# G3VM Low-cost Series with 4 or 6-pin Construction

- New G3VM Series with 350-V-output dielectric strength.
- A 4-pin Relay available with the same terminal-pin position as 4-pin photocouplers.
- Approved Standards: UL1577 (File No. E80555)

# **Ordering Information**

### Appearance



Note: "G3VM" is not printed on the actual product

### Model Number Legend



#### 1. Load Voltage

Load voltage, 350 VDC or 350 VAC max. (small model)
 Load voltage, 350 VDC or 350 VDC max.

#### 2. Terminal

F: Surface-mounting terminals None: PCB terminals

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick	Number per tape
SPST-NO	PCB terminals	350 VAC	G3VM-2	100	
			G3VM-3	50	
	Surface-mounting terminals (see note)		G3VM-2F	100	1,500
			G3VM-3F	50	

Note: Surface-mounting terminal models are also available on tape.

# **Application Examples**

- Electronic automatic exchange systems
- Cordless telephones

- Multi-functional telephones
- Gauging systems

# G3VM-2/3(F)

# Specifications —

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

<G3VM-2>

	ltem	Symbol	Rating	Unit
Input	LED forward current	IF	50	mA
	LED forward current reduction rate (Ta≧25°C)	$\Delta I_{F}^{\prime \circ}C$	-0.5	mA/°C
	Repetitive peak LED forward current (100 $\mu \text{s}$ pulse)	I <sub>FP</sub>	1	A
	LED reverse voltage	V <sub>R</sub>	5	V
	Connection temperature	Тј	125	°C
Output	Output dielectric strength	V <sub>OFF</sub>	350	V
	Continuous load current (see note)	lo	120	mA
	ON current reduction rate (Ta≧25°C)	$\Delta I_{ON} / ^{\circ}C$	-1.2	mA/°C
	Connection temperature	Tj	125	°C
Storage	temperature	T <sub>stg</sub>	-55 to +125	°C
Operatin	ng temperature	T <sub>a</sub>	-40 to +85	°C
Solderin	ng temperature (10 s)	T <sub>sol</sub>	260	°C
Dielectri with am less)	ic strength (AC for 1 min bient humidity of 60% or	V <sub>I-O</sub>	2,500	V <sub>rms</sub>

Note: The output load current varies depending on the ambient temperature. Refer to Engineering Data.

#### <G3VM-3>

	Item		Symbol	Rating	Unit
Input	LED forward current		I <sub>F</sub>	50	mA
	LED forward current reduction rate (Ta ≥ 25°C)		$\Delta I_{F}^{\circ}C$	-0.5	mA/°C
	Repetitive peak LED forward current (10	)0 μs pulse)	I <sub>FP</sub>	1	А
	LED reverse voltage		V <sub>R</sub>	5	V
	Connection temperature		Тj	125	°C
Output	Output dielectric strength		V <sub>OFF</sub>	350	V
	Continuous load current (see note 1)	Connection A	I <sub>O</sub>	120	mA
		Connection B		120	
		Connection C		160	
	ON current reduction rate (Ta≧25°C)	Connection A	$\Delta I_{ON}/^{\circ}C$	-1.2	mA/°C
		Connection B		-1.2	
		Connection C		-1.6	
	Connection temperature		Т <sub>ј</sub>	125	°C
Storage	temperature		T <sub>stg</sub>	-55 to +125	°C
Operating temperature		Ta	-40 to +85	°C	
Soldering temperature (10 s)		T <sub>sol</sub>	260	°C	
Dielectr less) (se	ic strength (AC for 1 min with ambient hu ee note 2)	midity of 60% or	V <sub>I-O</sub>	2,500	V <sub>rms</sub>

**Note:** 1. The output load current varies depending on the ambient temperature. Refer to *Engineering Data*.

2. Impose voltage between a group of pins 1, 2, and 3 and that of pins 4, 5, and 6.

Connection diagram

c 2 5 5 or AC c 3 4	$\begin{bmatrix} 1 & 6 & - & Load \\ - & 2 & 5 & - & DC \\ \hline & & & & \\ \hline & & & & & \\ \hline & & & & &$	
Connection A	Connection B	Connection C

## Recommended Operating Conditions

### <G3VM-2>

Item	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V <sub>DD</sub>			280	V
Forward current	I <sub>F</sub>	5.0	7.5	25	mA
Continuous load current	IO			100	mA
Operating temperature	Та	-20		65	°C

#### <G3VM-3>

ltem	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V <sub>DD</sub>			280	V
Forward current	I <sub>F</sub>	5.0	7.5	25	mA
Continuous load current	I <sub>O</sub>			120	mA
Operating temperature	Та	-20		65	°C

# ■ Electrical Characteristics (Ta = 25°C)

<G3VM-2>

	Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Input	LED forward voltage	V <sub>F</sub>	I <sub>F</sub> =10 mA	1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =5 V			10	μΑ
	Capacity between terminals	CT	V=0, f=1MHZ		30		pF
Output	Current leakage when the relay is closed	I <sub>LEAK</sub>	V <sub>OFF</sub> =350 V			1	μA

#### <G3VM-3>

	Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Input	LED forward voltage	V <sub>F</sub>	I <sub>F</sub> =10 mA	1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =5 V			10	μA
	Capacity between terminals	C <sub>T</sub>	V=0, f=1MHZ		30		pF
Output	Current leakage when the relay is closed	I <sub>LEAK</sub>	V <sub>OFF</sub> =350 V			1	μA

# ■ Connection Characteristics (Ta = 25°C)

<G3VM-2>

ltem	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Maximum resistance with	R <sub>ON</sub>	I <sub>ON</sub> =120 mA, I <sub>F</sub> =5 mA		22	35	Ω
output ON		I <sub>ON</sub> =20 to 120 mA, I <sub>F</sub> =5 mA		26	40	

#### <G3VM-3>

lte	m	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Maximum	Connection A	R <sub>ON</sub>	I <sub>ON</sub> =120 mA, I <sub>F</sub> =5 mA		22	35	Ω
resistance with			$I_{ON}$ =20 to 120 mA, $I_{F}$ =5 mA		26	40	
output on	Connection B		I <sub>ON</sub> =120 mA, I <sub>F</sub> =5 mA		13	23	
	Connection C		I <sub>ON</sub> =160 mA, I <sub>F</sub> =5 mA		7	12	

# ■ Insulation Characteristics (Ta = 25°C)

<G3VM-2>

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Floating capacity between I/O terminals	C <sub>I-O</sub>	V <sub>S</sub> =0, f=1MH <sub>Z</sub>		0.8		pF
Insulation resistance	R <sub>I-O</sub>	$V_S$ =500, operating ambient humidity: $\leq 60\%$	5 x 10 <sup>10</sup>	1014		Ω
Dielectric strength	V <sub>I-O</sub>	AC for 1 min	2,500			V <sub>rms</sub>
		AC for 1 s in oil		5,000		
		DC for 1 min in oil		5,000		V <sub>dc</sub>

