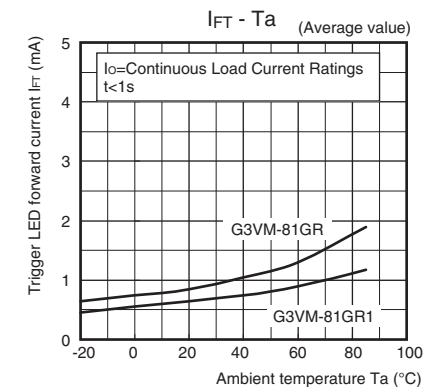
### Trigger LED forward current vs. Ambient temperature



### G3VM-41GR6/41GR4/41GR5

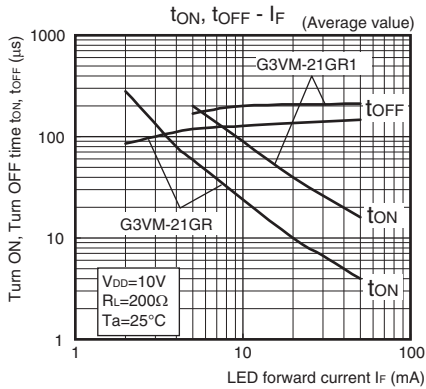


### G3VM-81GR/81GR1

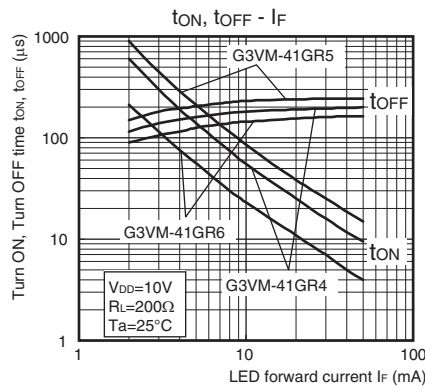


## Engineering Data

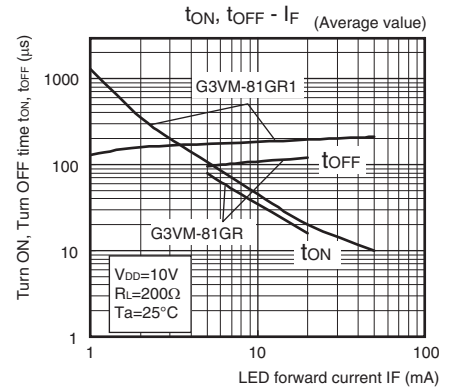
### ● Turn ON, Turn OFF time vs. LED forward current LED forward current G3VM-21GR/21GR1



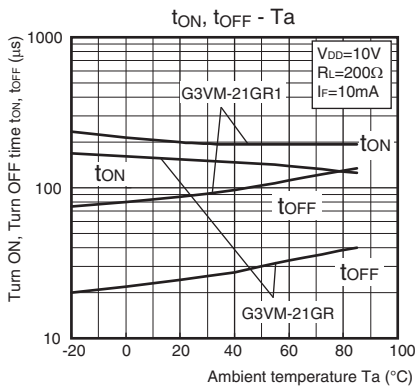
### G3VM-41GR6/41GR4/41GR5



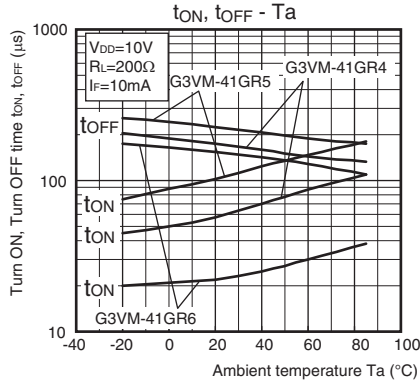
### G3VM-81GR/81GR1



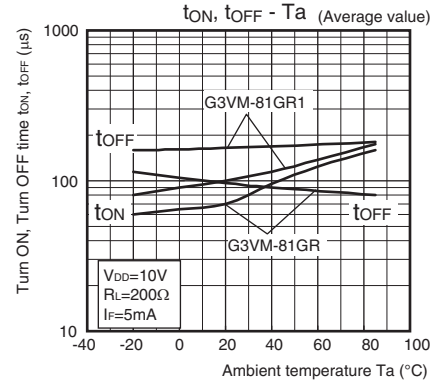
### ● Turn ON, Turn OFF time vs. Ambient temperature Ambient temperature G3VM-21GR/21GR1