#### <G3VM-3>

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Floating capacity between I/O terminals	C <sub>I-O</sub>	V <sub>S</sub> =0, f=1MH <sub>Z</sub>		0.8		pF
Insulation resistance	R <sub>I-O</sub>	$V_S$ =500, operating ambient humidity: $\leq 60\%$	5 x 10 <sup>10</sup>	1014		Ω
Dielectric strength	V <sub>I-O</sub>	AC for 1 min	2,500			V <sub>rms</sub>
		AC for 1 s in oil		5,000		
		DC for 1 min in oil		5,000		V <sub>dc</sub>

# ■ Switching Characteristics (Ta = 25°C)

<G3VM-2>

ltem	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Turn-on time	t <sub>ON</sub>	$R_L=200 \Omega$		0.3	1	ms
Turn-off time	t <sub>OFF</sub>	I <sub>F</sub> =10 mA (see note)		0.1	1	

Note: Switching Time Measuring Circuit



#### <G3VM-3>

ltem	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Turn-on time	t <sub>ON</sub>	$R_L=200 \Omega$		0.3	1	ms
Turn-off time	t <sub>OFF</sub>	I <sub>F</sub> =5 mA (see note)		0.1	1	

**Note:** Switching Time Measuring Circuit



# **Engineering Data**





# Dimensions

Note: All units are in millimeters unless otherwise indicated.

#### G3VM-2





4.58±0.25



7.62±0.2

7.85 to 8.80

4.0<sup>+0.15</sup>

1.0 min

Note: "G3VM" is not printed on the actual product.

#### G3VM-3

Unit: mm

Weight: 0.26 g





Unit: mm Weight: 0.4 g

**Note:** "G3VM" is not printed on the actual product.

#### G3VM-2F



Weight: 0.26 g



Note: "G3VM" is not printed on the actual product.

#### G3VM-3F

Unit: mm Weight: 0.4 g

Unit: mm





Note: "G3VM" is not printed on the actual product.

# Precautions

### Correct Use

### **Recommended Operating Conditions**

Use the G3VM under the following conditions so that the Relay will operate properly.

Item	Min.	Туре	Max.
Operating LED forward current	5 mA	7.5 mA	25 mA
Releasing LED forward voltage	0 V		0.8 V

Note: Refer to page 48 for precautions common to all G3VM models.

Terminal Arrangement/ Internal Connections (Top View)



Terminal Arrangement/ Internal Connections (Top View)



Terminal Arrangement/ Internal Connections (Top View)



Terminal Arrangement/ Internal Connections (Top View)



PCB Dimensions (Bottom View)



#### PCB Dimensions (Bottom View)



Actual Mounting Pad Dimensions (Recommended Value, Bottom View)



Actual Mounting Pad Dimensions (Recommended Value, Bottom View)



### G3VM Low-cost Series with 8-pin Construction (Two-output Models)

- New G3VM Series with 350-V-output dielectric strength.
- Two-output models now available.
- Approved Standards: UL1577 (File No. E80555)



# Ordering Information

## Appearance



Note: "G3VM" is not printed on the actual product

## Model Number Legend



- 1. Load Voltage
  - W: Load voltage, 350 VDC or 350 VAC min.

#### 2. Terminal

F: Surface-mounting terminals None: PCB terminals

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick	Number per tape
DPST-NO	PCB terminals	350 VAC	G3VM-W	50	
	Surface-mounting terminals (see note)		G3VM-WF		1,500

Note: Surface-mounting terminal models are also available on tape.

# Application Examples

- Electronic automatic exchange systems
- Cordless telephones

- Multi-functional telephones
- Gauging systems

# Specifications —

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

	Item			Rating	Unit
Input	LED forward curre	ent	I <sub>F</sub>	50	mA
	LED forward current reduction rate (Ta $\ge$ 25°C)		$\Delta I_{F}^{\circ}C$	-0.5	mA/°C
	Repetitive peak LE	ED forward current (100 $\mu$ s pulse)	I <sub>FP</sub>	1	А
	LED reverse volta	ge	V <sub>R</sub>	5	V
	Connection tempe	erature	Тj	125	°C
Output	Output dielectric s	strength	V <sub>OFF</sub>	350	V
	Continuous load current (see note)	Current per channel	IO	120	mA
	ON current reduction rate (Ta≧25°C)	Current per channel	$\Delta I_{ON} / ^{\circ}C$	-1.2	mA/°C
	Connection tempe	erature	Тj	125	°C
Storage	Storage temperature		T <sub>stg</sub>	-55 to +125	°C
Operating temperature		Ta	-40 to +85	°C	
Solderin	Soldering temperature (10 s)		T <sub>sol</sub>	260	°C
Dielectr less)	Dielectric strength (AC for 1 min with ambient humidity of 60% or less)		V <sub>I-O</sub>	2,500	V <sub>rms</sub>

**Note:** The output load current varies depending on the ambient temperature. Refer to *Engineering Data*.

### Recommended Operating Conditions

Item	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V <sub>DD</sub>			280	V
Forward current	I <sub>F</sub>	5.0	7.5	25	mA
Continuous load current	I <sub>O</sub>			100	mA
Operating temperature	Та	-20		65	°C

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

	Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Input	LED forward voltage	V <sub>F</sub>	I <sub>F</sub> =10 mA	1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =5 V			10	μA
	Capacity between terminals	CT	V=0, f=1MHZ		30		pF
Output	Current leakage when the relay is closed	I <sub>LEAK</sub>	V <sub>OFF</sub> =350 V			1	μA

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

ltem	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Maximum resistance with	R <sub>ON</sub>	I <sub>ON</sub> =120 mA, I <sub>F</sub> =5 mA		22	35	Ω
output ON		I <sub>ON</sub> =20 to 100 mA, I <sub>F</sub> =10 mA		26	40	

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

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Floating capacity between I/O terminals	C <sub>I-O</sub>	V <sub>S</sub> =0, f=1MH <sub>Z</sub>		0.8		pF
Insulation resistance	R <sub>I-O</sub>	$V_S$ =500, operating ambient humidity: $\leq 60\%$	5 x 10 <sup>10</sup>	1014		Ω
Dielectric strength	V <sub>I-O</sub>	AC for 1 min	2,500			V <sub>rms</sub>
		AC for 1 s in oil		5,000		
		DC for 1 min in oil		5,000		V <sub>dc</sub>

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

ltem	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Turn-on time	t <sub>ON</sub>	$R_L=200 \Omega$			1	ms
Turn-off time	t <sub>OFF</sub>	I <sub>F</sub> =10 mA (see note)			1	

Note: Switching Time Measuring Circuit



# **Engineering Data**



7.62±0.2

8.80

# Dimensions

Note: All units are in millimeters unless otherwise indicated. G3VM-W





Unit: mm Weight: 0.54 g

Note: "G3VM" is not printed on the actual product.

#### G3VM-WF



Unit: mm Weight: 0.54 g



Note: "G3VM" is not printed on the actual product.

# Precautions

#### Correct Use Recommended Operating Conditions

Use the G3VM under the following conditions so that the Relay will operate properly.

ltem	Min.	Туре	Max.
Operating LED forward current	5 mA	7.5 mA	25 mA
Releasing LED forward voltage	0 V		0.8 V

Note: Refer to page 48 for precautions common to all G3VM models.

Terminal Arrangement/ Internal Connections (Top View)



PCB Dimensions (Bottom View)



Terminal Arrangement/ Internal Connections (Top View)



Actual Mounting Pad Dimensions (Recommended Value, Bottom

View) <sub>2.54</sub>--+++-2.54



### Relay Incorporating a MOS FET Coupled with a GaAIAs Infrared LED

- Six-pin DIP package (Dual Inline Package)
- Low offset voltage when the Relay is OFF.
- Ideal for minute-signal scanning circuits and the subscriber circuits of digital telephone exchange systems for switching analog signals.
- Approved standards: UL1577 (File No. E80555)



# **Ordering Information**

### Appearance



Note: "G3VM" is not printed on the actual product

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick	Number per tape
SPST-NO	PCB terminals	60 VAC	G3VM-V	50	
	Surface-mounting terminals (see note)		G3VM-VF		1,500

Note: Surface-mounting terminal models are also available on tape.

### Model Number Legend



1. Load Voltage

V: Load voltage, 60 VDC or 60 VAC min.

# **Application Examples**

- Electronic automatic exchange systems
- Gauging control systems
- Data management systems
- Gauging systems

2. Terminal

F: Surface-mounting terminals None: PCB terminals

# G3VM-V(F)

# Specifications -

### General Specifications

- Output dielectric strength: 60 V min.
- Trigger LED current: 5 mA max.
- Continuous load current: 300 mA max.

- Output ON resistance: 2  $\Omega$  max.
- UL approval: UL1577, file number E80555
- Classification of trigger LED current: Ta of 25°C

Class name (see note)	Trigger LED	Marks on product	
	@ ION = 300 mA		
	Min.	Max.	
None		5	No marks

Note: Applicable product: G3VM-V and G3VM-VF

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

ltem			Symbol	Rating	Unit
Input	LED forward current		I <sub>F</sub>	50	mA
	LED forward current reduction rate (Ta $\ge$ 2	25°C)	$\Delta I_{F}^{\circ}C$	-0.5	mA/°C
	Repetitive peak LED forward current (100	μ <mark>s pulse, 100 pps)</mark>	I <sub>FP</sub>	1	А
	LED reverse voltage		V <sub>R</sub>	5	V
	Connection temperature		Tj	125	°C
Output	Output dielectric strength		V <sub>OFF</sub>	60	V
	Continuous load current (see note 1)	Connection A	I <sub>O</sub>	300	mA
		Connection B		450	
		Connection C		600	
	ON current reduction rate (Ta≧25°C)	Connection A	$\Delta I_{ON}/^{\circ}C$	-3	mA/°C
		Connection B		-4.5	
		Connection C		-6	
	Connection temperature		Tj	125	°C
Storage temperature			T <sub>stg</sub>	-55 to +125	°C
Operating temperature			T <sub>a</sub>	-40 to +85	°C
Soldering temperature (10 s)		T <sub>sol</sub>	260	°C	
Dielectric strength (AC for 1 min with ambient humidity of 60% or less) (see note 2)			V <sub>I-O</sub>	2,500	V <sub>rms</sub>

**Note:** 1. The output load current varies depending on the ambient temperature. Refer to *Engineering Data*.

2. Impose voltage between a group of pins 1, 2, and 3 and that of pins 4, 5, and 6.



### Recommended Operating Conditions

ltem	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V <sub>DD</sub>			48	V
Forward current	I <sub>F</sub>	7.5	15	25	mA
Continuous load current	I <sub>O</sub>			300	mA
Operating temperature	Та	-20		80	°C

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

	Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Input	LED forward voltage	V <sub>F</sub>	I <sub>F</sub> =10 mA	1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =5 V			10	μΑ
	Capacity between terminals	CT	V=0, f=1MHZ		30		pF
Output	Current leakage when the relay is closed	I <sub>LEAK</sub>	V <sub>OFF</sub> =60 V			1	μΑ

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

Item		Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Maximum	Connection A	R <sub>ON</sub>	I <sub>ON</sub> =300 mA, I <sub>F</sub> =10 mA		1.4	2	Ω
resistance with	Connection B		I <sub>ON</sub> =450 mA, I <sub>F</sub> =10 mA		0.7	1	
output on	Connection C		I <sub>ON</sub> =600 mA, I <sub>F</sub> =10 mA		0.35	0.5	

# ■ Insulation Characteristics (Ta = 25°C)

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Floating capacity between I/O terminals	C <sub>I-O</sub>	$V_{I-O}=0$ , f=1MH <sub>Z</sub>		0.8		pF
Insulation resistance	R <sub>I-O</sub>	$V_{I-O}$ =500 V, operating ambient humidity: $\leq 60\%$	5 x 10 <sup>10</sup>	1014		Ω
Dielectric strength	V <sub>I-O</sub>	AC for 1 min	2,500			V <sub>rms</sub>
		AC for 1 s in oil		5,000		
		DC for 1 min in oil		5,000		V <sub>dc</sub>

# ■ Switching Characteristics (Ta = 25°C)

ltem	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Turn-on time	t <sub>ON</sub>	R <sub>L</sub> =200 Ω			1	ms
Turn-off time	t <sub>OFF</sub>	I <sub>F</sub> =10 mA (see note)			1	

Note: Switching Time Measuring Circuit



# **Engineering Data**





# Dimensions

Note: All units are in millimeters unless otherwise indicated.

#### G3VM-V





Note: "G3VM" is not printed on the actual product.

#### G3VM-VF

Unit: mm

Weight: 0.4 g

Unit: mm

Weight: 0.4 g





Note: "G3VM" is not printed on the actual product.

# Precautions -

### Correct Use **Recommended Operating Conditions**

Use the G3VM under the following conditions so that the Relay will operate properly.

Item	Min.	Туре	Max.
Operating LED forward current	7.5 mA	15 mA	25 mA
Releasing LED forward voltage	0 V		0.8 V

Note: Refer to page 48 for precautions common to all G3VM models.