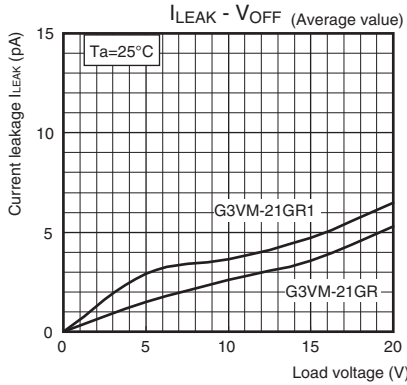
### G3VM-41GR6/41GR4/41GR5



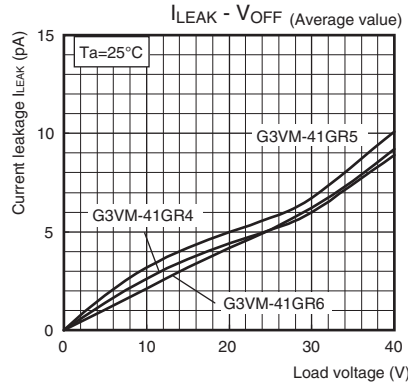
### G3VM-81GR/81GR1



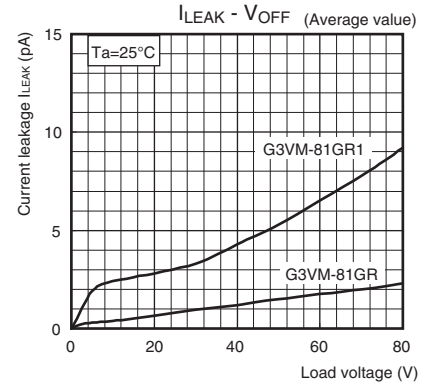
### ● Current leakage vs. Load voltage G3VM-21GR/21GR1



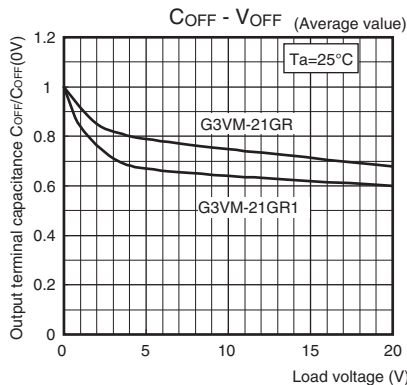
### G3VM-41GR6/41GR4/41GR5



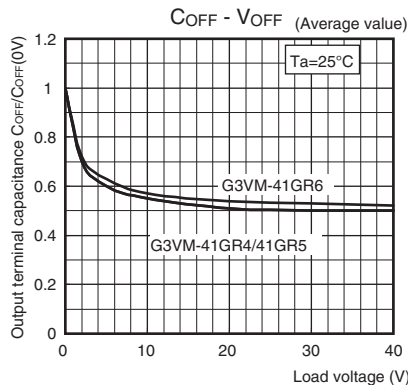
### G3VM-81GR/81GR1



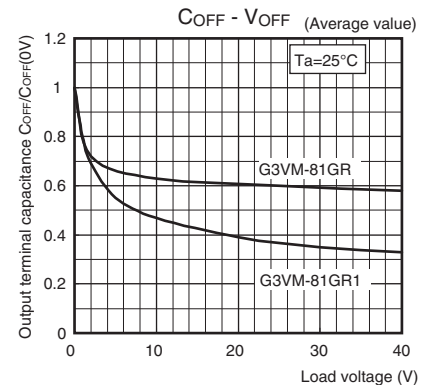
### ● Output terminal capacitance vs. Load voltage Load voltage G3VM-21GR/21GR1



### G3VM-41GR6/41GR4/41GR5



### G3VM-81GR/81GR1

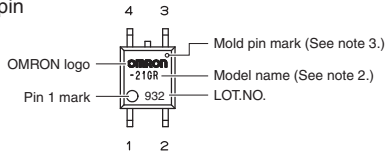


## ■ Appearance / Terminal Arrangement / Internal Connections

### ● Appearance

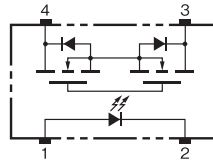
#### SOP (Small Outline Package)

SOP 4-pin



- Note: 1.** The actual product is marked differently from the image shown here.
- Note: 2.** "G3VM" does not appear in the model number on the Relay.
- Note: 3.** The indentation in the corner diagonally opposite from the pin 1 mark is from a pin on the mold.

### ● Terminal Arrangement/Internal Connections (Top View)

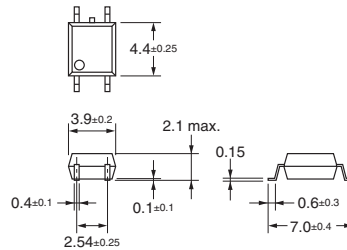


## ■ Dimensions (Unit: mm)



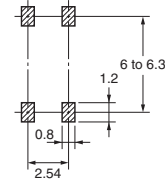
### Surface-mounting Terminals

Weight: 0.1 g



### Actual Mounting Pad Dimensions

(Recommended Value, TOP VIEW)



**Note:** The actual product is marked differently from the image shown here.

## ■ Approved Standards

UL recognized

Approved Standards	Contact form	File No.
UL (recognized)	1a (SPST-NO)	E80555

## ■ Safety Precautions

- Refer to the *Common Precautions for All MOS FET Relays* for precautions that apply to all MOS FET Relays.

Please check each region's Terms & Conditions by region website.

## OMRON Corporation

Electronic and Mechanical Components Company

### Regional Contact

#### Americas

<https://www.components.omron.com/>

#### Asia-Pacific

<https://ecb.omron.com.sg/>

#### Korea

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#### Europe

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#### China

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#### Japan

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