**Terminal Arrangement/** 

Internal Connections (Top View)



Anode Cathode

Drain D1

Drain D2

Source

1: 2: 4:

5:

6:

#### **PCB** Dimensions (Bottom View)



**Actual Mounting Pad Dimensions (Recommended** Value, Bottom View)



### Relay Incorporating a MOS FET Optically Coupled with an Infrared LED in a Miniature Out-line Package

- MOS FET of the output circuit has a high dielectric strength.
- Ideal replacement for the dial-pulse relay or hook relay of each modem or facsimile machine.
- Ideal for application to the line interface blocks of PBX and telephone exchange systems.
- Thin, flat, and extremely compact.
- Can be applied to hybrid IC circuits and card-type modems conforming to PCMCIA standards to make them even more compact and lightweight.
- Approved standards : UL1577 (File No. E80555)

# Ordering Information

## Appearance



Note: "G3VM" is not printed on the actual product

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick	Number per tape
SPST-NO	Surface-mounting terminals	350 VAC	G3VM-S2	100	2,500
	(see note)		G3VM-S3	75	

# Application Examples

- PBX subscriber interfaces
- Multi-functional telephones
- PC card modems

# Specifications

### General Specifications

- Output dielectric strength: 350 V min.
- Trigger LED current: 3 mA max.
- Continuous load current: 120 mA max. (connected to normally open contact)

- Card-type modems and fax modems
- Gauging systems
- Output ON resistance: 35  $\Omega$  max. (connected to normally open contact)
- Insulation resistance between I/O pins: 1,500 V<sub>rms</sub> min.



# ■ Absolute Maximum Ratings (Ta = 25°C) <G3VM-S2>

	Item	Symbol	Rating	Unit
Input	LED forward current	I <sub>F</sub>	50	mA
	Repetitive peak LED forward current (Duty: 1% max.; pulse-width: 100 μs max.)	I <sub>FP</sub>	1	A
	LED reverse voltage	V <sub>R</sub>	5	V
Output Output dielectric strength		V <sub>BO</sub>	DC or AC peak value: -350 to 350	V
			DC: 0 to 350	
	Continuous load current (see note 1)	l <sub>o</sub>	120	mA
	Dielectric strength between I/O terminals (AC for 1 min) (see note 2)	V <sub>I-O</sub>	1,500	V <sub>rms</sub>
Operating temperature (with no icing or condensation)		T <sub>a</sub>	-40 to 85	°C
Storage temperature (with no icing or condensation)		T <sub>stg</sub>	-55 to 125	°C
Soldering temperature (10 s)			260	°C

Note: 1. The output load current varies depending on the ambient temperature. Refer to Engineering Data.

2. The dielectric strength was checked by applying voltage between each pairing of input and output pins.

#### <G3VM-S3>

	ltem		Symbol	Rating	Unit
Input	LED forward current		I <sub>F</sub>	50	mA
	LED forward current reduction rate (Ta≧25°C)		∆ I <sub>F</sub> /°C	-0.5	mA/°C
	Repetitive peak LED forward cur (100 $\mu$ s pulse, 100 pps)	rrent	I <sub>FP</sub>	1	A
	LED reverse voltage		V <sub>R</sub>	5	V
	Input permissible loss		Pin	50	mW
	Connection temperature		Тj	125	°C
Output	Load voltage (AC peak)		V <sub>OFF</sub>	350	V
	Continuous load current (see	Connection A	I <sub>O</sub>	120	mA
	note 1)	Connection B			
		Connection C			
	Peak load current		I <sub>peak</sub>	0.35	А
	Output permissible loss		Pout	454	mW
	ON current reduction rate	Connection A	$\Delta I_{ON}/^{\circ}C$	-1.2	mA/°C
		Connection B			
		Connection C			
Total pe	rmissible loss		P <sub>T</sub>	504	mW
Dielectric strength between I/O terminals (AC for 1 min) (see note 2)		V <sub>I-O</sub>	1,500	V <sub>rms</sub>	
Insulation resistance (V <sub>S</sub> = 500; operating ambient humidity $\leq$ 60%)		R <sub>I-O</sub>	5 × 10 <sup>10</sup>	Ω	
Storage temperature		T <sub>stg</sub>	-55 to +125	°C	
Operati	ng temperature		Ta	-40 to +85	°C

Note: 1. The output load current varies depending on the ambient temperature. Refer to Engineering Data.

2. The dielectric strength was checked for each connection by applying a voltage between each pairing of pins 1, 2, and 3 and pins 4, 5, and 6.

Connection diagram

		$\begin{bmatrix} 1 & 6 \\ \hline \\ c \\ 2 & 5 \\ \hline \\ c \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 0 \\ c \\ c \\ c \\ c \\ c \end{bmatrix}$
Connection A	Connection B	Connection C

# ■ Electrical Characteristics (Ta = 25°C) <G3VM-S2>

ltem	Symbol	Minimum	Typical	Maximum	Unit	Measurement conditions	
Output ON resistance	R <sub>ON</sub>			35	Ω	I <sub>F</sub> =5 mA, I <sub>ON</sub> =120 mA	
Current leakage when the relay is closed	I <sub>LEAK</sub>			1.0	μΑ	V <sub>ON</sub> =V <sub>BO</sub>	
LED forward current	V <sub>F</sub>			1.3	V	I <sub>F</sub> =10 mA	
Capacity between input and output terminals	C <sub>I-O</sub>		0.8		pF	f=1 MHz	
Insulation resistance between I/O terminals	R <sub>I-O</sub>	5 x 10 <sup>10</sup>			Ω	V <sub>I-O</sub> =500 VDC	
Operating time	T <sub>ON</sub>			1	ms	$I_F$ =5 mA, V <sub>DD</sub> =20 V, R <sub>L</sub> =200 Ω (see note)	
Release time	T <sub>OFF</sub>			1	ms	I <sub>F</sub> =5 mA, V <sub>DD</sub> =20 V, R <sub>L</sub> =200 $\Omega$ (see note)	

Note: Switching Time Measuring Circuit



#### <G3VM-S3>

	Item		Symbol	Minimum	Typical	Maximum	Unit	Measurement conditions	
Input	LED forward voltage		V <sub>F</sub>	1.0	1.15	1.3	V	I <sub>F</sub> =10 mA	
Reverse current		I <sub>R</sub>			10	μA	V <sub>R</sub> =5 V		
Capacity between terminals		CT		30		pF	V=0, f=1MHZ		
Output Maximum res output ON	Maximum resistance with	Connection A	R <sub>ON</sub>		22	35	Ω	I <sub>ON</sub> =120 mA,	
	output ON	Connection B				25		I <sub>F</sub> =5 mA	
		Connection C				15			
	Current leakage when the re	elay is open	I <sub>LEAK</sub>			1	μA	V <sub>OFF</sub> =350 V	
Operating time		T <sub>ON</sub>		0.3	1	ms	R <sub>L</sub> =200 Ω V <sub>DD</sub> =20 V,		
Release time		T <sub>OFF</sub>		0.1	1	ms	I <sub>F</sub> =5 mA (see note)		
Floating	capacity between I/O termin	als	C <sub>I-O</sub>		0.8		pF	V <sub>S</sub> =0, f=1 MH <sub>Z</sub>	

Note: Switching Time Measuring Circuit



## Recommended Operating Conditions

<G3VM-S2>

Item	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V <sub>DD</sub>			280	V
Forward current	I <sub>F</sub>	5	7.5	25	mA
ON current	I <sub>ON</sub>			100	mA
Operating temperature	T <sub>opr</sub>	-20		65	°C

#### <G3VM-S3>

ltem	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V <sub>DD</sub>			280	V
Forward current	I <sub>F</sub>	5	10	25	mA
Continuous load current	I <sub>O</sub>			100	mA
Operating temperature	T <sub>opr</sub>	-20		65	°C

# **Engineering Data**



# Dimensions

G3VM-S2/S3 ·

Note: All units are in millimeters unless otherwise indicated.

#### G3VM-S2



Note: "G3VM" is not printed on the actual product.

Terminal Arrangement/ Internal Connections (Top View)



Actual Mounting Pad Dimensions (Recommended Value, Bottom View)





# Precautions

#### Correct Use Recommended Operating Conditions

Use the G3VM under the following conditions so that the Relay will operate properly.

ltem	Min.	Туре	Max.
Operating LED forward current	5 mA	7.5 mA	25 mA
Releasing LED forward voltage	0 V		0.8 V

Note: Refer to page 48 for precautions common to all G3VM models.

### Relay Incorporating a MOS FET Optically Coupled with an Infrared LED in a Miniature Flat Package

- MOS FET of the output circuit has a high dielectric strength.
- Ideal replacement for the dial-pulse relay or hook relay of each modem or facsimile machine.
- Ideal for application to the line interface blocks of PBX and telephone exchange systems.
- Thin, flat, and extremely compact.
- Can be applied to hybrid IC circuits and card-type modems conforming to PCMCIA standards to make them even more compact and lightweight.
- Approved standards : UL1577 (File No. E80555)

# Ordering Information

## Appearance



Note: "G3VM" is not printed on the actual product

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick	Number per tape
DPST-NO	Surface-mounting terminals (see note)	350 VAC	G3VM-SW	50	2,500

# Application Examples

- Electronic automatic exchange systems
- Multi-functional telephones
- Cordless telephones

# Specifications

- General Specifications
- Eight-pin SOP with two circuits (DPST-NO)
- Output dielectric strength: 350 V min.
- Trigger LED current: 3 mA max.

- Card-type modems and fax modemsPC card modems
- Continuous load current: 120 mA max.
- Output ON resistance: 35  $\Omega$  max.
- Insulation resistance between I/O pins: 1,500 V<sub>rms</sub> min.



# G3VM-SW

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

		Item	Symbol	Rating	Unit
Input	LED forward current		I <sub>F</sub>	50	mA
	LED forward current	reduction rate (Ta≧25°C)	$\Delta I_{F}^{\circ}C$	-0.5	mA/°C
	Repetitive peak LED	forward current (100 $\mu$ s pulse, 100 pps)	I <sub>FP</sub>	1	A
	LED reverse voltage		V <sub>R</sub>	5	V
	Connection temperature			125	°C
Output Output dielectric strength			V <sub>OFF</sub>	350	V
	Continuous load current (see note 1)	With current flowing to both channels simultaneously	IO	100	mA
		With current flowing to single channel only		120	
	ON current reduction rate	With current flowing to both channels simultaneously	$\Delta I_{ON} / ^{\circ}C$	-1.0	mA/°C
	(Ta≧25°C)	With current flowing to single channel only		-1.2	
	Connection temperat	ure	Тj	125	°C
Storage temperature			T <sub>stg</sub>	-55 to +125	°C
Operating temperature			T <sub>a</sub>	-40 to +85	°C
Soldering temperature (10 s)			T <sub>sol</sub>	260	°C
Dielectri less) (se	ic strength (AC for 1 m ee note 2)	in with ambient humidity of 60% or	V <sub>I-O</sub>	1,500	V <sub>rms</sub>

Note: 1. The output load current varies depending on the ambient temperature. Refer to Engineering Data.

2. Impose voltage between all input pins and output pins.

### Recommended Operating Conditions

ltem	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V <sub>DD</sub>			280	V
Forward current	I <sub>F</sub>	5	10	25	mA
Continuous load current	I <sub>O</sub>			100	mA
Operating temperature	T <sub>opr</sub>	-20		65	°C

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

	Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Input	LED forward voltage	V <sub>F</sub>	I <sub>F</sub> =10 mA	1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =5 V			10	μA
	Capacity between terminals	CT	V=0, f=1MHZ		30		pF
Output	Current leakage when the relay is open	I <sub>LEAK</sub>	V <sub>OFF</sub> =350 V			1	μΑ

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

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Maximum resistance with output ON	R <sub>ON</sub>	I <sub>ON</sub> =120 mA, I <sub>F</sub> =5 mA		22	35	Ω

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

ltem	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Floating capacity between I/O terminals	C <sub>I-O</sub>	$V_{I-O}=0$ , f=1MH <sub>Z</sub>		0.8		pF
Insulation resistance	R <sub>I-O</sub>	$V_{I-O}$ =500 V, operating ambient humidity: $\leq 60\%$	5 x 10 <sup>10</sup>	1014		Ω
Dielectric strength	V <sub>I-O</sub>	AC for 1 min	1,500			V <sub>rms</sub>
		AC for 1 s in oil		3,000		
		DC for 1 min in oil		3,000		V <sub>dc</sub>

# ■ Switching Characteristics (Ta = 25°C)

ltem	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Turn-on time	t <sub>ON</sub>	$R_L=200 \Omega$		0.3	1	ms
Turn-off time	t <sub>OFF</sub>	I <sub>F</sub> =5 mA (see note)		0.1	1	

**Note:** Switching Time Measuring Circuit



# **Engineering Data**



# Dimensions

Note: All units are in millimeters unless otherwise indicated.

#### G3VM-SW





Unit: mm Weight: 0.2 g

Note: "G3VM" is not printed on the actual product.







# Precautions -

# Correct Use

### **Recommended Operating Conditions**

Use the G3VM under the following conditions so that the Relay will operate properly.

Item	Min.	Туре	Max.
Operating LED forward current	5 mA	10 mA	25 mA
Releasing LED forward voltage	0 V		0.8 V

Note: Refer to page 48 for precautions common to all G3VM models.

# G3VM-SY

### Relay Incorporating a MOS FET Optically Coupled with an Infrared LED in a Miniature Flat Package

- Low offset voltage when the Relay is OFF.
- Ideal for minute-signal scanning circuits and the subscriber circuits of digital telephone exchange systems for switching analog signals.
- Approved standards : UL1577 (File No. E80555)



# **Ordering Information**

### Appearance



**Contact form** Terminals Load voltage Model Number per Number per (peak value) stick tape DPST-NO 60 VAC Surface-mounting terminals G3VM-SY 50 2,500 (see note)

# **Application Examples**

- Electronic automatic exchange systems
- Gauging control systems

- Data management systems
- Gauging systems

# Specifications

### General Specifications

- Eight-pin SOP with two circuits (DPST-NO)
- Output dielectric strength: 60 V min.
- Trigger LED current: 3 mA max.

- Continuous load current: 300 mA max.
- Output ON resistance: 2 Ω max.
- Insulation resistance between I/O pins: 1,500 V<sub>rms</sub> min.

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

	Item	Symbol	Rating	Unit
Input	LED forward current	l <sub>F</sub>	50	mA
	DC forward current reduction rate (Ta ≥ 25°C)	$\Delta I_{F}^{\circ}C$	-0.5	mA/°C
	Repetitive peak LED forward current (100 $\mu s$ pulse, 100 pps)	I <sub>FP</sub>	1	А
	LED reverse voltage	V <sub>R</sub>	5	V
	Connection temperature	Tj	125	°C
Output	Output dielectric strength	V <sub>OFF</sub>	60	V
	Continuous load current (see note 1)	I <sub>O</sub>	300	mA
	ON current reduction rate (Ta≧25°C)	$\Delta I_{ON} / ^{\circ}C$	-3.0	mA/°C
	Connection temperature	Tj	125	°C
Storage	temperature	T <sub>stg</sub>	-55 to +125	°C
Operatir	ng temperature	Ta	-40 to +85	°C
Solderin	ng temperature (10 s)	T <sub>sol</sub>	260	°C
Dielectri (see not	ic strength (AC for 1 min with ambient humidity of 60% or less) e 2)	V <sub>I-O</sub>	1,500	V <sub>rms</sub>

**Note:** 1. The output load current varies depending on the ambient temperature. Refer to *Engineering Data*.

2. Impose voltage between a group of the whole input pins and that of the whole output pin.

### Recommended Operating Conditions

Item	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V <sub>DD</sub>			48	V
Forward current	I <sub>F</sub>	5	10	25	mA
Continuous load current	lo			300	mA
Operating temperature	T <sub>opr</sub>	-20		65	°C

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

	Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Input	LED forward voltage	V <sub>F</sub>	I <sub>F</sub> =10 mA	1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =5 V			10	μA
	Capacity between terminals	CT	V=0, f=1MHZ		30		pF
Output	Current leakage when the relay is open	I <sub>LEAK</sub>	V <sub>OFF</sub> =60 V			1	μA

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

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Maximum resistance with output ON	R <sub>ON</sub>	I <sub>ON</sub> =300 mA, I <sub>F</sub> =5 mA		1.4	2	Ω

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

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Floating capacity between I/O terminals	C <sub>I-O</sub>	$V_{I-O}=0$ , f=1MH <sub>Z</sub>		0.8		pF
Insulation resistance	R <sub>I-O</sub>	$V_{I-O}$ =500 V, operating ambient humidity: $\leq 60\%$	5 x 10 <sup>10</sup>	1014		Ω
Dielectric strength	V <sub>I-O</sub>	AC for 1 min	1,500			V <sub>rms</sub>
		AC for 1 s in oil		3,000		
		DC for 1 min in oil		3,000		V <sub>dc</sub>

### Switching Characteristics (Ta = 25°C)

ltem	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Turn-on time	t <sub>ON</sub>	$R_L=200 \Omega$			2	ms
Turn-off time	t <sub>OFF</sub>	I <sub>F</sub> =10 mA (see note)			1	

Note: Switching Time Measuring Circuit



# **Engineering Data**



# Dimensions

Note: All units are in millimeters unless otherwise indicated.

#### G3VM-SY

Unit: mm Weight: 0.2 g



Note: "G3VM" is not printed on the actual product.

# Precautions -

## Correct Use

**Recommended Operating Conditions** Use the G3VM under the following conditions so that the Relay will operate properly.

Item	Min.	Туре	Max.
Operating LED forward current	5 mA	7.5 mA	25 mA
Releasing LED forward current	0 V		0.8 V

Note: Refer to page 48 for precautions common to all G3VM models.





### SSR for Switching Analog Signals, with an Insulation Value of 2.5 kVAC between Input and Output Terminals

- Switching minute analog signals.
- Linear voltage and current characteristics.
- Switching AC and DC.
- Ultra-highly sensitive and subminiature SSR assuring long life.
- Low ON-resistance.
- Low current leakage between output terminals when they are open.
- Surface-mounting-type models are also available.

# **Ordering Information**

### Model Number Legend:



#### 1. Load Voltage

- X: A load voltage of 60 VDC or 60 VAC (peak value)
  4: A load voltage of 400 VDC or 400 VAC (peak value)



G3VM-X/4(F)

2. Terminal

- None: PCB terminals
- F: Surface-mounting terminals

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick
SPST-NO	PCB terminals	60 VAC	G3VM-X	50
		400 VAC	G3VM-4	
	Surface-mounting terminals	60 VAC	G3VM-XF	
		400 VAC	G3VM-4F	

Note: Only available on stick.

# **Application Examples**

- Electronic automatic exchange systems
- Multi-functional telephones
- Cordless telephones
- Gauging systems

# Specifications —

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

	Item	Symbol	G3VM-X/-XF	G3VM-4/-4F	Conditions
Input	LED forward current	I <sub>F</sub>	20 mA		
	Repetitive peak LED forward current	I <sub>FP</sub>	40 mA		Duty: 50% max.; pulse width: 100 ms max.
	Excessive peak LED forward current	I <sub>FT</sub>	100 mA		Duty: 1% max.; pulse width: 0.2 ms max.
	LED reverse voltage	V <sub>R</sub>	3 V		
Output	Output dielectric strength (load voltage)	V <sub>BO</sub>	-60 to 60 V	-400 to 400 V	DC or AC peak value; AC connection (see note 1)
			0 to 60 V	0 to 400 V	DC; DC parallel connection (see note 2)
	Continuous load current (see note)	IO	500 mA	150 mA	AC connection (see note 1)
			650 mA	200 mA	DC parallel connection (see note 2)
	Peak load current	I <sub>OP</sub>	3.5 A	1.0 A	Pulse width: 100 ms max. per shot
	Output permissible loss	Po	425 mW		–5 mW/°C 40°C min.
Dielectri	ic strength between I/O terminals	V <sub>I–O</sub>	2,500 VAC		1 min VAC
Ambient	t temperature	Та	Operating: -40	)°C to +85°C	With no icing and condensation
Storage	temperature	Tstg	Storage: -55	5°C to +125°C	With no icing and condensation
Max. so	dering temperature and time		260°C		5 s

Note: The output load current varies depending on the ambient temperature. Refer to Engineering Data.

## ■ Characteristics (Ta = 25°C)

Item	Symbol	G3VM-X/-XF	G3VM-4/-4F	Conditions
Output ON resistance	R <sub>ON</sub>	0.7 Ω max. 10.0 Ω max.		AC connection $I_F = 10 \text{ mA}$ , $I_O = 500/150 \text{ mA}$ (see note 1)
		0.18 Ω max.	2.5 Ω max.	DC parallel connection $I_F = 10 \text{ mA}$ , $I_0 = 650/200 \text{ mA}$ (see note 2)
Switching current leakage	I <sub>LEAK</sub>	1.0 μΑ		$V_{F} = 0.8 \text{ V}, V_{0} = 60/400 \text{ V}$
LED forward voltage	V <sub>F</sub>	1.3 V min., 1.8	5 V max.	I <sub>F</sub> = 10 mA
Capacity between input and output terminals	C <sub>I-O</sub>	Approx. 1.0 pF		1 MHz
Insulation resistance between input and output	R <sub>I-O</sub>	1,000 MΩ min.		500 VDC
Operating time	t <sub>ON</sub>	1.4 ms max.	0.95 ms max.	I <sub>F</sub> = 10 mA (see note 3)
Release time	t <sub>OFF</sub>	0.1 ms max.		I <sub>F</sub> = 10 mA (see note 3)

Note: 1. AC Connection

2. DC Parallel Connection



# **Engineering Data**

### Reference Data



### OMRON



#### 39

Note: Mounting pad dimensions shown are a top view.

# **Dimensions**

Note: All units are in millimeters unless otherwise indicated.



Unit: mm

# **Precautions**

#### Correct Use **Recommended Operating Conditions**

Use the G3VM under the following conditions so that the Relay will operate properly.

2.54

2.54

Item	Min.	Туре	Max.
Operating LED forward current	5 mA	10 mA	20 mA
Releasing LED forward voltage	0 V		0.8 V

Note: Refer to page 48 for precautions common to all G3VM models.

G3VM-S5

# Slim 4-pin Relay Incorporating a MOS FET in a Miniature Out-line Package

- Ideal replacement for the dial-pulse relay or hook relay of each modem or facsimile machine.
- Ideal for application to the line interface blocks of PBX and telephone exchange systems.
- Can be applied to hybrid IC circuits and card-type modems conforming to PCMCIA standards.
- Uses SPST-NO contact-form and has a peak load voltage of 200 V.



# Ordering Information

### Appearance



Note: "G3VM" is not printed on the actual product

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick	Number per tape
SPST-NO	Surface-mounting terminals	200 VAC (DC or AC)	G3VM-S5	100	2,500

# Application Examples

- PBX subscriber interfaces
- Multi-functional telephones
- Gauging systems

- Built-in modems in personal computers
- Card-type modems and fax modems

# Specifications —

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

	Item	Symbol	Ratings	Unit
Input	LED forward current	۱ <sub>F</sub>	50	mA
	Repetitive peak LED forward current (Duty: 50% max.; pulse width: 100 $\mu s$ max.)	I <sub>FP</sub>	1	A
	LED reverse voltage	V <sub>R</sub>	5	V
Output	Output dielectric strength	V <sub>BO</sub>	DC or AC peak value: -200 to 200	V
			DC: 0 to 200	V
	Continuous load current (see note 1)	I <sub>O</sub>	150	mA
	Dielectric strength between I/O terminals (AC for 1 min) (see note 2)	V <sub>I–O</sub>	1,500	Vrms
Ambient ter	nperature (with no icing or condensation)	Та	-40 to +85	°C
Storage tem	Storage temperature (with no icing or condensation)		-55 to +125	°C
Soldering te	emperature (10 s)		260	°C

Note: 1. The output load current varies depending on the ambient temperature. Refer to Engineering Data.

2. The dielectric strength was checked by applying voltage between each pairing of input and output pins.

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

Item	Symbol	Minimum	Typical	Maximum	Unit	Measurement conditions
Output ON resistance	R <sub>ON</sub>			8	Ω	I <sub>F</sub> =5 mA, I <sub>ON</sub> =120 mA
Current leakage when the relay is closed	I <sub>LEAK</sub>			1.0	μΑ	V <sub>ON</sub> =V <sub>BO</sub>
LED forward voltage	V <sub>F</sub>			1.3	V	I <sub>F</sub> =10 mA
Capacity between I/O terminals	C <sub>I-O</sub>		0.8		pF	f=1 MHz
Insulation resistance between I/O terminals	R <sub>I-O</sub>	5 x 10 <sup>10</sup>			Ω	V <sub>I-O</sub> =500 VDC
Operating time	T <sub>ON</sub>			1.5	ms	I <sub>F</sub> =5 mA, V <sub>DD</sub> =20 V, R <sub>L</sub> =200 Ω (see note)
Release time	T <sub>OFF</sub>			1	ms	$I_{F}$ =5 mA, $V_{DD}$ =20 V, R <sub>L</sub> =200 Ω (see note)

Note: Switching Time Measuring Circuit



# Recommended Operating Conditions

ltem	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V <sub>DD</sub>		150	200	V
Forward current	I <sub>F</sub>	5	7.5	25	mA
Continuous load current	I <sub>O</sub>			120	mA
Operating temperature	T <sub>opr</sub>	-20		65	°C

# **Engineering Data**

### Reference Data



# Dimensions

Note: All units are in millimeters unless otherwise indicated.



**Note:** "G3VM" is not printed on the actual product.

Precautions

### Correct Use

#### **Recommended Operating Conditions**

Use the G3VM under the following conditions so that the Relay will operate properly.

Terminal Arrangement/ Internal Connections (Top View)



Actual Mounting Pad Dimensions (Recommended Value, Top View)



ltem	Min.	Туре	Max.
Operating LED forward current		1 mA	3 mA
Releasing LED forward voltage	0.1 V	0.9 V	

# G3VM-6(F)

# New Model with Dielectric Strength of 400 V and 5,000 V between Input and Output Terminals

- UL1577 (File No. E67349) pending approval.
- EN60065 (Recognition No. 8318) pending approval.
- EN60950 (Recognition No. 8319) pending approval.
- VDE0884 (Recognition No. 9850781) pending approval.



# **Ordering Information**

### Appearance



Note: "G3VM" is not printed on the actual product.

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick
SPST-NO	PCB terminals	400 VAC (DC or AC)	G3VM-6	50
	Surface-mounting terminals		G3VM-6F	50

Note: Only available on stick.

# **Application Examples**

- Electronic automatic exchange systems
- Gauging control systems

- Data management systems
- Gauging systems

# Specifications —

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

	ltem		Symbol	Ratings	Unit
Input	LED forward current		I <sub>F</sub>	30	mA
Repetitive peak LED forward current (Duty: 1% max.; pulse width: 100 $\mu$ s max.)		I <sub>FP</sub>	1	А	
LED reverse voltage		V <sub>R</sub>	5	V	
Output	Output dielectric strength (see note 2)	Connection A	V <sub>BO</sub>	DC or AC peak value: -400 to 400	V
		Connection B	V <sub>BO</sub>	DC: 0 to 400	V
		Connection C			
	Continuous load current (see	Connection A	I <sub>O</sub>	150	mA
	note 1)	Connection B		200	
		Connection C		300	
Dielectric strength between I/O terminals (AC for 1 min, operating ambient humidity $\leq$ 60%) (see note 2)		V <sub>I–O</sub>	5,000	Vrms	
Ambient temperature (with no icing or condensation)		Та	-40 to +85	°C	
Storage to	Storage temperature (with no icing or condensation)		Tstg	-55 to +125	°C
Soldering	temperature (10 s)			260	°C

Note: 1. The output load current varies depending on the ambient temperature. Refer to Engineering Data.

2. The dielectric strength was checked for each connection by applying a voltage between each pairing of pins 1, 2, and 3 and pins 4, 5, and 6.

Connection diagrar	n	
$\begin{bmatrix} 1 & 6 \\ \hline & 1 \\ \hline & 2 \\ \hline & 2 \\ \hline & 2 \\ \hline & 3 \\ \hline & 4 \end{bmatrix}$		
Connection A	Connection B	Connection C

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

Item		Symbol	Minimum	Typical	Maximum	Unit	Measurement conditions
Output ON resistance	Connection A	R <sub>ON</sub>			12	Ω	I <sub>F</sub> =10 mA, I <sub>ON</sub> =100 mA
	Connection B				6		
	Connection C				3		
Current leakage when t	the relay is closed	I <sub>LEAK</sub>			1.0	μA	V <sub>ON</sub> =V <sub>BO</sub>
LED forward voltage		V <sub>F</sub>	1.2	1.4	1.7	V	I <sub>F</sub> =10 mA
Capacity between I/O to	erminals	C <sub>I-O</sub>		0.8		pF	f=1 MHz
Insulation resistance b terminals	etween I/O	R <sub>I-O</sub>	5 x 10 <sup>10</sup>			Ω	V <sub>F</sub> =0, V <sub>0</sub> =0, V <sub>I-O</sub> =500 VDC
Operating time		T <sub>ON</sub>			1	ms	$I_F=10$ mA, $V_{DD}=20$ V, $R_L=200 \Omega$ (see note)
Release time		T <sub>OFF</sub>			1	ms	I <sub>F</sub> =10 mA, V <sub>DD</sub> =20 V, R <sub>L</sub> =200 Ω (see note)

Note: Switching Time Measuring Circuit



### Recommended Operating Conditions

ltem	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V <sub>DD</sub>			320	V
Forward current	I <sub>F</sub>	10	15	20	mA
ON current	I <sub>ON</sub>			150	mA
Operating temperature	T <sub>opr</sub>	-20		80	°C

# Engineering Data

### Reference Data



Duty ratio

# Dimensions

Note: All units are in millimeters unless otherwise indicated.

#### G3VM-6





Weight: 0.49 g

Note: "G3VM" is not printed on the actual product.

6 5 4

#### G3VM-6F

Unit: mm



Unit: mm

Weight: 0.49 g



Note: "G3VM" is not printed on the actual product.

# Precautions

#### ■ Correct Use Recommended Operating Conditions

Use the G3VM under the following conditions so that the Relay will operate properly.

Item	Min.	Туре	Max.
Operating LED forward current		1 mA	5 mA
Releasing LED forward voltage	0.1 V	0.5 V	

Terminal Arrangement/ Internal Connections (Top View)



Actual Mounting Pad Dimensions (Recommended Value, Top View)



Terminal Arrangement/ Internal Connections (Top View)



Actual Mounting Pad Dimensions (Recommended Value, Top View)



# Precautions

### 

Be sure to turn OFF the power when wiring the Relay, otherwise an electric shock may be received.

### 

Do not touch the charged terminals of the SSR, otherwise an electric shock may be received.

### Caution

Do not apply overvoltage or overcurrent to the I/O circuits of the SSR, otherwise the SSR may malfunction or burn.

### Caution

C-MOS

Be sure to wire and solder the Relay under the proper soldering conditions, otherwise the Relay in operation may generate excessive heat and the Relay may burn.

### **Typical Relay Driving Circuit Examples**



Transistor



Use the following formula to obtain the LED current limiting resistance value to assure that the relay operates accurately.

$$R_{1} = \frac{V_{CC} - V_{OL} - V_{F} (ON)}{5 \text{ to } 20 \text{ mA}}$$

Use the following formula to obtain the LED forward voltage value to assure that the relay releases accurately.

$$V_{F (OFF)} = V_{CC} - V_{OH} < 0.8 V$$

#### Protection from Surge Voltage on the Input Terminals

If any reversed surge voltage is imposed on the input terminals, insert a diode in parallel to the input terminals as shown in the following circuit diagram and do not impose a reversed voltage value of 3 V or more.

Surge Voltage Protection Circuit Example



# Protection from Spike Voltage on the Output Terminals

If a spike voltage exceeding the absolute maximum rated value is generated between the output terminals, insert a C-R snubber or clamping diode in parallel to the load as shown in the following circuit diagram to limit the spike voltage.

#### Spike Voltage Protection Circuit Example



#### **Unused Terminals**

Terminal 3 is connected to the internal circuit. Do not connect anything to terminal 3 externally.

#### Pin Strength for Automatic Mounting

In order to maintain the characteristics of the relay, the force imposed on any pin of the relay for automatic mounting must not exceed the following.



In direction A: 1.96 N In direction B: 1.96 N

#### Load Connection

Do not short-circuit the input and output terminals while the relay is operating or the relay may malfunction.

#### **AC Connection**



#### **DC Single Connection**



#### **DC Parallel Connection**



#### **Solder Mounting**

Maintain the following conditions during manual or reflow soldering of the relays in order to prevent the temperature of the relays from rising.

- 1. Pin Soldering
  - Solder each pin at a maximum temperature of 260°C within 10 s.
- 2. Reflow Soldering
  - a. Solder each pin at a maximum temperature of 260°C within 10 s.
  - Make sure that the ambient temperature on the surface of the resin casing is 240°C max. for 10 s maximum.
  - c. The following temperature changes are recommendable for soldering.



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

# Cat. No. K103-E1-3 In the interest of product improvement, specifications are subject to change without notice. OMRON Corporation

### Electronics Components Company

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Printed in Japan 1299-1M (1097) (A)